



CHANGING DEMAND: FLEXIBILITY OF ENERGY PRACTICES IN HOUSEHOLDS WITH CHILDREN

Interim Report

Findings from interviews with 44 family households

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GLOSSARY

Air conditioning	Refers to air conditioned <i>cooling</i> .
CAP	Consumer Advocacy Panel
Children	Occupants of households who are living with their parents or another guardian (usually 18 years old or less but sometimes older).
Family households	Households which include at least one parent and one dependent child 18 years or less.
ICTs	Information and communications technologies
IHD	In-home display
Parents	This term is used interchangeably with householders as all adult householders interviewed were also parents. The term 'parent' is also used in relation to other parenting arrangements such as step-parenting and occasionally for long term arrangements involving other people's children living in the home (e.g. overseas students).
Smart meter	Interval meter
Teenagers	Refers to children approximately 12-18 years old.
TOU	Time-of-Use (3-part); refers loosely to all tariff times as advertised in different Australian states or by different Australian retailers.
TV	Television
Young adults	Refers to children approximately 19-25 years old living in the home.
Young children	Refers to children approximately 8 years old or less.

SUMMARY

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 and dynamics have important implications for families' ability to participate in and adapt to electricity market reforms and demand management initiatives. This interim report presents findings from interviews with family households conducted for a one-year Consumer Advocacy Panel (CAP)-funded study titled '*Changing Demand: Flexibility of energy practices in households with children*'.

WHY STUDY FAMILY HOUSEHOLDS?

Family households are rarely considered a consumer group in their own right by energy advocates, companies or regulatory bodies. However, they represent 25% 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 contain children who may be more vulnerable to heat and cold than healthy adults.

STUDY AIMS

This is the first Australian study conducted on the flexibility of families' routines and their changing household practices. The project aims 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 engages with two of CAP's 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

This interim report presents the findings from in-depth interviews conducted with 44 family households in March-May 2014. Most interviews took place in participants' homes during the afternoon and early evening electricity peak period in Victoria and New South Wales. Interviews were conducted with 1 or 2 adult occupants (parents) in households containing one or more dependent children. Thirty-four per cent of the interviewed households (15 households) were classified as low-income.

The research adopts a social practice conceptual approach advanced by the authors in past research. This approach views electricity consumption as an outcome of participating in shared social practices which are routinely carried out.

The authors conducted a thematic analysis of the interviews. The analysis sought to emphasise the role, flexibility and changing routines of everyday life, centred on a series of key ‘activity domains’ which contribute to the majority of average and peak energy demand in Australian households. Additionally, the authors analysed what householders thought about electricity usage, bills, tariffs and market choices, and how these considerations intersected with or impacted on their everyday routines and practices.

FINDINGS

A fundamental change: having children and new priorities

Children’s needs came first in family households. The time available for personal ‘needs’ and interests was substantially restricted for parents as a result of competing demands on their time. Routines were reoriented around a series of new priorities:

- learning to look after children and be a good parent;
- providing children’s basic needs (e.g. feeding, clothing, bathing and putting to bed, and ‘healthy’ temperatures);
- educating and entertaining children;
- discipline, safety and wellbeing of children;
- caring for children with ‘high needs’;
- coping as a sole parent and/or managing shared parenting arrangements;
- managing injury, illness, and trauma in the family;
- managing exhaustion, mental health/ social isolation;
- encouraging family social interaction;
- housework (e.g. cleaning and tidying, grocery shopping, cooking);
- juggling paid work (including working from home) and study commitments;
- caring for/ accommodating elderly parents in the home;
- multi-tasking and forward planning activities; and
- household administration (e.g. managing finances, paying bills, home maintenance).

Role of routine in family life: managing time and competing activities

Family routines were coordinated around four approximate ‘activity periods’ throughout the day:

- Starting the day (rise-9am)— ‘like clockwork’;
- Morning to early afternoon (9am-3pm)— ‘get out of the house’ and/or ‘stay on top of things’;
- Afternoon to early evening (3-9pm) — ‘family peak period’ in most homes; and
- Late evening (after 9pm) — a ‘quieter time’.

The family peak period (3-9pm) correlated approximately with three-part Time-of-Use (TOU) tariff peak period. In households with young children the family peak period involved an intense and highly coordinated period of activity which normally occurred before dinnertime. This was referred to as ‘crazy time’, ‘arsenic hour’ and ‘feral o’ clock’ due to children’s challenging behaviour, children’s and parent’s tiredness, and the range of things to be done in family homes during this time.

Alongside routinised aspects of family life, ‘time gaps’ or short moments of time created when children were otherwise entertained or resting provided important opportunities for parents to carry out practices, such as putting on a load of washing. Multi-tasking and coordination of different activities was consistently used to try to ‘stay on top of things’ and reduce the possibility of ‘chaos’ in the home.

Parents worked towards creating 'down time' during the late evening activity period. This was time for parents (and young adults) to regroup, relax and do something for themselves or others (such as their workplace or a charity/ social group) after a busy day.

'Normal' disruptions and the flexibility of family routines

Amidst these day-to-day routines, regular and sometimes routine disruptions were also a normal part of everyday family life. Disruptions included events and conditions such as:

- illness and injuries;
- changing household members, *e.g.* guests and short-/long-term visitors;
- pregnancy and a new baby;
- relationship breakdown and changed parenting responsibilities;
- employment disruptions, *e.g.* loss or change of job, shift work;
- urgent work responsibilities;
- children's sport and other activities;
- car breakdown;
- school holidays;
- heatwaves;
- bushfires and evacuations (outer urban and regional households);
- power outages; and
- weather and seasonal variations.

Family households were very flexible and adaptable in response to these and other conditions and circumstances. Regular routines organised around the four activity periods would 'bounce back' (or sometimes carry on) following a normal disruption.

Changing activities in family households

Family households had experienced or were experiencing change in household practices across four activity domains which contribute to average and daily peaks in electricity demand:

- thermal comfort (heating and cooling);
- cleanliness and care (bathing, laundering, house cleaning and personal grooming);
- food provisioning (cooking, baking, snacking, hot drinks and food storage); and
- entertainment, work and study (TV viewing, ICT use)

Change occurred within each household as children aged and went through various stages of life development, and across the cohort of family households as new practice expectations emerged and changed with the introduction of new technologies, changing house design, increasing energy costs, and changing priorities.

Family practices held meanings which are distinct from how these practices are valued and performed in other types of households. In particular, family health, children's ongoing development, providing practical life skills, and enabling fun and socialisation were valued benefits which came from routinely carrying out practices across the activity domains. Young children's bathing, for example, provided social interaction between family members and ensured children were entertained and occupied before (or during) the 'crazy hour' and dinner. Children's bathing also created 'space' and time for parents to prepare the evening meal.

Key areas of change for family households included:

- the installation of household air-conditioning around the time of starting a family;
- increased use of heating and cooling appliances for children and families;
- adoption of new electric cooking appliances for increased convenience (*e.g.* Thermomix);

- increased time and energy spent on personal grooming for young adults (teenagers);
- increased food storage (refrigeration and freezing capacity) to support bulk-buy shopping (economy and convenience) and bulk cooking (to enable the provision of healthy food);
- importance of televisions for entertainment and occupying children;
- rapid changes in ICT use for young children, teenagers and parents for entertainment, schooling, communication and work; and
- changes in home occupancy including grandparents and overseas students living with the family on short- or long-term bases.

ICT practices was the biggest area of concern and rapid change for family households and many parents felt they had little 'control' over their children's usage. Parents' views about the potential health, social isolation and wellbeing impacts of their children spending prolonged screen time with ICT devices were often in conflict with the potential educational, development and communication functionalities these devices provided. These competing priorities and concerns took precedence over any energy concerns relating to ICT use and limited opportunities for parental intervention.

Housing and appliance arrangements, such as rental agreements, home renovations, old and new housing formats, and existing appliances, restricted householders' ability to change the energy use associated with some household activities.

Disengagement from electricity services and consumption

Electricity usage was not a key consideration in householders' everyday activities or priorities; this is despite rising electricity bills being a common concern or contributor to financial stress for family households. Where electricity usage was of interest to parents, most expressed limited capacity to control or monitor the consumption of their children. Most householders did not think there was much they could do to reduce their electricity consumption or bills further.

Most householders had very low levels of energy literacy and engagement. Few householders knew what a smart meter was or how it might be useful for the household. Several migrant households were more engaged in energy issues; they had practical experience in conserving resource use that helped them make changes to their routines. Most households felt unable to make appropriate choices about electricity tariffs and providers, and some were consciously disengaging from the current energy market focus on energy choices.

Flexibility and change for demand management

Most householders were confused or uncertain about their current electricity tariff. Most householders thought that electricity was cheaper at night even though most did not have a tariff with an off-peak rate. In order to take advantage of assumed off-peak rates, some households were already running the washing machine and/ or dishwasher in the late evening if practicable. Households that had already made adjustments (or disregarded further potential changes) to their routines had few practicable options for further flexibility if they changed to a TOU tariff.

Most family households were concerned about the financial impact of a TOU tariff on their household; however they discussed how changing their daily routines for a TOU tariff was impracticable or too hard. Other family priorities took precedence over financial savings. Some households were interested in potential cost savings and suggested they could shift some dishwashing and/ or laundering activities outside the peak time; however noise, convenience and other issues were a concern. In addition, the many changes that occur as part of family life (e.g. changes in numbers, ages and interests of children, and parents work patterns) potentially affected whether routines would be (or were) flexible where a TOU tariff applied. The financial outcome of a TOU tariff was particularly unpredictable because of this rapid change.

Householders were asked if they would respond to a 'peak alert' notification, where they would be asked to cut back their electricity use for a few hours during a critical peak period (the example given was in relation to a hot summer day). Most householders were willing to shift their routines in response to occasional peak alerts. They described concerns for the 'common good' and the need to work together for social benefits and to minimise negative impacts on the community or the health and wellbeing of others (distinct from personal financial gain or environmental benefits). Where householders had previously indicated that no family routines could be shifted during the TOU peak period, they often subsequently discussed major shifts that could take place in response to an occasional peak alert. Householders demonstrated their capacity to make these changes in other aspects of their everyday lives by discussing adaptations and innovations they had undertaken in their homes to reduce energy use.

DISCUSSION AND IMPLICATIONS

The findings suggest that current consumer demand management and engagement activities need to go beyond individually motivating family households to save money, protect the environment, or make better choices in the electricity market. Electricity usage was not a priority for family households in relation to their day-to-day activities; instead health and wellbeing, convenience, entertainment and development/ life skill opportunities and coping with family pressures were key concerns. While family households depended on routines and had little capacity to reorganise the family peak period (TOU peak period) or other activity periods, they were adaptable and inventive, and regularly shifted routines in response to normal disruptions.

Peak alerts, framed as a natural event or an 'exceptional circumstance' that benefits a common good and assists reliable and affordable access to electricity, is a potentially agreeable and productive strategy for engaging families to reduce energy use at times of peak demand.

NEXT STEPS

This interim project report communicates preliminary findings from the first stage of the *Changing Demand* project. Findings will be discussed with advocacy organisations in two forums held in Victoria and Sydney in August 2014. Findings will also be used to design a survey for family households, to be conducted in the second half of 2014. A final project report, including discussion of possible protections to benefit this consumer group, will be released in January 2015.

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1 INTRODUCTION

The Consumer Advocacy Panel (CAP) 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:

- **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?

This interim report for the *Changing Demand: flexibility of energy practices in households with children* project investigates the above two priorities in relation to households with children (also referred to as ‘families’ or ‘family households’) through an analysis of 44 in-depth interviews conducted with Victorian and New South Wales (NSW) households.

1.1 FAMILY HOUSEHOLDS AND ELECTRICITY MARKET REFORMS

Families represent 25 per cent of Australian households (ABS 2013). 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 (ABS 2013);
- have reduced family income (ABS 2013);
- 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.

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 adopting 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 Time-of-Use (TOU) tariffs have been introduced in some Australian states both on choice-based (opt-in) and default bases. In Victoria, TOU tariffs (or ‘flexible pricing’) are presented to household consumers as a measure to:

‘provide [households] with more choice and control over [their] power bill. Flexible pricing provides an incentive to use power outside of peak times, reducing the need for expensive energy infrastructure upgrade costs to be passed on to all consumers.’ (SGOV 2014)

Three-part TOU tariffs consist of ‘peak’, ‘shoulder’ and ‘off-peak’ rates which apply at different times of the day (see Figure 3 for an example) with the peak rate applying to weekday afternoons and early evenings (approximately 3-9pm, allowing for some state and retailer variation).

Preliminary energy use profile data from AGL indicated that TOU tariffs are likely to have different outcomes for different groups of consumers (Simshauser 2014). This data suggested 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 were predicted to be financially worse off on a TOU tariff if they did not shift some energy practices

to cheaper periods of the day. Larger households with children are also disproportionately likely to be at risk of disconnection (Simshauser 2012). This makes understanding the flexibility of practices and routines in family households an especially important concern.

1.2 CONCEPTUAL APPROACH AND STUDY SCOPE

This research is informed by theories of social practice (Shove et al. 2012) and sociological understandings of routine, flexibility and timing in everyday life (Southerton 2003, 2007). Social practice theories understand consumption as a 'moment' or outcome of participating in socially-shared practices, such as laundering, bathing, cooking or home cooling (Warde 2005). This conceptual approach follows the authors' past research on energy demand (Nicholls and Strengers 2013; Strengers 2013), and other international research investigating energy demand as an outcome of interwoven social practices (Powells et al. 2014; Walker 2014). Rather than investigating individuals' attitudes or behaviours, the study is focused on practices routinely performed in and around the home that consume energy (also referred to as 'energy practices' and 'household practices').

In addressing the first key CAP priority regarding changing demand profiles, this project investigates the practices of family households across four activity domains, where the majority of energy consumption and peak electricity demand is produced (Petchey 2010):

- thermal comfort;
- cleanliness and care;
- food provisioning; and
- entertainment, work and study.

In addressing the second priority regarding tariff design, the project investigates the timing and coordination of daily routines, and how these routines are already regularly disrupted and shifted to other times of the day. The project also seeks to understand the flexibility (or otherwise) of practices in family households in relation to various conditions and events, including TOU tariffs. Findings are intended to inform discussion about changing energy demand and the potential impacts of time-based pricing in family households.

Additionally, the project investigates 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.

1.3 OUTLINE OF REPORT

This interim report presents findings from 44 in-depth interviews with households in Victoria and NSW which comprise the first stage of the *Changing Demand* project. The report is organised as follows. Section 2 outlines the methodology, including recruitment, methods and analysis; and participant characteristics. Section 3 outlines the findings and key insights relating to:

- changing family priorities, the role of routine in everyday life, and disruption to family household routines (Sections 3.1, 3.2 and 3.3);
- household activities and change in four main areas of household energy use (Section 3.4);
- householder engagement with electricity services and consumption (Section 3.5); and
- flexibility and change for demand management (Section 3.6).

The report concludes with a summary of the initial research implications for family households which provides a basis for communication and consultation with consumer advocacy organisations. The next stage of the *Changing Demand* project will deliver a national survey which builds on the findings in this report. A final report will be issued in January 2015.

2 METHODOLOGY

2.1 METHODS, RECRUITMENT, AND ANALYSIS

The *Changing Demand* project employs mixed methods. The findings presented in this report draw on the first stage of research, which involved in-depth interviews and home tours with households. This qualitative research provides thematic depth and is useful for identifying connections, contradictions and complexities in family households which are relevant to how energy practices are changing in family homes, and how they are organised and coordinated around specific time periods during the day. Emerging trends and issues from the interviews and home tours will inform the national survey conducted later in 2014 as part of this project.

Interview participants were recruited via posters, paper and electronic flyers, email, through the project website (<http://familyenergystudy.net>), social media, and 'snowballing' (Robson 2002). Avenues for distribution of recruitment information included maternal/child health and childcare centres, schools, community centres, sports centres and events and libraries located in the suburbs of Melbourne and Sydney, and towns in regional Victoria. Recruitment was assisted by key organisations that provide services for families including social service agencies. Participants were offered a \$50 Coles/Myer gift voucher for their participation in line with best practice social research, and to avoid a strong environmental or altruistic bias in the sample.

Interviews were conducted with 44 households (10 in Melbourne; 12 in regional Victoria; and 22 in Sydney and the Blue Mountains area). The main criteria for inclusion in the study were having at least three people living in the home and at least one child 18 years of age or younger. Interviews included one or more adults from each household (children were also involved in some homes) and were conducted between March-May 2014 by one or two of the authors. Participant observation was used to assess a range of non-verbal responses and reactions including hostility, humour, uncertainty and confusion, as well as to understand the dynamics between participants in the same household. A demographic questionnaire was completed by all participants. Interviews were semi-structured and conducted as an open-ended conversation between the researcher(s) and participant(s) with interview questions being used as a guide through the interview topics (see Appendix). The order, wording, and inclusion of questions were adapted to the householders being interviewed, taking into consideration their answers and understandings, the flow of conversation, and participant observations. Two interviews were conducted via an interpreter.

The researchers engaged householders in discussion on the following topics:

- Practices carried out during 'peak times' (broadly defined as 2-9pm weekdays, allowing for some variations in NSW and Victoria), focusing on the main household activity domains which comprise the majority of energy consumption and peak electricity demand in households: thermal comfort; cleanliness and care; food provisioning; and entertainment, work, and study (Petchey 2010);
- Everyday running of the household, priorities, and management of energy use.
- Daily routines and routine disruptions;
- Changes in appliance ownership and usage over recent years (specifically since having children);

- Experiences with electricity bills and recent electricity market reforms;
- TOU experience (TOU households); and
- TOU interpretations and potential opportunities for flexibility (non-TOU households)¹.

Where feasible, interviews were conducted at participants' homes during 'peak' times of the day (according to proposed or existing TOU tariff structures), and included a tour of the home and its immediate surrounds. This approach allowed researchers and participants to jointly experience, investigate and discuss current and emerging routines and practices that use energy in the home.

Site visits were between one and two hours in length. Interviews were voice recorded, data were professionally transcribed, and transcripts were thematically analysed using the qualitative software analysis program NVivo. Consistent with a qualitative research methodology, the sample is not statistically representative but seeks to investigate and identify emerging themes in-depth. The sample size is consistent with the number of cases expected to achieve data saturation in qualitative research, where no new themes emerge despite continuing data collection (Morse & Richards 2002).

This study has approval from RMIT University's Human Ethics Committee and all research has been conducted in accordance with RMIT University's human ethics guidelines. All participants have been de-identified with pseudonyms throughout this report. Direct quotations are represented in italics and are included verbatim to retain the conversational style of the interview. 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 in the data tables are limited to an illustrative selection for each theme except where additional quotes provide further breadth or depth of findings, or offer new insights.

This study investigates the energy practices and routines that use energy in family households and how they are changing. As such, practices are usually discussed without reference to their relevant 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 it played a key role in the timing or performance of practices or was relevant to trajectories of change that may affect peak electricity consumption in family households.

¹ Where householders were unfamiliar with TOU tariffs the concept was briefly described as involving: three different electricity prices on weekdays; weekday electricity more expensive in 2-8pm or 3-9pm 'peak' period; weekday electricity less expensive in the 'off-peak' 10pm to 7am period (allowing for differences between NSW and Victoria); little change to weekday electricity prices at other times of weekdays ('shoulder' period); and 'peak' period at 'shoulder' rate on weekends. The actual rates in each period were not included in the description but approximate rates were provided by the researchers if the householder asked. The focus of the discussion was then directed to householder interpretations of the concept and how the TOU tariff might affect what households did in the late afternoon/early evening weekday (peak) period.

2.2 PARTICIPANT HOUSEHOLDS

Forty-four interviews were conducted with 50 participants (not including occasional participation by participants' children) living in metropolitan Melbourne, regional Victoria, Sydney and the Blue Mountains region. Victorian households lived in the following local government areas: Darebin; Wyndham; Moonee Valley; Kingston; Moreland; Port Phillip; Yarra; Cardinia; Greater Geelong; Macedon Ranges; Mount Alexander Shire; and Yarra Ranges (22 households). NSW households lived in the following local government areas: Bankstown; Kogarah; Marrickville; Hurstville; Randwick; Rockdale; and Blue Mountains (22 households).

A summary of participants and household characteristics is provided in Table 1. The age of participants ranged from 25-54 and the median age range of participants was 35-44. The ages of dependent children ranged from two months to 22 years. Household composition was predominantly couples with dependent children, but participant households included sole parents with children, step-families, 'blended families', and extended families, reflecting trends towards more diverse family forms (Qu and Weston 2013). Nine participants were sole parents. The number of household occupants ranged from 2-9 persons — one household with only two occupants (1 child) was included as the only social housing occupants. The average size of households was 4.1 occupants, compared to the Australian average of 2.57 (ABS 2013a) and the number of children living in the home ranged from 1 to 7 (average across sample = 2.0). Participants were predominantly mothers (86%) as few fathers volunteered to be interviewed.

Twenty-one participants (42%) were migrants which is higher than the Australian average (26%); however migrant resident rates are higher in urban centres such as Melbourne (35%) and Sydney (39%) (ABS 2014). In addition, some of the Sydney areas from which TOU tariff households were recruited have a higher proportion of migrant households (*e.g.* 62% migrants in Bankstown government area, ABS 2012). More migrants were from China (8 households) than any other country which is also reflective of the migrant population in this area of Sydney. Length of Australian residence for migrant participants ranged from 1 to 40 years.

Seventy-three per cent of households interviewed owned their home (with or without a mortgage) which is approximately reflective of the broader pattern of housing tenure in Australia (67% home ownership) (ABS 2012). Fifteen households (34%) were low-income/ Healthcare card holders which approximately met the recruitment target (35% low-income households). Thirty-two households (73%) provided their annual household income. Median household annual incomes for these households were in the range AU\$67,700-83,200. In comparison, the average annual income for full-time working adults in Australia is AU\$77,932 and the median income for couple families with children and two incomes in Australia, is AU\$104,000 or more (ABS 2013a, 2013b). Thirty-six (82%) householders had completed a university, TAFE or trade qualification which is higher than average for 25-64 year olds in Australia (64.1%) (ABS 2012).

The research aimed to include 12 households that were on a Time-of-Use (TOU, 3-part) tariff. Recruitment of TOU tariff households was targeted to the Southern and Canterbury-Bankstown areas of Sydney. However, consistent with the authors' previous research (confidential), householders were often unfamiliar or misunderstood their tariff (see Section 2.3 and 3.6.1). Eight households were confirmed as being on a TOU tariff (through citation of their bills) and six household's tariff type could not be confirmed but their responses suggested that they may be on a TOU tariff.

Table 1 Summary of participant / household characteristics

CHARACTERISTIC	DETAILS
Gender and parenting arrangements	<ul style="list-style-type: none"> • 43 women, 7 men • Most interviews were with mothers only; 1 interview with the father only (full-time stay-at-home parent); 6 interviews with both parents but in most cases 2nd adult participated intermittently • 9 interviews with sole parents (all mothers)
Dwelling and occupancy	<ul style="list-style-type: none"> • 35 detached homes; 2 semi-detached; and 7 apartments • Household size ranged from 2-9 occupants (average = 4.1) • Number of children ranged from 1-7 (average = 2.0) • 3 households included long-term students unrelated to the family; 5 households permanently included grandparents or unrelated adults; and another 5 households often had long-term guests
Age ²	<ul style="list-style-type: none"> • Adult participants: 13 participants 25-34 years old; 22 participants 35-44 years old; and 9 participants 45-54 years old • Children: 4 children <1 year old; 11 children 1-2 years old; 19 children 2-4 years old; 33 children 5-11 years old; 20 children 12-18 years old; and 2 children >18 years old
Education level and work ¹	<ul style="list-style-type: none"> • 26 university/college; 10 TAFE/Trade; 4 Year 12; and 4 Year 10 • 17 home-maker/not working; 6 working full time; 15 part-time; and 6 casual • Various work types
Cultural diversity	<ul style="list-style-type: none"> • 21 (42%) participants were born outside Australia • Migrant countries of origin were China (8), United Kingdom (4), Germany (2), France, Ireland, Russia, Lebanon, Egypt, Vietnam and Brazil (1 each) • 15 participants had migrated to Australia in the last 10 years • English was not the first language for 15 participants
Financial situation	<ul style="list-style-type: none"> • Median annual household income range was AU\$67,700-83,200 • 15 households (34%) had concession/ Healthcare cards • 3 households without concession cards were financially stressed (self-defined and confirmed by researchers' assessment)
Tenure	<ul style="list-style-type: none"> • 12 households (27%) were renting (1 public rental) • 32 households (73%) were owner occupiers (with or without a mortgage)
Energy sources	<ul style="list-style-type: none"> • 9 households did not have reticulated gas or did not use bottled gas • 17 households did not have gas heating • 5 households had solar photovoltaic panels
Motivations for participating in research / environmental interest	<ul style="list-style-type: none"> • Reasons to participate included: receive the voucher; contribute or learn something; because they were asked; curiosity; or wanted to use less energy • 18 participants expressed environmental concerns but about half of these had limited understanding of appliance energy consumption/ energy literacy • No obvious environmental bias across the sample

² Figures for primary interviewee from each household

2.3 LIMITATIONS AND EXCLUSIONS

The interview sample size was designed to uncover potentially important insights from family households in New South Wales and Victoria, as opposed to measuring the frequency of a particular view or action. However, as with all research, the validity of the findings may be influenced by certain sections of the population self-selecting out of or into the project. Notably, the sample does not include parents under 25 years old, (which may in part reflect the wider social trend of delaying starting a family until later), and only one household lived in social housing.

There was a very low rate of participation by fathers which was anticipated by the research team because locations to recruit households with children are more frequently attended by mothers (*e.g.* childcare centres). In addition, some mothers who are not in full-time work may have greater flexibility to arrange an interview. Other research about 'electricity' or 'energy' issues conducted by the authors has attracted more male participants, and some of the representation difference seen in this study may also reflect the research team's recruitment focus on 'household activities' instead of energy. Previous research indicates that many of the energy practices of interest in this study (*e.g.* cooking, cleaning and washing), are predominately performed by women in Australian family households, and as such their experiences of how and when these practices are performed are important and underrepresented in past research (Strengers 2011; 2013). However, 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.

Investigation of the actual change in energy consumption of participant households was outside the scope of this study. The research team (and often householders) did not have access to historic household consumption data.

Some households did not provide definitive information about their current electricity tariff (*e.g.* TOU tariff, or other off-peak, flat-rate/ inclining block tariff). This was due to a combination of householder uncertainty and/or lack of easy and timely access to a recent electricity bill. Therefore the exact number of participant households who were on a TOU tariff is unknown. Eight households were confirmed to be on a TOU tariff, and another six households were possibly on a TOU tariff. Householder uncertainty about their tariff is both an important finding and limitation of this research. Future work with households on TOU tariffs may require access to customers through an electricity provider to confirm actual tariff arrangements.

Householders without post-school level educational qualifications were underrepresented in this study. In addition, there were no participants who identified as Aboriginal or Torres Strait Islander and some significant migrant populations were not represented.

Interviews were conducted in the autumn months (March-May). As such, observations regarding heating, cooling and lighting were limited to milder temperatures and medium-low daylight hours compared to what households experience at other times of the year. However, thermal comfort and other activities in summer and winter were discussed with householders.

Although beyond the scope of this study, family households living in northern parts of Australia with warmer climates are not represented. Findings relating to thermal comfort (particularly cooling), drying clothes and other seasonally-dependent activities are expected to differ for these households. Further research with family households in hotter regions of Australia is needed to complement this study.

3 FINDINGS

3.1 A FUNDAMENTAL CHANGE: HAVING CHILDREN AND NEW PRIORITIES

'Your life changes completely.' Cass

Starting a family is a fundamental change in most people's lives that significantly disrupts existing household practices, and the energy demand these produce. This section summarises the key changes that occurred in householders' lives when starting a family (see Table 2), and the current priorities of family households (see Table 3).

Two overarching priorities for parents were evident from the interviews:

- doing what's best for their children; and
- managing limited time and many activities (time efficiency and convenience).

Table 3 provides a more detailed catalogue of priorities for parents' time and attention at home.

In contrast, energy use was not identified as a key consideration amidst the busyness of everyday life and the many things that needed to 'get done' in family households. Similar findings have been reported in recent UK research conducted on energy use in family households (Fell et al. 2014).

Table 2 Key changes in householders' lives when starting a family

KEY CHANGE	ILLUSTRATIVE QUOTES
<ul style="list-style-type: none"> • Increased time pressures and 'work' 	<p><i>'Everything always takes longer than you think so really, an hour, it just goes like that.'</i> Peta</p> <p><i>'Workload! [laughing] - time and work, yes, [life]'s just "denser".'</i> Lily</p> <p><i>'[With a young child] the time is eaten up. There's always something you need to prepare for the next thing and even for yourself as well, you care for them, giving them their food and then you eat and by the time you eat it's probably, and then you have a shower and then it's almost cooking time for them again, and then the cycle of things that you need to do.'</i> Susie</p>
<ul style="list-style-type: none"> • Reduced time and attention for personal needs 	<p><i>'It's 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.'</i> Briony</p> <p><i>'Very little spare time. [Laughing] Expensive. Yes. And that my husband and I are on the backburner. Our wants and needs come last. Everyone else's come first.'</i> Lindy</p> <p><i>'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.'</i> Jill</p> <p><i>'I haven't had time to get myself in order.'</i> Mel</p>
<ul style="list-style-type: none"> • Increased emotional and financial pressure, exhaustion 	<p><i>'Stressed..., the negative emotions sometimes hurt.'</i> Jasmin</p> <p><i>'Much more busy and more pressure...not only the financial pressure, also the time. Because I'm working so it's very difficult to keep the balance, the family and the work... some time I feel very tired.'</i> Rui</p>

Table 3 Priorities for parents' time and attention at home

PRIORITY	ILLUSTRATIVE QUOTES
Learning to look after a baby and be a good parent	<i>'I was very young, just 23 years old, and I was still a girl, not like a woman. I [didn't] know how to look after [my child]... I had to learn, like study.'</i> Hua
Providing children's basic needs, e.g. feeding, clothing, bathing and putting to bed	<i>'Once the kids come home then I'm usually into snacks and that sort of thing...homework as soon as we've sort of had snacks ... a bit of a play outside for the kids and I'll think about dinner then ... help with homework and then get organised to go to sport. So it'll be a bit of driving around. And then come home pretty much they jump in the shower while I get the dinner on...once they're out then we clean up... we do stories...and off to bed for them.'</i> Kylie
Educating and entertaining children	<i>'I just can't sit there while [my son]'s playing...I feel like he's not getting the interaction... I think it's important to do interaction or take him out, entertain him.'</i> Cass
Discipline, safety and wellbeing of children	<i>'It requires, you know, effort [to say no]. ... [My daughter] asks for something...I don't think it's going to be good for her, and she just keeps asking, I just have to... go, "No, no, you can't".'</i> Renae
Caring for children with 'high needs'	<i>'Because [my son]'s got Asperger's, he's got high needs...if I can respond to their needs quickly, there's less stress, because [my son] doesn't handle waiting very well.'</i> Briony
Coping as a sole parent and/or managing shared parenting arrangements	<i>'I will work until the end of May [then] I will take maternity leave. So, I start to worry... My husband [lives] in China... He hasn't got the visa at the moment.'</i> Rui
Injury, illness, loss and trauma in the family	<i>'I broke my leg...I couldn't do everything, or I couldn't pick up after them.'</i> Helen
Managing exhaustion, mental health/ social isolation	<i>'Sometimes I will not talk to 'grown ups' for, not days like it is when you've got a newborn, but...the only grown up interaction will be saying hello to the kindy teacher... it's not having a conversation.'</i> Briony <i>'Sometimes I don't feel that well because now [I] have two children and have a lot of the stress.'</i> Song
Family social interaction	<i>'I couldn't imagine not having my family by the table and hearing about everyone's days and laughing and chuckling, and it's noisy and it's fun.'</i> Lindy
Housework, e.g. cleaning and tidying, grocery shopping, cooking	<i>'I'll go round, tidy the lounge room, make the bed, put a load of washing on, do all that sort of stuff... it feels to me like housework is completely endless.'</i> Lily
Juggling paid work (work from home) and study commitments	<i>'I'm going to TAFE, studying... [My husband]'s studying accounting too.'</i> Mona
Caring for/accommodating elderly parents in the home	<i>After I pick [my daughter] up I will go to do some shopping and then come back home, it's about 4pm and then yeah I start to cook because my father...he cannot cook.'</i> Rui

PRIORITY	ILLUSTRATIVE QUOTES
Multi-tasking and forward planning activities	<i>'I keep in mind all the time, "what I'm going to cook tomorrow" and "anything important I need to do tomorrow", maybe pay bills or something like that, until I go to bed... anything I forget, anything I need to remember.'</i> Naomi
Household administration, e.g. managing finances, paying bills, home maintenance	<i>'We're trying to make a point of not kind of over-extending ourselves and also to make sure that the bills kind of get paid.'</i> Neil

Key Insight

Starting a family is a fundamental change in people's lives which reorganises priorities around doing what's best for children and managing time and competing activities.

3.2 ROLE OF ROUTINE IN FAMILY LIFE: MANAGING TIME AND COMPETING ACTIVITIES

Routines play the role of creating 'a secure and livable everyday life, where we are not compelled to do the overwhelming task of reflecting on every single act' (Gram-Hanssen 2008: 1182). Parents described how daily and weekly routines were needed to ensure things 'get done'. Routines also enabled families to manage the fluctuating and unpredictable aspects of family life, and provided structure and security for children to help manage their behaviour and benefit wellbeing.

'[We are] consciously creating routines because... it's just sort of to ensure that everything gets done.' Peta

'Routine is my saviour...it makes after school "do-able".' Mel

'Consistency helps [the children] understand our expectations of them. Because they're home life is very different [at their father's house] to when they're [living with us], so keeping routine makes it much more predictable for them, so easier for them to settle. But also when it comes to meals and things, it's easier for us....' Kim

This section discusses: (i) four interconnected routinised 'activity periods' structured around different times of the day; (ii) the coordination of the afternoon peak around 'crazy time'; (iii) the use of 'time gaps' to coordinate routines and avoid 'chaos' and; (iv) the creation of 'down time' in the evening.

3.2.1 Activity periods throughout the day

There were clear routines and rhythms to the practices performed throughout the day. Figure 1 outlines four interconnected daily time periods around within which most household practices were coordinated. Time periods are approximate and varied between households. These four time periods do not directly align with TOU tariffs; however, the family peak period is approximately aligned with the TOU tariff 'peak' period (particularly in Victoria, see Figure 2 and Figure 3). Most of the households interviewed were not currently on a TOU tariff (see Section 2.2).

Figure 1 Summary of activity periods throughout the day

Starting the day (rise-9am) — 'like clockwork'

- A busy and highly routinised time particularly for households with children going to school or childcare.
- Activities were oriented around getting everyone clothed and fed, lunches prepared, etc.
- Due to the 'time squeeze' experienced during this period (Southerton 2003), parents often eliminated any activities that could be left to another period of the day, e.g. putting washing on.

'There is no time in the morning, let me tell you...I get them up and they're bleary eyed...they make their breakfast, and I'm making them their lunches... by the time we leave here it's 8:45am and there is no second to spare so having a shower is not feasible...everything has to be done like clockwork... it can be hectic...We do get to school on time.' Holly

Morning to early afternoon (9am - 3pm) — 'get out of the house' and/or 'stay on top of things'

- Most homes were empty for most of this period on most days (subject to weather, health etc.) – both employed and most non-working parents left the home (except parent(s) working from home).
- Most parents with pre-school age children (except some with young babies) left the home for activities such as play groups, walking/ playing in the park, and exercise.
- Shopping and other activities were done to prepare for the family peak period later in the day.
- When at home during some of this period, parents with small children sought to get housework done by utilising time gaps (see Section 3.2.3 below) where their children were occupied or having a nap (this strategy also applied to other parts of the day).

'We do something every morning...I think it's better to get out the house and do something and I find the girls are, they're happy enough but if you leave it until about half 10, then they start to climb the walls and then, you know, they really need something more.' Peta

Afternoon to early evening (3pm - 9pm) — family peak period in most homes

- This highly routinised time of day followed family members' return home from morning activities or work.
- Children were picked up, dropped off to various sports/ other activities.
- A large range of activities in the home were coordinated including housework, homework, 'crazy time' for children (see below), the evening meal and clean up, bath-time, planning and organising, children's chores, TV/entertainment, family social interaction, reading to children, and putting children to bed.

'[I] walk in the door, run the bathtub, and while I'm running the bathtub I start to get dinner ready.' Kelly

Late evening (after 9pm) — a 'quieter' time

- Parents were tired but catching up on housework that hadn't been done or preparing for the next day, e.g. washing or drying clothes, dishwashing.
- Parents did paid work, community work, or study from home.
- Parents tried to find time to relax, rest or spend some time together.

'It's my favourite time of the day. Once [the children are in bed]... that's when I collect the washing and put a load into the machine...have a bath by myself, you know, quiet time, and read a book in the bath.' Selina

Figure 2 Weekday routine activity periods in family households

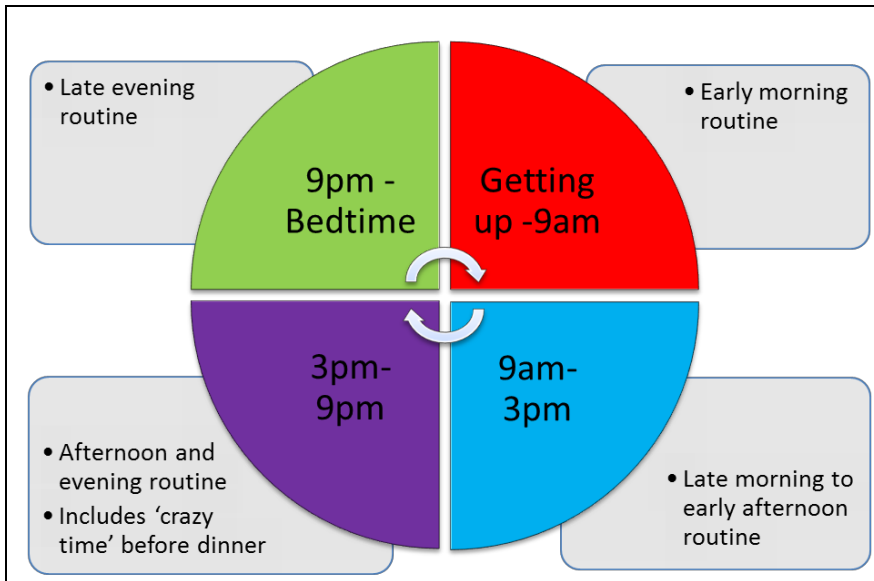
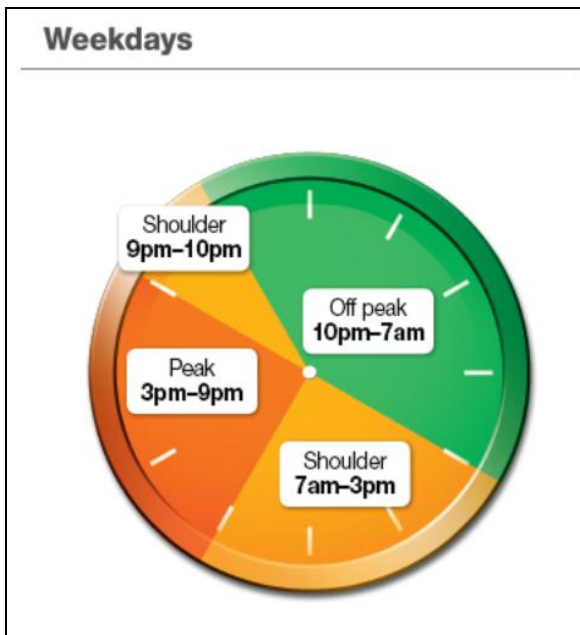


Figure 3 An example of weekday TOU tariff periods in Victoria



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

3.2.2 Coordination of the family peak period and ‘crazy time’ in family households

The late afternoon and early evening period was the busiest (or most complex) period in most family households. Practices were tightly sequenced, meaning that many were occurring simultaneously or were closely linked to or dependent on each other. Children were often tired and hungry and parents commonly described younger children as being more demanding in the period preceding (and sometimes including) dinner time (see Box 1). Parents were managing their children’s demands and behaviour (such as tiredness, hunger, arguing, fighting, getting upset, asking for things, and wanting attention) alongside the things they needed to get done during this period. See Section 3.4 below for a discussion of the main energy practices undertaken during the family peak period.

Due to the concentration of practices and the more difficult behaviour of their children, parents used terms such as ‘crazy time’ to describe the time before dinner. Crazy time occurred around the middle of the family peak period and routines were often coordinated around managing and coping with this particularly hectic time.

Box 1 Parents’ descriptions of the early evening period and children’s challenging behaviour

*‘Between about 4pm and 7pm and so if any family members would ring I’d say “What the hell are you doing ringing in **crazy time**?”’* Keira

*“**Arsenic hour**”...it’s like from about 6 til 7:30 at night when children just are knackered from a day, especially after being in care, because it’s so stimulating, and because they’re tired their temper is frayed and they’re less likely to be calm through the process of what needs to happen.’* Kelly

*“**Feral o’clock**” is usually about 5pm. [Laughing] And that’s usually when they’re all hungry and grumpy, and especially the guys that have just come back from school because I’ve got a prep and a grade one and they’re, especially the little boy who in prep, he’s still very tired...so five o’clock is usually “**witching hour**” around here.’* Lindy

*So it’s **busyness** for me because I probably do have a load of washing I have to do and I do have meals I have to cook... It also seems busier I think too because **the children get a bit more demanding at that time** because they’re tired. So often where they’d normally be happy to play or do something by themselves, they’ll be pestering me to entertain them.’* Robyn

At a time when parents’ energy and patience levels were declining, bedtime routines for children could also be time-consuming and challenging.

‘It depends on how quickly [our son] goes down [to sleep], so I tend to find that more challenging because you’re tired as well at the end of the day.’ Cass

‘We have quite a convoluted bedtime routine ...we get the girls out of the bath, we get them dressed in our bedroom, they jump on the bed for 10 minutes till we can persuade them to go read some books...then I sit and wait for them to go to sleep basically.’ Peta

3.2.3 Using time gaps to coordinate activities and avoid ‘chaos’

Most parents described certain activities that were not restricted to a particular time of the day but instead occurred when moments of time could be found or created. Practices such as house cleaning, laundry, cooking, working from home and household administrative tasks (such as paying bills) were often fitted into ‘time gaps’. Time gaps could be temporarily coordinated around activities such as a child’s normal nap time, or shifted and changed depending on when children were in the bath or ‘amusing themselves’.

[During my daughter's nap I] prepare dinner and cut vegetables, cleaning and wash clothes or something like that, I try to clean the house and make it tidy but it's very difficult if you have a child, if she wakes up yeah, it's very mess[y].' Naomi

'I'm usually being really frantic and trying to like squeeze every creative moment I can out of that 12 til 3 time, and [my son's] routine in that period can allow me, when I'm being creative, to sit down and paint [work] for two hours.' Ruby

Time gaps were especially important for sole parents, for whom multi-tasking was especially necessary.

'Because while they're eating, I'm like getting the bath ready and getting the bed ready, pyjamas...I kind of have to make use of the time when they're occupied to do the next thing, because no one is here to ever do the next thing. And if I get behind, it kind of sucks. Like if I'm trying to do everything, then I get more burnt out, so then I get tired, and then I have to fall asleep when I put them to bed, and then I've missed that three or four hours to do stuff... 'If I have time to sit down with the [children while they are in the bath], it's nice. But I'm usually in the shower or I'm cleaning the bathroom.' Briony

Multi-tasking and coordination of different and simultaneous practices was consistently used to try to 'stay on top of things' and reduce the possibility of 'chaos' in the home (Box 2).

Box 2 Coordination of practices to 'stay on top of things' in family homes

*'Usually I've done my household chores by the time school's finished so that I don't have that to worry about and [then] it's usually just dinner that I need to be concerned about. And most days I start [preparing dinner] some time in the earlyish afternoon so that it's not left to the last minute because **otherwise it's chaos.**'* Lindy

*'I would generally put on the machine as I'm leaving the house in the knowledge that it takes kind of a couple hours to go through its cycle. But if I'm coming home maybe at lunchtime, the machine will be finished. I'll **have an opportunity** to hang out the clothes before I go and do a school pickup.'* Neil

*'So in the evening when I come home I probably always put on a load of washing, and in the evening I'm hanging it out or making sure that we've got clothes for the following day. So in winter, because things don't dry on the line, I might be turning the ducted heating on so that I can dry clothes over the vents overnight for an hour or so. Or if we've only got one or two things, like a work shirt, we've got the dryer, so we'll be putting things in the dryer. So it's pretty much **all about convenience and preparation.**'* Kelly

*'It's the main block of time where we get to communicate about everything that's going on within that week's bubble...Organising who needs to be where, what needs to be paid for, what needs to be organised for each event. There's a **lot of rigmarole involved in organising** day to day stuff. Lunch money and lifts here, and coordinating other people, friends, sporting events, shopping, pets.'* Helen

The high value provided by even short periods of time, and the need to squeeze multiple activities within them, meant that parents were attracted to appliances which promised to save time and provide convenience (see Section 3.4 below).

3.2.4 Working towards down time

As found in past research (Leshed & Sengers 2011; Southerton 2003), part of the creation of the busy family peak period in families was about ensuring parents reached a quieter period at the end of the day (see Box 3). While things usually still needed to be done after their children went to bed,

parents valued this quieter period as 'down time'. Parents wanted to regain a sense of ownership over this time, spend some 'adult time', create time for themselves, and/or restore their energy levels for the following day. Parents were often unable to create down time for themselves every day, which made this time even more precious.

Box 3 The importance of down time for parents

*'It would usually be after 9-9:30[pm], when we finish, when we're finished with dinner and cleaning up after dinner, that would usually be the time where I consider it that **it's our time to be quiet and enjoy** and just have time on our own.'* Jill

*'That's sort of the plan, to get all that done so that once they're both in bed then we can just sort of come out from the kids' [bedrooms] and relax basically and not have to do too much housework after that...that's our **down time**.'* Sandi

*'We can just sit down and just relax for a couple of hours...[it's] a bit too frenzied sometimes 'cause [my husband] and I...we have the running joke that we're "**rushing to relax**".'* Lily

*'I can maybe I can watch a movie yeah, maybe listen to some music, maybe do something more personal like a chat with my friends or something, reply emails... it's very important time, it's a time when I think family belongs to me, **it's my time**, the rest of the day is [my daughter's] time.'* Naomi

*'And also there's a kind of a mental barrier for me that once I've sat down at the end of the day I find it very hard to get back up and keep working on something. So I'm trying to get everything done as quickly as possible when I get home so that I can relax before bed...From about 10:30 to 11[pm] at night I try to, and I always read in bed. So **that's my wind-down time**.'* Kelly

Key Insights

Routines are needed to manage the complexities of family life and provide structure for children.

The family peak period correlates with the peak in energy demand in the late afternoon and early evening (TOU tariff period).

The family peak period is made-up of a series of tightly-linked and closely sequenced practices often culminating around (and needed to manage) a period known as 'crazy time'.

Within routinised daily life, parents squeeze practices into less predictable time gaps during the day when their children are temporarily self-reliant (e.g. napping or independently playing/ watching TV).

The busyness of the family peak period and other periods of the day allows parents to make space for highly-valued down time at the end of the day.

3.3 'NORMAL' DISRUPTIONS AND THE FLEXIBILITY OF FAMILY ROUTINES

Disruptions are a normal part of everyday life (Trentmann 2009; Graham & Thrift 2007). Family household routines were frequently disrupted through a range of events and conditions, and were also flexible and adaptive in response to these disruptions (see Table 4). Higginson et al. (2013) report similar findings in their research on attempts to shift energy practices in UK households. Some of these disruptions, and the need to adapt to them, were seen as 'normal' parts of family life, while others caused significant impact and stress. The creation of routines assisted in managing and coping with disruptions whilst they were occurring, and provided a sense of normality and regularity to which everyday activities could return after the temporary disruption had ended.

Table 4 Disruptions experienced on a regular or occasional basis

TYPE OF DISRUPTION	ILLUSTRATIVE QUOTES
<ul style="list-style-type: none"> • Illness and health conditions (e.g. children's asthma, influenza, disability, autism or Aspergers' syndrome), and injuries (e.g. parents' or children' broken limbs or operations, back injuries etc.) 	<p><i>'So [my husband's] had hand surgery so he's had periods of, you know, 8 weeks where he hasn't been able to work after surgery and he's been home all day, just playing computer games with his one good hand probably.'</i> Kelly</p> <p><i>'I live with my daughter...[my next baby] is due in June... my father, he came as a visitor. He came last December [and is still here].'</i> Rui</p>
<ul style="list-style-type: none"> • Changing household members, e.g. students from overseas, grandparents and guests as long-term home occupants 	<p><i>'Oh the routines are always an ongoing kind of flux...the time that the boys spend [living with us] has changed in the last year... now it's you know every fortnight.'</i> Rhonda</p>
<ul style="list-style-type: none"> • Pregnancy and a new baby 	<p><i>'I'm currently, well, between jobs so I've been a stay-at-home dad. My position was made redundant where I was working.'</i> Scott</p>
<ul style="list-style-type: none"> • Relationship breakdown and changed parenting responsibilities 	<p><i>'So soccer's not til 5pm, so we're home for an hour and a half then, that's Tuesdays...Wednesday is swimming, that's at 4:30pm so pretty much come home and by the time we get home have a quick snack then we're out the door again. And Thursday [my daughter] does dancing.'</i> Keira</p>
<ul style="list-style-type: none"> • Employment disruptions, e.g. loss or change of job, shift work 	<p><i>'The clutch in our car broke and it was two and a half thousand to fix it... so I couldn't get my head around how I was going to possibly get the big bulk of shopping... [it took] about three weeks [to get fixed].'</i> Cass</p>
<ul style="list-style-type: none"> • Urgent work responsibilities 	<p><i>'When we had those awful [heatwave] weeks and it was in the school holidays, my brother has a pool and he lives about 15 minutes away and we spent two solid weeks there from sort of midday till 9[pm].'</i> Mel</p>
<ul style="list-style-type: none"> • Children's sport and other activities 	<p><i>'It's no big deal, because we're prepared. So we've got torches under the sink and we've got two barbecues. So if the power goes out during a meal preparation time, we just cook outside.'</i> Kelly</p>
<ul style="list-style-type: none"> • Car breakdown 	<p><i>'We had the fire which was two weeks ago, we were evacuated. It was just like 200 metres over the road.'</i> Ruby</p>
<ul style="list-style-type: none"> • School holidays 	
<ul style="list-style-type: none"> • Heatwaves 	
<ul style="list-style-type: none"> • Bushfires and evacuations (outer urban and regional households) 	
<ul style="list-style-type: none"> • Power outages 	
<ul style="list-style-type: none"> • Weather and seasonal variations 	

Key Insights

Practices are highly flexible and constantly adapting to change and disruption in family households. Routines create structure and stability for families to be able to cope with the unpredictable aspects of everyday life.

3.4 CHANGING HOUSEHOLD ACTIVITIES IN FAMILY HOUSEHOLDS

The research investigated household practices in relation to four activity domains where energy use (and peak electricity demand) is concentrated in homes (Petchey 2010):

- **Thermal comfort** — includes technologies and devices used to stay warm or cool down;
- **Cleanliness and care** — hot water and appliances used to bathe/shower, launder, iron and dry clothes and linen, maintain and provide personal care and grooming, and clean the home and dishes;
- **Working, socialising and playing** — includes digital equipment and devices used to watch television or other digital media, play games, communicate with others, work from home and undertake personal interests; and
- **Food provisioning** — includes cooking technologies used to store, preserve, cool/freeze, cook, make and reheat foods and drinks.

The following sections focus on the practices within these domains that were particularly relevant to family households during the weekday family peak period. Particular attention is given to practices that relate to children or are affected by having children. The discussion identifies how these practices have changed and are currently changing in family households.

3.4.1 Thermal comfort

Parents approached the provision of thermal comfort for their family and children as an issue of healthcare. However, what parents understood as the best or healthiest thermal conditions for children varied considerably (see Box 4). Thermal comfort expectations for heat and coolth varied within homes and were a source of disagreement in some.

'I think it's just [my husband]'s probably thinking about the environment and electricity bill...but I still feel as if, because I spend more time at home you want to be more comfortable.' Becky

'[My husband]'s the classic; he'll come out in the t-shirt and so will the kids, and want the heater on. So [the children are] not allowed to have the heater on if they're in singlet and undies.' Mel

'It's actually an ongoing battle in our house... I just said a few years ago, I'm really tired of being really, really cold in my own house and it's just, and now that we've got a child it's not functional.' Lily

Most households operated their heating and cooling systems manually — switching in on when needed and off when they left the home. With most homes unoccupied through the morning (see Section 3.2.1 above) and with family members coming home in the afternoon, heating and cooling use was substantially linked to the TOU peak period.

Heating

In families with young children, heating use in the home was explained as being necessary in order to maintain particular standards of health and comfort for children. Box 4 outlines the varied understandings parents held about heating needs for their young children. Some parents used additional heating for their babies because they were concerned about them getting cold, and some sought to maintain a ‘recommended’ temperature for health and/or to help their babies sleep well or longer. Other parents considered heating a baby’s room unhealthy and likely to make them sleep poorly³, or did not consider it necessary to change the way they heated the home for young children. Some parents used heating more because of children’s health conditions such as asthma or colds. The use of electric heaters for bathtime or to prewarm children’s bedrooms for sleeping was an additional electricity use for family households and was largely confined to the TOU peak period.

Box 4 Varied understandings of heating needs specifically for young children

‘We’re both a bit paranoid about [the children] getting cold. So we definitely, we used our heater a lot more to keep them warm... my seven year old daughter is asthmatic, and she tends to have a few more asthma attacks in winter time due to the cold... We worried more about that when our youngest was quite small, was a baby, and then the heater was on whenever it needed to be. But now it’s not on as much as it used to be...’ Lindy (regional Victoria)

‘I think generally the advice was not [to heat babies’ bedrooms] because over-heating is worse than being too cold... the general idea that it’s better to be on the side of cooler rather than hotter ...because that’s more dangerous.’ Peta (Blue Mountains)

‘[The heater]’s been sitting on, I think about 18, 19[°C] for the last couple of nights just because I’ve got a cold and both the boys have had a cough.’ Becky (Melbourne)

‘Bath time, pretty much. Yeah, we’ll turn the heater on for [our son in the bathroom] in the cold months.’ Scott (regional Victoria)

‘If we give heating to kids [in their bedroom], we wouldn’t give all night. We turn [the heater] on when he start to sleep, then turn off around 11[pm].’ Mathieu (Sydney)

Some households used little or no heating in their home (see Box 5). These were mostly migrant households migrants and most lived in Sydney. Understandings of heating as less necessary were not limited to low-income households and unhealthy self-rationing of heating was not evident. These households usually indicated a combination of concern about electricity costs and preference for more ‘natural’ air or concern about heater safety.

³ More detailed exploration of the range of information, advice and common know-how regarding heating, cooling and babies will be included in the final report for the project.

Box 5 Understandings of heating as unnecessary in Australia

'Having moved to Melbourne from climates in Europe where it's typically a lot colder, we found that winter was quite easy to get through. I think there may have been a handful of evenings where we actually switched on heat. Other than that, we didn't use any heat at all.' Neil (Melbourne, professional high income family recently migrated from England/Ireland, housing possibly more energy efficient than average)

'No we don't have [a] heater...I know it's very cold in winter but maybe it's because I come from the north east part of China so I think it's...I feel not very cold but my husband comes from south of China and he feels very cold... maybe close the window but that's not good because we need air flow so maybe I use the one what [do] I call it, I put hot water in [hot water bottle].' Naomi (Sydney, low-income family recently migrated from China)

'I don't like heaters. I think it's again a safety hazard, fire, especially when you have a child. To me, my daughter's safety comes first, no matter how I feel about the cold or the hot. So, no, I don't like heaters in general. I mean, you can use blankets and jumpers and scarves and all that. You don't need heaters. We're not in the mountains. It's not that cold here.' Amy (Sydney, low-income Australian-born family)

'In the morning [winter], we open the windows just to make refreshment... I feel everything natural is better. Like the heater, I don't like it because I feel maybe it causes some 'flu... when we came here [to Australia], people told us that electricity was expensive.' (Mona, Sydney, family recently migrated from Egypt)

Some parents in rented homes had concerns about the safety or efficiency of the heating available to them and this affected the way they heated their homes and their comfort.

'Electric [heating]. Not good... We're trying to manage it, not [use] too much energy because else it's too expensive.' Sophia (renting, Blue Mountains area)

'I'm a little bit worried about a fire with the kids. The two year old, she already knows how to open the fireplace. She opens it and plays with the ashes that were left in there and it scares me. So I haven't really used any heating yet this year... the owner says that that [the flue] gets really hot too... I don't want the kids to be up there by themselves with this burning hot thing.' Selina (renting, Blue Mountains area)

Some teenage children were insistent about extra heating.

'[My daughter] started to put on her small fan [heater], carries it under her arm. Just like her purse. Then say "I'm too chilly".' (Maya, Sydney)

It is clear that change in heating practices in family households is a complex and area which requires more in-depth investigation. The differences in understandings of heating needs in family homes were not fully explained by regional temperature differences or by demographic indicators such as income, education or age of children. We will examine variations further in our review of heating and cooling expectations for children in the Final Report for this project.

Cooling

In contrast to heating, most parents described young children as adaptable to hot weather and considered themselves (parents) to be more affected by the heat. However, air conditioning was often considered more necessary once having children — to improve comfort, assist sleeping and/or to reduce the likelihood of challenging behaviour from children. Parents valued air conditioning as a convenience — it enabled them to continue on ‘as normal’ and reduced the disruption of heat-related conditions and events on everyday life. Most households with air conditioning did not use it overnight except in periods of extreme heat. Parents sometimes noted how much they relied on air conditioning even though they used to manage without it.

‘I feel [the heat] more than they [my children] do. They don’t tend to complain about it...the last three years is when a house with ‘air con’ throughout has become part of our lives.’ Lindy

‘We never had air conditioners until we had a child. And we installed reverse cycle air conditioners so that we could heat [our daughter’s] room and cool her room.’ Kelly

Some households did not have air conditioning. This was mainly because they understood air conditioning to be unhealthy for their family, too expensive, or preferred ‘natural air’ and a range of other strategies to stay cool, such as fans, cold or hot drinks (‘to make you sweat’), ice blocks, cold showers/baths or play with water. Similar strategies have been reported in past studies of cooling practices in Australian homes (Strengers & Maller 2011). Some families also left the home for hot periods, going to libraries, parks, shopping centres and pools. Most of these households intended to continue without air conditioning in the future.

‘We don’t have an air conditioner so it does get pretty hot in here. Usually wouldn’t put a fan on until evening bedtime, so we probably wouldn’t have the fans going during the day... go out swimming around about evening time...local pool or the reservoir or...we’ll use wet towels.’ Norah (hot area of regional Victoria)

Some householders discussed situations when it was too hot to leave the home or for children to play outside. During these normal (weather) disruptions (see Section 3.3), parents said that they had to keep children inside with the air conditioner running or fans. This could lead to additional energy use to entertain children who were impatient or bored with being inside.

‘I think if it’s a very hot day, so normally [the children] feel impatient...they feel bor[ed], because if we can’t go outside for some activity, like go to the park, they feel bor[ed], they just watch TV or computer.’ Jasmin

In some homes, air conditioning was not considered necessary until other family members came home from school or work.

‘I’ve just had the back door open for a breeze. And then the fan will come on, then [my husband] will come home, and the air conditioning comes on.’ Alice

Key Insights

Parental understandings and know-how of their children’s health and thermal comfort needs inform how they heat or cool their house.

There is wide variation in parental understandings of their children’s health and thermal needs. Parents’ own comfort also influences use of cooling.

Air conditioned cooling reduces the disruption of heat-related conditions and events on everyday life and normal family household routines.

3.4.2 Cleanliness and care

Children's health was the key concern when carrying out a variety of daily and weekly cleanliness practices. Some 'cleanliness and care' activities were performed in family households at regular times. Others occurred when a time gap was found (see Section 3.2.3). Practices in this domain often held importance beyond their contribution to a clean and tidy home. Other meanings associated with these practices contributed to when, how and how often these activities were performed, as discussed below.

Bathing

Late afternoon or early evening bathtime routines were integral to the family peak period in most homes with young children (see Box 6). In addition to ensuring the cleanliness of children, bathtime was also associated with:

- calming children from the period of 'crazy time' (see Section 3.2.2);
- providing important social meanings within the family such as fun, play and creating positive interactions between siblings or between parents and children (such as connecting fathers with their children after work);
- confining children to one space (for supervision) and making it easier for another parent to get other things done such as prepare dinner; and/or
- reducing the amount of clothes or linen washing to be done by maintaining cleaner bodies.

Box 6 Multiple meanings of bathtime in family homes with young children

*[Bathtime] is also a **relaxation tool**, for [my daughter] to have a bath and just chill out for a little while... definitely like a time for **intimacy and closeness**.' Kelly*

*'It seems to be **therapeutic** for [my son with Aspergers' syndrome]. It's also a time when [the children are] stuck in a space but **it's happy**, rather than like being stuck together in the back of the car and it can be stressful...maybe they're fighting, whereas if they're in the bath they seem to **play well together**.'* Briony

*'Water is really **relaxing** for my children... I remember reading when my first one was born, too, that it helped with their like **spatial awareness** and stuff. So I've always made them have nice deep baths.'* Selina

*'And [bathtime] was a nice **time for her and her dad to spend together**. And it also gave me a bit of **time out**... They can shower themselves or bath themselves now, and that's our time to get them out of our hair so we can clean the kitchen...So **two purposes**.'* Keira

Other households bathed children less often and considered daily bathing to be unnecessary or unhealthy for children. Less frequent bathing was preferred for children with sensitive skin. In some cases young children's bathing was more linked to visible dirtiness resulting from daycare or eating. The regularity of children's baths could also be cultural; daily child bathing was more common in Australian-born households.

Parents' understandings of bathtime for the wellbeing of young children took precedence over any concerns for energy (including bathroom heating) or water use. Parents' own bathing was sometimes more amenable to reduced length and consumption than their children's. For example, Kelly ran a bath for her three year old on a daily basis (above) but had a rigorous and fast procedure for herself and her husband.

'[My husband and I have] boarding school showers. We're not like hang out in there for half an hour, it's like in and out.' Kelly

Parents often showered in the early evening, particularly those in shift work or jobs which made them hot or dirty. Others explained that showers did not fit into the hectic early morning routine. Some parents said that an evening shower helped them 'wind down' after the busyness of the day, or that the shower was a place to escape the multiple demands of family life. In some households, a limited hot water supply meant that family members' showers were scattered throughout the day (in time gaps) with some scheduled for the evening after the hot water system had reheated.

'[My husband] pretty much always has a shower after work (4-7pm).' Jane

'This [showering] is my time.' Sophia

'We have a small hot water service, so my son always showers in the morning and my daughter always showers in the evening. And then the adults are random.' Helen

Washing, drying and ironing clothes (doing the laundry)

Most parents associated having children with highly increased laundry requirements. Most young children's clothes were changed often and some teenagers frequently changed and discarded clothes for washing. Most households distributed the washing through the week in order to:

- 'stay on top' of washing requirements;
- respond to pressing needs such as providing clean uniforms (parents' and/or children's) for the following day, particularly where children had an 'accident'; or
- preserve some weekend time for family activities.

Doing the laundry was often inserted between other practices or in time gaps (see Section 3.2.3), such as arriving home from work and starting dinner preparation. Some parents avoided doing laundry late at night due to noise or concerns that washing would start to smell if left in the machine overnight (see Box 7) and lack of time to hang out or dry washing in the morning.

Box 7 Timing of clothes washing

'I try and do a load of washing a day at least. If I get a bit behind and find I'm out for a couple of days... I find it piles up a little bit over a couple of days then I might do a few in one day.' Keira

'I do [washing] all the time. I just do it whenever I've got a spare moment... there tends to be a bit of a big bundle of stuff...Whenever I'm just in between something I tend to fit it in to moving between one part of the house to the other.' Abbey

'I probably do a load at least a day or when I've, but it's normally, you have to get the school uniform ready. I tend, because I've got Fridays off I tend to do the washing that day, but yeah, sometimes I'll probably a load on Wednesday night.' Becky

'Because if you run [the washing machine] too late then you're too lazy to hang it out and then it sits in the machine and gets stinky and you have to rewash it.' Kelly

'I try not to do [washing] at night because I'm aware it's a block of flats, so I'm very self-conscious about the noise...I have done a couple of times, after 9 o'clock, but feeling really bad and really self-conscious, you know, that there is, there might be a knock at the door.' Renae

Some parents noted that they only used a clothes dryer since having children and most wanted to minimise use of the dryer (see Box 8). Use of clothes dryers was highly variable within homes and depended largely on the timing and scheduling of washing along with:

- the weather, seasons and geography;
- time pressures for clothes to be cleaned and dried by the next morning;
- sufficient space for drying racks in the home or the absence of outdoor drying space;
- the type of heating in the home;
- concerns about drying wet clothes to avoid smell or creasing;
- noise or safety issues associated with using a dryer at night; and
- difficulty supervising children while hanging out the washing.

Box 8 Using the clothes dryer

'We've also got like clothes horses around the house, but in winter time it's just, there's not enough clothes horses to fit our family. It's crazy. So, yes, the tumble dryer gets used quite regularly during winter...it's been abused a bit.' Lindy

'We've got [a dryer] and we only use it if we really need it...school uniforms. I used to be quite good at drying that in the oven. Yeah. It's the, "This is not dry, we need it now" kind of situation. Or when it's been raining for, I don't know how long, 10 days and things won't even dry in doors anymore because everything's too damp. But again, the wood fire should solve that too.' Sasha

'So we put a ducted vent into the laundry and we've got a pull-across clothes line, like a full clothes line in there so I'd usually hang everything up in there. So, with the heater going usually at night in there that would dry everything.' Sandi

'[Clothes] dryer, yeah. I feel really guilty about that...Because it's so cold and damp up here [Blue Mountains] a lot of the time, it's just, like in winter you need [the clothes dryer]...it's easier for me to just be in the house, like, if I'm out, our washing line is way at the back of a huge yard as well and God knows what the kids are doing when I'm out the back.' Selina

Ironing use appears to be declining in many family households; however where it is done, it is squeezed into time gaps and or done in the evening during downtime (see sections 3.2.3 and 3.2.4). Ironing was sometimes done while watching TV but many parents were trying to minimise ironing in order to save time (rather than save energy).

'I tend to iron of an evening, but I tend to do like shirts are the only things I iron because you know, you've got to just buy your clothes that don't need ironing. Getting out of ironing is a whole lifecycle approach, starting at the shop.' Mel

Vacuuming

Some households rarely vacuumed their floors (often because they had removed carpets and had polished board floors), while others vacuumed regularly or even daily. Cleaning activities such as vacuuming were often 'ideally' done prior to the family peak period (to reduce the number of things to be done during that period). However, the busyness of everyday life and parents' work commitments often meant vacuuming did occur in the family peak period or when the need for it was observed or an opportunity arose (e.g. during a time gap). Dirt, mess and hair from young children and pets contributed to the 'need' to vacuum.

'I do my vacuuming nearly every day... I try to avoid it... But when I see [dog] hair, bang, I'll vacuum – you know what I mean? Especially when you've got a child...I just don't want her to, maybe, I don't know, asthma or something like that. That's me. When it comes to my daughter, I just do what I can to avoid things.' Anna

'Things get dusty and there's stuff on the floor after meals, and it needs to [be vacuumed], otherwise if we waited for the weekend it would just be, yeah, wouldn't be so fresh.' Lindy

Dishwashing

Most households used a dishwasher for the majority of washing up, but some households washed all dishes (by hand). Dishwashers were usually run after the evening meal or in the morning and some larger households ran the dishwasher more than once a day. The timing of dishwashing could be affected by:

- concerns about noise (within the home or potential impacts on neighbouring households);
- concerns about 'build up' of work to be done if dishes left too long without being washed;
- perceptions of a period of cheaper electricity later at night (see Section 3.6.1);
- the need to finalise housework for the day and/or prepare for the morning rush;
- tiredness;
- family arrangements about who is responsible for this task; or
- concerns about attracting pests if not washed immediately or quickly.

'The rule is whoever's job [the washing up is], no matter how long they have to leave it, it's all their job. So it's accumulative nastiness, you don't want to leave it for too long.' Laura

'I wash [dishes] straightaway after we've eaten ...I try to do that because I don't want any insects and things like that.' Anna

Children's chores

In some households cleaning activities were part of children's chores (see Box 9). These activities often occurred in the TOU peak period after school. Children did not always do their chores when or how parents preferred, particularly teenagers. The importance of chores to children's development and the running of the household meant that convenient and 'easy' methods of carrying out cleaning practices (such as using the clothes dryer) were sometimes prioritised over more labour-but less energy-intensive methods (such as line drying). Encouraging children to help in the home sometimes involved acquiring new appliances that had previously been rejected or discounted on the basis of their high energy use.

Box 9 Children's chores and energy use in the TOU peak period

'So those two boys do their own washing so that's always [using the clothes] dryer because I cannot convince them to go outside... they've just laughed and done what they wanted. It's the teenage way.' Rhonda

'We have a dryer. I almost never use it. My son is probably the person who uses it the most and that's not very often but it's because he's disorganised and he'll put his washing on and then not hang it out...He'll just chuck it in and I'll frown at him and say don't use the dryer [laugh].' Laura

'My eldest is, every now and then, he'll put a load of laundry in for me. He knows how to use the machine. They all know how to put the clothes in the dryer.' Selina

The dryer's new as well...As in dryer, we've never had these things before. I've never owned a dryer in my life, the last 12 months...Maybe to give the children more independence. Just a changing, just because of their age, just changing needs.' Helen

'If they're [cleaning] their rooms now... I'll make them do the vacuuming at the end.' Keira

'The 14 year old has the responsibility of the dishwasher. That's her thing. And if she doesn't do it then everything falls apart...they've all got chores... They all vacuum and clean their own rooms ... we do have a chore chart up there... Everyone has to pitch in otherwise it would be just overwhelming. I wouldn't, I'd be like a mess. I couldn't do it all. I'm not Wonder Woman.' Lindy

Children and teenage grooming and personal care

As children grew older and transitioned into teenagers and young adults, spending more time (and energy) on their appearance was seen as an important part of their development (see Box 10). As Gram-Hanssen (2007: 7) found in her study of Danish teenagers' cleanliness habits, 'it was obvious that neither economy nor environmental concerns had any real influence on cleanliness habits'.

Some parents encouraged their children to shower or change their clothes more regularly and others felt that their teenagers shower length and frequency, hair drying and straightening increased of its own accord. Children's grooming practices often occurred after school (in the TOU peak period), and while the energy use associated with teenage grooming was sometimes a concern, most parents felt that there was little they could (or should) do to attempt to intervene or change these practices. Encouraging children to conserve water in the bathroom was sometimes considered more manageable (e.g. taking shorter showers).

Box 10 Grooming issues, energy use and teenager development

'I'm encouraging [my daughter] to trying to take on looking after herself. And so that's changing a little bit... she's just getting to that phase where she's getting a little bit of oily hair ... so she's on to the next stage... learning how to look after yourself which is part of your wellbeing. So it's not just grooming. It's really wellbeing.' Abbey

'It's excruciating. We start off saying [to our daughter], "can you go and have a shower", and it just goes on...there's this long process of hassling her to get in...and then generally there's a process of trying to get her out as well, "come on you've had the water running long enough". It's ridiculous!' Lily (daughter 11 years old)

'Evening, after they've showered, yes...They can't leave the house without undried hair or unstraightened hair...The 14 and 17 [year old]. Yes. They're very into, yeah, their appearance and their grooming...if I hear someone's washed their hair twice or three times in a day and they're using the hair dryer yet again, it's like "My God, really?"' Lindy

'Every second day she washes her hair, which sounds weird, but washing hair is a bit of ritual, because it takes about an hour. And in the scheme of power, that hour is shower and hair drying, so that's a big hour...I have reduced the length of the showers is the best I could come up with... I had to find out why it took so long first, and it was simply because she just likes to stand under the water. So then I showed her Australian drought and the impact of that.' Alice

Hair dryers were also often used by younger children or parents to dry long hair before going to bed or out to play, often due to health concerns about 'catching a cold'. The process of washing and drying long hair for children often occurred in the afternoon or evening because there was not sufficient time before going to school or work.

'[My daughter] only uses the hair dryer if she's washed her hair too late and I don't like her to go to bed with wet hair 'cause we don't heat the house at night, so it's cold, I don't want her to have a wet head.' Lily

'[My daughter] would happily go outside the house with wet hair...Well, this might be another German thing. Germans get really sick when they're cold, so I tell her, you know, you need to dry your hair first.' Sasha

Parents were attracted to new appliances (clothes dryers, dish washers and larger fridges and washing machines) which were anticipated to save time and help them manage in unpredictable/unexpected circumstances. These priorities often took precedence over energy consumption.

'I think the sun is good for drying clothes... but I'm thinking about [getting a dryer], because sometimes the school uniform... sometimes every day change, especially the sport uniform, they like to change every day.' Jasmin

Key Insights

Cleanliness and care is not only about health; it also provides social interaction, entertainment, convenience and important life skill development opportunities.

The daily distribution of tasks associated with doing the laundry limits the potential for family households to shift these activities to other times of the day for financial benefit (or to avoid cost).

3.4.3 Food provisioning

The evening meal

The weekday evening meal was a central point in the family peak period around which many other activities were organised. Most families tried to eat together in the evening but it was common for some family members to arrive home after the usual meal time, following sporting activities or work. In some households children ate before parents and more than one main meal was prepared because children preferred/needed different food. These households had additional reheating or additional cooking energy use during the TOU peak period. Other parents prepared one meal only and insisted that children eat what is available or adapted their meals to suit children's tastes or health needs.

'I do cook two different meals... my youngest boy, because he's a really fussy eater so I might be cooking him a bit of, I have a bit of fish in the freezer and he'll have that with some steamed broccoli and maybe some cut up cucumber...he doesn't like food clumped.' Norah

'I will only cook one meal during the day and if they don't like it they can go hungry because with nine people in the house it's very hard to keep everyone happy.' Lindy

Cultural background may have impacted on the timing of energy use associated with the evening meal. Some migrant families preferred their main hot meal earlier in the day and some migrants from Asia prepared multiple hot dishes for the evening meal.

'[I] will cook about four dishes including one soup and maybe two vegetable and another one is like a meat based dish.' Mai

Preparing the evening meal was a regular (once per week) chore for older children in a few households and was part of their ongoing development of life skills.

Snacking and baking

Parents with babies often reheated milk in various ways through the day and evening. After-school snacks were often cold but sometimes involved the use of toasters, microwaves, sandwich makers and other appliances. Cooking, particularly baking, was an enjoyable activity for some parents and a means of entertaining and educating children (or a fun chore). Baking also provided healthier or cheaper snacks and school lunch items for children. Baking often occurred in the TOU peak period and the importance of this activity to family life was a higher priority than any energy concerns. 'Peak baking' (a concentrated period of baking) could also occur in the school holidays or on weekends, when families participated in 'bake ups' as a fun group activity or to stock up on baked goods for the week.

'I like cooking...The electricity is high, but yes, we can save from the other side like turning the lights off...we like to eat so we will create the food what we like. We will cook. Even if it takes more electricity, what can I do?' Mona

'Over the holidays we usually have big bake ups...The kids love making bread.' Lindy

'My oldest one she'll cook, sometimes I'll get her to bake in the afternoon, while I'm doing the dinner she'll be baking some biscuits or something like that, yeah... she's good, she's pretty much our baker in the house now for weekly biscuits and stuff.' Keira

Making time for hot drinks

Preparation and consumption of hot drinks, such as tea and coffee, was an important part of individual and shared routines. Electric espresso coffee machines had been introduced to many homes in recent years and some were left on throughout the day.

In the family peak period, hot drinks performed a range of roles including helping to keep warm (in unheated homes), facilitating togetherness, providing expressions of care between family members, or helping parents relax and regain energy for later parts of the day (see Box 11). Hot drinks were sometimes an important part of down time or squeezed into time gaps for parents.

Box 11 Role of hot drinks in families

'[My husband]'s a big tea drinker, as an Irishman... he just loves it, like it's just ritual, it's religious almost. Like the Irish fascination of tea is just astounding. But, and I think [my son], there's a fair bit of wanting to be like Dad.' Mel

'[My daughter's] drink tea. A lot of tea... it comes from, my partner's family are big tea drinkers and I think it's something they used to do with their nanna... It's like a relaxation thing. Like, you know, they'll have dinner and then they'll sit down and have a cup of tea... They do it together... A little nice thing that they do for each other and yeah, so tea's very important to them.' Tanya

'I like to renew by making tea, coffee, every kind of the drinks.' Mona

'Well and think the purpose [of having a cup of tea] is creating a buffer between myself and the children. Yeah. This is what I'm doing, I'm going to sit down and have a cup of tea... it just gives you a buffer between that world and the other world. Transition time.' Helen

'We'll have hot chocolate, maybe have coffee, hot milk, maybe hot water, we drink a lot of hot things... maybe for relaxing, but for my husband definitely keeps him warm.' Naomi (household rarely uses heating)

Convenient cooking appliances

Most householders preferred gas burners over electric hot plates but households with gas cooking often had electric ovens. The convenience and time saving features of oven cooking and electric appliances such as microwaves and rice cookers often shifted cooking away from the (gas) stovetop.

'I use my oven a lot. So most days my oven will be used because my kids love roasts... I have to say that's the easiest type of food. You get everything done and in it goes and it frees me up to do other things.' Holly

'[When I broke my leg]...it just meant that the children had to be way more organised because I couldn't do everything, or I couldn't pick up after them. And that was when their meal routines changed. That's when we got the microwave. It was all inspired by that.' Helen

A new phase of electric appliances to save time and assist in the preparation of healthy, home-cooked food had entered homes in recent years, such as the Thermomix⁴, Babycook⁵ and a resurgence of slow cookers.

'We like food that's all put in together. I can just chuck it in [the slow cooker] in the morning and put it on...it's just there ready when we get home and they're so big, like it could do big bulk meals for us.' (Selina)

⁴ A cooking appliance which integrates the functions of more than 10 home appliances into one unit.

⁵ An appliance which cooks and blends food for babies.

The Thermomix, which has gained popularity in other parts of the world (Truninger 2011), was a potential addition to some households' TOU peak period electricity use as it replaced other (gas) cooking methods almost entirely in some homes.

'All the pots and pans and things that we have in our cupboard don't get used now. Like Thermomix is used daily, pretty much for every meal like if I have a recipe that's not Thermomix, I'd convert it over to that so that just, it's a one-pot thing that's easy.' Sandi

Planning ahead: fridges and freezers

The inclusion of children into the family home resulted in most households acquiring bigger fridges (or fridge-freezers), or intending to get them in the future. Parents valued extra fridge or freezer space to reduce the frequency of trips to the supermarket or to store bulk food they had prepared themselves. This allowed them to save time and/or provide healthier food for their family. While energy efficiency information was considered by most households, the price, quality, design, and potential convenience of increased refrigeration/ freezing capacity in the home usually took precedence over energy considerations. Several households obtained their fridge second-hand, as 'hand me downs' or gifts from others.

'We've got a chest freezer as well. Like, a small one ... We're part of a bulk buying group where we buy, you know, 10 kilos of... and then I freeze them in portions... so I might as well make a whole big batch. But then, yeah, I guess I use the freezer that uses energy too.' Sasha

'As [the children] eat more we put more frozen meals in [the freezer], so if we make a big, huge batch of bolognaise sauce we'll put half of it in the freezer, and also because [my husband] works shift work, for example, he has to have his evening meals ready-made all this week, so last week we were doing a bit of cooking, we'd always make sure there was extra food that we put in the freezer.' Becky

'If I would have more money I would buy a washing machine or a fridge which would save more money. Our things are second hand, so we had not possibility to look for that.' Alison

One household reported replacing their fridge/freezer unit with one without any freezer section to save energy. The parents persisted even as the children grew older and became dissatisfied with the lack of freezing capacity in the home. Eventually the health of one of their children led to a reintroduction of potentially inefficient freezing capacity to the home. The introduction of new appliances for children's 'needs' was a common trend across the sample.

'It's been a source of a lot of dissatisfaction with our children... [the kids] were like "everybody has a freezer, you can't deny us a freezer"... [our daughter] had the knee operation she needed ice packs... [we] bought that [bar] fridge but with a little freezer to put ice packs in.' Kylie *'That's only fairly recently so we've been a long time without a freezer and we've put up with a lot of flak because of it.'* Todd

Key Insights

Food preparation and eating fulfil important social functions in family life such as educating and entertaining children, and facilitating togetherness and down time.

Bulk cooking, baking and food storage is valued as a means of saving time, and providing convenient, low-cost and healthy home-cooked food.

Convenience, health and financial savings from home cooked food take priority over considerations of additional energy use involved in cooking and food storage.

New convenience appliances are shifting cooking from gas to electricity in some family households.

3.4.4 Entertainment, work and study

The area of greatest ongoing change in family homes was the use and role of digital media for entertainment, work and study. Similar findings have been reported in other studies of changing ICT use (EST 2007; Røpke & Christensen 2012; Røpke et al. 2010). TV and other ICTs, such as game consoles, tablets, smart phones, laptops, and computers, were integral to many family routines and were a topic of ongoing discussion and concern for many parents. School age children's use of ICTs was particularly concentrated in the after school (TOU peak tariff) period. This section discusses some of the emerging and changing ways in which ICTs were being integrated into family routines.

Creating and managing time: TVs and electronic devices

A few parents had resisted or 'banned' the entry of ICTs into young children's home lives, but most households included a range of devices which children used. TV and other ICTs were valued by parents as a way to manage, calm or entertain children, particularly through the 'crazy time' (see Section 3.2.2) when parents needed to get things done, e.g. prepare dinner. Some parents noted how the experience of parenting encouraged them to use TVs and ICTs as 'babysitters' or distractions for their children, even though they thought they would not do this before having children.

'TV has its place and that place is now.' Mel (5.30pm, preparing dinner while being interviewed and watching the clock to ensure children's TV time limit of 1 hour was not exceeded)

'[We] stick [our son] in front of the television. Yeah, the 'telly' is the babysitter at times. When there's things we have to do...times when he needs to be distracted and so the television is the answer...even though we always [thought we would] never resort to that.' Scott

'I just need a bit of quiet and I'm trying to cook and they're a bit crazy or wild or whatever then I will say, "yes, you can have half an hour Athletics or half an hour homework time on the computer and then you can have half an hour free time".' Keira

'Uncontrollable' change: the proliferation of ICT devices

Parents often discussed and reflected on the rapid pace of change in availability and use of ICTs, the unpredictable nature of these changes, and how they affect their family now or might in the future. These changes were often understood to be beyond their control.

'Computers, iPhones, iPad, yeah. It's insane...[The children will] be going from one thing to the other. I don't even want to think about what it's going to be like when my little guys get up to that age because, I mean, it'll change again won't it?' Lindy

'If you'd asked me three years ago, "what's an iPad?", if my three year old daughter would know how to use a computer, but she does so, I don't know.' Robyn

'[My daughter will] be sitting in front of the telly and have an iPhone or an iPad in front of her as well, doing things on that as well as watching telly and talking to people. I hate it...It wasn't actually really anything to do with the, my child turning, you know, like being a certain age. It just happened.' Tanya

Many parents were uncertain about how to manage or control the ICT use of their young children in a way that would be best for their ongoing development. Most parents of teenagers were concerned about the extent of their ICT use and its impacts (Table 5). The wellbeing of children, not energy use, was central to parents' concerns. These wellbeing concerns related to ideas about the 'unhealthiness' of, or potential 'addiction' to, prolonged ICT use which generally involved sedentary and solitary activity. Parents wanted to ensure their children also participated in other 'healthy'

activities, such as socialising with friends, participating in sports or other extracurricular activities, and/or spending time outdoors.

However, there was also pressure on parents from children and others to ‘keep up’ with new ICT developments. They were also concerned about their children ‘missing out’ on opportunities that ICTs might provide. In some households, TV had been largely superseded by use of other ICTs (Table 5). Parents discussed a range of strategies they used or had attempted to restrict children’s ICT use in the home (Box 12). ICT use was unrestricted in a few households but most parents sought to manage their children’s ‘screen time’ due to the concerns outlined above. Some parents had tried to exclude devices from the home, but this strategy could be hindered by the integration of ICT devices into homework for school.

As children grew older and as the number of devices in the home increased, it became more difficult for parents to monitor and manage children’s ICT use. Parents often opted to ‘let go’ to reduce disagreement and/or stress in the home (see also 3.5.2 Change and control of children’s energy use below). One household that was determined to ensure their children’s ICT use was monitored turned to technology for assistance (see Box 13 Case Study — Laura and Nathan).

Table 5 Parental concerns and pressures relating to children’s ICT use

CONCERNS	PRESSURES
<p><i>‘A very mixed feeling. [ICT is] their life, a part of their life, their future life, but at this stage, at this preschool age, I prefer to limit it, time with the computer, the TV time.’ Jasmin</i></p> <p><i>‘My husband goes, “Why aren’t they playing ... sport? Why aren’t they doing this and that?” I go, “Look, our kids are just not interested.” They want to be, sadly, with all the computers. Unfortunately it has meant that they’re not interested in a lot of the outdoor activities. We’ve had to force them a lot of the time.’ Holly</i></p> <p><i>‘He’s definitely addicted...we’re struggling to find a way of limiting it...he actually just sits around and does nothing...it’s an ongoing issue, particularly, for [our son].’ Todd</i> <i>‘I think it’s more just the missed opportunity to do other things. It’s not technology’s bad...[but] he could be out running about playing basketball...it affects your brain I think...not really, not electricity per se.’ Kylie</i></p> <p><i>‘So we’re not controlling their electricity use because we’re thinking about electricity. We’re sort of thinking about their development and them having as a natural development as possible.’ Abbey</i></p>	<p><i>‘The oldest boy’s [school] counsellor [said], [children] require a phone in high school to fit in....And not any phone a smart phone... it’s kind of when they all have something it’s hard to, ‘cause we didn’t have Xbox or TVs in rooms and stuff for quite a while, that came last year...they needed some sort of, something [to help them adjust to changed parenting/living arrangements]. You know and to be able to keep up with their peers ‘cause that’s really important to. Their own space and their own stuff that they take pride in.’ Rhonda</i></p> <p><i>‘I think [my son]’s teacher was quite surprised we didn’t, he didn’t have [ICTs for children] at home...I just think, you know, they say they’re educational but still it’s that staring at the screen, and yeah, but it is something I worry about that is, is it, am I putting him at a disadvantage by not letting him have one, because that’s his generation? And if all his peers and all his friends have one?’ Becky</i></p>

Box 12 Strategies to restrict children's ICT use

'For some reason I'm just not wanting to [unpack and hook up the new computer]...I know before when we had the computer set up, the kids would sit there for hours and it was a huge distraction and I really enjoyed not having that, yeah, and not having to worry about what they're looking at. I feel like a little bit more in control at the moment.' Selina

'Oh they would like to play [computer games] all the time. They're not allowed during the week, so weekends. And that's interrupted by us dragging them out of their room kicking and screaming.' Rhonda

'Homework and everything has to be done first and [ICT use has] got to be after dinner and otherwise they sort of get sucked into, and they don't want to do anything else...they'll be sitting there saying they're doing homework but they're not really. So it's only when you walk behind them and realise that they're playing some drag game that, and it's not like you can confiscate those because they have to have it every day at school. So that makes it a bit difficult. Lindy

'I didn't let [my 5 year old daughter] use the, you know, the tablet or the computer or even the mobile a lot...I try to not let her to get in touch with these things too early and too much. But you know this year when she's in Kindy their school have some homework. You have to use the computer.' Rui

Box 13 Case Study — Laura and Nathan — 'taking control' of ICT use with technology

Laura and her husband Nathan were worried about their children's ICT use. They had previously used computers with built in parental controls but managing screen time was difficult now that the children had laptops for school and smart phones. They did not feel they could manage the problem without assistance despite trusting their children on other issues. They ordered a device which they hoped would get them back in control.

'Since the big kids are bigger, they have their own computers in their rooms now and they are much less constrained. Although we have just bought a new router called a 'Skydog'...it'll limit every individual device...so you can control and be aware of exactly what they're accessing and how long they're accessing each thing...The man came today and delivered it...We're very excited...You can prioritise different people's [computers]...so if we're sitting here watching TV on my husband's computer, [our internet connection] won't drop out, they'll drop out if something's going to drop out...Of course in a lot of ways they're very trustworthy kids, but of course they're just kids and these things are all addictive...we don't want to be really draconian, you know, certainly my son is getting older, but he just hasn't been really successful and managing his own screen time. So we've just felt like we've had to step in...take control...and my husband loves technology, so for him this is like great, we've got a technological solution, it'll fix the problem.'

ICTs as development, communication and educational aids

In addition to the concerns and pressures of changing ICT use outlined above, many parents described the significant benefits and advantages of their children integrating these devices into their everyday practices. Some parents considered ICTs' benefits to their children's development as being far more important than any potential negative outcomes. They described how their children's evolving 'identities' were strongly linked to ICT knowledge and skills.

'My son's an aspiring animator...I argue with parents about it a lot, other parents, because a lot of them see computer time as a negative. It [depends] what industry you're [child is] choosing...So we do allow it.' Helen

The ability for children to socialise with friends outside of school hours through ICT devices (e.g. via a smart or mobile phone) was of particular importance for families that lived far from their children's schools, especially in regional locations.

'Most of the children who go to their school are bussed in from the entire district so there is no opportunity to go play in the afternoon, because all the kids are bussed back out to their farms and most of that [social] connection is continued online...the same with my son's gaming. It's always group online chat. It's more like they're all just hanging out, as opposed to being an insular event.' Helen

ICTs were also becoming integral components of targeted therapies for children (e.g. therapy for Aspergers' syndrome).

Social media and ICTs: Parental connection and support

ICTs played an important role during changes and adjustments to parenthood. For example, parents of new babies connected with others and shared advice, shopping online saved time and avoided the challenges of going to shops with small children, parents explored opportunities to return to paid work through online job seeking websites, and family and social connections were maintained through ICTs for those separated from others by the demands of looking after children or geography. Smart phones and social media platforms such as Facebook and Twitter enabled parents to use very small time gaps to make contact with others. They sometimes noted that there was rarely time to use a computer when caring for babies or toddlers.

'We have a mother's group [on Facebook]. We have our own private page where people post questions and things like that, how we connect. And looking for a job, 'cause I'm in the middle of looking for a job. So SEEK websites and things like that, they're all on my phone so I can quickly see what job's available.' Susie

'And then some days when I'm talking with my family on Skype, if I have a day off, up to, yeah, two hours on Skype...It's important for [my daughter] to keep in touch with my family [living overseas].' Renae

TVs and ICTs as 'down time' for parents

TV viewing and other ICT entertainment practices were part of relaxing at the end of the day. This was particularly common during the evening period once children had gone to bed, when parents often had some down time (see sections 3.2.1 and 3.2.4). For example, a single parent described how she would stay up at night for some 'escapism' through TV viewing.

'I make myself stay up and watch something [on TV], because I don't want to spend all my time to myself asleep...I watch a lot of escapism [on TV] that's not about single parents ... you know what I mean, single women, alcohol, money, living in an awesome apartment, fancy clothes, just to not be in my world for half an hour.' (Briony)

Working from home

Parents were taking up opportunities to work from home more often, particularly as workplaces adopt more flexible working conditions. This had implications for ICT use but also affected the amount and timing of energy demand on work days. This change is likely to apply to more families in the future with potential implications for daily peaks and troughs in energy demand.

'I actually work from home a lot more because, you know, the office has introduced new way of working... "Activity-based working" ...they just say "Just, you are [working] where you need to be"...I find that I can save a lot of time by doing that, like working from home because I can save at least one and a half hours travelling and it makes it easy for me to go to child care to pick my daughter up in the afternoon.' Carol

Managing and upgrading electronic devices: energy implications

Ensuring that each device was switched off when not in use or minimising standby power use of ICTs was challenging or inconvenient for most families. For example, some households had discarded devices to manage the standby power of TVs and associated devices because they were inconvenient or did not function as expected. Some households were concerned that regularly switching ICT devices on and off would reduce the life of the device.

'We run two computers and we don't turn them off...But then there's, "Well, it's bad for electronics to be turned on and off all the time". So like you're kind of weighing up, do you want to keep your electronics lasting longer or do you want to save money and the environment? And also things take so long to boot up, so in like a time-pressure world where you've got to get stuff done... if you had to turn your TV off at the wall and then you wanted to turn it on, it takes like 5 minutes for TiVo to reboot, so if you only have half an hour to watch something or you need the television to entertain your child while you cook dinner, then you're much less likely to turn it off.' Kelly

Most householders discussed ongoing change in TV numbers, sizes, and aesthetic qualities (Box 14). The relevance and importance of TVs was also changing. These devices were being superseded by other ICTs in some households. Other households were:

- using TVs in conjunction with computers or games consoles;
- moving to 'smart TVs' as replacements for computers;
- planning to acquire a larger TV or one that more seamlessly and invisibly blended into the aesthetic of the home (e.g. slimline, wall-integrated, flat screen); or
- planning to upgrade to the latest technology with new functionality (e.g. Bluetooth, USB-enabled).

In some homes TVs were switched on whenever the home was occupied for 'company' or 'background noise'; however other parents were concerned about the potential negative effects this might have on their children's development.

The energy implications of ICTs and the activities they are associated with are in a state of rapid change and flux within and between the households we interviewed, making it difficult to predict or anticipate clear trends (Røpke et al. 2010). However, the number of ICTs in family homes appears likely to increase as a greater range of devices become 'necessary' or 'normal' elements of various

entertainment, work and study practices. The energy implications will be highly dependent on the energy efficiency of these devices and how they become integrated into these practices.

Box 14 TVs and ICTs: rapid and unpredictable change in energy demand

'[The children] used to love watching TV, especially animation. Now all they want to do is go on YouTube and watch things. So essentially they do not watch TV... I don't know if the TV is going to be relevant. I'm not sure.' Holly

'My husband plans to get another TV, maybe a larger one, maybe 60 inch or 80 inch, I said no, no, no 55 inch is enough for us because our living room, the size is fixed, we can't have a larger one...the mid-season the sale is on...they have a label on the corner with the number of stars, I try to find one, not the best one, because the best one, normally is the expensive one.' Naomi

'An iPad mini and one's got an iPod... they've got more than that, they've each got a TV in their room and they've each got an Xbox in their room. Apparently you don't play games together... Four [TVs]. Two of which have TV capabilities, the others are used for the Xboxes...Probably got on the horizon a TV, like a nice TV...slimmer maybe...we probably would like to build it into the wall...[My son] would like a bigger TV in his room. He has a list of demands.' Rhonda

'It's a smart TV. You actually use it as a computer...So in a way I bought it for myself but if my daughter can use it for doing her homework, that'll be great. Instead of sitting down at a computer, smaller screen, she actually can use the smart TV... I thought, "Big TV, reasonable price." I thought, "I'll get that, smart TV." When the man came to install it I said, "Does it use a lot of electricity?" and he goes, "No, it's got five stars," so it means something.' Anna

'So rather than buying a TV we actually just got given them...I think we've got plasmas, which aren't as good with electricity usage...so people started getting rid of them...It seemed like crazy. So I think other families are utilising newer televisions than we are, because we are getting off-casts from people who are upgrading televisions, where we would never upgrade a television; we just use them until they die.' Kelly

Key Insights

Parents are concerned about the 'uncontrollable' effects of changing ICT use on their children's wellbeing. However, ICTs are also considered important for keeping children entertained, and for cultivating life skills and providing development and learning opportunities.

Parents use ICTs for social support, as a child-minding and communication tool, to create down time and time out, and to enable working from home.

TVs and other ICTs are integrated into entertainment, work, study and social activities largely independently of considerations about their energy use.

The fast pace of change in ICT devices and their changing roles in everyday life have unpredictable energy use implications for family households.

3.4.5 Housing and household activities

Housing and household changes including tenure arrangements, moving house, changes in home design, and differences in gas and electricity utility access were also contributing to changing household activities in families. These changes also affected some families' energy use and their ability to control it.

Home renovations, which were undertaken to accommodate growing families, were often a time when heating or cooling technologies were changed. Most householders wanted more efficient units but also wanted to heat and cool a larger floor area, as found in other Australian research on home renovation (Maller et al. 2011; Judson & Maller 2014). As such, the process of accommodating a growing family (and meeting increasing standards of comfort or 'normal' amenity) potentially increased TOU peak period energy use (and overall energy demand) for the family. The ongoing running costs associated with these changes were not usually considered during the renovation.

'It was an upsell by the electrician, because we put the fan in and then he was doing 'air con' at the time and he said, "Oh look, I can put this in," and we just sort of, we got sold to, and we agreed to it without sort of thinking...the[gas] space heaters are just unbelievable, like they're great...they are essentially our only heating, but we're renovating...so that'll be different...we're thinking of a gas unit that will be ducted, like through the house.' Mel

Some migrants were concerned about the thermal or energy inefficiency of their houses or appliances. For example, one Chinese household considered the standard ovens in Australian kitchens (such as the one in the townhouse they had purchased) wasteful because their family would rarely heat or cook more than one dish in the oven. They put a small toaster oven in the garage and were pleased with the extra kitchen shelf and storage space created when they removed the larger oven from the home.

Some householders expressed ongoing discomfort with their home environment due to the thermal inefficiency of old housing. As found in past Australian research (Strengers & Maller 2011), other householders reported that new housing reduced their ability to take adaptive measures to achieve thermal comfort, dry clothes indoors or manage energy use. In particular, new housing could be:

- smaller with limited (outdoor) space for drying clothes on racks (apartments);
- more energy intensive to heat or cool with larger, open plan spaces (no partitions or zoning); or
- include appliances that were energy inefficient and/or larger.

'We bought the fridges and freezers and then as our family grew we bought another fridge and another freezer... we had all appliances that were energy efficient, and quite miss them because the ones that were already installed here [new house and land package home] aren't as well designed as the ones we had purchased, but what can you do? Eventually one day when we can afford it we'll replace them.' Lindy

Renters' ability to improve energy efficiency and comfort in their home comfort was often restricted. Parents who were renting their homes often had energy concerns about poor insulation and inefficient (or lack of) appliances such as heaters. Some had asked for changes to be made to improve their comfort and/or reduce energy use but these requests had often been refused or ignored. Others didn't ask because they had difficulties getting essential things fixed or were concerned that asking for changes could lead to increased rent.

'The windows don't open. Well, they do open, but they don't stay open. And we really wanted to have this fixed and we've been asking for it...being able to open the window properly and let the air come in and come out would also warm up the house without having to put the heater [on]...They send us one guy to fix it, that put nail into it [and] say, "You just have to open with the nail," and then you have nail falling and then the kids [are at risk].' Jill

'I don't like to stick my head up too much and complain because I don't want to put the rent up...and also the landlord often does a really bodgy job. He likes to do things like fix electrics himself.' Laura

Several renting households had made changes which are illustrative of some of the constraints of tenure on comfort and energy management.

'I got these polystyrene lids that...broccoli boxes have, and I squeezed them in that [skylight] frame. That made a difference [to the amount of heat entering the home].' Sasha

'Normally in winter as well, we are closing the window with sticky tape...because it's quite old house...Keeping the warm inside.' Sophia

'There were old blinds there and they were really rubbishy and just perishing and so I thought it's easy just to go and buy them and replace them and [the landlord]'s not going to complain...the two halves of our house are quite different...between the front section and the back section we put up a curtain which in wintertime keeps the heat in one half of the house or the other, and in summertime keeps the heat in the back half of the house so the front half of the house will stay nice and cool.' Laura

Some regional householders were concerned about the energy use of water or septic tanks (in response to toilet flushing etc.) and their limited ability to manage this usage.

'We use a pump for all of our, because on tank water so every time I turn the tap on you'll hear the pump kick in. And we found that that is quite, consumes a lot of energy, so even when you flush the toilet.' Robyn

'We have a septic [tank], though, and that uses, it has a pump that comes on intermittently.' Ruby

Key Insights

Housing arrangements currently limit householders' ability to participate in adaptive strategies to manage their home comfort and other household activities in ways that reduce or shift energy demand.

Home renovations and new housing arrangements do not always facilitate energy demand reductions, and in some cases further limit opportunities for shifting or reducing energy demand.

3.5 (DIS)ENGAGEMENT WITH ELECTRICITY SERVICES AND CONSUMPTION

Over recent years there has been considerable change in electricity prices, offers and services, and in the Australia's electricity industry in general. This section provides an overview of family householders' engagement (or otherwise) with electricity costs, use, information, tariffs, management and providers — as a basis for considering how family households may respond and adapt to further industry and government-led initiatives. It is important to note that this was not an area of high priority or interest for most households.

3.5.1 Electricity use as an outcome, not a series of decisions throughout the day

Most householders did not think about electricity before or while they were performing energy practices (e.g. when they switched an appliance on or used it). Instead, following Warde (2005), energy consumption was an outcome of having participated in a practice, rather than a conscious decision or continually reflective process.

Householders discussed how activities were done because they needed to be done or were considered part of family life and wellbeing (Box 15). Any consideration of electricity use was particularly absent during the busiest parts of the day (including the TOU peak period), in part due to the number of things that needed to be done and organised at this time.

For some householders, the arrival of the electricity bill was the main (or only) time that electricity use was considered.

Box 15 Getting stuff done: Purposeful non-deliberative energy use

'I know [electricity]'s being used but I'm not calculating how much I'm spending. So I just know that I'm going to be using an oven, I'm going to use a dishwasher and if needs be I am going to put the heating on. I also understand that I'm running a fridge and possibly going to do the washing and might watch some watch TV. I am aware of what consumes but I'm not thinking how much...[When the bill arrives] that's when my jaw drops and I feel really depressed.' Holly

'It's not that [my husband] has made a conscious decision not to care about electricity, it's just that he's involved in other things.' Kelly

'I wouldn't be thinking about my energy use when I'm on the internet because I'm doing that for a specific purpose and I'll do it until that purpose is completed. I wouldn't be concerned about, yeah, what else, and hair dryers and vacuum cleaners, I just do the job that they're intended to do and then put it away I suppose.' Lily

'When you have to do something you've got to do it. No, I don't think about [electricity] but now we're talking about it...when I get my electricity bill...' Anna

Efforts to manage energy use usually occurred outside of the family peak period (and TOU peak period) when fewer things were competing for attention. Having more efficient appliances was a preferred way to reduce energy usage without the need to constantly reflect on their consumption. In addition to concerns about heating use in some households (see Section 3.4.1 above), the main focus for reducing energy use was intermittently switching off what was no longer being used, particularly lights in unoccupied rooms or ICTs that were no longer being used. Householders' focus on lights as an area for saving energy has been noted in other studies (Hargreaves et al. 2010; Strengers 2011).

Parents were concerned about wasted power from appliances being used or on standby, but most did not monitor or manage the use of energy by children or themselves on a frequent basis throughout the day. The focus was on quick and easy (and possibly small) savings rather than significant shifts in their routines or energy practices.

'It's more after I go to bed I suppose, and I look around the house and think "What can we turn off?'" Sandi

'I don't think [electricity] comes to mind at all...Probably in the morning before I leave the house is the only time I consciously think, "I don't want to use too much electricity." So I go through the house and make sure I've turned off like all the lights as I leave the house, and make sure. And then maybe when I'm going to bed I go and check that all the lights are off.' Kelly

'If I've decided I want to watch TV I'm not thinking oh well I shouldn't do that because I want electricity. Or if I need to use the computer I'm not thinking about you know, the electricity that might use, it's more the standby electricity... So more thinking okay well that's left on [when] the boys have gone to their mums for the weekend, you know that type of thing.' Petra

3.5.2 Change and control of children's energy use

As discussed above, household energy use in family homes is an outcome of many practices carried out by multiple occupants. Parents were not necessarily able or willing to control the actions of others in the home for the purposes of managing energy use (Box 16).

Despite frustrations with children forgetting to turn off unused lights and appliances, parents often wanted to minimise this source of disagreement or stress. In addition, encouraging children's independence could involve relinquishing control of some activities that require energy use to their children (Box 16). Some parents felt that outside 'forces' from 'society' contributed to difficulties controlling children's energy use and that an additional 'burden' (worrying about energy) would not benefit children or their family. Other parents believed that their children were disengaged from their energy consumption because they weren't involved in paying the bills.

Box 16 Parental control of energy use and encouraging independence

'I used to make them turn off lights or put the heater on later or that sort of stuff, or I'll turn off an appliance, I'll get them turning it off. These days I think I've become more tolerant of leaving stuff on, like the computer...it's just hibernating some of the time, and there's other things that, you know. I used to be much more vigilant at always turning stuff off...when you went to bed there was no lights on anywhere. But now it seems there's so many appliances.' Bella

'Our 19-year-old has the computer on all the time in her room and I don't think she switches it off at the wall, which she's supposed to...It was easier when she was younger and she's just so independent now we kind of just leave her to her own devices and hope that she does things.' Tanya

'I mean the fact that they're just independent people. I'm not in control of when things are done anymore...I mean they're encouraged to turn lights off and turn things off at the wall and things like that. We certainly have communicated all that stuff with them...they're pretty good. They're also teenagers.' Helen

'[My children say] "I'm too cold"..."You tight arse" ...Yeah, because they don't pay. Children, they don't care. They've got no idea...I don't want to create extra burden on them. But whenever it's needed, they have to do it.' Maya

Having children was sometimes linked to additional family members (particularly grandparents) staying or living in the home on a long-term or permanent basis. This resulted in extra energy use but provided other important benefits such as contact between grandparents and grandchildren, and opportunities for parents to return to paid work. With these arrangements, it could be very difficult (or inappropriate) for those responsible for paying the energy bills to try to manage or control the energy use of other adult family members.

'Well, a couple of times granddad did put on the dishwasher in the evening [laughing] and we had to have words...I don't think he put the dishwasher on again [at all] after that.' Peta

'[I am] almost shouting. You have to stop [using the computer] now...They [the children are] very smart, they know parents in law will let them play the computer [in their room].' Mai (parents in law living permanently in the home)

Some parents mentioned that despite strong environmental motivations and having been very conscious of energy use prior to having children, they had found that they could not maintain their previous attention to energy-saving with children to look after.

'I think a shift in priorities in terms of environmental perspective. You tend to lose, because you've got lack of time and in the past you were more focused on, well for us in particular, more focused on a greener lifestyle, but since [having children we] feel like you don't have the time to, or it goes out the window a little bit at times.' Scott

Key Insights

Most family householders are not actively engaged in managing or considering their energy usage aside from quarterly reflection on their energy bill. Energy use is least likely to be considered during the family peak period (TOU peak period).

In family homes, one person does not (and often cannot) control energy use in the home.

Energy saving is intermittently sought through quick and easy savings (turning things off) rather than monitored and managed throughout the day.

Greater engagement with electricity usage and issues is unlikely for parents with limited time, interest and competing priorities.

3.5.3 Increasing cost of energy, bills and financial hardship

Most households were concerned about the increasing cost of their electricity bills despite having tried to save energy. Electricity bills were a source of stress, anxiety or family tension in some households.

'Bills have gone up, especially over the last couple of years. It's just been phenomenal the changes...If anything [our electricity use has] come down. I mean we've got safety switches in place, we've got the timers, things like that, low watt globes, all those sort of things...at the end of the day I don't think it's made that much of a difference... I think the electricity bill is what causes the stress and anxiety in the family, or between my husband and myself.' Lindy

'I care about the bills because the bill goes higher and higher so oh, it's another financial problem, it tax on my family a lot.' Naomi

Several households had been experiencing a high level of financial hardship, either as part of reliance on social welfare payments, reduced income after having children, or an unexpected job loss in the family. While this research did not expressly investigate family hardship, clear indications of unhealthy self-rationing of energy use in these households were not apparent. These households tried to use less energy; however with children to consider, they used the energy that was 'needed' in the short term and found ways to pay the bill in the longer term.

Householders discussed using a range of strategies to pay electricity bills. Some households used regular deductions for electricity bills from their bank account or Centrelink payments (e.g. fortnightly via bill smoothing or Centrepay systems) to help them avoid difficulties associated with paying larger bills on a quarterly basis. Arranging (multiple) payment extensions, utility relief grants, and assistance from social service agencies was common but few had entered a formal hardship program. As reported elsewhere (Chester 2013), the need to prioritise payment of electricity bills impacted on family wellbeing and householders' ability to buy other important household items such as healthy food.

'I definitely have gone there and gotten financial assistance for bills a couple of times...Like if a big bill comes, you can ring and get an extension, or you can have a payment plan, but it still means that you don't have as much money for other stuff. And so when you're on a limited income and you can't cut certain things back, it's going to come out of the grocery budget. And it means you're going to either eat less food, or you're going to not be able to afford the food you want. So instead of being able to buy fruit and vegetables and pasta and bread and whatever, you end up just buying three loaves of Homebrand bread because it's cheap and it fills their stomach up...because you've paid your electricity bill and you buy crap food, then you feel like crap, because you know that you're feeding your kids something that's not good.' Briony

Low-income households were sometimes unsure what financial assistance was available to them or whether they were receiving it. Energy bill concessions for low-income family households were considered inadequate by some of these households.

'I call the company and they say you should check it with Centrelink they have some program to reduce your bills, I'm not sure.' Rui

'I think their concession discount is inadequate... I remember in the past it being quite a significant discount, but I think these days it's automatically processed and it might only be the equivalent of 5% or 10%. I'm not even sure.' Helen

Difficulty getting through to customer contact centres impacted on householders' limited time and their household budget.

*'The **amount of time** you have to wait on hold, which can sometimes be longer than an hour...I've had other experiences where my phone's actually gone flat because I've been on hold for so long... it actually means you can't make any other phone calls as well that whole time...I don't mind the wait I just don't really like my phone service being tied up...it's one of the main reasons I don't disconnect [the landline]...the hold processes — you just cannot do it on a mobile phone.'* Helen

Limited financial resources reduced low-income households' access to more efficient appliances. Further, having children could reduce the capacity for low-income households to choose a more energy efficient home as some landlords/ real estate agents considered families with children to be a 'risk'.

'I've got no choice to have a second-hand fridge and all that at the moment.' Anna

'It was really hard for me to find a house with five kids. A lot of [agents/landlords] thought it was too risky so we looked at so many houses before we got this one. The one that we're in now is 50% of my income, if anything changes, like I've just got [my financial situation] so carefully kind of stacked at the moment, that if anything changes it can put us out big time with like, you know, worst case, be homeless, like, that really concerns me.' Selina

Key Insight

Difficulty paying electricity bills compounds financial hardship and negative social outcomes in some family households.

3.5.4 Low levels of energy literacy and engagement

Householders were often unfamiliar with key elements of energy literacy such as units of electricity measurement, cost per unit or appliance energy consumption. This finding had no correlation with education; indeed the sample is considered highly educated in comparison to the ABS national education average. These findings reflect similar research conducted in Australia and internationally (Strengers 2013). Many householders found bills difficult to understand and/or did not engage with details beyond the total cost despite participant education levels being higher than the Australian average. Low levels of energy literacy and bill familiarity could be attributed to the combination of limited time, electricity being low priority, and lack of clarity/complexity of bills and tariff details.

'What do they call them [units of electricity]? Megahertz or whatever they call it... [I look at] the amount that I have to pay. That's when my jaw drops and I feel really depressed. But in terms of what they put about how much for whatever it is, the hertz and what else, I do not understand any of it, and I suppose if I was one of those really anal organised people I might call them and ask them to explain every single detail to me, but I'm just not one of those people.' Holly

'I could have done a lot more [to learn about electricity use] but it's, there are so many other things in life that seems to be more important...they're all more important than doing research on electricity.' Carol

'Have I used more [electricity] this time? But I can't figure out why. I don't know... It's in their language but it's not in mine. I don't understand [the bill]. All I understand is that you have to pay for the bill... I think they should be simple. Don't make the bills so complicated.' Amy (English is first language, non-TOU household)

3.5.5 Smart meters

Smart meters are being introduced in homes throughout Victoria and other states and territories to enable householders 'track and monitor your household's energy usage, so that informed choices can be made about how and when appliances are used so as to achieve energy and cost savings' (SGOV 2014). Other than households with solar photovoltaics (PVs), most households⁶ knew little, were confused or distrustful, or had not heard about smart (interval) meters.

'We've got a smart meter but I don't know what that means.' Scott
'Doesn't mean we're smart.' Lucy (Scott's partner)
'Isn't that mental? I don't know. .. smart meters are meant to change lives, so I'm a bit lost...I wish I knew.' Scott

'We've got one [a smart meter]...I used to like being able to look at the [old] power meter and seeing the wheel spinning and then actually being able to see, I remember as a kid being able to go out and turn everything off in the house and see how slow you could get the meter to spin. Now ...I'm scared to touch the thing.' (Jeff) *'I don't really understand why we have a smart meter but someone still comes to read it because I thought that was the whole point that no-one, someone still comes so I don't understand that about it. It seems like a waste.'* Sandi

Two households had engaged with their smart meter data but to a limited extent. One had received an in-home display (IHD) from their electricity retailer but it had only operated briefly and no-one in the home had found time to see if it could be reactivated. The other household had solar PVs and used a web portal to check their electricity generation (but not household consumption of energy).

'I was quite obsessed about [the IHD] for the first few days...you had to tick off something and sign it and send it back to them, and I forgot to do it so they switched it off... it sits on the microwave never being used... I was quite excited at first and then of course when I forgot to do the thing and it switched off it became another job to do, so they didn't do. And every time I look at it I think I must do that.' Mel

'When I get downstairs [in the morning], I'll check the, there's like an internet web thing so you can see how much the solar panels are producing.' Peta

Two households (without solar PV) were aware that they could use a web portal to access data about their electricity use but they had not done this.

'[The smart meters] have, like, more interval time measurements of electricity so that you can manage your electricity better. And I think you can access it on the web, which would be useful if you had time to do things like that.' Kelly

'They gave us a flier when they came, before they came [to install the smart meter]. And, they did give us like a code I think so we could log on, have a look at [our usage information], which I probably intended to do, but haven't done.' Jane

3.5.6 Migrant engagement and understanding

Understanding electricity bills, different electricity systems in Australia and communicating with utilities were challenging issues for some migrants, particularly when English was not their first language and during their first years in Australia.

'When I came [to Australia], in the first year, because of my language it's not very good enough to you know, to explain things very well so we always make misunderstanding

⁶ Living in areas where smart meters had been installed.

between each other so I have to ring them up several times to get things done, after that it's better.' Naomi

'One day I saw the bill, why are they charging me a service fee? It's all very strange. I ask Origin staff, "We don't charge the service fee. It just as agreed." Before I don't know what is agreed ... every month is different and they ask me, "Why you call me? That's very funny, strange." ... I can't understand what happened, the same language, make mistake. After that I know for the service fee we have to pay and every month is different and that's for the ...not for the Origin company, just for the whole Australia electricity. That's the only time I rang them.' Hua

Despite these challenges, more migrant households were engaged with managing their electricity use on a day-to-day basis. Previous research conducted with Australian migrant households reports similar findings and suggests that some migrant households carry 'memories' and practical experiences with 'not wasting' (conserving resources) from their home countries that continue to inform current practice (Maller & Strengers 2013; Strengers & Maller 2012).

3.5.7 Making (or avoiding) decisions about electricity tariffs and providers

Electricity market strategies intended to improve the consumer experience often focus on providing better retail (and service) 'choice' (e.g. AEMC 2012)⁷. These strategies assume that consumers will benefit from greater choice by making informed decisions based on available information in relation to their households' individual circumstances. With additional demands on time, attention and energy use in households with children, it is important to understand how family households engage with the issue of choice.

Householders were generally distrustful of phone and door-to-door electricity sales offers but these contacts often catalysed making a change in their electricity retailer or tariff. The discount percentage offered often took precedence over other considerations such as the cost per unit. Householders were often concerned that comparing retail tariff offers was complex and time-consuming and that their past decisions had not had a positive financial outcome. Very few householders were aware of, or had used, independent electricity offer comparison sites.

'The [energy retailer] man knocked on the door and presented a bigger saving than what we were having with [another energy retailer]...we were just ready to just get rid of them because the customer service was appalling...we were fed up by then, and we went, "Yeah. Righto." And I don't know that we're saving that much, you know.' Alice

I kind of think [it] is probably a bit of a con along the way. You know, they come and knock on your door...then [my husband] goes, "Oh yeah, maybe we should try this because if it's going to give us 20% discount", I'm kind of like, "Yeah, but in the long run it probably doesn't", and that's how they get you to change... I think, I mean I must admit I don't look into what they say about the kilowatts.' Bella

There were various reasons for householders not engaging with the range of choice currently available (Table 6).

⁷ For one of the authors' responses to the AEMC Power of Choice Review, visit: <http://www.aemc.gov.au/Media/docs/RMIT-University-bad57296-931a-4d69-b2d3-731a255f0af4-0.pdf>

Table 6 Reasons for householders’ not choosing a more financially beneficial electricity offer

REASON	ILLUSTRATIVE QUOTES
<ul style="list-style-type: none"> • Not convinced that offers are significantly different • Unfamiliar terms • Complexity of comparing offers • Lack of access to internet • Insufficient time • Convenience of accepting electricity connections by real estate agencies. 	<p><i>‘I just said stick with the same [electricity retailer] because it’s swings and roundabouts often isn’t it?’ Kylie</i></p> <p><i>‘I think the whole thing surrounding electricity there’s a lot of, the words they use, the jargon, all the, it is so confusing and so hard to get a straight answer and it’s so, just by ringing round and all that sort of thing they want you to be in the dark...there’s so many little catches and oh we’ll give you a 10% discount or a 3% discount or whatever it is but they don’t tell you their rates are higher or, “oh no that’s not on supply charge, it’s only on the rate or...”’ Keira (one of the most electricity-engaged householders)</i></p> <p><i>‘They’ve “baffled” it so much that you actually can’t compare them. I guess you just go with your gut, and you just go “Okay, well, I’ve been loyal to this company for so long and it’s not really working for me anymore, I might as well try somebody else and see what happens”.’ Briony</i></p> <p><i>‘I should somehow compare companies. But that wasn’t very easy at all because we didn’t have the internet. So I couldn’t really... So I just went, look, it’s probably all much of muchness, anyway, I decided.’ Sasha</i></p> <p><i>‘I haven’t thought about changing electricity suppliers... I probably wouldn’t unless there was reason ...In fact I’m, yeah, I would find having to do that annoying.’ Norah</i></p> <p><i>‘I just think that the offer is not really clear in Australia because you have that many providers, it’s hard to, to be honest, I wouldn’t know if I’m paying more or less...the offer is not really clear for me... they’re comparing apple to pears, so it’s hard to, unless you really want to sit down and spend two hours on it, which [we] probably won’t... it’s a little bit controversial because when you don’t have children you have, kind of, more money where you don’t really go into the hassle of trying to see if you can save 10 bucks per month because you can afford the extra 10 bucks. And then when you start having children you have less money but then less time as well to do all that type of research.’ Jill</i></p> <p><i>‘There were kind of preferred providers [through the real estate agency] which I haven’t done much investigating as to whether we’re on the best plan or not.’ Neil</i></p>

Engaging in deliberate disengagement

Householder disengagement from electricity issues was not necessarily a result of lack of interest or knowledge, but was sometimes a considered and deliberate strategy (Box 17). The increased cost of electricity or problems householders had experienced in the past had created anxiety, frustration and distrust. As a result, householders participated in a different form of choice: they ‘chose’ to minimise their contact with retailers and disengage from electricity issues to avoid further stress and/or reduce demands on their time.

Deliberate disengagement needs to be acknowledged as a potentially common and legitimate consumer response to rapid change in the electricity market. Given that deliberate disengagement is the result of past (negative) experiences with the electricity industry and service providers, this may take some time to change.

Box 17 Householders deliberately disengaging from electricity issues

*'They **promised it would be cheaper** and that's when I was looking at the bills at the old house, and it wasn't cheaper. And they promised that it wouldn't cost anything to change back to my old one if I wanted to, and then they tried to sting me for the cost. It just, yeah, it was so **frustrating, so stressful**. Now if anyone does come to the door knocking I say "No, I'm not interested", whether it is going to save me money or not, that was, it was awful...I guess it's a bit lazy saying I can't change it. But yeah, there's **no point in stressing myself about it**.'* Kim

*'As it was we were paying too much and then they kept demanding more and more and we couldn't, it was like well, we couldn't pay anymore. ...I don't think I've ever felt **so stressed** as getting those horrible notices in the mail or the phone calls [from electricity retailer] with people who were so rude. And then to find out in the end that it wasn't actually your fault, that just made me so **angry**. I was, mmm. Yeah. I'm so angry, **frustrated with myself**.'* Lindy

*'I always thought this bill is probably not quite right... I start to **hyperventilate** even at the thought of having to ring these companies. And so I just **paid it and forgot about it**.'* Sasha

*'It's always so frustrating. I think I'm not alone. Most, most people just go, "Like, whatever, let's just pay it." ...got a bit of an issue to actually prompt someone to call... You know, so you actually have to put on your diary to call the company and allocate the time... [I am] already **anxious**... It seems like there's something designed to **discourage the questioning** of anything the company does. You know, so it's really frustrating... it's just a ridiculous, absolute **ridiculous amount of time of your day**.'* Renae

Key Insights

As a result of past experience and current confusion, some householders are unlikely to be interested in making active 'choices' in the electricity market to their financial advantage.

Greater engagement with energy choices is unlikely for parents with limited time, limited interest or stressful past experiences without satisfactory resolution.

3.6 FLEXIBILITY AND CHANGE FOR DEMAND MANAGEMENT

This section discusses findings regarding householders' views on TOU tariffs and the potential 'flexibility' of their daily activities in response to this tariff, particularly those usually carried out in the TOU tariff peak period (during the family peak period – see Section 3.2.2). The possibility of a 'peak alert' to achieve demand management aims is also considered.

3.6.1 Widespread ideas of 'off-peak' electricity

Most householders believed that all the electricity used in the home was cheaper at night regardless of whether their household was on a TOU (3-part), Controlled Load, Two Rate or peak only tariff. They usually didn't have a clear idea of when the assumed off-peak rate applied, and frequently acknowledged that the existence of an off-peak electricity rate was an assumption they had made but not verified.

'I understand there are peak and off-peak times and off-peak is usually like ridiculous times like middle of the night or at some point in the day. I couldn't even tell you.' Cass

'I thought there was peak and off-peak...I think off-peak is throughout the night.' Norah

Off-peak or TOU tariffs (experienced or mentioned by others) and references to 'peak' tariff rates on the electricity bill contributed to confusion in households about their electricity tariff, times and rates. This confusion resulted in fewer than expected interviews being conducted with TOU tariff households (see Section 2.3). This was because householders' reports of being on TOU tariffs (or off-peak tariffs) were not confirmed by the electricity bill (or electricity bills were not available). This finding is likely to have implications for surveys (including a subsequent survey being conducted as part of this project), or other studies that rely on householder accounts of their own electricity tariff.

Whether correct or not, assumptions that off-peak or TOU tariff electricity rates applied to their household do provide insights into householders' current responses to perceived variations in electricity prices within a 24-hour or weekly period.

Responses to assumed off-peak electricity

There was variation in householders' ideas regarding what times off-peak rates (might) currently applied to their household and how they were responding to these (see Table 7). Even though some householders considered it impractical to change the timing of current activities, running the dishwasher was the main activity that some households had consistently been able to shift to take advantage of the (perceived) off-peak electricity rate. This finding suggests that a proportion of households may have already implemented their available flexibility to time-based pricing.

Table 7 Householder responses to assumed (but often not applicable) 'off-peak' electricity rates

No shift in timing of activities
<i>'Off-peak is just between 11[pm] and 6[am]...when you're asleep anyway so it's really not much use. So we don't ever consciously decide, "Oh, we'll run the dishwasher late because it's going to be in off-peak usage." We just run the dishwasher late because it's full.'</i> Kelly
<i>'I'm sure [electricity has a different price at different times of the day]. But I don't know when, and I don't care when, because if I need to use something I'll use it then.'</i> Kim
<i>'I would assume that during the day would be peak time and then evening and early morning would be off-peak time for like industry consumption, I don't know. It certainly doesn't affect the way I use electricity.'</i> Ruby
<i>'We don't curb our energy use to do with peak or off-peak, ever.'</i> Helen
<i>'I'd like to think I would try and do [washing] in the hours of best energy conservation [off-peak] but...it doesn't work like that. So it's usually [done] when I remember or I've got a bit of time to do it.'</i> Cass
Shift(s) in timing of activities
<i>Sometime I use the dishwasher when some guest come to my house and I just turn on the dishwasher after 11pm.'</i> Rui
<i>'I think there's an off-peak [rate]. So if we wash, we should do our washing overnight [but we don't]...We set the dishwasher to come on later at night.'</i> Keira
<i>'The main thing was that...[we] left all the dirty laundry until the weekend and just cram it...probably to a great extent vacuuming and everything with power...Got a bit disinterested in the thing [responding to off-peak]'</i> Scott (talking about what they used to do before having a child)

Key Insights

Householder confusion about their electricity tariff undermines opportunities for consumers to benefit, or avoid financial penalty, from TOU (or other variable pricing) tariffs.

Pre-existing (mis)understandings that electricity is *already* cheaper at night (and more expensive during the afternoon) suggest reduced potential for families to shift their activities to off-peak times.

3.6.2 Initial reactions to the idea of TOU tariffs

Householders’ initial reactions to the idea of TOU tariffs are summarised in Table 8. These households had not experienced a TOU tariff and expressed a range of concerns about the idea. Some were clearly distressed by the possibility of being on a TOU tariff. A few householders felt they may be able to shift some activities and might benefit financially (see Section 3.6.4).

Table 8 Householder responses to the idea of TOU tariffs

FINDINGS	ILLUSTRATIVE QUOTES
<ul style="list-style-type: none"> Unfairness, lack of choice and consideration of consumers, distrust in utilities 	<p><i>‘Isn’t it when people are most likely to be home, so it’s sort of, you get stung anyway...in the afternoon/evening you’re going to be home and what are you going to do? You have to use electricity. Yeah. It does feel a little bit unfair...are they just trying to find a new way of making more money? Because they know that we can’t not use it.’</i> Lindy</p> <p><i>‘It’s cashing in on the times that families are at home, that have to do things’. Lucy1 ‘They put you over a barrel, don’t they? I mean, what can consumers do?’</i> Scott</p>
<ul style="list-style-type: none"> Too complex and confusing 	<p><i>‘When you have to do something you’ve got to do it...People [would] have to look at the time when they use something. I think it should be 24/7, a normal rate and that’s it. It’s a bit complicated for people... I’ve got other things to think about than that, look at time.. the price of my bill would go high or low. I’m not really sure.’</i> Anna</p>
<ul style="list-style-type: none"> Impractical to shift family activities away from the TOU peak period 	<p><i>‘We could do our best but I’m not sure we could move a lot of things...we’re too many people...School holidays, especially during the winter...they’re really hard. Because you’re home. It’s wet, it’s miserable and it’s cold and going out is... not a great option.’</i> Lindy</p> <p><i>‘Each household is different. For my parents, they will use it differently from me...but [TOU peak period is] the only time we’re at home. And that’s not fair, because we can’t exactly adjust our routine over this kind of charging.’</i> Susie</p> <p><i>‘[R]ealistically we don’t live in a time-shifted world...we work from 9 to 5, or 8 to 4:30, and we all come and we all have to cook dinner... how do you change your routine to not use energy in the evenings? ... we still have to bath and prepare our children for bed, so there’s not much choice.’</i> Kelly</p> <p><i>‘The lights, cooking, preparing, cleaning, washing. All this stuff is between 2pm and 8pm. If the high price is this period, it would be like crisis.’</i> Mona</p> <p><i>‘I think I don’t have any choice because I have to work and after</i></p>

FINDINGS	ILLUSTRATIVE QUOTES
	<i>10pm I have to go to sleep. It's not useful for me...[The TOU tariff is] good for someone who doesn't work.'</i> Hua
<ul style="list-style-type: none"> Negative social and wellbeing impacts on families 	<p><i>'I think that would be very stressful for families. And I think that's quite insidious actually because it will actually affect people, families with children more than anyone else.'</i> Abbey</p> <p><i>'If it's going to actually cost me even \$5 a week more...if your bill's already say \$280 and it's going to take it up to over \$300, and that's going to mean you eat even less food, because that really is the only thing that you can change, if you're already using second hand clothes... So then if you don't want to do that, then you do have to change your routine...And then that affects your mental health... and then that affects your family dynamic.'</i> Briony</p>
<ul style="list-style-type: none"> Concerns for other (vulnerable and low-income) households 	<p><i>'You need to be able to be organised to work around a system that allocates particular times of the day to certain things... in families and households... in survival mode, it's more chaotic. Their lives are generally more chaotic and they're not going to be able to organise themselves to do their washing [at a certain time]. I'm making a generalisation, I'm not saying that everybody in a low socio-economic group is going to be like that.'</i> Lily (works with vulnerable low-income households)</p>
<ul style="list-style-type: none"> Inability to control timing of other household members (children) 	<p><i>'[A TOU tariff] would be complicated and it would be frustrating and it would be annoying... I guess if I felt that it was going to make a real difference to the cost of it then I probably would put the effort into it. But, you know, there are certain, you know, a lot of things beyond my control, you know... my children will do stuff... I can't expect them to, you know, as they get older, as they're teenagers I can't necessarily expect them to have the same view.'</i> Bella</p> <p><i>'It wouldn't mean that [the children] would behave any differently. I think the only person in the house that would behave differently would be me.'</i> Mel</p>
<ul style="list-style-type: none"> Limited interest in shifting routines to save money on TOU tariff 	<p><i>'I like this idea [TOU tariff].'</i> Mai</p> <p><i>'I'd like to see what the proposal was first before I decide is it a good thing.'</i> Neil</p> <p><i>'If I was going to save a significant amount of money by putting the washing machine on and setting it to start ...6 o'clock in the morning or something, then I'd be happy to do that.'</i> Laura</p>

3.6.3 Experiences of TOU tariffs

Most of the households who reported being on a TOU tariff were confused about tariff times and had not shifted energy practices to different times of the day (see Table 9)⁸. The tariff was an irrelevant or deliberately ignored complexity in most families' everyday activities. They felt their activities had to be carried out at certain times of the day or when it was 'practical' to fit them into their routines (see Sections 3.2 and 3.4). Two households reported making changes to their routines in response to the TOU tariff. However, one of these households had since started a family and their new routines were not compatible with responding to the TOU tariff.

Table 9 Householder experiences of TOU tariffs

FINDINGS	ILLUSTRATIVE QUOTES
<ul style="list-style-type: none"> Confusion about tariff times (and whether they apply to their household) 	<p><i>'Because I find [the tariffs] hard to understand I don't convert that into behaviour.'</i> Todd</p> <p><i>'I'm pretty sure they said to me if you put things on after 7pm it'll reduce the cost [of the bill].'</i> Holly</p> <p><i>'There's just different tariffs isn't there? I think...There might not even be. That might just be an idea that I have. I haven't really done the research. It might just be an idea that I have...there's like sort of peak, shoulder and then off-peak usage and I think the pricing is different for each of those times.'</i> Peta</p>
<ul style="list-style-type: none"> Other family priorities are more important 	<p><i>'Electricity does cost different amounts at different times of the day...it's probably a little bit more about getting through [the day] rather than you know actively or consciously [changing things we do].'</i> Rhonda</p> <p><i>'So normally [before having a baby] if I want to wash my clothes, I can pick... off-peak time...Now is a little bit hard for me to you know, to organise things what I need to do in off-peak time because I need to get a sleep, I need to get a rest.'</i> Naomi</p> <p><i>'It's nice to just enjoy the weekend [with the family]. I don't want to be doing washing or cleaning on the weekend.'</i> Peta</p>
<ul style="list-style-type: none"> Family activities not flexible 	<p><i>'We don't definitely make any changes to our lifestyle based on it, it's one of those things you have to live with.'</i> Kylie</p> <p><i>'We don't have a balcony, I can't hang [washing] out...I think [a TOU tariff] works well for some people...You just need a bit of work and planning. For me, like doing the washing at night...I have to read to my daughter ... put her to bed so I just don't have the time.'</i> Carol</p>
<ul style="list-style-type: none"> Small daily savings don't compensate for disruption to routines 	<p><i>'You could shift, you know, making the meals, you could prepare them [earlier]...what would be the motivating factor for me?... It might be you know 20c [that I save each day]...it's certainly not going to make me do it at a different time.'</i> Rhonda</p>

⁸ Householder experiences of TOU tariffs (Table 9 Householder experiences of TOU tariffs) are based on a limited number of households and include households that thought they were on a TOU tariff but may not have been. Given the small numbers, the findings are illustrative of the experiences of these households but may not represent the full range of family households' experiences of TOU tariffs.

FINDINGS	ILLUSTRATIVE QUOTES
<ul style="list-style-type: none"> Timing of activity shifts in response to TOU (but incomplete understandings of tariff) 	<p><i>'I think they have two different times, peak time, off-peak time. I just wash my clothes mostly after eight or nine o'clock and other things we use we just use the machine when I need to use. So just for the washing clothes, I think after nine o'clock.'</i> Hua</p>
<ul style="list-style-type: none"> Complexity understanding TOU tariff with solar feed-in tariff 	<p><i>'Instinctively you put things on overnight because that's the cheapest electricity...whereas now [that we have solar PV], I would wait until we've had breakfast and then put it on so it was in the middle of the day and doing things like using a slow cooker instead of using the oven so then it's using the electricity over the day, not in the evening when you're likely to be generating less solar...I would always go with when to do things when I thought we were generating enough solar...rather than relying on off-peak...I probably should have thought about it a bit more.'</i> Peta</p>

3.6.4 Potential flexibility of routine activities in response to TOU tariffs

Many of the householders quoted in Table 7 and Table 8 did not think changing established family routines to respond to a TOU tariff was feasible in their home. This was perceived as being 'too hard', an unjustified burden or requiring 'supreme effort' to organise in addition to everything else. A few householders were enthusiastic, and a few others cautiously interested, about the idea of TOU tariffs as a way to reduce their electricity bills. These householders felt they had flexibility in the timing of a limited range of household activities.

Dishwashing and laundry were the main practices considered possible for some households to shift outside peak demand times, as found in research on the flexibility of family routines conducted in the UK (Powells et al. 2014). Running the dishwasher late in the evening was feasible for those who stayed up late enough to switch it on (or had a delay function on their dishwasher) and did not have concerns about the dishwasher making noise. Changing the timing of laundering was considered less flexible than dishwashing, as laundering activities were more interconnected and dependent on fitting in with other daily routines (see Section 3.4.2). Larger households doing many loads of washing felt particularly constrained in the timing of laundering and other household practices. Some householders did not want to leave washing in the machine overnight due to concerns about safety, smell, creasing or the noise effects on their family or neighbours (see also Section 3.4.2).

'Washing I could definitely move to wash overnight and then just hang out in the morning, that'd probably be a smart thing to do.' Keira

'I'm not sure if I would like to have my washing machine running if I'm not at home. Because sometimes accidents happen when the hose is not in the sink and things like that. So I actually prefer to be around when they run.' Alison

'I know we've got a timer on the washing machine but I don't actually know how to use it. But if I did and I could find that out, I'm sure, fairly easily, I could time it so that my washing goes on at 10 o'clock at night. The only thing is it makes a hell of a banging noise when it goes in its spin cycle. We've got the tumble dryer on top of it, so I daren't wake myself or my baby up in that time. I guess that's the other thing to be conscious of.' Cass

'I can hear the noise the washing machine making, especially during the night because everywhere is very quiet. So I'm not prefer using the washing machine or dryer you know, in the night, I don't want to disturb my neighbours.' Naomi (living in apartment building)

Bathing and showering (and associated bathroom heating use) for children and some other family members were considered fixed practices in the TOU peak period/ family peak period for most young families.

'I couldn't switch things to morning like the shower routines...it just doesn't work.' Lindy

Heating and cooling were not flexible during the TOU peak period, as households considered their current heating and cooling practices appropriate for the health and comfort needs of their family (see Section 3.4.1). Similarly, householders did not consider **lighting** an opportunity for change during the TOU peak period, which may be due in part to understandings of lighting use as an area that is already managed and closely controlled for energy-saving benefits (see Section 3.5.1).

Mealtimes were considered relatively inflexible because of conventions, established social structures and rhythms (Powells et al. 2014). A few households considered the possibility of doing evening meal preparation earlier in the day; however the planning and organisation involved, along with the timing and geographical constraints of other activities such as working outside the home, limited the feasibility or regularity that this could be done. The need to reheat food in the TOU peak period was noted as a constraint to shifting meal routines.

'I think that [cooking] would be a very difficult one to move from that kind of late afternoon/early evening kind of period. I think that's kind of set.' Neil

TV and other ICT devices were not considered flexible by any families during the TOU peak tariff.

'How am I going to deal with [my son] at times that I need a break? Times that I need to entertain him to have a shower or something. I can't tie to him a chair.' Susie

One household with a swimming pool was on a TOU tariff and had not co-ordinated the **pool filter** times to take advantage of cheaper tariff periods. Advice they had received about appropriate filtering prioritised other considerations such as optimal pool cleanliness.

Larger households and sole-parent households

Larger family size and the challenges of sole-parenting were additional pressures noted by householders as limiting their ability to change or shift routines in response to a TOU tariff.

'There's no way I could do washing all night...it has to get done during the day as well...like for example if I'm changing sheets, or if someone's unwell, and there's a lot of washing...the washing machine will be going literally from the moment I get up to the moment I go to bed... if it was just one person or even a couple...but when you are a family of nine people it's just too hard [to change routines].' Lindy

'Because we only have one child it is easier to be a bit more flexible I think. But we do find that when we have all three girls [step-children] with us, on those weekends, we need to be much more routine. It does make life easier for everyone, such as meal times, shower times, bed times, all of that sort of thing, with three kids.' Kim

'There's so many nights I've been to bed at 8:30[pm] because I'm just exhausted...my bill would be bigger...I couldn't see us making a lifestyle change to fit it in.' Selina (sole-parent)

Key Insights

Shifting the timing of dishwashing, and sometimes laundering practices are likely to be feasible and practicable responses to TOU tariffs in some family households.

For most family households, responding to TOU tariffs conflicts with routines and other family priorities.

Larger households and sole parent households are likely to find it harder to respond to TOU tariffs.

3.6.5 Financial outcomes of TOU and changing circumstances in the home

Change is ongoing in family households as children grow older and routines shift to accommodate changing circumstances and needs. Without previous experience of a TOU tariff, householders could not confidently predict how their family would respond and therefore the financial outcome was also unpredictable. The impact of school holidays on household routines and the capacity to respond to a TOU tariff was sometimes a concern associated with changing to this tariff.

'If I was opting in to this new kind of three phase system [TOU tariff] I'd be kind of saying, making sure there's an update if it doesn't suit our patterns of use. But we're prepared to give it a go and see how we get on.' Lindy

Some householders that were not working full-time indicated more flexibility in their routines.

'And because I'm at home (not working) I can run the washing machine and dishwasher and whatever accordingly, you know, if they said, okay, it's cheaper at this time of the day, I could schedule it, you know, within reason.' Sasha

These householders also intended to return to work in the coming years. With these types of changes affecting the flexibility of activities, the suitability of a TOU tariff for a household may also change. Even if householders do review tariff options regularly, contract terms and other electricity market processes, along with difficulties such as long waiting times on phone calls, may slow or prevent householders making changes to their tariff. There needs to be consideration of ways to protect households from financial disadvantage as a result of unanticipated household changes.

3.6.6 Occasional flexibility of family routines for the 'common good'

The findings above indicate that households with children are particularly limited in their ability to respond to TOU tariffs — as time efficiency and family wellbeing take priority over small daily financial costs or savings. Householder concerns, such as fairness of TOU and perceptions of corporate profit-making, are also likely to impact on their willingness to shift routines on a regular basis. However, these findings do not necessarily indicate that family households are inflexible or uncooperative. Section 3.3 highlighted that family routines are constantly adapting in response to the normal disruptions that are part of everyday life.

Previous research conducted by the authors suggests that households (not specifically households with children) may be more willing to shift routines on an occasional basis (Nicholls & Strengers 2013; Strengers 2010, 2013). This finding was confirmed in this study. Householders who indicated that their routines were inflexible in response to a TOU tariff were often willing to shift their routines) outside the afternoon/early evening period if occasionally requested to do so in advance via a 'peak alert' (see Table 10).

The peak alert scenario was posed to householders as a request to reduce electricity 'where possible' at times when electricity supply may not be able to meet demand or is under extreme pressure, with very hot days provided as an example (see Appendix). Householders explained their willingness to shift their routines in response to this occasional disruption in a range of ways, citing their commitment to doing things for the 'common good' of the community, electricity system and/or social responsibility (distinct from 'the environment').

Table 10 Contrasting householder responses – TOU tariffs and 'peak alerts'⁹

Householder	Flexibility during TOU tariff	Flexibility during peak alert
Laura	<i>[Changing washing machine times] would be something that I would think was worthwhile to put into our routine. But I don't think we would turn our life upside down.'</i>	<i>'We'd be right there willing to do that [respond to a peak alert]...A sense of civic responsibility...If it's worth doing you'll do it.'</i>
Jill	<i>'So the only thing that I could, that I would change would be to be more careful to do my washing machine all night... that's the only thing because that's the only thing I can control. But all the rest, I have to do it when I do it.'</i>	<i>'Personally, I would do it... I would definitely...here in Australia you have this have it with the water...So you could have electricity ban, or please be mindful...That would that would work for me.. I think calling on people, especially in Australia it seems that, maybe I'm wrong, but people would be willing to help out of national solidarity.'</i>
Lily	<i>'I think that [a TOU tariff is] just nasty stuff. It just adds another thing for people to worry about.'</i>	<i>'You do need to be mindful about it, of course. There are some people who can't [limit their usage], like, people whose health is going to suffer if they turn off their air conditioner, that's not really an option for them, but we could. We could turn our fans off for a few hours or something... if that [peak alert] request is a genuine need, then, yes.</i>
Alice	<i>'So it's interesting that their higher [TOU tariff] rate is in the time where you're cooking and your TV's on and the kids are home and they're all on their laptops, when you would use the most electricity...I think that's really disgusting actually. I mean, how is that going to help households?'</i>	<i>I think [a peak alert is] quite reasonable...we could do less cooking because it's easier to have colder food when it's hot. We could reduce the amount of time that we use the air conditioner...so we would just use less computers and stick to the essentials. It would be fairly easy...Well, I think the general Australian would [respond].'</i>
Kelly	<i>'I just see peak pricing as a way for energy companies to just shaft users, and that I don't really feel like I have much choice in...they're going to get as much money out of me as they possibly can. There's no one good out there worrying about the wellbeing of the humans who live on the planet.'</i>	<i>'I think if they explained to people why [a peak alert] was necessary and it was something that was altruistic, not profit-driven, that people would definitely do it... "We're going to tell you 6 days of the year that we need you not to use as much energy...[for example] we'd like you to have dinner with your family." And make it like, you know, a community thing...share time together and only cook in one house... turn off the power...go and see your mum and dad. Like, that would be really nice, and I think people would do that. I know we would do that. But if it's just like, "Oh, don't use power on this day, otherwise we're going to fine you," I think that would just annoy people.'</i>

⁹ Householder responses are hypothetical; however similar responses are confirmed in research conducted by the authors with households participating in similar programs and tariff trials (Nicholls & Strengers 2013; Strengers 2010, 2013).

When considering their response to a peak alert, householders often suggested ways they could reduce their electricity demand which they had not considered under the TOU tariff scenario, such as reducing the use of air conditioning or fans (see Keira, Mel, Lily below), or TV and other ICTs.

'We'd try and make sure that we would only use a minimum number of computers... wouldn't charge your phone or your laptop or your iPad or something on that day. Wouldn't turn... the exhaust fan in the bathroom on.' Nathan

The differences in householder response to these two demand management strategies (TOU tariffs and peak alerts) highlights key differences in demand management strategies and the potential to engage household consumers beyond financial mechanisms.

These findings raise a number of key considerations for time-based demand management strategies, including:

- **The way the message is delivered.**

'If [the message] was delivered in a certain way then of course you'd be willing to do anything rather than if you were told. You kind of start feeling like you're on Big Brother.' Cass

- **Understanding that householder actions can benefit other householders instead of utility profits (or themselves).**

'I'd be happy to do that [respond to a peak alert]...You know what? I'd say it would be because I like feeling like I'm part of something bigger. That I can do something that may make a difference on a bigger scale. And it also makes you feel like you're part of a community looking after each other...Look if it was about [electricity companies] saving money...[I] possibly wouldn't be as forthcoming...I think that the driving force for me would be more of the equity kind of social justice kind of issue. I can't imagine them giving, making it financially more rewarding on a grand enough scale to make a big difference to me personally.' (Tanya, family of 4, household income AU\$67,700-83,100)

'You always look to yourself if it's better for the electricity company or if it's better for yourself. And I don't really think that company[ies] today do things because it's better for people, I do think that they do things because it's better for themselves, and probably they would earn more money if they were doing that this way.' Jill

- **Understanding that householder actions can benefit the health of others who may have a 'greater need' for electricity, such as the elderly, very young, and people requiring hospitals and emergency services.**

'I'd sort of be willing to say yeah we'll cope [without air-conditioning] okay if the elderly need it more or, you know, families with babies or small children. Definitely, I mean it's not a good thing to be using all the time.' Keira

'I'd rather go without the 'air con' and have the 85 year old neighbour across the road know she, but she's probably the one that turns hers off on those days. So yeah, and I'd go to the pool.' Mel

- **Opportunities to leave the home or meet family needs in other ways (change where or how activities are done).**

'[A peak alert] would be fine with me. I guess in summer it's different, like, the kids can go outside into the yard until 8 o'clock at night and the sun's still up. It's warm enough to do that.' Selina

'I think if I get advance notice [of a peak alert] I might be okay, like we might plan a trip out or, you know, we might go out for a few hours.' Carol

'I think [a peak alert would] be interesting, go out for a barbeque or something...If it was happening all the time that'd be annoying maybe but a few times a year it could be interesting.' Kylie

Although the timing of activities done on a *regular* basis may be particularly constrained in households with children, most householders' willingness to *temporarily* shift routines in response to a 'peak alert' resonates with earlier findings that household routines are constantly being shifted by irregular disruptions (see Section 3.3). It is the temporary or exceptional nature of the alert that makes it manageable, in contrast to regular daily routines, which are more difficult to flex and shift.

During the 'exceptional circumstances' (Strengers 2013) created by a peak alert, householders discussed how they could relocate or disrupt their routines during a short period of time. There was some variation in this flexibility which depends on household demographics (*e.g.* age of children), alternatives available (*e.g.* mobility and access to suitable facilities, money for entry to pools, or access to indoor play centres), and social networks (proximity to family or friends). Some householders with infants or young children described being tied to the home and unable to respond to a peak alert.

Key Insights

Householders were more willing to shift their routines on an occasional basis in response to a 'peak alert' than on a regular basis in response to a TOU tariff.

Householders interpret a peak alert as a 'common good' or social issue which provides benefits to 'other people', including those less fortunate than themselves.

4 DISCUSSION AND IMPLICATIONS

The findings presented in Section 3 are supported by limited research on families, teenagers and children, which demonstrates that energy use considerations are not a priority for family households, particularly during the family peak period, which roughly correlates with the TOU peak tariff period (Fell 2014; Gram-Hanssen 2007; Powell et al. 2014; Southerton 2006; Strengers et al. in press). Instead, this research found that family householders' participation in (and scheduling of) energy practices is oriented around providing and accessing health, convenience, entertainment and development/ life skill opportunities.

Family life is highly dynamic and undergoing rapid and constant change. Key areas of change for energy use in family households identified in this research include:

- the installation of household air-conditioning around the time of starting a family;
- increased use of heating and cooling appliances for children and families;
- adoption of new electric cooking appliances for increased convenience (*e.g.* Thermomix);
- increased time and energy spent on personal grooming for young adults (teenagers)
- increased food storage (refrigeration and freezing capacity) to support bulk-buy shopping (convenience and economy) and bulk cooking (to enable the provision of healthy food);
- importance of televisions for entertainment and occupying children;
- rapid changes in ICT use for young children, teenagers and parents for entertainment, schooling, communication and work; and
- changes in home occupancy including grandparents and overseas students living with the family on short- or long-term bases.

There is a clear rhythm to family life, with the intensity of tightly-sequenced activity peaking during the late afternoon and early evening—particularly prior to and during the period referred to as 'crazy time' in households with young children. Parents rely on routine to keep their everyday lives 'under control'; however they also make use of opportunistic time gaps throughout the day, and face ongoing disruptions as part of 'normal' everyday life. Family routines change and shift frequently to accommodate short and long-term changes in the household and its circumstances.

The research suggests that many family households are unlikely to significantly benefit from, or shift their routines, in response to TOU tariffs. There are several reasons for this.

1. Family households are likely to have a poor understanding of their current tariff, even when they are well-educated. This is because they lack the time and interest to actively engage in becoming energy literate or navigate the increasing complexity of the energy market.
2. It's unlikely that family households will have a good understanding of a TOU tariff if introduced (especially where it is introduced as a default tariff), for reasons outlined in the previous point.
3. Family households may be more likely to deliberately ignore a TOU tariff, even when the times are known, because it represents an unacceptable trade-off against important family priorities and activities considered 'non-negotiable' during the family peak period. It may also be ignored if the activities that contribute to the peak are considered 'uncontrollable' (such as those carried out by children/ teenagers) or not worth shifting for small personal savings.
4. The ways in which a family responds to and is financially affected by a TOU tariff is likely to vary over time as children get older and change their activities, new children enter the

home, or parents change their work patterns. This is likely to make the effects of a TOU tariff on family households highly variable.

However, while it may not be feasible for many family households to monitor and manage energy use on a daily (or hourly) basis and/or shift their routines in response to TOU tariffs, some family households demonstrated other types of flexibility and adaptation such as visiting family or community facilities with pools on hot days. Flexibility of routines in response to normal disruptions (such as blackouts, school holidays and family health issues) was also demonstrated.

Further, most of the family households we interviewed discussed the idea of 'peak alerts' positively. Peak alerts shifted the discussion away from individual financial penalties and rewards ('what's in it for me'), which were common concerns with TOU tariffs, and onto how households could 'do their bit' for the ongoing security and affordable supply of electricity for all Australians.

An occasional peak alert was considered an acceptable disruption by most of the parents interviewed, during which time a range of routines could be temporarily adapted around the peak period. A peak alert was also a more empowering idea for parents for them to engage, encourage or otherwise coerce their children into change during a short period of time. These findings raise possibilities for other types of demand management initiatives that engage householders in peak demand management by drawing on their existing adaptive capacity and experience in managing normal disruptions as part of their everyday lives.

Most of the family householders interviewed had low levels of energy literacy and interest in electricity market changes and available market choices. Many of the family households had been 'left behind' as the electricity market changed and increased in complexity. These findings challenge assumptions that electricity consumers are equipped and willing to make informed decisions to maximise financial opportunities from increased choice in the electricity market. It is unlikely that further information will bring these households 'up to speed', given their current priorities and the busyness and intensity of their everyday lives.

We will test these findings and implications in the next stage of this research, which will involve a survey with Australian families. A final report with further implications and recommendations will be issued in January 2015.

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6 APPENDIX: INTERVIEW SCHEDULE

Overview of interview questions/topics

- Q. Firstly, could you tell us a bit about your family – e.g. who lives here etc.
- Q. What comes to mind when someone asks how your life has changed since you had children?
- Q. Are you (and/or other family members) usually home on weekday afternoons? Who comes home from work, school or other places during the afternoon/evening? When do they arrive?
- Q. Do you do any things in preparation for partner/children coming home?
- Q. What sort of routines do you have in your home? How have these changed since starting a family? What purpose do the routines serve?

Activities during weekday 'peak times'

Thermal comfort

- Q. Thinking of summer, can you tell us about how you and your family stay cool on hot afternoons/evenings?
- Q. Do you do anything else to keep the house or family members cool?
- Q. Do you feel that your cooling needs have changed since starting a family?
- Q. Do you remember how you stayed cool on hot days before air-con? Do you ever do any of these things now to stay cool?
- Q: Do you ever leave the house on a really hot day? Where to?
- Q. Thinking now about winter, can you tell us about how you and your family stay warm on cold afternoons/evenings.
- Q. Do you do anything else to keep the house or family members warm? Is there agreement in the house about temperatures and heating and cooling?
- Q. Who operates heating and cooling in your home?
- Q. Do/did you do anything especially to keep your baby(ies) or toddlers warm or cool (heating or cooling).
- Q. Have you changed heating or cooling appliances in recent years?

Food provisioning

- Q. What sorts of meals do you usually prepare/eat during weekday afternoons/ evenings?
- Q. Who is involved with preparation of food and what appliances are used? Has this changed?
- Q. What other food preparation activities occur in this period? E.g. hot snacks, hot drinks, baking
- Q. What do these activities mean to your family members?
- Q. When is the evening meal usually eaten and does the family eat together?
- Q. What sort of refrigeration and freezing units do you have? Have these changed in recent years or since starting a family? Why?

Cleanliness and care

- Q. Does anyone wash, iron, dry, clothes/ laundry during the afternoon, evening? Who?
- Q. Does anyone take a shower or bathe in the afternoon/ evening? Why? How has this changed over recent years?
- Q. Is the bathroom being used for any other activities during the afternoon/early evening (e.g. hair drying/styling)
- Q. When is bathroom heating used and why?
- Q. Do you use a dishwasher or wash up in the sink? Who does it and when? Why?
- Q. What sort of other cleaning activities are done? When? Why? By whom?
- Q. How have these activities been changed/increased/decreased since starting a family?
- Q. Do any of your children have chores such as doing washing, dishes or cleaning? When do they do them and why?

Working, socialising and playing

- Q. What do the children do when they get home from school?
- Q. Are there multiple devices going at once during this period (e.g. laptop, phone and tv?)
- Q. Can you tell us about the changes in TVs and other devices in your home over recent years?
- Q. What activities do your children use ICTs for? How much? Do/ how do you try to limit this?
- Q. Do you or does anyone in the home do any work in the afternoon/ evenings? What sorts of devices would you use to do this?
- Q. Do you use computer for social networking, shopping, other things?
- Q. If yes, why at that time and has this routine changed since having children?
- Q. Are there any other social, sporting or other planned activities happening during this time?
- Q. If yes, how do these change your routines in the afternoon/ evenings?

Managing energy use

- Q. How much do you think family members think about electricity?
- Q. Do you/ they think about electricity when they're doing the activities we discussed?
- Q. Do you feel that you have much control over your children's use of energy in the home? Has this changed? Have you tried to influence their energy use and how has this turned out? If not, why not? Is this something you'd like to do in the future? How do you think you might you go about it?
- Q. Do you want/plan more of your activities to be gas? Why? Or do you prefer to have electricity run appliances? Why?
- Q. Does electricity usage, or trying to manage it, cause any stress or anxiety in your family? Do you ever disagree about how to best use electricity in the home?
- Q. What are the most important things you need to get done during this busy time of the day?
- Q. Are the afternoons/evenings the busiest time in your home? Why? If not, why not?

Routine disruptions

Q. Can you think of any changes or events which happened over the last year that has affected any of the routines you have just described?

Q. How did these changes affect you/your family? What did you do differently during these times? Stressful/ enjoyable etc.?

Q. Is there a time of the day or week or less often that you try to keep for relaxing etc?

Changes in appliance ownership and usage over recent years (specifically since having children)

Q. What other new types of appliances have you acquired since starting a family (not already discussed)?

Q. Have they replaced other appliances? Or are they in addition to what you had before starting a family?

Q. Are there any additional electrical appliances that you anticipate needing/getting in the future? When do you think you will get these?

Q. Do you feel you know much/enough about the energy use of your appliances?

Experiences of electricity bills

Q. What sort of changes have you noticed in your electricity bills over recent years? Consumption and/or total price change?

Q. How do you budget for energy bills?

Q. Have you experienced difficulty paying your electricity bills? How much? If yes, did they get assistance from retailer or other source? Where?

Q. Have electricity bills affected your family's ability to afford things you need (energy or otherwise)? What sort of things? Do you think there are any wellbeing impacts?

Q. Is your family eligible for any concessions (low-income/healthcare card/pension card)? Do you get a rebate on the bill?

Q. Who in your household takes an interest in / understands the electricity bill?

Q. Have you changed your electricity supplier or signed up for any new deals over the last couple of years? If yes, how did you choose? What sources of information did you use? If not, why not?

Q. Do you feel that making the change was beneficial? Why?

Q. Do you know if you have a smart meter/interval meter? What do you know or think about smart/interval meters?

Q. What do you know about the type of electricity tariff you are on? Flat-rate or different costs at different times of day (distinguish from off-peak HW), Has this changed recently?

TOU experience [TOU households only]

Q. Are there any activities/routines that your household have changed in response to TOU that you haven't already mentioned?

Q. Were there other activities you thought about moving (or were suggested to move by others/retailer) that you could not move, why?

Q. What sort of effects did moving activities (or being on the TOU tariff) have had on the electricity bill? Effects on family? How do you feel about this?

TOU awareness and flexibility [non-TOU households only]

Q. Have you heard of time-of-use/'flexible' electricity pricing? If no explain concept.

Q. What do think about the idea of electricity having different prices through the day?

Q. If there was some financial benefit for moving any of your usual afternoon/evening activities to earlier in the day, after 9pm, or weekends, do you think you could/would do this? Which activities and when would you move them to? Why not others?

Q. Do you think school holidays or other events would your ability to do this?

Q. Do you think your other family members/ child(ren) would understand and change the times they use electricity if you were on this type of tariff/ incentive?

Q. If households were asked in advance to reduce electricity use occasionally – like if there was a possibility of more demand than could be met a very hot day – do you think you would want to reduce your electricity use? Be able to? Why (not)?

Q. Do you feel that overall your electricity needs are any different to other energy consumers?

Q. What do you think the electricity industry needs to do/ what needs to be changed to better support families and their electricity needs?

Conclusion

Q. Do you ever talk about any of the issues we've discussed today with your family or friends? (Mothers/ Parents groups, relatives etc.)

Q. Why did you choose to participate in this research?

Q. Is there anything else you would like to mention or ask?

Q. Home tour