Electricity Bill Benchmarks for residential customers

Prepared for the Consumer Information Implementation Committee

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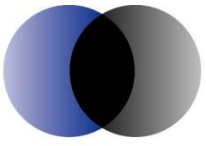

ACIL Tasman

Economics Policy Strategy

ACIL Tasman Pty Ltd

ABN 68 102 652 148
Internet www.aciltasman.com.au

Melbourne (Head Office)
Level 4, 114 William Street
Melbourne VIC 3000

Telephone (+61 3) 9604 4400
Facsimile (+61 3) 9604 4455
Email melbourne@aciltasman.com.au

Brisbane
Level 15, 127 Creek Street
Brisbane QLD 4000
GPO Box 32
Brisbane QLD 4001

Telephone (+61 7) 3009 8700
Facsimile (+61 7) 3009 8799
Email brisbane@aciltasman.com.au

Canberra
Level 2, 33 Ainslie Place
Canberra City ACT 2600
GPO Box 1322
Canberra ACT 2601

Telephone (+61 2) 6103 8200
Facsimile (+61 2) 6103 8233
Email canberra@aciltasman.com.au

Perth
Centa Building C2, 118 Railway Street
West Perth WA 6005

Telephone (+61 8) 9449 9600
Facsimile (+61 8) 9322 3955
Email perth@aciltasman.com.au

Sydney
PO Box 1554
Double Bay NSW 1360

Telephone (+61 2) 9389 7842
Facsimile (+61 2) 8080 8142
Email sydney@aciltasman.com.au

For information on this report

Please contact:

Jeremy Tustin
Telephone (03) 9604 4411
Mobile 0421 053 240
Email j.tustin@aciltasman.com.au

Contributing team members

Brent Taylor
Marianne Lourey
Linda O'Mullane

Contents

List of boxes

List of figures

List of tables

Executive summary

The Energy Bill Benchmarking Initiative (EBB) is one of a number of measures that Australian Governments are implementing to help Australians improve their energy efficiency.

The EBB is focussed on residential electricity customers. Other measures in the broader energy efficiency policy environment focus on other users and on gas.

Electricity prices have risen substantially in recent years and are expected to continue to rise in the near future. In addition, the high greenhouse gas emissions intensity of Australia's electricity generation means that our greenhouse gas emissions are more closely linked to electricity use than most other countries.

In spite of this, there are opportunities for Australian electricity customers to reduce their electricity consumption without experiencing a substantial decline in comfort or the other benefits that electricity use provides. Therefore, improving energy efficiency can lead to economic benefits for both individual consumers and electricity customers more broadly. It can also lead to environmental benefits through reductions to greenhouse gas emissions and other environmental impacts of electricity consumption.

A number of reasons have been identified as to why energy efficiency persists below the level which could be achieved. Of these, an important factor is that users often do not know how their consumption compares to similar households and what is possible to achieve.

The EBB is designed to address this information gap. It will ensure that consumers are able to compare their own electricity use with their peers.

The methodology we have used is to base benchmarks on the average electricity use of groups of customers. The amount of electricity that customers (households) use depends on a range of characteristics, such as the size of the dwelling and its physical characteristics, the number, type and energy efficiency of appliances in the dwelling and household size (number of occupants).

The benchmarks we have estimated are the average consumption for households in 'groups'. Those groups are defined by reference to characteristics relevant to household electricity use. Any given customer will be able to identify their 'group' and use this to identify their benchmark.

In deciding how many factors should be used to define these groups, it is appropriate to consider the objective of the EBB, which is "*to enable … informed*

decisions about actions to reduce energy consumption, and to motivate …energy saving actions."[1]

To achieve this objective, benchmarks must be *accurate*, in the sense that a customer in a particular group must be able to relate their actual consumption to the benchmark applicable to them. Benchmarks must also be *simple*, in that consumers must be able to understand the factors upon which they are based and see the relationship between the factor(s) and electricity consumption.

The process we used to estimate these benchmarks began with a survey of more than 5,000 Australian residential electricity customers in all jurisdictions. These customers provided information regarding the characteristics of their household and the way they use electricity. They also provided the information necessary to match those answers with their electricity metering data, which we obtained from the electricity Distribution Network Service Providers (DNSPs)[2].

These two datasets were merged, and the benchmarks estimated using multiple regression and other statistical analysis techniques.

The EBB will be implemented under the National Energy Retail Rules (NERR), specifically Part 11. Pursuant to the NERR, the benchmarks must be based on household size and data provided by the DNSPs to the Australian Energy Regulator (AER).[3]

The simplified benchmarks produced are, based on household size and the assumption that the customer in question does not have a swimming pool. Therefore the benchmarks satisfy the first of these requirements. They satisfy the second requirement due to the way that they were calibrated with the data to which the NERR refers.

The benchmarks at the jurisdictional level based on annual data are summarised in Table ES 1 below.

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1 This is taken from MCE's primary objective for the General Consumer Capacity Program under the National Framework for Energy Efficiency.

2 Data were collected from Synergy in Western Australia and Power and Water Corporation in the Northern Territory.

3 The NERR will only apply in jurisdictions belonging to the National Electricity Market, which includes all jurisdictions but Western Australia and the Northern Territory. For those two jurisdictions implementing the EBB was optional. We understand that neither has chosen to implement it at this stage.

Table ES 1 **Jurisdictional benchmarks – based on household size only, no swimming pool**

Household size (people)	1	2	3	4	5	6	Var
	Electricity consumption (kWh)						
Queensland	4030	5331	6633	7934	9236	10538	34%
New South Wales	4422	5548	6673	7799	8924	10050	27%
Australian Capital Territory	5939	7219	8500	9780	11061	12341	15%
Victoria	4028	4835	5642	6449	7256	8064	14%
Tasmania	6862	8733	10604	12475	14347	16218	28%
South Australia	4398	5306	6213	7121	8028	8936	18%
Western Australia	4107	5140	6173	7206	8239	9272	32%
Northern Territory	6266	7806	9345	10885	12425	13965	29%

Note: VAR is explained variance
Data source: ACIL Tasman

The benchmarks were calculated at a finer geographic level based on the localised zones chosen by jurisdictional Ministers as summarised in Table ES 2.

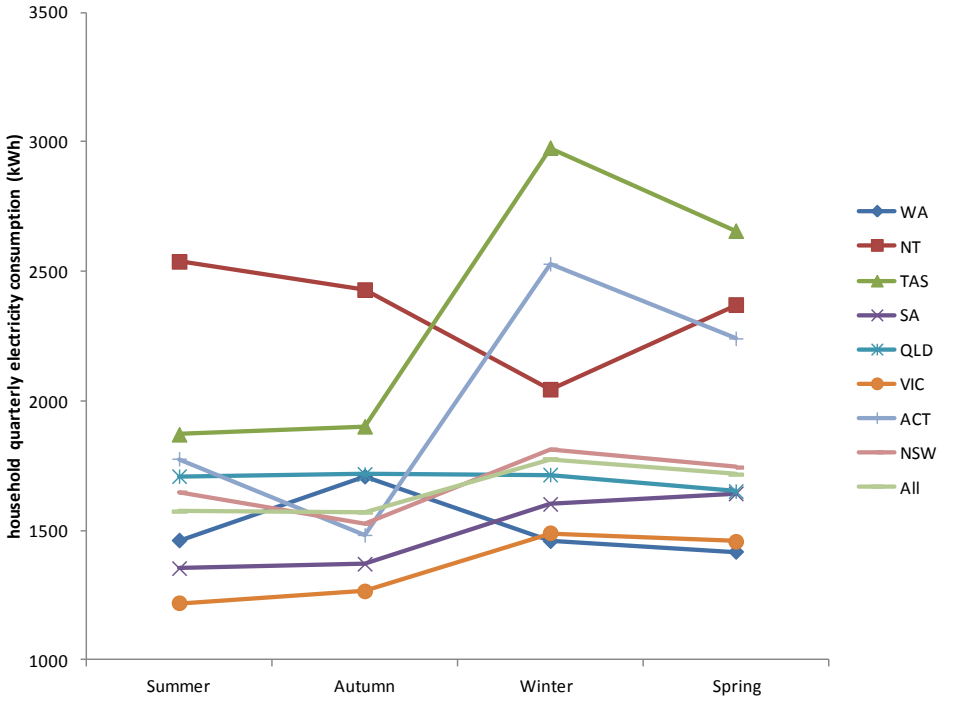
Table ES 2 **Localised zones determined by jurisdictional Ministers**

Jurisdiction	Zones
South Australia	10 zones [a]
Tasmania	One zone
Victoria	One zone
New South Wales	18 zones
Queensland	12 zones
Australian Capital Territory	One zone
Northern Territory	One zone
Western Australia	One zone

[a] NATHERS is the Nationwide House Energy Rating Scheme. Within NATHERS, Australia is divided into many regions of similar climate. In these regions it is reasonable to expect that a similar household would, on average, use a similar amount of electricity. The zones are defined by reference to postcode in most cases.
Data source: ACIL Tasman

Benchmarks were also produced on a seasonal basis to also take into account the seasonal variation in electricity consumption. The seasonal variation in consumption based on our sample is summarised in Figure ES 1.

Figure ES 1 **Average electricity consumption by jurisdiction and season**



Data source: ACIL Tasman

The explanatory power of the benchmarks can be improved by taking more of the factors that drive electricity consumption into account. The explanatory power of the benchmarks shown in Table ES 1 can be increased by approximately fifty per cent if one more variable is added to each. The factor with the most explanatory power in all jurisdictions but Tasmania and the Northern Territory is the use of heating and cooling appliances. In Tasmania and the Northern Territory, it is the number of rooms in a house.

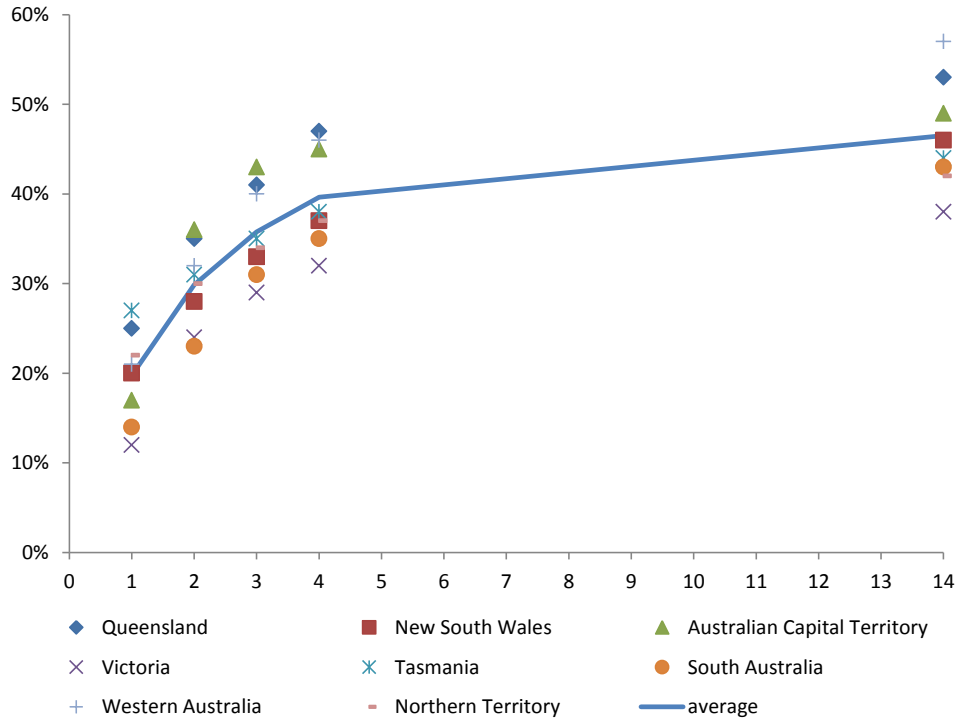
In more complex models, incorporating more variables, the explanatory power can be increased still further. The particular variables that improve the explanatory power of the models vary by jurisdiction. As variables are added the 'overlap' between some of them means that the rank order changes.

The analysis of our sample 'peaked', with the maximum possible explanatory power obtained in a model with 17 explanatory variables. This model was simplified to 14 by creating a compound variable to capture the presence (or absence) of the following appliances:

- electric water heating
- electric cooktop
- electric space heater (in winter) and/ or air conditioner (in summer).

As Figure ES 2 shows, there are diminishing returns in explanatory power as the number of variables increases.

Figure ES 2 **Relative explanatory power of models across number of variables**



Data source: ACIL Tasman

The NERR also require the AER to publish more detailed information regarding energy efficiency generally, and benchmarking in particular. The simplified model, estimated at the jurisdictional level, will be provided to the AER for this purpose.

These models would allow customers to develop benchmarks tailored to their own characteristics.

1 Introduction

It is widely accepted that there are opportunities for Australian electricity customers to reduce their electricity consumption without experiencing a substantial decline in comfort or the other benefits that electricity use provides. In other words, people are typically not as energy efficient as they could be. Over the years, a significant amount of attention has been given to the so called 'energy efficiency gap' or the difference between actual energy efficiency and the level thought to be achievable and affordable.[4]

The Ministerial Council on Energy (MCE) endorsed the National Framework for Energy Efficiency (NFEE) in August 2004. NFEE was to provide a coordinated action on a range of energy efficiency measures.

More recently, the Australian Government adopted the National Strategy for Energy Efficiency (NSEE) which extends NFEE.[5] The objectives of NFEE and NSEE are supported by 10 committees, one of which is the Consumer Information Implementation Committee (CIIC).

A key element of the CIIC's work program is the Energy Bill Benchmarking (EBB) initiative for residential electricity customers.

Electricity prices have risen substantially in recent years and are expected to continue to rise in the near future. In addition, the high greenhouse gas emissions intensity of Australia's electricity generation means that our greenhouse gas emissions are more closely linked to electricity use than most other countries. For these reasons it is more important now than ever for Australian households to improve their energy efficiency. Doing so will assist them to manage rising energy bills and limit Australia's greenhouse gas emissions.

A number of reasons have been identified as to why energy efficiency persists below the level which could be achieved. Of these, an important factor is that users often do not know how their consumption compares to similar households and what is possible to achieve.

The EBB initiative seeks to change this by allowing Australian householders to compare their own energy use with that of their peers. The Regulatory Impact

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4 See, for example, Productivity Commission, "Productivity Commission Inquiry Report no 36, The Cost Effectiveness of Improving Energy Efficiency", 2005, pXXIV

5 For simplicity we adopt the acronym NFEE for both the National Framework and the National Strategy.

Statement for the EBB initiative established that enabling householders to compare their energy use with like households will motivate them to discover ways of improving their energy efficiency.

The MCE engaged ACIL Tasman to develop the initial electricity bill benchmarks. This report summarises the process undertaken by ACIL Tasman and presents the benchmarks produced.

The remainder of this report is structured as follows.

Section 2 provides background information, including the requirements for the benchmarks as set out in the MCE's original determination and the National Energy Retail Rules (NERR). It also considers the objectives of NFEE and NSEE and therefore of the benchmarks.

Section 3 describes the methodology we used to estimate the benchmarks.

Section 4 presents the results of our modelling.

One of the requirements for the benchmarks was that they should be based on certain data collected by the Australian Energy Regulator (AER) from the electricity Distribution Network Service Providers (DNSPs). Section 5 describes the way that the benchmarks were based on that data.

2 Background

In endorsing the EBB initiative, the MCE made a number of determinations that have guided the development of the benchmarks reported here.

First, the EBB initiative should be implemented using a consistent approach across all jurisdictions to minimise cost and inefficiency.

The NERR will only apply in jurisdictions belonging to the National Electricity Market, which includes all jurisdictions but Western Australia and the Northern Territory. For those two jurisdictions implementing the EBB was optional. We understand that neither has chosen to implement it at this stage.

Second, the EBB initiative should be implemented for electricity customers but not for gas customers.

Third, the benchmarks themselves should be based on the number of persons living in a household (referred to as household size).

Fourth, energy retailers should have the discretion to present the benchmarks in either a graphical or a tabular format, at a location of their choosing on the electricity bill.

Finally, energy retailers should include a link to a Government website that will provide more detailed information on the benchmarks.

The NERR, which have not yet been made, set out the basis for the implementation of the EBB initiative. Part 11 of the NERR, which provides for the benchmarks, is reproduced in Box 1.

Relevantly for this project, the NERR provide that the benchmarks must be based on:

- the number of people living in a household (household size)
- localised zones determined by the relevant jurisdictional Minister
- consumption information collected by the AER from the DNSPs

Other elements of the NERR relevant to the EBB initiative are that:

- the AER will maintain a website to accompany the benchmarks. We understand that the website will contain the initial benchmarks along with other information including a web based tool
- the benchmarks should be updated by the AER no less frequently than every three years
- retailers are required to place the benchmarks on electricity bills, but retain discretion over their format

Box 1 **National Energy Retail Rules, Part 11 (unmade)**

169 AER administration of electricity consumption benchmarks

1. The AER must provide the initial benchmarks to retailers and publish those benchmarks on its website.
2. Following publication of the initial benchmarks under subrule (1), the AER must prepare subsequent benchmarks for the consumption of electricity (electricity consumption benchmarks) by residential customers in accordance with this rule.
3. The electricity consumption benchmarks must be based on the following—
   a) electricity consumption information received by the AER from distributors pursuant to rule 171;
   b) localised zones as determined and notified to the AER by the relevant jurisdictional Minister;
   c) household size.
4. The AER must—
   a) provide the electricity consumption benchmarks to retailers; and
   b) publish the electricity consumption benchmarks on the AER website; and
   c) provide the information supporting the development of the electricity consumption benchmarks to the MCE.
5. The AER must administer the electricity consumption benchmarks and update them at least every 3 years from the date when the initial benchmarks are published.
6. The AER may consult on the electricity consumption benchmarks in any manner that it considers appropriate.
7. In this rule— initial benchmarks means the benchmarks for the consumption of electricity by residential customers as provided for by the National Regulations.

170 Retailer obligations—electricity consumption benchmarks

1. Without limiting any requirement under rule 25, a retailer must provide the following particulars in a bill for a residential customer—
   a) a comparison of the customer's electricity consumption against the electricity consumption benchmarks under rule 169;
   b) a statement indicating the purpose of the information provided with respect to those benchmarks;
   c) a reference to an energy efficiency website.
2. A retailer is required to present the information in subrule (1) in a graphical or tabular form, as appropriate, but may do so in a location on the bill that is convenient for the retailer.
3. A retailer must present the information in subrule (1) in a manner which is easy for the customer to understand.
4. In this rule— energy efficiency website means a website, containing information about electricity consumption benchmarks, that is prescribed by the National Regulations and notified by the AER on its website.

Source: National Energy Retail Rules, http://www.mce.gov.au/emr/rpwg/default.html

The benchmarks are part of a broader package of measures and, therefore, must contribute to the objectives of the broader package of measures.

The peak policy statement relating to energy efficiency in Australia is the National Partnerships Agreement for Energy Efficiency, signed by the Council of Australian Governments in December 2009. The agreement states that:

> Improvements in energy efficiency can improve the productivity of our economy, allow households and businesses to achieve savings on their energy bills and deliver significant low cost greenhouse gas abatement.

This is consistent with the MCE's (earlier) primary objective for the General Consumer Capacity Program under NFEE, of which the EBB initiative is one component, which is:

> To raise the awareness of consumers regarding the benefits of energy efficiency, to enable consumers to make better informed decisions about actions to reduce energy consumption, and to motivate general consumers to implement energy saving actions.

Therefore, the objective of the EBB initiative is to help householders reduce their electricity consumption by enabling them to make better informed decisions.

To contribute to this objective, benchmarks must meet two key criteria:

Accuracy – they must provide an accurate representation of the electricity that real consumers actually use.

Simplicity – they must be understandable and consumers must be able to accept that the variables are relevant.

3 Methodology

The amount of electricity that residential customers (households) use depends on a range of factors. Among these are:

- the size of the dwelling and its physical characteristics
- the number, type and energy efficiency of appliances in the dwelling
- household size

Our approach to estimating the benchmarks presented in this report is to estimate the average consumption by households grouped according to these factors.

In this way, the benchmarks will enable consumers to compare their own electricity use with that of others who use electricity similarly to themselves (i.e. others in their 'group'). The benchmarks will also allow consumers to estimate what their electricity use would be if they changed 'group'. For example, a consumer could use the web based tool to estimate their electricity if they added, or removed, a swimming pool or refrigerator, or moved house.

The benchmarks presented in this report were developed through a statistical process whereby data relating to the way electricity is used in individual households was used to explain, statistically, the electricity consumption of those households.

The methodology was in three steps:

1. collect household data
2. collect consumption data
3. modelling and analysis

These three steps are summarised in sections 3.1 to 3.3 below.

3.1 Collect household data

The household data underpinning the electricity bill benchmarks were collected using an online survey of residential electricity customers in each jurisdiction.

The data covered a range of matters relevant to the way that householders use electricity. The questionnaire that was administered is at Appendix A to this report.

In summary, the following data were gathered:

1. Household demographics (number of occupants by age, household income, whether premises rented or owned, composition of household)

2. Dwelling size (number of bedrooms, bathrooms, floors; dwelling age; orientation)
3. Dwelling construction material and insulation
4. Equipment by fuel type (number and type of televisions; fridges; cook tops; ovens; hot water services; dryers; heating; lighting; air conditioners;, pools and pool heaters; other appliances)
5. Appliance usage
6. Use of other fuels and alternative generation (solar panels etc)[6]
7. Seasonal behaviour
8. Reported use behaviours
    a) Amount of energy conservation effort over the last year
    b) Do they think they are doing more/ less/ the same energy conservation as last year
    c) Do they think they use more/ less/ the same amount of electricity than comparable households
9. Postcode and other zone/location information as necessary.

In addition, the data included the householder's National Metering Identifier (NMI). This was necessary to match their responses to the consumption data discussed in section 3.3 below. In Western Australia and the Northern Territory responses were matched using different identification numbers reflecting the different market arrangements in those jurisdictions. For simplicity we refer to NMIs in this report.

The data also included respondents' postcodes. This allowed the household's location to be taken into account and enabled the estimation of benchmarks at the localised zone level.

The following controls were applied during data collection to avoid demographic bias in the sample:

- no more than 30 per cent of respondents to have university qualifications
- approximately equal gender split
- no more than 5 per cent of respondents to be aged over 65 years

[6] This enabled us to control for the fact that households with solar panels consume more electricity than is reflected on their meter because the output of their solar panel is not measured. In Western Australia the metering arrangements are such that exported PV output is not measured separately. Rather the meter 'spins backwards' rendering the meter data unreliable for these purposes. In other States the exported PV output is metered separately. In Western Australia it was necessary to exclude solar customers from the sample.

- approximately 50 per cent of responses to come from households with at least one child

Other controls were applied:

- approximately 50% of the sample was from regional areas to ensure adequate depth of sample outside capital cities
- respondent must have lived at current address for 12 months or more to ensure the consumption data provided by distributors applied to their behaviours reported in the survey
- respondent must contribute to paying the electricity bill and/or make decisions about how electricity is used to ensure their knowledge about household use patterns

The household data were collected using panels of people who had previously indicated their willingness to complete online surveys. A link to the questionnaire was sent to them and they completed the survey online.

Data collection was conducted by members of the Australian Market and Social Research Society (AMSRS) in line with its code of ethics and, professional practice and with the appropriate quality assurance certification. The firm responsible for data collection, I-view, is accredited to the new International Market and Social Research Standard ISO 20252.

Initially the survey responses were over sampled to allow for respondents that could not be matched with NMIs[7]. As shown in Table 1, a sample significantly in excess of 5,000 responses was collected in the first instance. 4,233 of these were ultimately matched to consumption data and used in the modelling. The final sample was robust and suitable for statistical modelling.

[7] Other identification numbers in Western Australia and the Northern Territory.

Table 1 **Sample size**

State	Sample target	Initial sample	Final matched sample
Victoria	1,000	1,145	829
New South Wales	1,000	1,148	906
Queensland	1,000	1,151	1,005
South Australia	500	580	449
Western Australia	500	576	475
Northern Territory [a]	250	103	86
Australian Capital Territory	250	287	236
Tasmania	250	289	247
Total	**4,750**	5,279	4,233

[a] The sample in the Northern Territory was very small. This is common for online samples and is due partly to the small population in the Northern Territory and partly to the fact that it is not well served by online panels. Consideration was given to supplementing the sample with data collected by telephone survey but the CIIC agreed that this was not necessary.

Data source: ACIL Tasman

3.2 Collect consumption data

The benchmarks were developed using customers' actual electricity consumption data collected from the respondents' DNSPs. The data supplied by DNSPs originated from the same source that underpins customers' billing and is based directly on meter reads, conducted by the DNSP. While these data would reflect any meter reading or other errors that may be made from time to time, this is the most accurate possible source of consumption data for individual households.

The exceptions to this were Western Australia, where the data was supplied by Synergy, the retailer supplying the vast majority of respondents, and the Northern Territory, where the retail and distribution functions are both performed by the same organisation, Power and Water Corporation. These differences were necessary due to the specifics of those jurisdictions, but they do not change the analytical approach. For simplicity we refer to DNSPs throughout this report.

To obtain consumption data from the DNSPs, ACIL Tasman supplied each DNSP with a list of the NMIs belonging to respondents who had reported postcodes in the DNSP's service area. Each DNSP then returned a data file containing consumption data that could be matched to respondents and identifying some NMIs nominated by respondents for which no data was available.

In some cases DNSPs 'share' postcodes, so these missing responses were customers of another DNSP. In other cases, respondents made errors in transcribing their NMIs despite the controls put in place during surveying.

Respondents whose NMIs could not be matched were contacted a second time and asked to review their details. These 'pickup' responses were sent back to DNSPs and more matches were achieved.

The format of the data supplied by each DNSP varied slightly. In each case, it was sufficient to determine the date that respondents' meters were read and the quantity of electricity that was supplied.

To allow seasonality to be accounted for, DNSPs supplied four consecutive quarters of consumption data for each respondent.

Data collected from DNSPs was preferable to data collected from the respondents themselves for a number of reasons. First, had we asked respondents to key in their consumption there would have been transcription errors and also the risk that some customers would enter dollar amounts rather than kWh. This would not necessarily be detectable after the fact. Further, relying on customers to provide the data would have reduced the eligible sample to those who were prepared to locate at least four electricity bills, which would have jeopardised the sampling. Finally, customers would not necessarily be aware of the date their meter was read and there would have been a risk that they would have entered either the bill date or the due date for payment instead. These issues would have tainted the dataset and introduced unnecessary error into the benchmarks.

ACIL Tasman greatly appreciates the assistance that the DNSPs, Synergy and Power and Water Corporation provided with this project.

3.3 Modelling and analysis

The approach we took to estimating benchmarks was to determine the factors that correlate substantially with household electricity use and discard all others.

The factors that correlated substantially with electricity consumption were analysed in a regression model that estimates electricity consumption for each household based on a number of variables. The survey results were the explanatory (independent) variables with actual electricity consumption as the explained (dependent) variable. Figure 1 illustrates the form of the model using a simplified example.

Figure 1 **Illustrative model**

$$C = a + b(occupants) + c(gas/hotwater) + d(dryer) + \cdots$$

Where:

occupants	number of people living in the dwelling (i.e. household size)
gashotwater	whether gas water heating is used
dryer	number of times a clothes dryer is used each week
a, b, c, d	coefficients estimated using regression techniques

A more detailed description of the approach used, and the models that were estimated, is presented with the results in chapter 4.

The analysis began with all factors in the survey. A number of trial models with successive refinements were carried out until statistical explanatory power (variance explained) was maximised. Those factors not in the final models did not have substantial explanatory power. [8]

As discussed previously, the amount of electricity that households use depends on a range of factors. Among these are:

- the size of the dwelling and its physical characteristics
- the number, type and energy efficiency of appliances in the dwelling
- household size.

The more of these factors that are taken into account, the more accurate (and less simple) the resulting benchmark will be. For example, a benchmark that reflects the average household use by three person households in a particular jurisdiction is likely to be more accurate than a benchmark that does not take jurisdiction into account. Similarly, as the benchmark takes account of other factors such as household size it will become more accurate.

However, as more factors are taken into account, the benchmarks will also become less simple, and it will be impractical to present them on electricity bills. Therefore, it was necessary to identify a small number of factors that account for the greatest variation in electricity use and use those factors in the benchmarks.

[8] As discussed in section 4.1, this included demographic factors such as age and income. These showed no relationship to electricity use.

This was achieved by a sequential process wherein those variables that explained the most variance in electricity use were identified and others discarded from the model.

The modelling approach used in developing the benchmarks began with a national model including all explanatory variables.

The fully specified national model was then simplified, by combining some variables into compound variables, and disaggregated into separate models for each jurisdiction. These models were an important stage in identifying those variables that would be most informative in explaining variations in electricity use. The fully specified jurisdictional models would be suitable for use as the web based tool to be hosted by the AER.

The jurisdictional models derived from the fully specified national model retain a high degree of explanatory power, but they are far too complex to use as benchmarks on electricity bills. Therefore, the next stage was to develop a series of simplified models that could potentially be used in this way.

In addition to this broad approach, we took account of seasonality in the data, as discussed in section 3.4 and accounted for the localised zones identified by jurisdictional Ministers, as discussed in section 3.5.

3.4 Seasonality

It is well understood that there is a strong relationship between weather and electricity use.

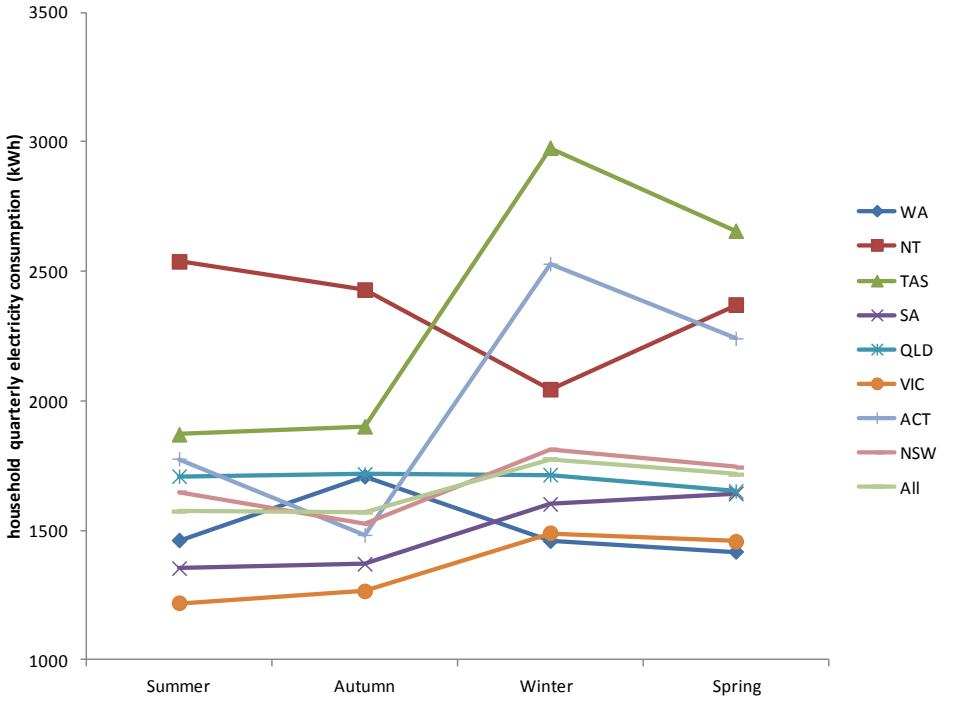
During winter, particularly in colder climates, electricity use is expected to be higher than at other times due to heating load. In warmer climates electricity consumption is driven by cooling load so the reverse pattern is expected.[9]

Figure 2 shows the average consumption, by season, for the survey respondents. In this figure the date the meter was read determines the season. That is, meter readings between:

- December and February (inclusive) were classified as 'summer'
- March and May (inclusive) were classified as 'autumn'
- June and August (inclusive) were classified as 'winter'
- September and November (inclusive) were classified as 'spring'

[9] This is approximately the reverse of the pattern observed in maximum demand.

Figure 2 **Average electricity consumption by jurisdiction and season**



Data source: ACIL Tasman

It is evident from Figure 2 that electricity consumption varies seasonally, particularly in the cooler jurisdictions. If the benchmarks were averaged across the year, with a single benchmark model applying year round, that benchmark would not reflect underlying consumption in any season.

The seasonal pattern observed in Figure 2 fits with the prior expectation that electricity consumption would be greater in winter than in summer and that this effect would be more evident in the colder jurisdictions.[10] It also fits the prior expectation that the Northern Territory would show the reverse pattern due to its warmer climate, which is the likely explanation for Queensland's small seasonal variation.

The presence of a seasonal pattern in the data raises a methodological problem with the data that were used or, more specifically, with the way the electricity consumption is metered in most cases.

The vast majority of Australian electricity customers have their meters read quarterly. Most meters in use at present are accumulation meters, capable only of providing the total amount of electricity used since they were last read (in

[10] Note that this is the expectation for energy consumption as plotted here. Peak demand, shows a different pattern, peaking in summer in most places in Australia.

some cases the meter is capable of distinguishing between electricity used at peak and off peak times).

Relatively few of the meters in use at present are capable of producing information as to when the electricity was used since the last meter reading. In other words, there are relatively few interval meters in use in Australia at present.

Electricity meter reading is an ongoing task for most electricity distributors. The majority of meters in Australia are not read remotely, but must be read by teams of people who visit each meter. The result is that, any given meter is generally only read once every three months.

The fact that meters are not all read at the same time, coupled with the inability to 'separate' the quarterly reading data into smaller time periods puts some limits on the extent to which seasonality can be examined. This is due to a problem to which we refer as 'billing lag'.

To illustrate billing lag, consider a hypothetical meter that was read on 15 December and again on 15 March. In Figure 2 the December reading would have been assigned to summer and the March reading to autumn, because that is the season in which those readings occurred.

However, the reading taken on 15 December captured electricity used since 15 September. That electricity was consumed mainly in spring. Similarly, the March reading relates more closely to summer than autumn.

This raises the possibility that the quarterly data plotted in Figure 2 may not show the true seasonal pattern.

Ideally, this problem would be addressed by disaggregating the quarterly data into months and assigning each month to its 'own' season. However, this is not possible with the data that are available.

Instead, we explored the possibility that lagging the data would provide a better exposition of the seasonal pattern than using them in the way summarised in Figure 2.

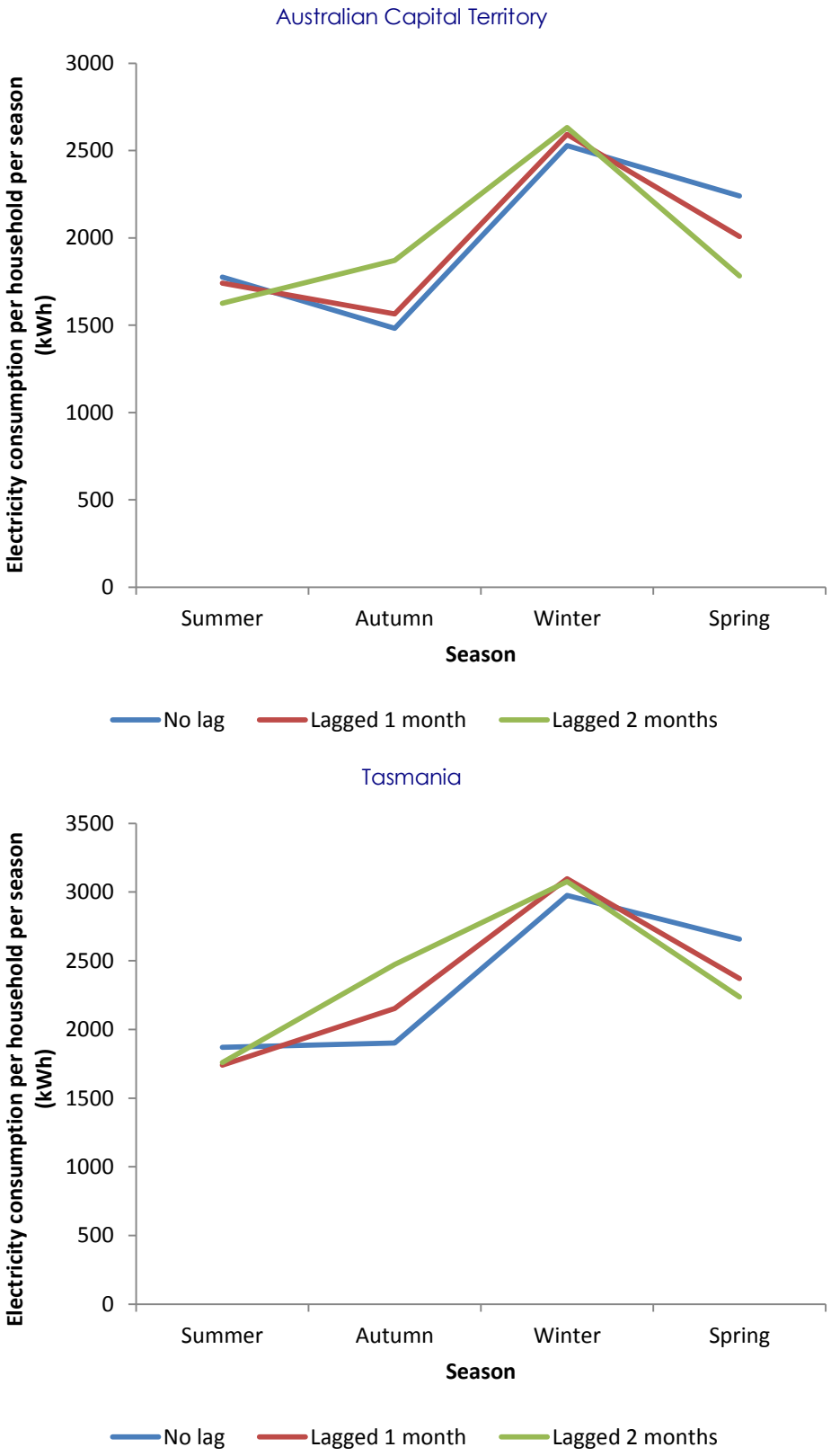
To do this we lagged the data for Tasmania and the Australian Capital Territory, where the seasonal patterns are most obvious, by one and two months.[11] In other words, we defined the seasons as shown in Table 2. The results are shown in Figure 3.

[11] As the seasons each run for three months, lagging by three months is not possible.

Table 2 **Seasons as lagged**

Season	No lag	One month lag	Two month lag
summer	December to February	November to January	October to December
autumn	March to May	February to April	January to March
winter	June to August	May to July	April to June
spring	September to November	August to October	July to September

Figure 3 **Lagged approach to seasonality**



Data source: ACIL Tasman

Figure 3 shows that, contrary to expectations, redefining the seasons and lagging the data suppresses the seasonal pattern shown in the raw data. What appears to be happening is that by lagging the data from the early months of winter, consumption is shifting into the autumn season, exaggerating consumption then. This is being offset by reductions in spring and, to a lesser extent, summer.

The effects differ between the two jurisdictions. In the Australian Capital Territory lagging the data by one month produces similar results to the unlagged data except in spring. With the lag, consumption in spring is lower.

In Tasmania, the effect varies by lag and by season.

Without metered monthly consumption data it is not possible to determine which approach is 'right'.

The fact that lagging the data causes the pattern to move contrary to expectations suggests that the lagging approach should not be adopted.

This suggestion is supported by the fact that, as shown in Table 3, lagging the data leads to a significant reduction in the variance explained by the model for Tasmania while moderately increasing it for ACT leading to an overall loss of explanatory power.

Table 3 **Variance explained by lagged approach to seasonality**

	Original	Lagged1	Lagged2
Australian Capital Territory			
summer	0.24	0.30	0.25
autumn	0.26	0.26	0.27
winter	0.24	0.29	0.30
spring	0.26	0.33	0.31
Tasmania			
summer	0.25	0.19	0.17
autumn	0.31	0.13	0.15
winter	0.23	0.21	0.23
Spring	0.23	0.18	0.17

Data source: ACIL Tasman

While lagging the data causes the observed pattern to move contrary to expectations and reduces the variance explained, it does not challenge the first conclusion, that electricity consumption varies seasonally. Given these two shortcomings, though, we concluded that the unlagged data provides a better reflection of the true seasonal pattern.

We also note that season is, in itself, only an approximation of the variation in heating and cooling load we are seeking to identify here. We understand, anecdotally, that it is commonplace for residents of the Australian Capital Territory to begin using the space heating in May and keep using it until October. This period includes the whole winter and a month each of autumn and spring.

This 'season' could not be reconstructed using quarterly data.

Given the ambiguous results, we concluded that there was insufficient evidence to support the lagged approach for all jurisdictions. Therefore, mindful of the requirement for consistency across jurisdictions, we did not lag the data in any jurisdiction.

Therefore, in our analysis we assign meter readings to season based on the date the meter was read as set out in the first column of Table 2.

3.5 Localised zones

Pursuant to the NERR, the benchmarks must reflect localised zones as determined by each jurisdictional Minister.

The purpose of these zones is to account for variations in electricity use that are driven by where a person lives within a state.

The zones, as identified by jurisdictional Ministers, are summarised in Table 4. Further details of the zones are provided in Appendix B.

Table 4 **Localised zones determined by jurisdictional Ministers**

Jurisdiction	Zones
South Australia	10 zones [a]
Tasmania	One zone
Victoria	One zone
New South Wales	18 zones
Queensland	12 zones
Australian Capital Territory	One zone
Northern Territory	N/A[b]
Western Australia	N/A[b]

[a] NATHERS is the Nationwide House Energy Rating Scheme. Within NATHERS, Australia is divided into many regions of similar climate. In these regions it is reasonable to expect that a similar household would, on average, use a similar amount of electricity. The zones are defined by reference to postcode in most cases.

[b] The NERR will only apply in jurisdictions belonging to the National Electricity Market, which includes all jurisdictions but Western Australia and the Northern Territory. For those two jurisdictions implementing the EBB was optional. Neither has chosen to implement the EBB so neither has declared localised zones.

Data source: ACIL Tasman

Variation in electricity use between localised zones, whether driven by climate or other factors, would ideally be identified through an independent model estimated for each zone. However, to do this, each 'zonal' model would need to be based on its own data. Therefore a significant sample of responses would be required in each zone.

Given that Ministers identified 45 zones in total, an indicative target sample size would be a minimum of 250 times 45, or 11,250 observations to be able to adopt this approach. Collecting a sample of this size would be prohibitively costly for this exercise. In smaller zones, it may be almost impossible to collect a sufficiently large data set.

Rather than estimating individual zonal models, the CIIC asked us to calibrate models estimated at the State level to the average electricity use in each zone. The zonal data had already been collected by the AER so the calibration was in line with the NERR requirements.

A description of the data and the calibrations we undertook is in section 5.

4 Modelling results

In this chapter we provide an overview of our results.

We begin with a summary of electricity consumption of the households in our sample. Section 4.1 shows the distribution of household electricity consumption in the sample for each jurisdiction.

Section 4.1 provides the results of the national model. This identifies the variables which have significant explanatory power and those which do not.

Section 4.3 provides a description of a simplified national model in which heating and cooling appliances are treated as a compound variable.

Section 4.4 provides a description of a series of jurisdictional models based on the simplification discussed in section 4.3.

The models discussed to this point have substantial explanatory power, but they are too complex to be presented on electricity bills. Section 4.5 provides a discussion of a series of simplified models, one for each jurisdiction. These models have substantial explanatory power but use only two or three factors.

Finally, section 4.6 provides even simpler models for each jurisdiction based on household size alone. These models have substantially less explanatory power than the models presented in section 4.5.

For ease of presentation the results presented in this chapter are limited to annual data and only presented at the jurisdictional level. The accompanying spreadsheet contains seasonal and zonal benchmarks.

Throughout the following sections we report the explanatory power of different models by reference to their explained variance.

Our models use a range of factors (explanatory variables) to explain, in a statistical sense, the variation in electricity consumption (the explained variable). Electricity consumption varies widely for a range of reasons. Explained variance is a measure of how much of that variability is 'accounted for' by the explanatory variables in each model.

In the vast majority of statistical models, some variance will be left unexplained. There are a range of reasons including randomness in the explained variable (electricity consumption) and measurement difficulties in the explanatory variables. When all else is equal though, a model that explains a greater percentage of variance in the explained variable is preferable to a model that explains a lower percentage.

4.1 Household electricity consumption by jurisdiction

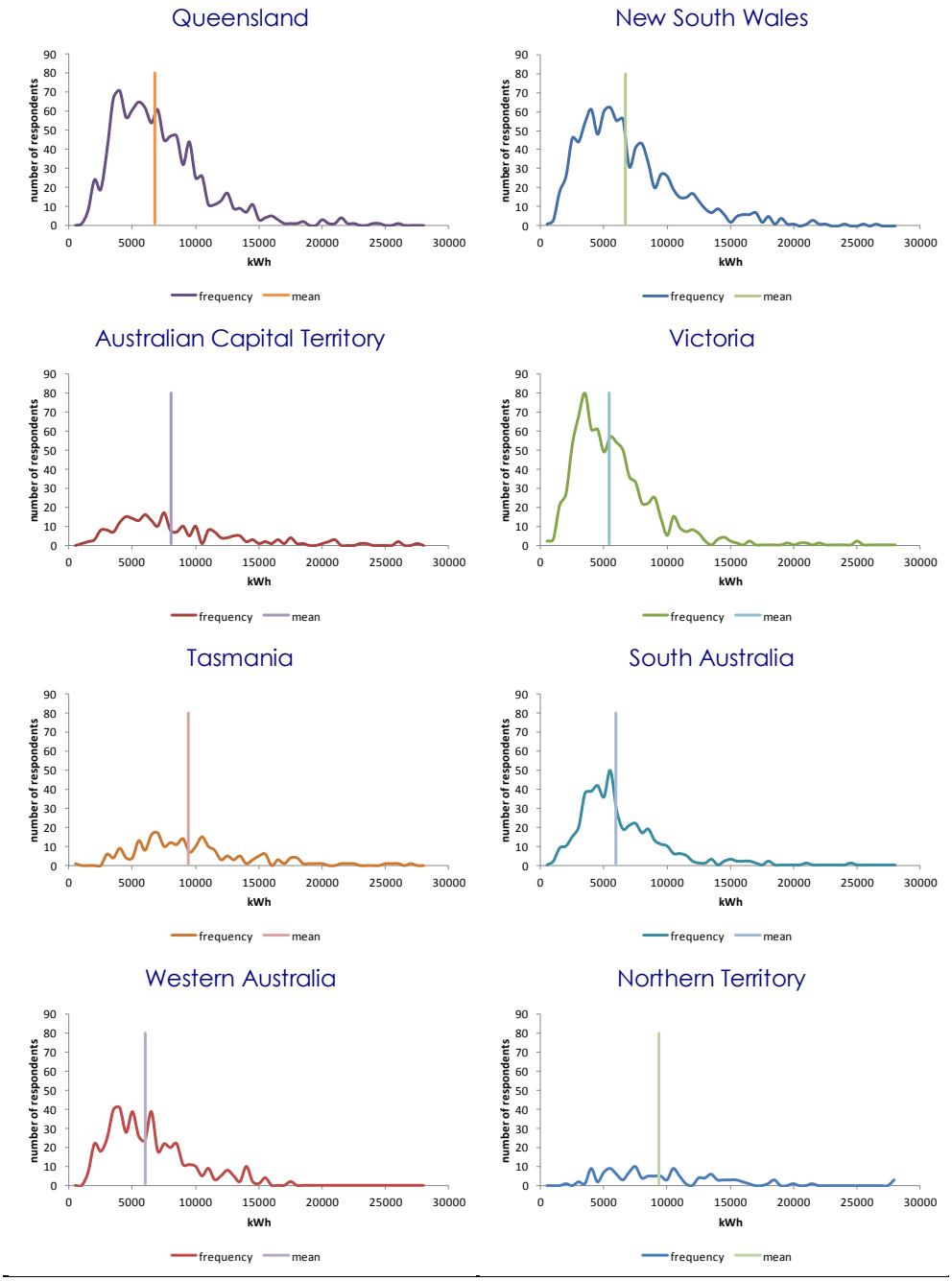
Electricity Bill Benchmarks can be used to inform customers about whether their electricity consumption is at, above or below the average given their characteristics. Previous work on this initiative, in particular the Regulatory Impact Statement, suggests that improved information may lead these customers to improve their energy efficiency, which would have economic benefits for both the individual and electricity customers generally as well as environmental benefits.

Electricity consumption by residential customers is 'skewed' in its distribution. A small proportion of people use significantly more electricity than average. This is the case around the country. As shown in Figure 4, the mean consumption (vertical line) is significantly to the left (low end) of the frequency distribution.

The skewed distribution of electricity consumption means that, if all residential consumers whose electricity consumption is above the mean were brought back to the mean, the mean would decrease by 20 per cent. In other words, improving the energy efficiency of the inefficient few would produce substantial reductions in total electricity use.

While benchmarking may not achieve such a large reduction by itself, this illustrates the value of focussing on above average consumption. It also shows the value of benchmarking customers to average use. However, this is not to say that there is not value in other approaches. For example benchmarks could be established based on appliance models of a nominal 'efficient' household. However, this would require subjective judgement as to what use is 'efficient'.

Figure 4 **Distribution of individual electricity consumption by jurisdiction**



Note: the sample size for Northern Territory too small to provide a robust distribution.

Source: ACIL Tasman

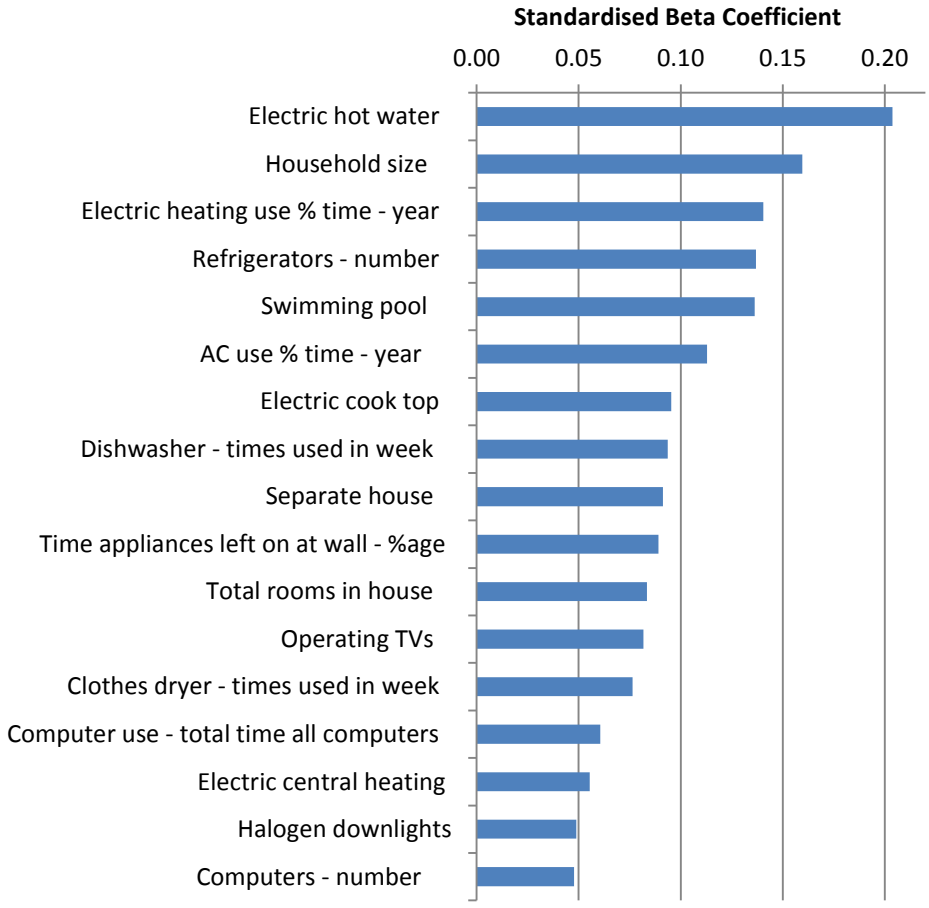
4.2 National model

The fully specified national model is presented in Figure 5. It contains 17 explanatory variables, listed on the vertical axis of the chart. The blue bars show the standardised beta coefficient for each variable. These illustrate the relative importance of each variable in explaining variations in electricity use.

For example, Figure 5 illustrates that the variable that accounts for the most variance in electricity use in the fully specified model is the presence or absence of electric hot water. The variable that explains the second most variance in electricity use is household size.

Beyond this, the coefficients are difficult to interpret and should be treated with care.[12] They are not used directly in the benchmarks or the web based tool.

Figure 5 **Fully specified national model – standardised beta coefficients**



Note: The higher the coefficient, the greater the increase in electricity use for a one standard deviation increase in the variable.

Data source: ACIL Tasman

[12] These coefficients are based on a model estimated after the explanatory variables have been 'standardised', or rescaled so that their variance is 1 and their zero. The coefficients indicate the change in electricity use for a one standard deviation change in the variable. This is an extremely useful tool for understanding the relative impact of any one factor. The factors used in the model are not rescaled and unstandardised beta coefficients are used in the model.

This model explains approximately 45 per cent of the variance in electricity use. The model itself is strongly statistically significant as are each of the explanatory variables individually. All 'p values' are substantially smaller than one per cent.[13]

All factors in the survey were modelled against annual electricity consumption. Only those that were statistically significant were retained in the model. These are the major factors driving household electricity consumption in Australia.

A key observation from this model is the significance of both household size and the number of rooms in the house.[14]

The fact that both are in the model means that each of these variables adds its own explanatory power independent of the other. This suggests that there is significant variation in the size of *houses* in which *households* of a given size live. In other words, some large houses have few occupants while other large houses have many occupants. These factors drive electricity use separately.

Another key observation from this model, which fits with the importance of the number of rooms, is the notion of the house using electricity as a total electricity-using-'machine'. For example, the model shows that the number of televisions in a house is an important indicator of electricity use. The importance appears to outweigh the electricity used by the televisions themselves.

The likely reason for this is that when a second or subsequent television is added to a house, it is likely to be used in a different room than the existing television(s). Consequently an additional room would then be lit and heated and/or cooled, at least while the television was being watched if not at other times as well. In this way, adding a television to a house can increase the electricity used by the 'house as a machine' by significantly more than the amount of electricity used by the television itself. This also explains why computers appear twice; once for the time they are in operation and again for the number of them in the house. As with TVs, additional computers activate more of the house.

The number of rooms is included as an imperfect marker for house size.[15] Its inclusion as an independent variable in the model captures the fact that the

[13] P-values calculated for t-tests for individual variables and an F-test for the model itself. They are the inverse of a confidence interval. For example a 99 per cent confidence interval corresponds to a one per cent p-value.

[14] To avoid confusion, remember that household size refers to the number of people living in the house, not the physical size of the house itself. The latter is captured in the number of rooms.

energy needed to run a large house is greater than that needed for a small house with the same number of occupants. Large houses have greater areas of lighting, walls and ceilings transmit more energy to the outside, hot water has to run further and so on.

There is also the factor 'separate house' in the model. This also has an element of house size incorporated in it as apartments and other attached dwellings are often smaller than separate houses. It also includes the different thermal characteristics of separate houses as compared to other types of dwelling. Apartments may have only one or two walls exposed to the elements while a separate house may have all sides, roof and under floor exposed.

All demographic factors other than household size failed to enter the model. In contrast, behaviour (such as number of times a week a dishwasher was used), equipment types and home configuration are the types of factors that have strongest explanatory power. The absence of demographics may seem a surprising result, particularly for factors such as income, age and pensions but this is a finding that has been replicated in previous similar studies by the consultant on a number of occasions. It simply means that there is little homogeneity in the amount of electricity different demographic groups use in their houses.

4.3 Simplified national model

The fully specified model contains a number of variables that appear to be measuring the same underlying information. Specifically, the model includes separate variables relating to the following:

1. The presence of electric water heating
2. The presence of an electric cooktop
3. The presence of electric space heating

These three pieces of equipment have a strong explanatory power in the full model and have the added significance of denoting the presence or absence of gas. Electric ovens have less explanatory power as they are used less frequently than the other three. They are also commonly used even where gas is present.

Given the strength of these appliances in the modelling, it was clear that the benchmarks may contain these pieces of equipment and it was equally clear that simple benchmarks could not be developed that covered all seven combinations. A simple approximation had to be found.

[15] Respondents can count major rooms in a house whereas areas are much harder to estimate and thus subject to more error.

The simplified approach to dealing with these appliances was to create a compound variable. Households with all three of the appliances were given a score of three. Households with (any) two of them scored two and households with only one scored one.

This single compound variable was named "cold appliances". It was used in all seasons but summer. In some specifications a "hot appliance" compound variable was developed for the summer benchmark. This included air conditioning instead of electric space heating but was otherwise the same as "cold appliances."

In other specifications the variable was simplified further to "appliances." In this case, households were given a different score in each season. In addition to 'points' for electric hot water and cooktops as applicable they were given a 'point'

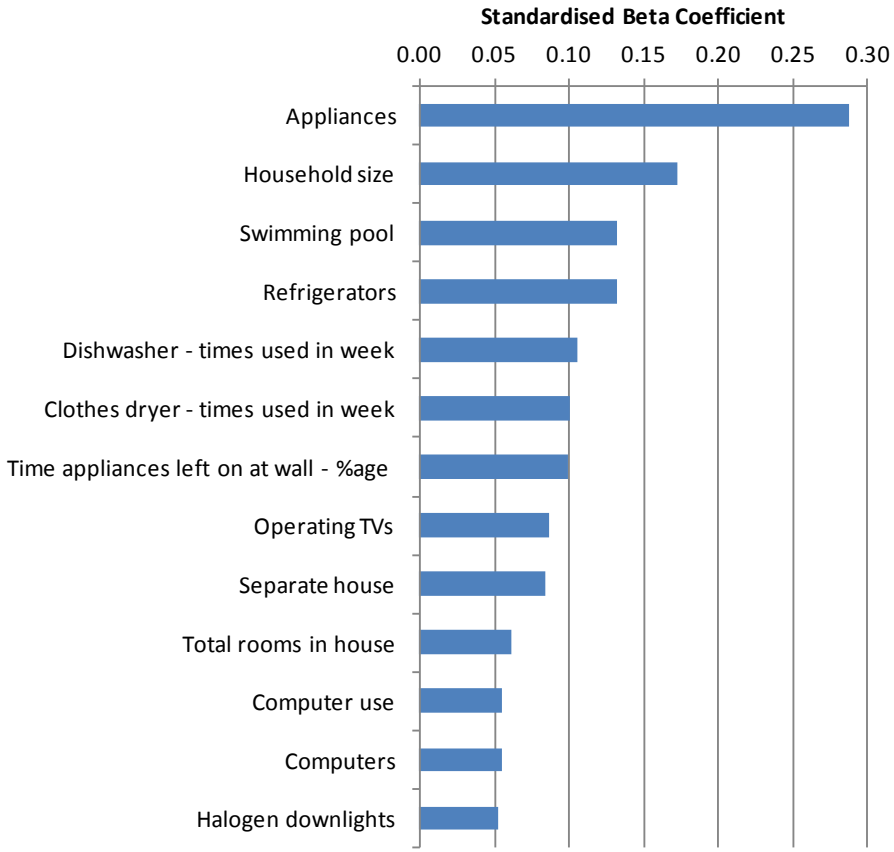
- in summer if they had an air-conditioner
- in the other three seasons if they had an electric space heater.

The "cold appliances", "hot appliances" and "appliances" variables are proxies for the presence of gas appliances in the household. On the assumption that all respondents have cooktops and water heaters, the vast majority of these are either electric or gas. Leaving aside respondents who have no space heating at all, the same is true for space heating.

In this modelling, gas is only important in that it allows for substitution of some electrical equipment.

The results of the simplified national model are presented in Figure 6.

Figure 6 **Simplified national model with compound 'cold appliances' variable – standardised beta coefficients**



Data source: ACIL Tasman

As Figure 6 shows, the combined variable "appliances" accounts for a significant portion of the variance in electricity use. This is unsurprising, as it simply confirms that households that use electricity for these functions use more electricity overall as indicated in the full model.

As with the fully specified model, the simplified model itself and each of the variables other than hot appliances are strongly significant, with p-values substantially below one per cent.

4.4 Jurisdictional models

The next step in the process was to estimate the simplified general model at the jurisdictional level.

The key learning from this step of the process was that the relative importance of different variables varied between jurisdictions. This is shown in Table 5 based on models specified with the 'top five' variables in each jurisdiction.[16]

Table 5 **Rank importance of variables in five variable models – by jurisdiction**

	Household size	Rooms	Pool	Cold appliances	Hot appliances	Fridges	TVs	Dryer	Wall	PC use	Dishwasher	Downlights
Queensland	1		3		4	2		5				
New South Wales	2	1	3	4					5			
Australian Capital Territory	3	1		2						4	5	
Victoria	1	5		2		3		4				
Tasmania	1				4					5	2	3
South Australia	1		4	2		3					5	
Western Australia	1	4	2	3						4		
Northern Territory	1	2	5				4		3			

Data source: ACIL Tasman

Variables are the same as in the earlier figures, but labels are truncated for presentation purposes:
Household size – number of people normally living in the home
Rooms – number of rooms
Pool – whether the home has a pool
Cold app - whether the home has one, two or three 'cold climate' appliances
Hot app - whether the home has one, two or three 'hot climate' appliances
Fridges - the number of operating refrigerators in the home
TVs - the number of operating televisions in the home
Dryer - the number of times each week a clothes dryer is used
Wall - how often appliances are switched off at the wall
PC use - how often and for how long computers are used in the home
Dishwasher - how often a dishwasher is used
Downlights - whether downlights are installed

Table 5 shows that the relationship between the size of a household and the amount of electricity it uses is strong. However, it also suggests that in New South Wales and the Australian Capital Territory other variables are able to explain more of the variability in electricity use and highlights the importance

[16] Note that overlap (multicollinearity) between some variables means that the rank order changes as the number of variables in the model is changed. Essentially this means that different variables are correlated with one another and thus 'tell the same story' in the model.

of the size of the *house* (number of rooms), in addition to the size of the *household* (number of occupants), in explaining electricity use.

Table 5 also shows that in certain jurisdictions, New South Wales, Queensland and Western Australia in particular, the presence or absence of a swimming pool is an important factor in describing electricity use. This is discussed in section 4.5.1 below.

4.5 Simplified jurisdictional models

The preceding sections show that a large number of variables are associated with household electricity use and that, while the most important variables are similar between the jurisdictions, they are not the same. Neither is their rank order.

Nonetheless, in order to achieve the simplicity and consistency across jurisdictions required for effective benchmarks, it is necessary to reduce the number of variables used in benchmarks. While it is feasible to have seventeen variables in a web based tool, this would be completely impractical for a bill-based benchmark.

There are interdependencies between the variables. The relationship between electricity use and the variables will vary depending on how many, and which, variables are included in the model. The number of variables in the underlying model therefore needs to be consistent with the number of variables to be presented on the electricity bill.

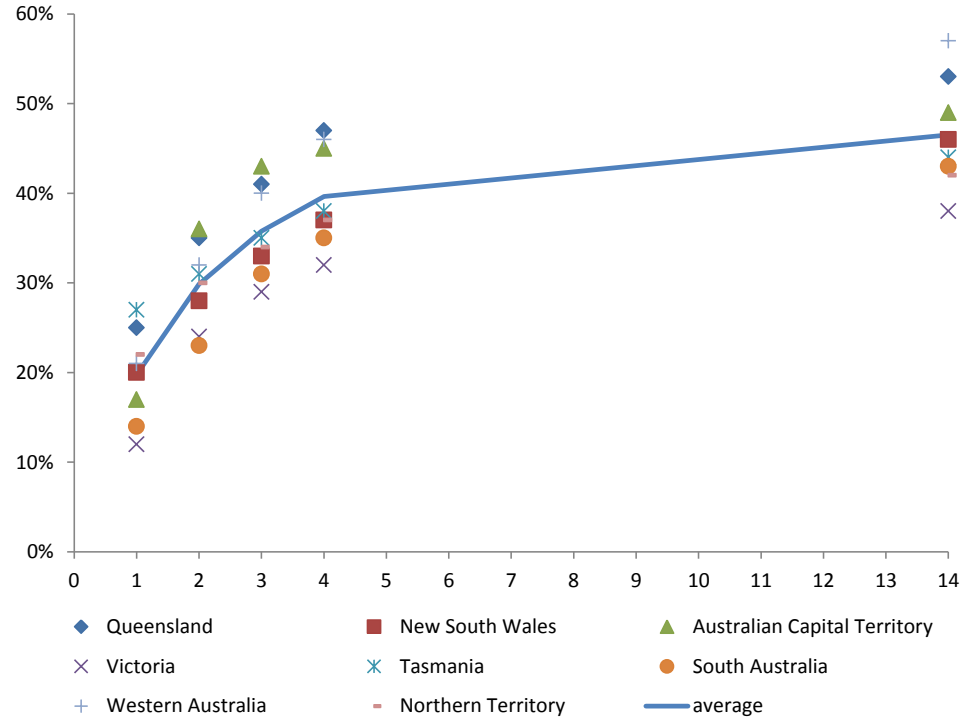
As noted above, as a model is based on fewer variables, it becomes *more* simple and *less* accurate. Therefore there is a tradeoff between accuracy and simplicity. Figure 7 and Table 6 illustrate this trade off by showing how the variance explained by individual jurisdictional models increases as more variables are added.

Table 6 **Relative explanatory power of models across number of variables**

Jurisdiction	One variable	Two variables	Three variables	Four variables	Max variables (14)
Queensland	25%	35%	41%	47%	53%
New South Wales	20%	28%	33%	37%	46%
Australian Capital Territory	17%	36%	43%	45%	49%
Victoria	12%	24%	29%	32%	38%
Tasmania	27%	31%	35%	38%	44%
South Australia	14%	25%	32%	37%	43%
Western Australia	21%	32%	40%	46%	57%
Northern Territory	22%	30%	34%	37%	42%

Data source: ACIL Tasman

Figure 7 **Relative explanatory power of models across number of variables**



Data source: ACIL Tasman

Table 6 and Figure 7 also illustrate that the explanatory power of the model exhibits diminishing returns as more variables are added.

Most of the explicable variability is 'captured' by a small number of variables, two or three. Beyond this, adding additional variables displays sharply diminishing returns.

The correlation (covariance) between variables means that in models with fewer variables the rank order is similar to, but not necessarily the same as, that shown in Table 5 above.

In the sections that follow, we present models based on household size and the 'second factor' that has the most explanatory power in each jurisdiction.

In most jurisdictions the 'second factor' is the extent of gas use in the household, indicated by the appliances variables discussed in section 4.3 ("hot appliances" in summer and "cold appliances" in the other seasons"). However, in New South Wales, Tasmania and the Northern Territory the size of the house, indicated by the number of rooms, had more explanatory power. The difference in the explanatory power of the models using house size and appliances for New South Wales is small. We have therefore been requested to use 'appliances' as the second variable rather than number of rooms.

Table 7 shows the variance explained by two variable models using either number of rooms or appliances as the second variable. In both cases we have also controlled for the presence of a swimming pool.

Table 7 **Summary of jurisdictional two variable models**

Jurisdiction	Second factor			
	Number rooms	& Pool	Appliances	& Pool
Queensland	30%	36%	31%	39%
New South Wales	28%	33%	23%	31%
Australian Capital Territory	21%	22%	31%	32%
Victoria	15%	17%	24%	25%
Tasmania	30%	31%	29%	30%
South Australia	18%	21%	25%	30%
Western Australia	29%	37%	30%	40%
Northern Territory	31%	34%	21%	29%

Data source: ACIL Tasman

4.5.1 Swimming pools

Customers who live in houses with swimming pools use significantly more electricity than those who do not. The average difference is approximately 2,800 kWh per year, although this varies across the jurisdictions.[17] In the context of a household's electricity consumption, this is a substantial quantity of electricity.

The proportion of households that have swimming pools varies widely across the country. In our sample, the highest observed take-up rate is 34% in the Northern Territory. The lowest is 3% in Tasmania. The take-up rate for each jurisdiction is shown in Table 8.

Table 8 **Swimming pool take-up rates**

Jurisdiction	Take-up rate
Victoria	7%
New South Wales	14%
Queensland	20%
South Australia	7%
Western Australia	15%
Northern Territory	34%
Australian Capital Territory	9%
Tasmania	3%

Data source: ACIL Tasman

The electricity consumption associated with swimming pools and the take-up rates have substantial implications for developing the electricity bill benchmarks.

If benchmarks are computed without considering the implications of swimming pools, this assumes that all households use the average amount of electricity for a swimming pool. For example, the implied assumption would be that all Queenslanders have one fifth (20%) of a swimming pool or, more specifically, that all Queenslanders use one fifth of the electricity associated with a swimming pool.

A benchmark calculated in this way would be of little value to either group of households. For households with swimming pools, the benchmark would include only a fraction of the electricity associated with operating the average swimming pool and thus be below what could reasonably be achieved. For

[17] This is not a direct estimate of the electricity used by the appliances associated with the swimming pool. It is determined statistically by comparing electricity use by households with, and without, swimming pools.

households without swimming pools, the benchmark would make allowance for an energy intensive appliance that does not exist, thus building in unnecessary 'headroom' and send the wrong signal.

In the sections that follow we present benchmarks for each jurisdiction based on three distinct treatments of swimming pools. In the first, we make no adjustment for the presence, or absence, of a swimming pool, thus assuming that all households have the average portion of a swimming pool as described above. We then present benchmarks calculated on the assumption that the household does not have a swimming pool and then benchmarks assuming that it has one. This allows choice regarding this issue.

Our recommendation is that the benchmarks published on electricity bills should be calculated on the assumption that the household in question does not have a swimming pool. This assumption should be stated on the bill.

This approach would produce benchmarks that are meaningful to the majority of households.

Households with swimming pools should be referred to the web based tool for benchmarks applicable to them.

4.5.2 Queensland

The variables that have the most explanatory power in estimating the electricity consumed by Queensland householders are household size and appliances (i.e. the hot and cold appliances compound variable).[18]

Table 9 provides benchmark electricity use for households summarised by household size and the appliance variable.

The top pane of Table 9 makes no adjustment for the presence of swimming pools, that is, it includes the average portion of a swimming pool for all households.

The second pane of Table 9 provides benchmark electricity use for Queensland households *without* swimming pools summarised by household size and the extent of cold appliances used. The third pane provides the average electricity use for households *with* swimming pools summarised in the same way.

[18] Note that this is in the case of a two-variable model. The ranking differs from the five variable models shown in Table 5 due to correlation between the variables themselves.

Table 9 **Two variable benchmarks for Queensland – with adjustments for swimming pools (kWh per year)**

	Household Size	1	2	3	4	5	6
	Average pools =20%						
Appliances	0	2,719	4,046	5,374	6,701	8,028	9,355
	1	3,665	4,992	6,320	7,647	8,974	10,301
	2	4,611	5,938	7,266	8,593	9,920	11,248
	3	5,557	6,885	8,212	9,539	10,866	12,194
	No pool						
Appliances	0	2,189	3,516	4,843	6,170	7,498	8,825
	1	3,135	4,462	5,789	7,116	8,444	9,771
	2	4,081	5,408	6,735	8,062	9,390	10,717
	3	5,027	6,354	7,681	9,009	10,336	11,663
	Pool						
Appliances	0	4,849	6,177	7,504	8,831	10,158	11,486
	1	5,795	7,123	8,450	9,777	11,104	12,432
	2	6,741	8,069	9,396	10,723	12,051	13,378
	3	7,688	9,015	10,342	11,669	12,997	14,324

Data source: ACIL Tasman

Table 9 illustrates that the electricity consumption increases as the household size increases and as the number of cold (or hot) appliances increases. The benchmark electricity consumption increases by 1327 kWh per annum for each additional person in the household. The electricity consumption is higher for households with a swimming pool than those without.

4.5.3 Australian Capital Territory

The NERR require that household size be used as a variable in the benchmarking. With household size as one variable, the variable with the second most explanatory power in estimating the electricity consumed by Australian Capital Territory householders is appliances (i.e. the hot and cold appliances compound variable).[19]

[19] Note that this is in the case of a two-variable model. The ranking differs from the five variable models shown in Table 5 due to correlation between the variables themselves.

Table 10 provides benchmark electricity use for households summarised by household size and the appliance variable.

The top pane of Table 10 makes no adjustment for the presence of swimming pools, that is, it includes the average portion of a swimming pool for all households.

The second pane of Table 10 provides benchmark electricity use for Australian Capital Territory households *without* swimming pools summarised by household size and the extent of cold appliances used. The third pane provides the average electricity use for households *with* swimming pools summarised in the same way.

Table 10 **Two variable benchmarks for the Australian Capital Territory – with adjustments for swimming pools (kWh per year)**

	Household Size	1	2	3	4	5	6
	Average pools = 9%						
Appliances	0	3,210	4,745	6,280	7,815	9,350	10,885
	1	5,305	6,840	8,375	9,910	11,445	12,979
	2	7,400	8,935	10,470	12,004	13,539	15,074
	3	9,495	11,029	12,564	14,099	15,634	17,169
	No pool						
Appliances	0	3,047	4,582	6,117	7,652	9,187	10,722
	1	5,142	6,677	8,212	9,747	11,282	12,816
	2	7,237	8,772	10,307	11,841	13,376	14,911
	3	9,332	10,866	12,401	13,936	15,471	17,006
	Pool						
Appliances	0	4,850	6,384	7,919	9,454	10,989	12,524
	1	6,944	8,479	10,014	11,549	13,084	14,619
	2	9,039	10,574	12,109	13,644	15,179	16,714
	3	11,134	12,669	14,204	15,739	17,274	18,809

Data source: ACIL Tasman

Table 10 illustrates that the electricity consumption increases as the household size increases and as the number of cold (or hot) appliances increases. The benchmark electricity consumption increases by 1535 kWh per annum for each additional person in the household. The electricity consumption is higher for households with a swimming pool than those without.

4.5.4 Victoria

The variables that have the most explanatory power in estimating the electricity consumed by Victorian householders are household size and appliances (i.e. the hot and cold appliances compound variable).[20]

Table 11 provides benchmark electricity use for households summarised by household size and the appliance variable.

The top pane of Table 11 makes no adjustment for the presence of swimming pools, that is, it includes the average portion of a swimming pool for all households.

The second pane of Table 11 provides benchmark electricity use for Victorian households *without* swimming pools summarised by household size and the extent of cold appliances used. The third pane provides the average electricity use for households *with* swimming pools summarised in the same way.

[20] Note that this is in the case of a two-variable model. The ranking differs from the five variable models shown in Table 5 due to correlation between the variables themselves.

Table 11 **Two variable benchmarks for Victoria – with adjustments for swimming pools (kWh per year)**

	Household Size	1	2	3	4	5	6
	Average pools = 7%						
Appliances	0	3,144	4,061	4,977	5,894	6,811	7,727
	1	4,359	5,275	6,192	7,109	8,025	8,942
	2	5,574	6,490	7,407	8,324	9,240	10,157
	3	6,788	7,705	8,622	9,538	10,455	11,372
	No pool						
Appliances	0	3,024	3,941	4,858	5,774	6,691	7,608
	1	4,239	5,156	6,073	6,989	7,906	8,823
	2	5,454	6,371	7,287	8,204	9,121	10,037
	3	6,669	7,585	8,502	9,419	10,335	11,252
	Pool						
Appliances	0	4,758	5,674	6,591	7,508	8,424	9,341
	1	5,972	6,889	7,806	8,722	9,639	10,556
	2	7,187	8,104	9,020	9,937	10,854	11,770
	3	8,402	9,318	10,235	11,152	12,068	12,985

Data source:

Table 11 illustrates that the electricity consumption increases as the household size increases and as the number of cold (or hot) appliances increases. The benchmark electricity consumption increases by 917 kWh per annum for each additional person in the household. The electricity consumption is higher for households with a swimming pool than those without.

4.5.5 Tasmania

The two variables that are recommended for Tasmania use household size and house size (i.e. the number of rooms variable).

As Table 5 shows, house size is not the second highest ranking variable in explaining household electricity use in Tasmania. Other variables associated with house size, such as lighting, have greater power. However, in our view it would be impractical to reflect these variables in a bill based benchmark. Therefore we recommend that house size be used instead.

Using the house size variable instead of lighting reduces the explained variance by a small amount (from 0.38 to 0.34).

Table 12 provides benchmark electricity use for households summarised by household size and the number of rooms variable.

The top pane of Table 12 makes no adjustment for the presence of swimming pools, that is, it includes the average portion of a swimming pool for all households.

The second pane of Table 12 provides benchmark electricity use for Tasmanian households *without* swimming pools summarised by household size and number of rooms. The third pane provides the average electricity use for households *with* swimming pools summarised in the same way.

Table 12 **Two variable benchmarks for Tasmania – with adjustments for swimming pools (kWh per year)**

Household size		1	2	3	4	5	6
	Average pools = 3%						
House size (rooms)	Small	5,995	7,661	9,326	10,991	12,656	14,321
	Medium	7,063	8,728	10,393	12,058	13,723	15,388
	Large	8,309	9,974	11,639	13,304	14,969	16,634
	No pool						
House size (rooms)	Small	6,072	7,737	9,402	11,067	12,732	14,397
	Medium	7,140	8,805	10,470	12,135	13,800	15,465
	Large	8,385	10,050	11,715	13,380	15,045	16,710
	Pool						
House size (rooms)	Small	8,286	9,951	11,616	13,282	14,947	16,612
	Medium	9,354	11,019	12,684	14,349	16,014	17,679
	Large	10,599	12,265	13,930	15,595	17,260	18,925

Note: Small means up to 5 rooms, medium means 6 to 9 rooms, large means 10 to 12 rooms

Data source: ACIL Tasman

Table 12 illustrates that the electricity consumption increases as the household size increases and as the number of rooms in the house increases. The benchmark electricity consumption increases by 1,666 kWh per annum for each additional person in the household. The electricity consumption is higher for households with a swimming pool than those without.

4.5.6 South Australia

The variables that have the most explanatory power in estimating the electricity consumed by South Australian householders are household size and appliances (i.e. the hot and cold appliances compound variable).[21]

Table 13 provides benchmark electricity use for households summarised by household size and the appliance variable.

The top pane of Table 13 makes no adjustment for the presence of swimming pools, that is, it includes the average portion of a swimming pool for all households.

The second pane of Table 13 provides benchmark electricity use for South Australian households *without* swimming pools summarised by household size and the extent of cold appliances used. The third pane provides the average electricity use for households *with* swimming pools summarised in the same way.

[21] Note that this is in the case of a two-variable model. The ranking differs from the five variable models shown in Table 5 due to correlation between the variables themselves.

Table 13 **Two variable benchmarks for South Australia – with adjustments for swimming pools**

	Household size	1	2	3	4	5	6
	Average pools = 7%						
Appliances	0	3,060	4,077	5,094	6,110	7,127	8,144
	1	4,123	5,140	6,157	7,174	8,190	9,207
	2	5,187	6,204	7,220	8,237	9,254	10,271
	3	6,250	7,267	8,284	9,300	10,317	11,334
	No pool						
Appliances	0	2,869	3,886	4,903	5,920	6,936	7,953
	1	3,933	4,949	5,966	6,983	8,000	9,017
	2	4,996	6,013	7,030	8,046	9,063	10,080
	3	6,059	7,076	8,093	9,110	10,127	11,143
	Pool						
Appliances	0	5,777	6,794	7,811	8,828	9,844	10,861
	1	6,841	7,857	8,874	9,891	10,908	11,925
	2	7,904	8,921	9,938	10,954	11,971	12,988
	3	8,967	9,984	11,001	12,018	13,035	14,051

Data source: ACIL Tasman

Table 13 illustrates that the electricity consumption increases as the household size increases and as the number of cold (or hot) appliances increases. The benchmark electricity consumption increases by 917 kWh per annum for each additional person in the household. The electricity consumption is higher for households with a swimming pool than those without.

4.5.7 Northern Territory

The variables that have the most explanatory power in estimating the electricity consumed by Northern Territory householders are household size and house size (i.e. the number of rooms variable).[22]

Table 14 provides benchmark electricity use for households summarised by household size and the number of rooms variable.

[22] Note that this is in the case of a two-variable model. The ranking differs from the five variable models shown in Table 5 due to correlation between the variables themselves.

The top pane of Table 14 makes no adjustment for the presence of swimming pools, that is, it includes the average portion of a swimming pool for all households.

The second pane of Table 14 provides benchmark electricity use for Northern Territory households *without* swimming pools summarised by household size and the extent of cold appliances used. The third pane provides the average electricity use for households *with* swimming pools summarised in the same way.

Table 14 **Two variable benchmarks for Northern Territory – with adjustments for swimming pools (kWh per year)**

Household size		1	2	3	4	5	6
	Average pools = 34%						
House size (rooms)	Small	6,323	7,559	8,796	10,032	11,269	12,505
	Medium	8,131	9,367	10,604	11,840	13,077	14,313
	Large	10,241	11,477	12,713	13,950	15,186	16,423
	No pool						
House size (rooms)	Small	5,553	6,790	8,026	9,263	10,499	11,735
	Medium	7,362	8,598	9,834	11,071	12,307	13,544
	Large	9,471	10,707	11,944	13,180	14,417	15,653
	Pool						
House size (rooms)	Small	7,828	9,064	10,300	11,537	12,773	14,010
	Medium	9,636	10,872	12,109	13,345	14,581	15,818
	Large	11,745	12,982	14,218	15,454	16,691	17,927

Note: Small means up to 5 rooms, medium means 6 to 9 rooms, large means 10 to 12 rooms

Data source: ACIL Tasman

Table 14 illustrates that the electricity consumption increases as the household size increases and as the number of rooms in the house increases. The benchmark electricity consumption increases by 1,237 kWh per annum for each additional person in the household. The electricity consumption is higher for households with a swimming pool than those without.

4.5.8 Western Australia

The variables that have the most explanatory power in estimating the electricity consumed by Western Australian householders are household size and appliances (i.e. the hot and cold appliances compound variable).[23]

Table 14 provides benchmark electricity use for households summarised by household size and the appliance variable.

The top pane of Table 14 makes no adjustment for the presence of swimming pools, that is, it includes the average portion of a swimming pool for all households.

The second pane of Table 14 provides benchmark electricity use for Western Australian households *without* swimming pools summarised by household size and the extent of cold appliances used. The third pane provides the average electricity use for households *with* swimming pools summarised in the same way.

[23] Note that this is in the case of a two-variable model. The ranking differs from the five variable models shown in Table 5 due to correlation between the variables themselves.

Table 15 **Two variable benchmarks for Western Australia – with adjustments for swimming pools (kWh per year)**

	Household Size	1	2	3	4	5	6
	Average pools = 15%						
Appliances	0	3,538	4,615	5,692	6,769	7,846	8,923
	1	4,598	5,675	6,752	7,829	8,906	9,983
	2	5,658	6,735	7,812	8,889	9,966	11,044
	3	6,718	7,795	8,872	9,950	11,027	12,104
	No pool						
Appliances	0	3,093	4,170	5,247	6,324	7,401	8,478
	1	4,153	5,230	6,307	7,384	8,461	9,539
	2	5,213	6,290	7,367	8,445	9,522	10,599
	3	6,274	7,351	8,428	9,505	10,582	11,659
	Pool						
Appliances	0	6,095	7,172	8,249	9,326	10,403	11,480
	1	7,155	8,232	9,309	10,386	11,463	12,540
	2	8,215	9,292	10,369	11,446	12,523	13,601
	3	9,275	10,352	11,429	12,507	13,584	14,661

Data source: ACIL Tasman

Table 15 illustrates that the electricity consumption increases as the household size increases and as the number of cold (or hot) appliances increases. The benchmark electricity consumption increases by 1,077 kWh per annum for each additional person in the household. The electricity consumption is higher for households with a swimming pool than those without.

4.5.9 New South Wales

With household size as one variable, the second factor with the most explanatory power in New South Wales was the size of the house (as indicated by number of rooms). However, the difference in variance explained by house size and the use of cold appliances (together with household size and swimming pool) was small. We were therefore requested to estimate the two variable models for New South Wales based on cold (and hot) appliances rather than house size.

Table 16 provides benchmark electricity use for households summarised by household size and the appliance variable.

The top pane of Table 16 makes no adjustment for the presence of swimming pools, that is, it includes the average portion of a swimming pool for all households.

The second pane of Table 16provides benchmark electricity use for New South Wales households *without* swimming pools summarised by household size and the extent of cold appliances used. The third pane provides the average electricity use for households *with* swimming pools summarised in the same way.

Table 16 **Two variable benchmarks for New South Wales – with adjustments for swimming pools (kWh per year)**

	Household Size	1	2	3	4	5	6
	Average pools = 14%						
Appliances	0	3,471	4,622	5,773	6,924	8,075	9,226
	1	4,318	5,469	6,620	7,771	8,922	10,073
	2	5,165	6,316	7,467	8,618	9,769	10,920
	3	6,012	7,163	8,314	9,465	10,616	11,767
	No pool						
Appliances	0	3,005	4,156	5,307	6,458	7,609	8,760
	1	3,852	5,003	6,154	7,305	8,456	9,607
	2	4,699	5,850	7,001	8,152	9,303	10,454
	3	5,546	6,697	7,848	8,999	10,150	11,301
	Pool						
Appliances	0	6,334	7,485	8,636	9,787	10,938	12,089
	1	7,181	8,332	9,483	10,634	11,785	12,936
	2	8,028	9,179	10,330	11,481	12,632	13,783
	3	8,875	10,026	11,177	12,328	13,479	14,630

Data source: ACIL Tasman

Table 16 illustrates that the electricity consumption increases as the household size increases and as the number of cold (or hot) appliances increases. The benchmark electricity consumption increases by 1,151 kWh per annum for each additional person in the household. The electricity consumption is higher for households with a swimming pool than those without.

4.6 Household size models

The final stage in the process is to reduce the benchmarks to an even simpler form which takes only one factor into account, namely household size. This will enable a narrow reading of the NERR such that benchmarks "based on" household size are limited to that factor.

Even in this scenario, the impact of swimming pools on household electricity use is sufficiently large that we recommend that it be taken into account (see section 4.5.1 for a discussion). This in effect gives a second hidden dimension and increases the explanatory power of the model for households without pools. The effect is strongest in Queensland and Northern Territory. Controlling for swimming pools has minor but worthwhile impacts on the states with a relatively smaller proportion of households having them.

Average electricity use benchmarks based on household size are presented below as follows:

1. Table 17 provides benchmarks calculated with an average portion of a swimming pool
2. Table 18 provides benchmarks for households without swimming pools
3. Table 19 provides benchmarks for households with swimming pools

These tables provide summary level benchmarks at the jurisdictional level based on annual data. They are indicative only. Where jurisdictions have chosen to apply localised zones, zonal benchmarks are set out in the accompanying spreadsheet for the 'no swimming pool' case. The benchmarks in the spreadsheet also reflect seasonal differences.

Table 17 **Jurisdictional benchmarks – based on household size only, average portion of a swimming pool**

Household size (people)	1	2	3	4	5	6	Var
	Electricity consumption (kWh)						
Queensland	4,565	5,867	7,168	8,470	9,771	11,073	25%
New South Wales	4,928	6,053	7,179	8,304	9,430	10,555	17%
Australian Capital Territory	6,177	7,457	8,738	10,018	11,298	12,579	13%
Victoria	4,170	4,977	5,784	6,591	7,398	8,205	12%
Tasmania	7,053	8,925	10,796	12,667	14,538	16,410	27%
South Australia	4,596	5,504	6,411	7,319	8,226	9,134	14%
Western Australia	4,581	5,614	6,647	7,680	8,713	9,746	21%
Northern Territory	7,326	8,866	10,406	11,945	13,485	15,025	22%

Note: VAR is explained variance
Data source: ACIL Tasman

Table 18 **Jurisdictional benchmarks – based on household size only, no swimming pool**

Household size (people)	1	2	3	4	5	6	Var
	Electricity consumption (kWh)						
Queensland	4,030	5,331	6,633	7,934	9,236	10,538	34%
New South Wales	4,422	5,548	6,673	7,799	8,924	10,050	27%
Australian Capital Territory	5,939	7,219	8,500	9,780	11,061	12,341	15%
Victoria	4,028	4,835	5,642	6,449	7,256	8,064	14%
Tasmania	6,862	8,733	10,604	12,475	14,347	16,218	28%
South Australia	4,398	5,306	6,213	7,121	8,028	8,936	18%
Western Australia	4,107	5,140	6,173	7,206	8,239	9,272	32%
Northern Territory	6,266	7,806	9,345	10,885	12,425	13,965	29%

Note: VAR is explained variance
Data source: ACIL Tasman

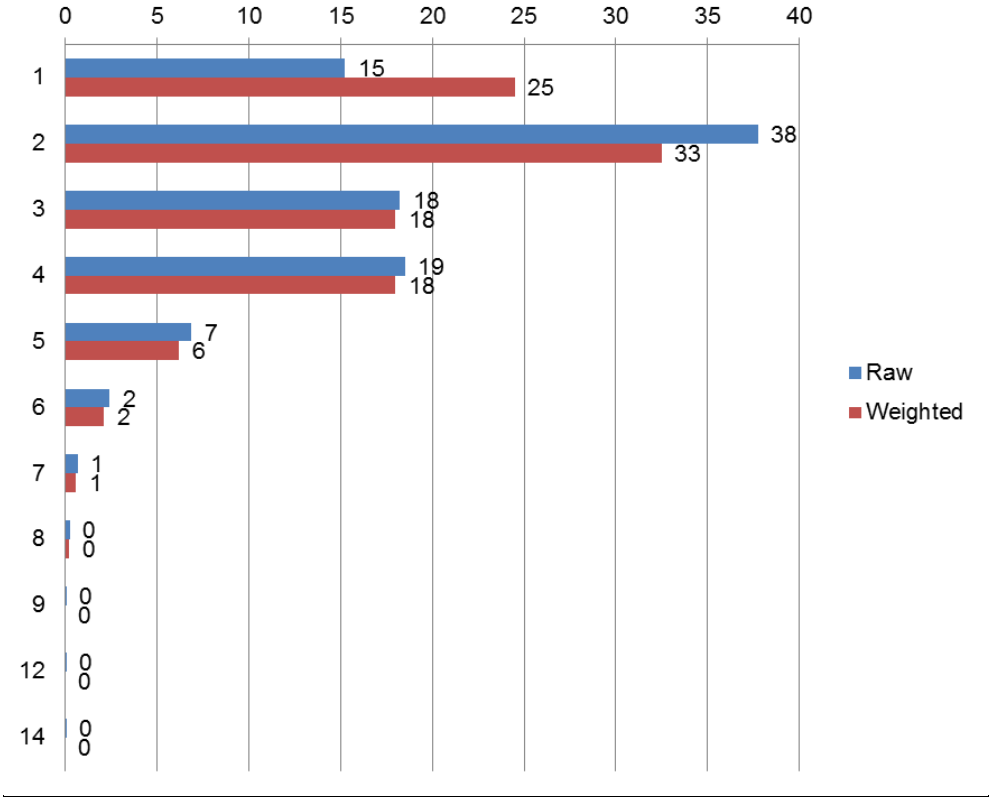
Table 19 **Jurisdictional benchmarks – based on household size only, with swimming pool**

Household size (people)	1	2	3	4	5	6	Var
	Electricity consumption (kWh)						
Queensland	6,707	8,009	9,310	10,612	11,913	13,215	34%
New South Wales	8,033	9,158	10,284	11,410	12,535	13,661	27%
Australian Capital Territory	8,583	9,863	11,144	12,424	13,705	14,985	15%
Victoria	6,053	6,860	7,667	8,474	9,281	10,088	14%
Tasmania	9,600	11,471	13,342	15,214	17,085	18,956	28%
South Australia	7,227	8,134	9,042	9,949	10,856	11,764	18%
Western Australia	7,269	8,302	9,335	10,368	11,401	12,434	32%
Northern Territory	9,384	10,924	12,464	14,004	15,543	17,083	29%

Note: VAR is explained variance
Data source: ACIL Tasman

For reference, the distribution of household sizes in our sample is shown in Figure 8.

Figure 8 **Household size – sample and population**



Data source: ACIL Tasman

The 'raw' series in Figure 8 reflects the makeup of the sample, for example 38 per cent of respondents were from two person households. The 'weighted' series shows the sample after it was reweighted to match the broader population based on statistics from the Australian Bureau of Statistics.

5 Calibration with AER data

Having produced one and two factor benchmarks at the localised zone level and taking account of seasonality, the final step is to calibrate the results of our sample with the average consumption data collected by the AER. This is necessary to satisfy the requirement in the NERR that the benchmarks must be based on data supplied to the AER by the DNSPs.

The CIIC intends that, in future, the AER will be able to collect updated average consumption data and re-calibrate the benchmarks using an algorithm. That algorithm is essentially a series of ratios relating electricity consumption by households of different sizes to the zonal mean. The algorithm can be taken from the calibrated benchmarks as described in section 5.2.

In section 5.1 we describe the AER dataset provided to us and our understanding of the way it was collected.

In section 5.2 we describe our approach to calibrating our results with that dataset and describe the way that the calibrated benchmarks would be used to compute updated benchmarks in future if the AER repeats its data gathering exercise.

We have some concerns with the calibrated benchmarks and, therefore, with the CIIC's proposed approach to updating the benchmarks in future. These concerns are set out in section 5.3.

5.1 Description of AER dataset

At the commencement of this assignment, the AER provided ACIL Tasman with data showing the average electricity consumption by households in each postcode in Australia. Where more than one distributor supplies a postcode separate averages were provided for each distributor.

The data were accompanied by a data dictionary and data information sheet to aid in interpreting them and a PowerPoint presentation summarising the results of an analysis undertaken by the AER.

Our understanding is that the data provided to us are annual averages, although we note from the data information sheet that they do not all span the same period. From that sheet it appears that, while the data that apply to any single DNSP only cover a single year, the data set in its entirety cover a period from November 2008 until July 2010.

All DNSPs reported customer numbers to the AER although there are small differences in the way that these were determined. Some DNSPs based their

estimate of customer numbers on the number of NMIs they supply, while others used the number of premises they supply.

In some cases DNSPs provided 'point in time' estimates while in other cases they provided the average number of customers over a period.

There appear to be some cases where the customer numbers data relate to a different period than the consumption data.

We understand that all datasets reported to the AER included controlled load electricity where applicable.

5.2 Calibration

The process for calibrating the benchmarks based on our sample to the average consumption data collected by the AER began with calculating the average electricity consumption for each localised zone from both datasets.

The next step was to take the ratio of those averages and scale the benchmarks derived from our sample. The process is outlined in the following example.

The annual mean electricity consumption in New South Wales based on our sample is approximately 7080 kWh per household.

In the Northern Rivers zone, the AER data show that the annual mean electricity consumption is 6375 kWh per household, which is 90 per cent of the State mean.

Based on our sample, the average consumption benchmark for households in New South Wales in summer without swimming pools are set out in the first row of Table 20. The calibration ratio was applied to these to produce the average consumption benchmarks for the Northern Rivers zone, which are shown in row 3.

Table 20 **Calibrating localised zone, New South Wales Northern Rivers zone, summer, no swimming pool**

Household size	1	2	3	4	5	6
State mean summer consumption (kWh/ household/season)	1,012	1,305	1,599	1,892	2,185	2,479
Calibration ratio, Northern Rivers: New South Wales	0.9					
Northern Rivers zone summer benchmarks consumption (kWh/household/ season)	910	1,175	1,439	1,703	1,967	2,231

This process was repeated in each zone and in each season to produce calibrated, seasonal, zonal benchmarks based on household size and assuming that the household in question has no swimming pool. The result of this

process is a set of seasonal, zonal benchmarks, which are provided in the attached spreadsheet.

For future calibration exercises with updated mean consumption levels for each zone, two approaches are possible. Either:

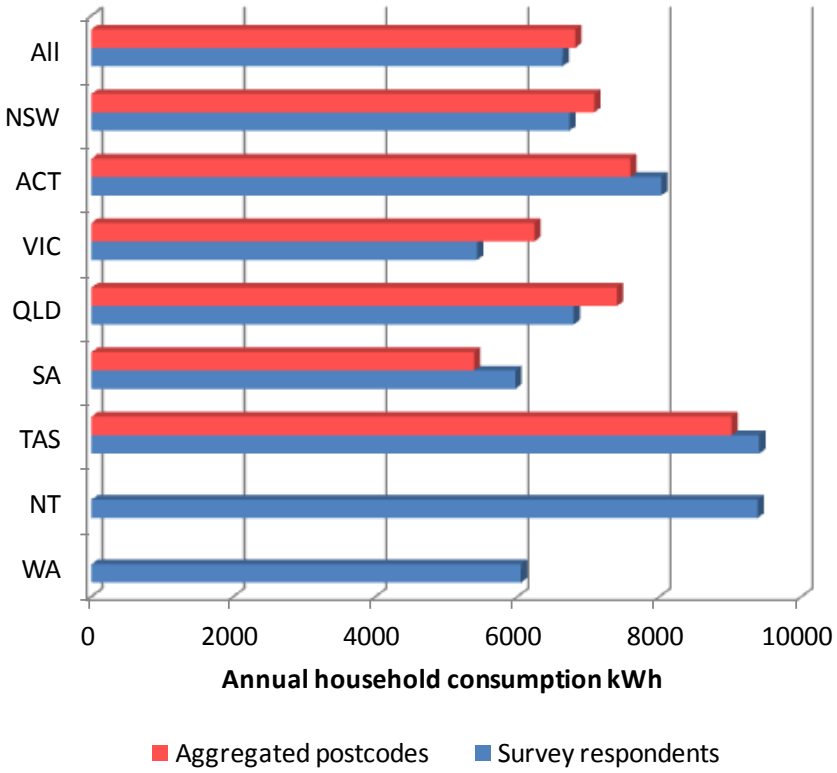
- divide the new zonal mean consumption by the mean in the current benchmarks and scale each benchmark by the same proportion
- calculate the ratio between each benchmark and the zonal mean and multiply these ratios by the new zonal mean

5.3 Concerns with proposed approach

During the process of calibrating our benchmarks with the AER dataset we compared the state electricity consumption averages in the AER data set with those from our data, as shown in Figure 9.

As is to be expected there are some differences between the two datasets. In particular our sample suggests lower average electricity consumption in Victoria and Queensland than the AER's data. This is probably due to the different time periods covered by the two datasets. Our sample was collected in mid 2011, whereas the AER data covers either calendar year 2009 or financial year 2009/10.

Figure 9 **Average annual electricity consumption by jurisdiction – comparison of AER and ACIL Tasman samples**



We also compared the jurisdictional means with the zonal means in the AER's data. This comparison showed a high level of variation between the zonal and state averages. The differences ranged from +39% (North West Slopes and Plains, NSW) to -34% (Sydney Central, NSW).

Deviations greater than ten per cent are listed in Table 21.

Table 21 **Large (>10%) zonal mean deviations from state mean average consumption**

Zone	Zone mean	Jurisdiction mean	Deviation (KWh pa)	Deviation (%)
North West Slopes and Plains - NSW	9,858	7,082	2,777	39%
Sydney Central - NSW	4,671	7,082	-2,411	-34%
Riverina – NSW	9,321	7,082	2,239	32%
Mt Lofty Ranges - SA	6,870	5,385	1,485	28%
North West-QLD	9,245	7,398	1,847	25%
Central West-QLD	9,080	7,398	1,682	23%
Cabrumurra - NSW	5,489	7,082	-1,593	-22%
Lower Burdekin-QLD	9,033	7,398	1,634	22%
Mid North - Woomera - SA	6,525	5,385	1,140	21%
Thredbo - NSW	8,410	7,082	1,328	19%
Yorke Peninsula & Kangaroo Island – SA	4,419	5,385	-966	-18%
Central West Slopes and Plains – NSW	8,280	7,082	1,199	17%
Pt Augusta & Pastoral - SA	6,223	5,385	838	16%
Hunter_Hawkesbury_Nepean - NSW	8,180	7,082	1,098	16%
Wide Bay Burnett-QLD	6,261	7,398	-1,137	-15%
Tweed – NSW	6,054	7,082	-1,028	-15%
Mid North Coast - NSW	6,198	7,082	-883	-12%
Upper Western - NSW	7,946	7,082	865	12%
South East – SA	6,038	5,385	653	12%
South Coast - NSW	6,242	7,082	-840	-12%

The deviations in Table 21 raise some concerns with the notion of re-calibrating future benchmarks to updated average values. In some cases the average figure appears to be biased away from the state mean for reasons about which we can only speculate.

In some places where the zonal means appear lower than expected there may be a high proportion of holiday homes. Examples are the Yorke Peninsula and Kangaroo Island region of South Australia and the Coffs Harbour region of New South Wales. In zones where there is a disproportionately high concentration of holiday homes the average consumption figures become meaningless. The problem is similar to the issue with swimming pools discussed above. The benchmarks will be too low for homes that are occupied year round and too high for those occupied infrequently.

The same concern may apply to other regions such as Cabramurra, in the Snowy Mountains, which has surprisingly low average consumption for an alpine region.

In other places the difference may be explained by localised climate conditions, for example the Thredbo region in New South Wales and the Mt Lofty Ranges region in South Australia are both significantly colder than the average for their respective States. It is unsurprising that mean consumption in those zones would be above the state mean due to the increased heating load.

In other places, such as the North West Slopes and Plains region in New South Wales, we are not aware of an explanation for the difference, although one may exist.

In zones where the mean is different than the state mean for reasons genuinely connected to electricity consumption the calibration process described here is sound. In other cases it may be problematic, although we cannot comment definitively.

The only ways we can see of addressing this problem would be:

1. do not update the benchmarks – over time the benchmarks would gradually become less accurate and lose relevance
2. repeat the data collection and modelling exercise whenever the benchmarks are to be updated – this may be a disproportionate exercise relative to the inaccuracy that would be created by not updating

As neither of these solutions is ideal, it may be best to improve the zonal average data used for future updates by 'screening out' holiday homes and non-residential users of electricity. This may be as simple as deleting outliers from the dataset although, as we understand it, the AER was provided with mean consumption, not raw data, so could not have done this on this occasion.

6 Conclusions

The benchmarks we have estimated are the average consumption for households in 'groups' where the groups are defined by reference to characteristics (factors) relevant to household electricity use.

For benchmarks to be effective in reducing customers' electricity use they must be accurate and simple.

The explanatory power of the benchmarks is improved by adopting different benchmarks each season. This introduces the problem of 'billing lag' because electricity meters are read progressively and thus do not align to seasons neatly.

Notwithstanding this, we found that the best statistical fit in the data was achieved by assigning bills to seasons based on the day the meter was read. Therefore, we recommend that the benchmarks we have estimated are applied to bills based on the date the meter was read:

Table 22 **Assigning benchmarks to seasons**

Meter read date	Season
1 December to 28 (or 29) February	Summer
1 March to 31 May	Autumn
! June to 31 August	Winter
1 September to 30 November	Spring

Further, as more factors are added to a benchmark, or as a customer's 'group' is defined more precisely, the benchmark becomes more accurate but less simple. Choosing the appropriate number of factors is a trade off between these two competing objectives.

Fortunately, there are diminishing returns in the accuracy of benchmarks. While we found 17 variables that contribute to explaining electricity consumption, a model based on only household size and an assumption that the household does not have a swimming pool can explain about 20 per cent of the variance in electricity consumption.

This is substantial, but it can be increased by half again by adding a third factor. We recommend that consideration be given to strengthening the benchmarks by doing this. This could be done by an amendment to the NERR or retailers may choose to add extra information themselves.

The third factor that would be added varies by jurisdiction. In all but Northern Territory and Tasmania it would be the extent of electricity using appliances (i.e. our appliances or cold appliances variables). In the Northern Territory and

Tasmania, where gas is less prevalent, the number of rooms in the house is a more powerful variable.

In all cases we recommend that benchmarks be calculated, and presented on bills, based on the assumption that the householder does not have a swimming pool. Swimming pools are associated with substantially increased electricity use, but only a small proportion of households have them. If the benchmarks were calculated without controlling for swimming pools, householders with swimming pools would be set benchmarks that are well below what they use on average. On the other hand, the benchmarks would give households without swimming pools unnecessary 'head room' in the benchmarks.

A Questionnaire

The questionnaire used for the online sample is reproduced below. The questionnaire itself was administered online, so the below has been reformatted.

There were some slight differences in the introduction to account for jurisdictional differences. For example the questionnaire distributed in the Northern Territory did not refer to NMI, as these are not used in the Northern Territory. That survey referred to Customer Account ID instead.

This survey will be used to better understand household energy use and to develop electricity use benchmarks to be used by Australian Governments in their efforts to help Australian electricity customers become more energy efficient. The benchmarks are being prepared by consultants ACIL Tasman.

[NSW, VIC, ACT, SA, QLD, TAS intro] In order to do this, your consent is required to get your electricity consumption data for 12 to 36 months from your electricity distributor and/or retailer by matching to your National Metering Identifier, which is an 11 digit number located on your electricity bill. Your electricity consumption data will then be matched to your responses by the research team to analyse energy use by households and develop National Electricity Use Benchmarks.

Do you give your consent for your electricity consumption data to be provided by electricity distributor and/or retailer to ACIL Tasman and the Government for this purpose understanding that it will only be used for this purpose and you will not be identified to anyone outside the research team?

- ❍ Yes (1)
- ❍ No (2) – screen out if No

S1

How long have you lived at your current address?

- ❍ Less than a year (1) – screen out
- ❍ 1 year but less than 2 years (2)
- ❍ 2 to 5 years (3)
- ❍ More than 5 years (4)

S2

Do you contribute to the paying the electricity bill and/or decisions about using electricity?

- ❍ Yes (1)
- ❍ No (2) – screen out

S3

Do you have your last electricity bill in front of you? We need to ask you a couple of questions about your bill so it is necessary to continue. If you do not have your bill handy,

please close your browser. Once you have your bill you will be able to click on the survey link and return to the survey. Selecting "No" below will terminate the survey.

- ❍ Yes (1)
- ❍ No (2) – screen out

S3b

To make sure we have surveys a good cross-section of Australian households, we need to ask a few questions about you. In which state do you live?

- ❍ NSW (1)
- ❍ Victoria (2)
- ❍ Queensland (3)
- ❍ SA (4)
- ❍ WA (5)
- ❍ Tasmania (6)
- ❍ ACT (7)
- ❍ NT (8)

Note D1 to D4 are used to control sample quotas

D1

What best describes where you live?

- ❍ Rural/not in a town or city (1)
- ❍ Small regional centre (2)
- ❍ Major regional centre (3)
- ❍ State capital city (4)

D2

What is your gender?

- ❍ Male (2)
- ❍ Female (1)

D3

Into which of these age groups do you fall?

- ❍ 18-19 years (1)
- ❍ 20-24 years (2)
- ❍ 25-29 years (3)
- ❍ 30-34 years (4)
- ❍ 35-39 years (5)
- ❍ 40-44 years (6)
- ❍ 45-49 years (7)
- ❍ 50-54 years (8)
- ❍ 55-59 years (9)
- ❍ 60-64 years (10)
- ❍ 65-69 years (11)
- ❍ 70-74 years (12)
- ❍ 75-79 years (13)
- ❍ 80-84 years (14)
- ❍ 85+ years (15)

D4

What is the highest level of education that you have completed?

- ❍ Did not attend highest level of secondary school available (1)
- ❍ Attended highest level of secondary school available (2)
- ❍ Trade certificate or apprenticeship (3)
- ❍ Other certificate or diploma (4)
- ❍ Other post school qualification (5)
- ❍ Bachelors degree (6)
- ❍ Post graduate degree (7)
- ❍ Other (specify) (8)_____

S4 - S4

What is the $ amount (numbers only) on your last electricity bill?

$ (1) _____ (1)

S5 - S5

How often are you billed for electricity?

- ❍ Monthly (1)
- ❍ Bi-monthly (every two months) (2)
- ❍ Quarterly (3)
- ❍ Other (please specify) (4)_____

S7 - S7

Who is your electricity retailer?

- ❍ AGL (1)
- ❍ Aurora Energy (2)
- ❍ Australian Power and Gas (3)
- ❍ Ergon Energy (4)
- ❍ ERM Power (5)
- ❍ Horizon Power (6)
- ❍ Integral Energy (17)
- ❍ Lumo Energy (7)
- ❍ Momentum Energy (8)
- ❍ Neighborhood Energy (9)
- ❍ Origin (10)
- ❍ PowerWater (18)
- ❍ QEnergy (11)
- ❍ Red Energy (12)
- ❍ Simply Energy (13)
- ❍ Synergy (14)
- ❍ TRUenergy (15)
- ❍ Other (please specify) (16)_____

- S6

[For Northern Territory] Please enter the Customer ID from your electricity bill. The Customer ID is a 9-digit number with a dash on your bill (may include some zeros at the start).

[Tasmania] Please enter your NMI number from your electricity bill. What is the NMI number on your electricity bill (this is not your account number). The NMI number is a 10-digit number on your bill (some may include letters). This number is also referred to as a National Meter Identifier or Meter Number.

[NSW, ACT, VIC, QLD, SA] Please enter your NMI number from your electricity bill. What is the NMI number on your electricity bill (this is not your account number). The NMI number is a 11-digit number on your bill (some may include letters). This number is also referred to as a National Meter Identifier or Meter Number."^

Please take care entering the "Customer ID":"NMI". It is very important for the study that this is accurate.

[Note; Respondents are asked to enter their number twice, if there is a mismatch, they are asked to repeat. They are terminated if there are not two matches in any of the three tries]

s7a - S7a

Is average daily use shown on your bill?

❍ Yes (1)
❍ No (2)

s7b - S7b

Please enter the average daily use (kWh) for the present billing period.

(1) _____

s7c - S7c

Is average daily use shown on your bill for previous billing periods as either numbers or in chart form ?

❍ Yes (1)
❍ No (2)

If yes s7d - S7d

Please provide or if there is a chart or graph please estimate the AVERAGE DAILY consumption for:

(Note: we require the average daily consumption per billing period)

Most recent billing period but not the present (kWh) (1) _____

Next most recent billing period (kWh) (2) _____

Next most recent billing period (kWh) (3) _____

S8 - S8

Do you have gas connected to your house?

❍ Yes (1)
❍ No (2)

A1 - A1

Please rate your agreement to the following statements...

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
Our household is about as efficient in electricity use as it can be (1)	❍	❍	❍	❍	❍
I closely monitor and manage my electricity use (2)	❍	❍	❍	❍	❍
I am concerned about the environment (3)	❍	❍	❍	❍	❍
I am concerned about climate change (4)	❍	❍	❍	❍	❍
I am concerned about the cost of electricity (5)	❍	❍	❍	❍	❍

A10 - A10

Do you currently buy green power?

❍ Yes (1)
❍ No (2)

A11

Please rate your agreement to the following statement: I know how much electricity our household uses compared to similar households

❍ Strongly disagree (1)
❍ Disagree (2)
❍ Neutral (3)
❍ Agree (4)
❍ Strongly agree (5)

A12

Please rate your agreement to the following statement: Compared to households like ours, the amount of electricity we use is ...

❍ Much more (1)

❍ A bit more (2)
❍ About the same (3)
❍ A bit less (4)
❍ A lot less (5)

A14 - A14

Please rate your agreement to the following statements...

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
Our household has reduced electricity consumption in the last year (1)	❍	❍	❍	❍	❍
Our household has reduced electricity consumption in the last 2 years (2)	❍	❍	❍	❍	❍
If I found we were using slightly more electricity than a household like ours we would save more electricity (3)	❍	❍	❍	❍	❍
If I found we were using much more electricity than a household like ours we would save more electricity (4)	❍	❍	❍	❍	❍
If I found we were using slightly less electricity than a household like ours we would save more electricity (5)	❍	❍	❍	❍	❍

B1 - B1

Which of the following do you have in your home?

(Check all that apply)

❑ Electric cook top (i.e. not gas) (1)
❑ Electric oven (i.e. not gas) (2)
❑ Microwave oven (3)
❑ Electric outdoor BBQ (4)
❑ A dishwasher (5)
❑ A clothes dryer (6)
❑ A household water supply that needs electricity (e.g. for pumping) (7)
❑ Wind powered electricity generation (8)

❑ Solar powered electricity generation (9)
❑ An irrigation pump that needs electricity (10)
❑ Commercial sized refrigeration (11)
❑ Industrial power tools and equipment (these are heavy duty drills & grinders, welders – not handy man tools) (12)
❑ Medical equipment or life support equipment needing electricity (13)
❍ None of these (99)

B2 - B2

What is your primary heating method for your hot water?

❍ Electricity (1)
❍ Electricity and solar (2)
❍ Gas (3)
❍ Gas and solar (4)
❍ Solar alone (5)
❍ Wood (6)
❍ Other (specify) (7)_____

B5 - B5

Which of the following heating do you use?

(Check all that apply)

❑ Electric central ducted/split cycle/reverse cycle heating (1)
❑ Electric under floor heating (2)
❑ Individual electric room heaters (3)
❑ Gas central heating (4)
❑ Gas room heating (5)
❑ Gas underfloor heating (6)
❑ Coal or wood fires (7)
❑ Slow combustion stove (8)
❑ Other (specify) (10)_____
❍ None of these (11)

B6 - B6

(if 1 or 2 above) Which statement best describes how your household manages the temperature of your central heating for normal use?

❍ We turn it on and leave it at a constant temperature (1)
❍ We manually turn it on and off and/or adjust the temperature at least once a day (2)
❍ We programme it to automatically turn on and off and/or adjust the temperature at least once a day (3)
❍ Don't know (9)

B6A - B6A

Is the heating for your central heating generated by a heat pump?

❍ Yes (1)
❍ No (2)
❍ Don't know (9)

B7 - B7

Are you connected to an off-peak tariff? (see on the bill)

- ❍ Yes (1)
- ❍ No (2)
- ❍ Don't know (9)

B8 - B8

What type of cooling do you have?

(Check all that apply)

- ❑ Air conditioning (1)
- ❑ Ceiling or pedestal fans (2)
- ❍ None (3)

B12 - B12

(if 1) Which statement best describes how your household manages the temperature of your air conditioning for normal use?

- ❍ We turn it on and leave it at a constant temperature (1)
- ❍ We manually turn it on and off and/or adjust the temperature at least once a day (2)
- ❍ We programme it to automatically turn on and off and/or adjust the temperature at least once a day (3)
- ❍ Don't know (9)

B13 - B13

Is your air conditioning refrigerant or evaporative?

- ❍ Refrigerant (1)
- ❍ Evaporative (2)
- ❍ Don't know (9)

B14 - B14

What sort of air conditioner do you have (you may have more than one)?

(Check all that apply)

- ❑ Room air conditioner - (Cooling unit is mounted on the wall or in a window) (1)
- ❑ Split system - (Cooling unit is mounted outside and outlet(s) is/are mounted in the wall) (2)
- ❑ Ducted - (Multiple rooms are cooled by air blown through ducts) (3)
- ❍ Don't know (9)

B15 - B15

Is your air conditioning reverse cycle?(the system can be used to heat or cool)

- ❍ Yes (1)
- ❍ Partially (2)
- ❍ No (3)
- ❍ Don't know (9)

B16 - B16

How many room air conditioners do you have?

(1) _____

B17 - B17

How many split systems do you have?

(1) _____

B18 - B18

Do you expect to install any (or more) air conditioning units in the next year?

❍ Yes (1)
❍ No (2)
❍ Don't know (9)

B19 - B19

Do you have a swimming pool?

❍ Yes (1)
❍ No (2)

B20 - B20

Does your pool have?

(Check all that apply)

❑ Electric heating (1)
❑ Gas heating (2)
❑ Solar heating (3)
❑ A pool cover (4)
❍ None of these (9)

B23 - B23

How many operating televisions are in the house?

(1) _____

B24a - B24a

How many of those televisions are flat screen LCD or Plasma

(You must enter a number or zero in each box)

Plasma (1) _____

LCD (2) _____

LED (latest technology) (3) _____

B25 - B25

How many of the following do you have in the household?

(You must enter a number or zero in each box)

Operating Refrigerators (1) _____

Operating computers (2) _____

B26 - B26

Please estimate how many hours in total your household computers were in use last week?

- ❍ None (0)
- ❍ One (1)
- ❍ 2 to 3 (2)
- ❍ 4 to 5 (3)
- ❍ 6 to 7 (4)
- ❍ 8 to 10 (5)
- ❍ 11 to 15 (6)
- ❍ 16 to 30 (7)
- ❍ 31 to 60 (9)
- ❍ More than 60 (10)

B26a - B26a

What proportion of the time were the computers on-line?

- ❍ None (1)
- ❍ Some but less than a quarter (2)
- ❍ About a quarter (3)
- ❍ About half (4)
- ❍ About three quarters (5)
- ❍ All (6)
- ❍ Don't know (9)

B26b - B26b

Some equipment, particularly computers. TVs and anything with a remote control or external transformer (phone, iPod, iPad and other chargers, portable telephones) will use power unless turned off at the wall. Thinking of all this type of equipment in your house on average how much of the time are they turned off at or disconnected from the wall?

- ❍ None (1)
- ❍ Some but less than a quarter (2)
- ❍ About a quarter (3)
- ❍ About half (4)
- ❍ About three quarters (5)
- ❍ All (6)
- ❍ Don't know (9)

B27 - B27

In the last week, how many times did you use:

	None (0)	One (1)	2 - 3 (2)	4 - 5 (3)	6 - 7 (4)	8 - 10 (5)	11 - 15 (6)	16 - 30 (7)	More than 30 (8)
The dishwasher (1)	❍	❍	❍	❍	❍	❍	❍	❍	❍
Washing machine (2)	❍	❍	❍	❍	❍	❍	❍	❍	❍
Clothes dryer (3)	❍	❍	❍	❍	❍	❍	❍	❍	❍

B28 - B28

What proportion of the lights in your house are the following:

(Note; Indicative proportions are all that are required. They need not sum to exactly 100%.)

	None (1)	Some but less than a quarter (2)	About a quarter (3)	About half (4)	About three quarters (5)	Almost all (6)	All (7)	Don't know (9)
Old style incandescent filament globes (1)	❍	❍	❍	❍	❍	❍	❍	❍
Old style fluorescent tube lights (2)	❍	❍	❍	❍	❍	❍	❍	❍
New style efficient fluorescent tube lights (3)	❍	❍	❍	❍	❍	❍	❍	❍
Conventional halogen down lights (flush with ceiling) (4)	❍	❍	❍	❍	❍	❍	❍	❍

	None (1)	Some but less than a quarter (2)	About a quarter (3)	About half (4)	About three quarters (5)	Almost all (6)	All (7)	Don't know (9)
Compact (energy saving) fluorescent lights (globes and down lights) (5)	❍	❍	❍	❍	❍	❍	❍	❍
LED lights (6)	❍	❍	❍	❍	❍	❍	❍	❍
Decorative lights outside all year (7)	❍	❍	❍	❍	❍	❍	❍	❍
Other (8)	❍	❍	❍	❍	❍	❍	❍	❍

B29 - B29

Which of the following do you have?

(Check all that apply)

❑ Roof insulation (1)
❑ Under-floor insulation (2)
❑ Wall insulation (3)
❍ None (8)
❍ Don't know (9)

B32 - B32

What proportion of the external walls are:

(Note; Indications of proportions is all that is required and need not sum to exactly 100%)

	None (1)	Some but less than a quarter (2)	About a quarter (3)	About half (4)	About three quarters (5)	All (6)	Don't know (9)
Glass (1)	❍	❍	❍	❍	❍	❍	❍
Double brick (2)	❍	❍	❍	❍	❍	❍	❍
Brick veneer (3)	❍	❍	❍	❍	❍	❍	❍

	None (1)	Some but less than a quarter (2)	About a quarter (3)	About half (4)	About three quarters (5)	All (6)	Don't know (9)
Weather board (4)	❍	❍	❍	❍	❍	❍	❍
Fibro cement (5)	❍	❍	❍	❍	❍	❍	❍
Other (6)	❍	❍	❍	❍	❍	❍	❍

B33 - B33

What proportion of the windows are:

(Note; Indications of proportions is all that is required and need not sum to exactly 100%)

	None (1)	Some but less than a quarter (2)	About a quarter (3)	About half (4)	About three quarters (5)	All (6)	Don't know (9)
Double glazed (1)	❍	❍	❍	❍	❍	❍	❍
Thermal insulated (2)	❍	❍	❍	❍	❍	❍	❍
Shaded with awnings or shutters (3)	❍	❍	❍	❍	❍	❍	❍
Tinted or solar guarded (4)	❍	❍	❍	❍	❍	❍	❍
Have curtains or blinds (5)	❍	❍	❍	❍	❍	❍	❍
Have boxed pelmets over the curtains or blinds (6)	❍	❍	❍	❍	❍	❍	❍
West facing (7)	❍	❍	❍	❍	❍	❍	❍
South facing (8)	❍	❍	❍	❍	❍	❍	❍

B34 - B34

What proportion of external doors have draft excluders?

- ❍ None (1)
- ❍ Some but less than a quarter (2)
- ❍ About a quarter (3)
- ❍ About half (4)
- ❍ About three quarters (5)
- ❍ Almost all (6)
- ❍ All (7)
- ❍ Don't know (9)

B35 - B35

What proportion of the time is anyone at home?

	None (1)	Some but less than a quarter (2)	About a quarter (3)	About half (4)	About three quarters (5)	Almost all (6)	All (7)	Don't know (9)
During a typical working day (1)	❍	❍	❍	❍	❍	❍	❍	❍
During week nights (2)	❍	❍	❍	❍	❍	❍	❍	❍
During the weekend (3)	❍	❍	❍	❍	❍	❍	❍	❍

B36 - B36

What type of dwelling do you live in?

- ❍ Separate house (1)
- ❍ Semi-detached townhouse, row, terrace house, villa etc (2)
- ❍ Apartment, unit (3)
- ❍ Other (specify) (4)_____

B37 - B37

How many of the following are in the house?

*(actual number not a scale): *

Bed rooms (1) _____

Bath rooms (2) _____

Other rooms (living rooms, dining rooms, kitchens but exclude separate toilets etc) (3) _____

Floors (that you occupy – exclude basements) (4) _____

B38 - B38

Finally, some questions about your household.

How many people live in the house (Total number including you) (1) _____ (1)

B39 - B39

(if >1) How many, including you, are ...

(Note: leave no blank fields - enter 0 if none)

Adults older than 50 years (1) _____

Adults 30 to 50 years (2) _____

Adults 18 to 29 years (3) _____

Children 13 to 17 years (4) _____

Children 5 to 12 years (5) _____

Children 0 to 4 years (6) _____

B40 - B40

How would you describe your household?

- ❍ Family members only (1)
- ❍ Family and others who are not family (2)
- ❍ Shared household (not related to each other) (3)
- ❍ Other (specify) (4)_____

B41 - B41

Using the scale please estimate the total number of weeks during the following periods last year that your house was UNOCCUPIED for 2 or more days (include holidays etc). (Note, your best estimate will be sufficient)

Not at all (1)	Less than a week (2)	1 to 2 weeks (3)	2 to 3 weeks (4)	3 to 4 weeks (5)	4 to 6 weeks (6)	6 to 8 weeks (7)	8 to 12 weeks (8)	All the time (9)

	Not at all (1)	Less than a week (2)	1 to 2 weeks (3)	2 to 3 weeks (4)	3 to 4 weeks (5)	4 to 6 weeks (6)	6 to 8 weeks (7)	8 to 12 weeks (8)	All the time (9)
1 December to 28 February (1)	❍	❍	❍	❍	❍	❍	❍	❍	❍
1 March to 31 May (2)	❍	❍	❍	❍	❍	❍	❍	❍	❍
1 June to 31 August (3)	❍	❍	❍	❍	❍	❍	❍	❍	❍
1 September to 30 November (4)	❍	❍	❍	❍	❍	❍	❍	❍	❍

B42

What proportion of the time did you use AIR CONDITIONING during the following months of last year?Please take into account seasonal variations and the length of time it is off because you are away and the extent that you switch it on or off during the day. (Note, Your best estimate will be sufficient)

	None (1)	Some but less than a quarter (2)	About a quarter (3)	About half (4)	About three quarters (5)	Almost all (6)	All (7)	Don't know (9)
1 December to 28 February (1)	❍	❍	❍	❍	❍	❍	❍	❍
1 March to 31 May (2)	❍	❍	❍	❍	❍	❍	❍	❍
1 June to 31 August (3)	❍	❍	❍	❍	❍	❍	❍	❍
1 September to 30 November (4)	❍	❍	❍	❍	❍	❍	❍	❍

B42b - B42b

What proportion of the time did you use ELECTRIC HEATING during the following months of last year? Please take into account seasonal variations and the length of time it is off because you are away and the extent that you switch it on or off during the day.

	None (1)	Some but less than a quarter (2)	About a quarter (3)	About half (4)	About three quarters (5)	Almost all (6)	All (7)	Don't know (9)
1 December to 28 February (1)	❍	❍	❍	❍	❍	❍	❍	❍
1 March to 31 May (2)	❍	❍	❍	❍	❍	❍	❍	❍
1 June to 31 August (3)	❍	❍	❍	❍	❍	❍	❍	❍
1 September to 30 November (4)	❍	❍	❍	❍	❍	❍	❍	❍

D2 - D2

What is your post-code?

(1) _____

D6 - D6

Do you receive a government pension or benefit (other than family benefit)?

❍ Yes (1)
❍ No (2)

D8 - D8

What is your current work status?

❍ Work full time (for money) (1)
❍ Work part time (for money) (2)
❍ Unemployed (3)
❍ Household duties only (4)
❍ Retired (self supporting) (5)
❍ Full time student (6)
❍ Other pensioner (7)

❍ Other (specify) (8)_____

D10 - D10

What is the gross (before tax) annual family income?If you live with a partner, it will be the joint income, otherwise your income alone

❍ Negative/nil income (1)
❍ $1 to $10,499 (2)
❍ $10,500 to $15,499 (3)
❍ $15,500 to $20,499 (4)
❍ $20,500 to $25,999 (5)
❍ $26,000 to $30,999 (6)
❍ $31,000 to $36,499 (7)
❍ $36,500 to $41,499 (8)
❍ $41,500 to $51,999 (9)
❍ $52,000 to $62,499 (10)
❍ $62,500 to $77,999 (11)
❍ $78,000 to $103,999 (12)
❍ $104,000 to $129,999 (13)
❍ $130,000 to $155,999 (14)
❍ $156,000 or more (15)
❍ (Don't know / unsure) (98)

D11 - D11

How far do you live from a harbour or the sea?

❍ Less than 5km (1)
❍ 5km to 20 km (2)
❍ 20km to 50 km (3)
❍ 50km to 100 km (4)
❍ Greater than 100 km (5)

comments - comments

Do you have any comments you would like to add regarding your experience in answering this survey. If so, please write them in the box below.

Thank you for answering these questions. Please click the 'NEXT' button below to finish the survey.

B Localised zones

B.1 Queensland

Postcode	Localised Zone Name
4000	Brisbane
4005	Brisbane
4006	Brisbane
4007	Brisbane
4008	Brisbane
4009	Brisbane
4010	Brisbane
4011	Brisbane
4012	Brisbane
4013	Brisbane
4014	Brisbane
4017	Brisbane
4018	Brisbane
4019	Brisbane
4020	Brisbane
4021	Brisbane
4022	Brisbane
4030	Brisbane
4031	Brisbane
4032	Brisbane
4034	Brisbane
4035	Brisbane
4036	Brisbane
4037	Brisbane
4051	Brisbane
4053	Brisbane
4054	Brisbane
4055	Brisbane
4059	Brisbane
4060	Brisbane
4061	Brisbane
4064	Brisbane
4065	Brisbane
4066	Brisbane
4067	Brisbane
4068	Brisbane
4069	Brisbane
4070	Brisbane
4073	Brisbane

Postcode	Localised Zone Name
4074	Brisbane
4075	Brisbane
4076	Brisbane
4077	Brisbane
4078	Brisbane
4101	Brisbane
4102	Brisbane
4103	Brisbane
4104	Brisbane
4105	Brisbane
4106	Brisbane
4107	Brisbane
4108	Brisbane
4109	Brisbane
4110	Brisbane
4111	Brisbane
4112	Brisbane
4113	Brisbane
4114	Brisbane
4115	Brisbane
4116	Brisbane
4117	Brisbane
4118	Brisbane
4119	Brisbane
4120	Brisbane
4121	Brisbane
4122	Brisbane
4123	Brisbane
4124	Brisbane
4125	Brisbane
4127	Brisbane
4128	Brisbane
4129	Brisbane
4130	Brisbane
4131	Brisbane
4132	Brisbane
4133	Brisbane
4151	Brisbane
4152	Brisbane

Postcode	Localised Zone Name
4153	Brisbane
4154	Brisbane
4155	Brisbane
4156	Brisbane
4157	Brisbane
4158	Brisbane
4159	Brisbane
4160	Brisbane
4161	Brisbane
4163	Brisbane
4164	Brisbane
4165	Brisbane
4169	Brisbane
4170	Brisbane
4171	Brisbane
4172	Brisbane
4173	Brisbane
4174	Brisbane
4178	Brisbane
4179	Brisbane
4183	Brisbane
4184	Brisbane
4280	Brisbane
4300	Brisbane
4301	Brisbane
4303	Brisbane
4304	Brisbane
4500	Brisbane
4501	Brisbane
4502	Brisbane
4503	Brisbane
4504	Brisbane
4505	Brisbane
4506	Brisbane
4507	Brisbane
4508	Brisbane
4509	Brisbane
4510	Brisbane
4511	Brisbane
4512	Brisbane
4516	Brisbane
4520	Brisbane
4680	Capricornia
4694	Capricornia

Postcode	Localised Zone Name
4695	Capricornia
4697	Capricornia
4699	Capricornia
4700	Capricornia
4701	Capricornia
4702	Capricornia
4703	Capricornia
4704	Capricornia
4705	Capricornia
4706	Capricornia
4707	Capricornia
4710	Capricornia
4711	Capricornia
4714	Capricornia
4715	Capricornia
4716	Capricornia
4718	Capricornia
4719	Capricornia
4739	Capricornia
4741	Capricornia
4742	Capricornia
4737	Central Coast
4738	Central Coast
4740	Central Coast
4750	Central Coast
4751	Central Coast
4753	Central Coast
4754	Central Coast
4756	Central Coast
4757	Central Coast
4798	Central Coast
4799	Central Coast
4800	Central Coast
4802	Central Coast
4804	Central Coast
4805	Central Coast
4417	Central West
4418	Central West
4419	Central West
4420	Central West
4426	Central West
4427	Central West
4428	Central West
4454	Central West

Postcode	Localised Zone Name
4455	Central West
4461	Central West
4462	Central West
4465	Central West
4467	Central West
4468	Central West
4470	Central West
4472	Central West
4474	Central West
4475	Central West
4477	Central West
4478	Central West
4479	Central West
4480	Central West
4481	Central West
4482	Central West
4486	Central West
4487	Central West
4488	Central West
4489	Central West
4490	Central West
4491	Central West
4492	Central West
4493	Central West
4709	Central West
4712	Central West
4713	Central West
4717	Central West
4720	Central West
4721	Central West
4722	Central West
4723	Central West
4724	Central West
4725	Central West
4726	Central West
4727	Central West
4728	Central West
4730	Central West
4731	Central West
4732	Central West
4733	Central West
4735	Central West
4736	Central West
4743	Central West

Postcode	Localised Zone Name
4744	Central West
4745	Central West
4746	Central West
4829	Central West
2372	Darling Downs
2476	Darling Downs
4310	Darling Downs
4350	Darling Downs
4352	Darling Downs
4352	Darling Downs
4353	Darling Downs
4354	Darling Downs
4355	Darling Downs
4356	Darling Downs
4357	Darling Downs
4358	Darling Downs
4359	Darling Downs
4360	Darling Downs
4361	Darling Downs
4362	Darling Downs
4363	Darling Downs
4364	Darling Downs
4365	Darling Downs
4370	Darling Downs
4371	Darling Downs
4372	Darling Downs
4373	Darling Downs
4374	Darling Downs
4375	Darling Downs
4376	Darling Downs
4377	Darling Downs
4378	Darling Downs
4380	Darling Downs
4381	Darling Downs
4382	Darling Downs
4385	Darling Downs
4387	Darling Downs
4388	Darling Downs
4390	Darling Downs
4400	Darling Downs
4401	Darling Downs
4402	Darling Downs
4403	Darling Downs
4404	Darling Downs

Postcode	Localised Zone Name
4405	Darling Downs
4406	Darling Downs
4407	Darling Downs
4408	Darling Downs
4410	Darling Downs
4411	Darling Downs
4412	Darling Downs
4413	Darling Downs
4415	Darling Downs
4416	Darling Downs
4421	Darling Downs
4422	Darling Downs
4423	Darling Downs
4424	Darling Downs
4425	Darling Downs
4494	Darling Downs
4496	Darling Downs
4497	Darling Downs
4498	Darling Downs
4205	Gold Coast
4207	Gold Coast
4208	Gold Coast
4209	Gold Coast
4210	Gold Coast
4211	Gold Coast
4212	Gold Coast
4213	Gold Coast
4214	Gold Coast
4215	Gold Coast
4216	Gold Coast
4217	Gold Coast
4218	Gold Coast
4220	Gold Coast
4221	Gold Coast
4223	Gold Coast
4224	Gold Coast
4225	Gold Coast
4226	Gold Coast
4227	Gold Coast
4228	Gold Coast
4270	Gold Coast
4271	Gold Coast
4272	Gold Coast
4275	Gold Coast

Postcode	Localised Zone Name
4806	Lower Burdekin
4807	Lower Burdekin
4808	Lower Burdekin
4809	Lower Burdekin
4810	Lower Burdekin
4811	Lower Burdekin
4812	Lower Burdekin
4814	Lower Burdekin
4815	Lower Burdekin
4816	Lower Burdekin
4817	Lower Burdekin
4818	Lower Burdekin
4819	Lower Burdekin
4850	Lower Burdekin
4820	North West
4821	North West
4822	North West
4823	North West
4824	North West
4825	North West
4828	North West
4830	North West
4871	North West
4874	North West
4875	North West
4876	North West
4890	North West
4891	North West
4517	Sunshine Coast
4518	Sunshine Coast
4519	Sunshine Coast
4550	Sunshine Coast
4551	Sunshine Coast
4552	Sunshine Coast
4553	Sunshine Coast
4554	Sunshine Coast
4555	Sunshine Coast
4556	Sunshine Coast
4557	Sunshine Coast
4558	Sunshine Coast
4559	Sunshine Coast
4560	Sunshine Coast
4561	Sunshine Coast
4562	Sunshine Coast

Postcode	Localised Zone Name
4563	Sunshine Coast
4564	Sunshine Coast
4565	Sunshine Coast
4566	Sunshine Coast
4567	Sunshine Coast
4568	Sunshine Coast
4569	Sunshine Coast
4570	Sunshine Coast
4571	Sunshine Coast
4572	Sunshine Coast
4573	Sunshine Coast
4574	Sunshine Coast
4575	Sunshine Coast
4580	Sunshine Coast
4581	Sunshine Coast
4849	Tablelands
4852	Tablelands
4854	Tablelands
4855	Tablelands
4856	Tablelands
4857	Tablelands
4858	Tablelands
4859	Tablelands
4860	Tablelands
4861	Tablelands
4865	Tablelands
4868	Tablelands
4869	Tablelands
4870	Tablelands
4872	Tablelands
4873	Tablelands
4877	Tablelands
4878	Tablelands
4879	Tablelands
4880	Tablelands
4881	Tablelands
4882	Tablelands
4883	Tablelands
4884	Tablelands
4885	Tablelands
4886	Tablelands
4887	Tablelands
4888	Tablelands
4895	Tablelands

Postcode	Localised Zone Name
4285	Western (SE QLD)
4287	Western (SE QLD)
4305	Western (SE QLD)
4306	Western (SE QLD)
4307	Western (SE QLD)
4309	Western (SE QLD)
4310	Western (SE QLD)
4311	Western (SE QLD)
4312	Western (SE QLD)
4313	Western (SE QLD)
4340	Western (SE QLD)
4341	Western (SE QLD)
4342	Western (SE QLD)
4343	Western (SE QLD)
4344	Western (SE QLD)
4346	Western (SE QLD)
4347	Western (SE QLD)
4350	Western (SE QLD)
4352	Western (SE QLD)
4359	Western (SE QLD)
4514	Western (SE QLD)
4515	Western (SE QLD)
4521	Western (SE QLD)
4306	Wide Bay Burnett
4312	Wide Bay Burnett
4570	Wide Bay Burnett
4600	Wide Bay Burnett
4601	Wide Bay Burnett
4605	Wide Bay Burnett
4606	Wide Bay Burnett
4608	Wide Bay Burnett
4610	Wide Bay Burnett
4611	Wide Bay Burnett
4612	Wide Bay Burnett
4613	Wide Bay Burnett
4614	Wide Bay Burnett
4615	Wide Bay Burnett
4620	Wide Bay Burnett
4621	Wide Bay Burnett
4625	Wide Bay Burnett
4626	Wide Bay Burnett
4627	Wide Bay Burnett
4630	Wide Bay Burnett
4650	Wide Bay Burnett

Postcode	Localised Zone Name
4655	Wide Bay Burnett
4659	Wide Bay Burnett
4660	Wide Bay Burnett
4662	Wide Bay Burnett
4670	Wide Bay Burnett
4671	Wide Bay Burnett

Postcode	Localised Zone Name
4673	Wide Bay Burnett
4674	Wide Bay Burnett
4676	Wide Bay Burnett
4677	Wide Bay Burnett
4678	Wide Bay Burnett

B.2 New South Wales

Postcode	Localised Zone Name
2629	Cabramurra
2328	Central Tablelands
2333	Central Tablelands
2583	Central Tablelands
2586	Central Tablelands
2587	Central Tablelands
2594	Central Tablelands
2787	Central Tablelands
2790	Central Tablelands
2791	Central Tablelands
2792	Central Tablelands
2793	Central Tablelands
2795	Central Tablelands
2797	Central Tablelands
2798	Central Tablelands
2799	Central Tablelands
2800	Central Tablelands
2803	Central Tablelands
2807	Central Tablelands
2845	Central Tablelands
2846	Central Tablelands
2847	Central Tablelands
2848	Central Tablelands
2849	Central Tablelands
2850	Central Tablelands
2865	Central Tablelands
2866	Central Tablelands
2867	Central Tablelands
2343	Central West Slopes & Plains
2357	Central West Slopes & Plains
2360	Central West Slopes & Plains
2379	Central West Slopes & Plains
2395	Central West Slopes & Plains

Postcode	Localised Zone Name
2396	Central West Slopes & Plains
2671	Central West Slopes & Plains
2794	Central West Slopes & Plains
2804	Central West Slopes & Plains
2805	Central West Slopes & Plains
2806	Central West Slopes & Plains
2809	Central West Slopes & Plains
2810	Central West Slopes & Plains
2820	Central West Slopes & Plains
2821	Central West Slopes & Plains
2823	Central West Slopes & Plains
2824	Central West Slopes & Plains
2825	Central West Slopes & Plains
2827	Central West Slopes & Plains
2828	Central West Slopes & Plains
2829	Central West Slopes & Plains
2830	Central West Slopes & Plains
2842	Central West Slopes & Plains
2843	Central West Slopes & Plains
2844	Central West Slopes & Plains
2852	Central West Slopes & Plains
2864	Central West Slopes & Plains
2868	Central West Slopes & Plains
2869	Central West Slopes & Plains
2870	Central West Slopes & Plains
2871	Central West Slopes & Plains
2873	Central West Slopes & Plains
2874	Central West Slopes & Plains
2875	Central West Slopes & Plains
2876	Central West Slopes & Plains
2145	Hunter/Hawkesbury/Nepean
2146	Hunter/Hawkesbury/Nepean
2147	Hunter/Hawkesbury/Nepean

Postcode	Localised Zone Name
2148	Hunter/Hawkesbury/Nepean
2155	Hunter/Hawkesbury/Nepean
2156	Hunter/Hawkesbury/Nepean
2157	Hunter/Hawkesbury/Nepean
2158	Hunter/Hawkesbury/Nepean
2159	Hunter/Hawkesbury/Nepean
2164	Hunter/Hawkesbury/Nepean
2165	Hunter/Hawkesbury/Nepean
2166	Hunter/Hawkesbury/Nepean
2167	Hunter/Hawkesbury/Nepean
2168	Hunter/Hawkesbury/Nepean
2170	Hunter/Hawkesbury/Nepean
2171	Hunter/Hawkesbury/Nepean
2172	Hunter/Hawkesbury/Nepean
2173	Hunter/Hawkesbury/Nepean
2174	Hunter/Hawkesbury/Nepean
2175	Hunter/Hawkesbury/Nepean
2176	Hunter/Hawkesbury/Nepean
2177	Hunter/Hawkesbury/Nepean
2178	Hunter/Hawkesbury/Nepean
2179	Hunter/Hawkesbury/Nepean
2311	Hunter/Hawkesbury/Nepean
2320	Hunter/Hawkesbury/Nepean
2321	Hunter/Hawkesbury/Nepean
2322	Hunter/Hawkesbury/Nepean
2323	Hunter/Hawkesbury/Nepean
2325	Hunter/Hawkesbury/Nepean
2326	Hunter/Hawkesbury/Nepean
2327	Hunter/Hawkesbury/Nepean
2330	Hunter/Hawkesbury/Nepean
2331	Hunter/Hawkesbury/Nepean
2334	Hunter/Hawkesbury/Nepean
2335	Hunter/Hawkesbury/Nepean
2415	Hunter/Hawkesbury/Nepean
2420	Hunter/Hawkesbury/Nepean
2421	Hunter/Hawkesbury/Nepean
2422	Hunter/Hawkesbury/Nepean
2424	Hunter/Hawkesbury/Nepean
2425	Hunter/Hawkesbury/Nepean
2558	Hunter/Hawkesbury/Nepean
2559	Hunter/Hawkesbury/Nepean
2560	Hunter/Hawkesbury/Nepean
2563	Hunter/Hawkesbury/Nepean
2564	Hunter/Hawkesbury/Nepean

Postcode	Localised Zone Name
2565	Hunter/Hawkesbury/Nepean
2566	Hunter/Hawkesbury/Nepean
2567	Hunter/Hawkesbury/Nepean
2568	Hunter/Hawkesbury/Nepean
2569	Hunter/Hawkesbury/Nepean
2570	Hunter/Hawkesbury/Nepean
2571	Hunter/Hawkesbury/Nepean
2572	Hunter/Hawkesbury/Nepean
2573	Hunter/Hawkesbury/Nepean
2574	Hunter/Hawkesbury/Nepean
2745	Hunter/Hawkesbury/Nepean
2747	Hunter/Hawkesbury/Nepean
2748	Hunter/Hawkesbury/Nepean
2749	Hunter/Hawkesbury/Nepean
2750	Hunter/Hawkesbury/Nepean
2752	Hunter/Hawkesbury/Nepean
2753	Hunter/Hawkesbury/Nepean
2754	Hunter/Hawkesbury/Nepean
2755	Hunter/Hawkesbury/Nepean
2756	Hunter/Hawkesbury/Nepean
2757	Hunter/Hawkesbury/Nepean
2758	Hunter/Hawkesbury/Nepean
2759	Hunter/Hawkesbury/Nepean
2760	Hunter/Hawkesbury/Nepean
2761	Hunter/Hawkesbury/Nepean
2762	Hunter/Hawkesbury/Nepean
2763	Hunter/Hawkesbury/Nepean
2765	Hunter/Hawkesbury/Nepean
2766	Hunter/Hawkesbury/Nepean
2767	Hunter/Hawkesbury/Nepean
2768	Hunter/Hawkesbury/Nepean
2770	Hunter/Hawkesbury/Nepean
2773	Hunter/Hawkesbury/Nepean
2774	Hunter/Hawkesbury/Nepean
2775	Hunter/Hawkesbury/Nepean
2777	Hunter/Hawkesbury/Nepean
2312	Mid-North Coast
2324	Mid-North Coast
2423	Mid-North Coast
2431	Mid-North Coast
2440	Mid-North Coast
2441	Mid-North Coast
2445	Mid-North Coast
2447	Mid-North Coast

Postcode	Localised Zone Name
2448	Mid-North Coast
2449	Mid-North Coast
2450	Mid-North Coast
2452	Mid-North Coast
2454	Mid-North Coast
2455	Mid-North Coast
2456	Mid-North Coast
2460	Mid-North Coast
2462	Mid-North Coast
2463	Mid-North Coast
2464	Mid-North Coast
2465	Mid-North Coast
2466	Mid-North Coast
2472	Mid-North Coast
2473	Mid-North Coast
2898	Mid-North Coast
2899	Mid-North Coast
2250	Newcastle/Central Coast
2251	Newcastle/Central Coast
2256	Newcastle/Central Coast
2257	Newcastle/Central Coast
2258	Newcastle/Central Coast
2259	Newcastle/Central Coast
2260	Newcastle/Central Coast
2261	Newcastle/Central Coast
2262	Newcastle/Central Coast
2263	Newcastle/Central Coast
2264	Newcastle/Central Coast
2265	Newcastle/Central Coast
2267	Newcastle/Central Coast
2278	Newcastle/Central Coast
2280	Newcastle/Central Coast
2281	Newcastle/Central Coast
2282	Newcastle/Central Coast
2283	Newcastle/Central Coast
2284	Newcastle/Central Coast
2285	Newcastle/Central Coast
2286	Newcastle/Central Coast
2287	Newcastle/Central Coast
2289	Newcastle/Central Coast
2290	Newcastle/Central Coast
2291	Newcastle/Central Coast
2292	Newcastle/Central Coast
2293	Newcastle/Central Coast

Postcode	Localised Zone Name
2294	Newcastle/Central Coast
2295	Newcastle/Central Coast
2296	Newcastle/Central Coast
2297	Newcastle/Central Coast
2298	Newcastle/Central Coast
2299	Newcastle/Central Coast
2300	Newcastle/Central Coast
2302	Newcastle/Central Coast
2303	Newcastle/Central Coast
2304	Newcastle/Central Coast
2305	Newcastle/Central Coast
2306	Newcastle/Central Coast
2307	Newcastle/Central Coast
2308	Newcastle/Central Coast
2309	Newcastle/Central Coast
2314	Newcastle/Central Coast
2315	Newcastle/Central Coast
2316	Newcastle/Central Coast
2317	Newcastle/Central Coast
2318	Newcastle/Central Coast
2319	Newcastle/Central Coast
2426	Newcastle/Central Coast
2427	Newcastle/Central Coast
2428	Newcastle/Central Coast
2429	Newcastle/Central Coast
2430	Newcastle/Central Coast
2439	Newcastle/Central Coast
2443	Newcastle/Central Coast
2444	Newcastle/Central Coast
2446	Newcastle/Central Coast
2386	North West Slopes & Plains
2387	North West Slopes & Plains
2388	North West Slopes & Plains
2390	North West Slopes & Plains
2397	North West Slopes & Plains
2398	North West Slopes & Plains
2399	North West Slopes & Plains
2400	North West Slopes & Plains
2401	North West Slopes & Plains
2402	North West Slopes & Plains
2405	North West Slopes & Plains
2406	North West Slopes & Plains
2408	North West Slopes & Plains
2409	North West Slopes & Plains

Postcode	Localised Zone Name
2410	North West Slopes & Plains
2411	North West Slopes & Plains
2832	North West Slopes & Plains
2833	North West Slopes & Plains
2834	North West Slopes & Plains
2469	Northern Rivers
2470	Northern Rivers
2471	Northern Rivers
2474	Northern Rivers
2480	Northern Rivers
2329	Northern Tablelands
2336	Northern Tablelands
2337	Northern Tablelands
2338	Northern Tablelands
2339	Northern Tablelands
2340	Northern Tablelands
2341	Northern Tablelands
2342	Northern Tablelands
2344	Northern Tablelands
2345	Northern Tablelands
2346	Northern Tablelands
2347	Northern Tablelands
2350	Northern Tablelands
2351	Northern Tablelands
2352	Northern Tablelands
2353	Northern Tablelands
2354	Northern Tablelands
2355	Northern Tablelands
2356	Northern Tablelands
2358	Northern Tablelands
2359	Northern Tablelands
2361	Northern Tablelands
2365	Northern Tablelands
2369	Northern Tablelands
2370	Northern Tablelands
2371	Northern Tablelands
2372	Northern Tablelands
2380	Northern Tablelands
2381	Northern Tablelands
2382	Northern Tablelands
2403	Northern Tablelands
2404	Northern Tablelands
2453	Northern Tablelands
2475	Northern Tablelands

Postcode	Localised Zone Name
2476	Northern Tablelands
2648	Riverina
2669	Riverina
2680	Riverina
2681	Riverina
2700	Riverina
2703	Riverina
2705	Riverina
2706	Riverina
2707	Riverina
2710	Riverina
2711	Riverina
2713	Riverina
2714	Riverina
2715	Riverina
2716	Riverina
2717	Riverina
2731	Riverina
2732	Riverina
2733	Riverina
2734	Riverina
2735	Riverina
2736	Riverina
2737	Riverina
2738	Riverina
2739	Riverina
2527	South Coast
2529	South Coast
2533	South Coast
2534	South Coast
2535	South Coast
2536	South Coast
2537	South Coast
2538	South Coast
2539	South Coast
2540	South Coast
2541	South Coast
2545	South Coast
2546	South Coast
2548	South Coast
2549	South Coast
2550	South Coast
2551	South Coast
2555	South Coast

Postcode	Localised Zone Name
2556	South Coast
2557	South Coast
2584	South West Slopes
2585	South West Slopes
2588	South West Slopes
2590	South West Slopes
2640	South West Slopes
2641	South West Slopes
2642	South West Slopes
2643	South West Slopes
2644	South West Slopes
2645	South West Slopes
2646	South West Slopes
2647	South West Slopes
2650	South West Slopes
2651	South West Slopes
2652	South West Slopes
2655	South West Slopes
2656	South West Slopes
2658	South West Slopes
2659	South West Slopes
2660	South West Slopes
2661	South West Slopes
2663	South West Slopes
2665	South West Slopes
2666	South West Slopes
2668	South West Slopes
2701	South West Slopes
2702	South West Slopes
2712	South West Slopes
2721	South West Slopes
2722	South West Slopes
2725	South West Slopes
2726	South West Slopes
2727	South West Slopes
2729	South West Slopes
2575	Southern Tablelands/Blue Mountains
2576	Southern Tablelands/Blue Mountains
2577	Southern Tablelands/Blue Mountains
2578	Southern Tablelands/Blue Mountains

Postcode	Localised Zone Name
2579	Southern Tablelands/Blue Mountains
2580	Southern Tablelands/Blue Mountains
2581	Southern Tablelands/Blue Mountains
2582	Southern Tablelands/Blue Mountains
2619	Southern Tablelands/Blue Mountains
2621	Southern Tablelands/Blue Mountains
2622	Southern Tablelands/Blue Mountains
2623	Southern Tablelands/Blue Mountains
2626	Southern Tablelands/Blue Mountains
2628	Southern Tablelands/Blue Mountains
2630	Southern Tablelands/Blue Mountains
2631	Southern Tablelands/Blue Mountains
2632	Southern Tablelands/Blue Mountains
2633	Southern Tablelands/Blue Mountains
2649	Southern Tablelands/Blue Mountains
2653	Southern Tablelands/Blue Mountains
2720	Southern Tablelands/Blue Mountains
2730	Southern Tablelands/Blue Mountains
2776	Southern Tablelands/Blue Mountains
2778	Southern Tablelands/Blue Mountains
2779	Southern Tablelands/Blue Mountains
2780	Southern Tablelands/Blue Mountains
2782	Southern Tablelands/Blue Mountains
2783	Southern Tablelands/Blue Mountains
2784	Southern Tablelands/Blue Mountains
2785	Southern Tablelands/Blue Mountains

Postcode	Localised Zone Name
2786	Southern Tablelands/Blue Mountains
2000	Sydney Central
2007	Sydney Central
2008	Sydney Central
2010	Sydney Central
2011	Sydney Central
2060	Sydney Central
2061	Sydney Central
1363	Sydney Metropolitan/Illawarra
1639	Sydney Metropolitan/Illawarra
2006	Sydney Metropolitan/Illawarra
2009	Sydney Metropolitan/Illawarra
2015	Sydney Metropolitan/Illawarra
2016	Sydney Metropolitan/Illawarra
2017	Sydney Metropolitan/Illawarra
2018	Sydney Metropolitan/Illawarra
2019	Sydney Metropolitan/Illawarra
2020	Sydney Metropolitan/Illawarra
2021	Sydney Metropolitan/Illawarra
2022	Sydney Metropolitan/Illawarra
2023	Sydney Metropolitan/Illawarra
2024	Sydney Metropolitan/Illawarra
2025	Sydney Metropolitan/Illawarra
2026	Sydney Metropolitan/Illawarra
2027	Sydney Metropolitan/Illawarra
2028	Sydney Metropolitan/Illawarra
2029	Sydney Metropolitan/Illawarra
2030	Sydney Metropolitan/Illawarra
2031	Sydney Metropolitan/Illawarra
2032	Sydney Metropolitan/Illawarra
2033	Sydney Metropolitan/Illawarra
2034	Sydney Metropolitan/Illawarra
2035	Sydney Metropolitan/Illawarra
2036	Sydney Metropolitan/Illawarra
2037	Sydney Metropolitan/Illawarra
2038	Sydney Metropolitan/Illawarra
2039	Sydney Metropolitan/Illawarra
2040	Sydney Metropolitan/Illawarra
2041	Sydney Metropolitan/Illawarra
2042	Sydney Metropolitan/Illawarra
2043	Sydney Metropolitan/Illawarra
2044	Sydney Metropolitan/Illawarra
2045	Sydney Metropolitan/Illawarra

Postcode	Localised Zone Name
2046	Sydney Metropolitan/Illawarra
2047	Sydney Metropolitan/Illawarra
2048	Sydney Metropolitan/Illawarra
2049	Sydney Metropolitan/Illawarra
2050	Sydney Metropolitan/Illawarra
2052	Sydney Metropolitan/Illawarra
2062	Sydney Metropolitan/Illawarra
2063	Sydney Metropolitan/Illawarra
2064	Sydney Metropolitan/Illawarra
2065	Sydney Metropolitan/Illawarra
2066	Sydney Metropolitan/Illawarra
2067	Sydney Metropolitan/Illawarra
2068	Sydney Metropolitan/Illawarra
2069	Sydney Metropolitan/Illawarra
2070	Sydney Metropolitan/Illawarra
2071	Sydney Metropolitan/Illawarra
2072	Sydney Metropolitan/Illawarra
2073	Sydney Metropolitan/Illawarra
2074	Sydney Metropolitan/Illawarra
2075	Sydney Metropolitan/Illawarra
2076	Sydney Metropolitan/Illawarra
2077	Sydney Metropolitan/Illawarra
2079	Sydney Metropolitan/Illawarra
2080	Sydney Metropolitan/Illawarra
2081	Sydney Metropolitan/Illawarra
2082	Sydney Metropolitan/Illawarra
2083	Sydney Metropolitan/Illawarra
2084	Sydney Metropolitan/Illawarra
2085	Sydney Metropolitan/Illawarra
2086	Sydney Metropolitan/Illawarra
2087	Sydney Metropolitan/Illawarra
2088	Sydney Metropolitan/Illawarra
2089	Sydney Metropolitan/Illawarra
2090	Sydney Metropolitan/Illawarra
2092	Sydney Metropolitan/Illawarra
2093	Sydney Metropolitan/Illawarra
2094	Sydney Metropolitan/Illawarra
2095	Sydney Metropolitan/Illawarra
2096	Sydney Metropolitan/Illawarra
2097	Sydney Metropolitan/Illawarra
2099	Sydney Metropolitan/Illawarra
2100	Sydney Metropolitan/Illawarra
2101	Sydney Metropolitan/Illawarra
2102	Sydney Metropolitan/Illawarra

Postcode	Localised Zone Name
2103	Sydney Metropolitan/Illawarra
2104	Sydney Metropolitan/Illawarra
2105	Sydney Metropolitan/Illawarra
2106	Sydney Metropolitan/Illawarra
2107	Sydney Metropolitan/Illawarra
2108	Sydney Metropolitan/Illawarra
2109	Sydney Metropolitan/Illawarra
2110	Sydney Metropolitan/Illawarra
2111	Sydney Metropolitan/Illawarra
2112	Sydney Metropolitan/Illawarra
2113	Sydney Metropolitan/Illawarra
2114	Sydney Metropolitan/Illawarra
2115	Sydney Metropolitan/Illawarra
2116	Sydney Metropolitan/Illawarra
2117	Sydney Metropolitan/Illawarra
2118	Sydney Metropolitan/Illawarra
2119	Sydney Metropolitan/Illawarra
2120	Sydney Metropolitan/Illawarra
2121	Sydney Metropolitan/Illawarra
2122	Sydney Metropolitan/Illawarra
2123	Sydney Metropolitan/Illawarra
2125	Sydney Metropolitan/Illawarra
2126	Sydney Metropolitan/Illawarra
2127	Sydney Metropolitan/Illawarra
2128	Sydney Metropolitan/Illawarra
2130	Sydney Metropolitan/Illawarra
2131	Sydney Metropolitan/Illawarra
2132	Sydney Metropolitan/Illawarra
2133	Sydney Metropolitan/Illawarra
2134	Sydney Metropolitan/Illawarra
2135	Sydney Metropolitan/Illawarra
2136	Sydney Metropolitan/Illawarra
2137	Sydney Metropolitan/Illawarra
2138	Sydney Metropolitan/Illawarra
2139	Sydney Metropolitan/Illawarra
2140	Sydney Metropolitan/Illawarra
2141	Sydney Metropolitan/Illawarra
2142	Sydney Metropolitan/Illawarra
2143	Sydney Metropolitan/Illawarra
2144	Sydney Metropolitan/Illawarra
2150	Sydney Metropolitan/Illawarra
2151	Sydney Metropolitan/Illawarra
2152	Sydney Metropolitan/Illawarra
2153	Sydney Metropolitan/Illawarra

Postcode	Localised Zone Name
2154	Sydney Metropolitan/Illawarra
2160	Sydney Metropolitan/Illawarra
2161	Sydney Metropolitan/Illawarra
2162	Sydney Metropolitan/Illawarra
2163	Sydney Metropolitan/Illawarra
2190	Sydney Metropolitan/Illawarra
2191	Sydney Metropolitan/Illawarra
2192	Sydney Metropolitan/Illawarra
2193	Sydney Metropolitan/Illawarra
2194	Sydney Metropolitan/Illawarra
2195	Sydney Metropolitan/Illawarra
2196	Sydney Metropolitan/Illawarra
2197	Sydney Metropolitan/Illawarra
2198	Sydney Metropolitan/Illawarra
2199	Sydney Metropolitan/Illawarra
2200	Sydney Metropolitan/Illawarra
2203	Sydney Metropolitan/Illawarra
2204	Sydney Metropolitan/Illawarra
2205	Sydney Metropolitan/Illawarra
2206	Sydney Metropolitan/Illawarra
2207	Sydney Metropolitan/Illawarra
2208	Sydney Metropolitan/Illawarra
2209	Sydney Metropolitan/Illawarra
2210	Sydney Metropolitan/Illawarra
2211	Sydney Metropolitan/Illawarra
2212	Sydney Metropolitan/Illawarra
2213	Sydney Metropolitan/Illawarra
2214	Sydney Metropolitan/Illawarra
2216	Sydney Metropolitan/Illawarra
2217	Sydney Metropolitan/Illawarra
2218	Sydney Metropolitan/Illawarra
2219	Sydney Metropolitan/Illawarra
2220	Sydney Metropolitan/Illawarra
2221	Sydney Metropolitan/Illawarra
2222	Sydney Metropolitan/Illawarra
2223	Sydney Metropolitan/Illawarra
2224	Sydney Metropolitan/Illawarra
2225	Sydney Metropolitan/Illawarra
2226	Sydney Metropolitan/Illawarra
2227	Sydney Metropolitan/Illawarra
2228	Sydney Metropolitan/Illawarra
2229	Sydney Metropolitan/Illawarra
2230	Sydney Metropolitan/Illawarra
2231	Sydney Metropolitan/Illawarra

Postcode	Localised Zone Name
2232	Sydney Metropolitan/Illawarra
2233	Sydney Metropolitan/Illawarra
2234	Sydney Metropolitan/Illawarra
2500	Sydney Metropolitan/Illawarra
2502	Sydney Metropolitan/Illawarra
2505	Sydney Metropolitan/Illawarra
2506	Sydney Metropolitan/Illawarra
2508	Sydney Metropolitan/Illawarra
2515	Sydney Metropolitan/Illawarra
2516	Sydney Metropolitan/Illawarra
2517	Sydney Metropolitan/Illawarra
2518	Sydney Metropolitan/Illawarra
2519	Sydney Metropolitan/Illawarra
2522	Sydney Metropolitan/Illawarra
2525	Sydney Metropolitan/Illawarra
2526	Sydney Metropolitan/Illawarra
2528	Sydney Metropolitan/Illawarra
2530	Sydney Metropolitan/Illawarra
2624	Thredbo
2625	Thredbo
2627	Thredbo
2477	Tweed
2478	Tweed

Postcode	Localised Zone Name
2479	Tweed
2481	Tweed
2482	Tweed
2483	Tweed
2484	Tweed
2485	Tweed
2486	Tweed
2487	Tweed
2488	Tweed
2489	Tweed
2490	Tweed
2672	Upper Western
2675	Upper Western
2831	Upper Western
2835	Upper Western
2836	Upper Western
2839	Upper Western
2840	Upper Western
2877	Upper Western
2878	Upper Western
2879	Upper Western
2880	Upper Western

B.3 Australian Capital Territory

The Australian Capital Territory comprises one zone.

B.4 Victoria

Victoria comprises one zone.

B.5 South Australia

Postcode	Localised Zone Name
5000	Adelaide & Environs
5005	Adelaide & Environs
5006	Adelaide & Environs
5007	Adelaide & Environs
5008	Adelaide & Environs
5009	Adelaide & Environs
5010	Adelaide & Environs
5011	Adelaide & Environs

Postcode	Localised Zone Name
5012	Adelaide & Environs
5013	Adelaide & Environs
5014	Adelaide & Environs
5015	Adelaide & Environs
5016	Adelaide & Environs
5017	Adelaide & Environs
5018	Adelaide & Environs
5019	Adelaide & Environs

Postcode	Localised Zone Name
5020	Adelaide & Environs
5021	Adelaide & Environs
5022	Adelaide & Environs
5023	Adelaide & Environs
5024	Adelaide & Environs
5025	Adelaide & Environs
5031	Adelaide & Environs
5032	Adelaide & Environs
5033	Adelaide & Environs
5034	Adelaide & Environs
5035	Adelaide & Environs
5037	Adelaide & Environs
5038	Adelaide & Environs
5039	Adelaide & Environs
5040	Adelaide & Environs
5041	Adelaide & Environs
5042	Adelaide & Environs
5043	Adelaide & Environs
5044	Adelaide & Environs
5045	Adelaide & Environs
5046	Adelaide & Environs
5047	Adelaide & Environs
5048	Adelaide & Environs
5049	Adelaide & Environs
5050	Adelaide & Environs
5051	Adelaide & Environs
5052	Adelaide & Environs
5061	Adelaide & Environs
5062	Adelaide & Environs
5063	Adelaide & Environs
5064	Adelaide & Environs
5065	Adelaide & Environs
5066	Adelaide & Environs
5067	Adelaide & Environs
5068	Adelaide & Environs
5069	Adelaide & Environs
5070	Adelaide & Environs
5072	Adelaide & Environs
5073	Adelaide & Environs
5074	Adelaide & Environs
5075	Adelaide & Environs
5076	Adelaide & Environs
5081	Adelaide & Environs
5082	Adelaide & Environs

Postcode	Localised Zone Name
5083	Adelaide & Environs
5084	Adelaide & Environs
5085	Adelaide & Environs
5086	Adelaide & Environs
5087	Adelaide & Environs
5088	Adelaide & Environs
5089	Adelaide & Environs
5090	Adelaide & Environs
5091	Adelaide & Environs
5092	Adelaide & Environs
5093	Adelaide & Environs
5094	Adelaide & Environs
5095	Adelaide & Environs
5096	Adelaide & Environs
5097	Adelaide & Environs
5098	Adelaide & Environs
5106	Adelaide & Environs
5107	Adelaide & Environs
5108	Adelaide & Environs
5109	Adelaide & Environs
5110	Adelaide & Environs
5111	Adelaide & Environs
5112	Adelaide & Environs
5113	Adelaide & Environs
5114	Adelaide & Environs
5115	Adelaide & Environs
5116	Adelaide & Environs
5117	Adelaide & Environs
5118	Adelaide & Environs
5120	Adelaide & Environs
5121	Adelaide & Environs
5125	Adelaide & Environs
5126	Adelaide & Environs
5127	Adelaide & Environs
5131	Adelaide & Environs
5132	Adelaide & Environs
5133	Adelaide & Environs
5134	Adelaide & Environs
5136	Adelaide & Environs
5157	Adelaide & Environs
5158	Adelaide & Environs
5159	Adelaide & Environs
5160	Adelaide & Environs
5161	Adelaide & Environs

Postcode	Localised Zone Name
5162	Adelaide & Environs
5163	Adelaide & Environs
5164	Adelaide & Environs
5165	Adelaide & Environs
5166	Adelaide & Environs
5167	Adelaide & Environs
5168	Adelaide & Environs
5169	Adelaide & Environs
5170	Adelaide & Environs
5171	Adelaide & Environs
5172	Adelaide & Environs
5173	Adelaide & Environs
5174	Adelaide & Environs
5201	Adelaide & Environs
5202	Adelaide & Environs
5203	Adelaide & Environs
5204	Adelaide & Environs
5210	Adelaide & Environs
5211	Adelaide & Environs
5212	Adelaide & Environs
5213	Adelaide & Environs
5214	Adelaide & Environs
5231	Adelaide & Environs
5232	Adelaide & Environs
5253	Adelaide & Environs
5254	Adelaide & Environs
5350	Adelaide & Environs
5351	Adelaide & Environs
5352	Adelaide & Environs
5360	Adelaide & Environs
5371	Adelaide & Environs
5372	Adelaide & Environs
5400	Adelaide & Environs
5950	Adelaide & Environs
5381	Central North
5418	Central North
5419	Central North
5420	Central North
5421	Central North
5480	Central North
5481	Central North
5482	Central North
5483	Central North
5485	Central North

Postcode	Localised Zone Name
5490	Central North
5491	Central North
5493	Central North
5495	Central North
5501	Central North
5502	Central North
5510	Central North
5520	Central North
5521	Central North
5522	Central North
5523	Central North
5540	Central North
5550	Central North
5552	Central North
5555	Central North
5560	Central North
5600	Eastern Eyre
5601	Eastern Eyre
5602	Eastern Eyre
5603	Eastern Eyre
5604	Eastern Eyre
5605	Eastern Eyre
5606	Eastern Eyre
5607	Eastern Eyre
5608	Eastern Eyre
5609	Eastern Eyre
5373	Mid North
5374	Mid North
5401	Mid North
5410	Mid North
5411	Mid North
5412	Mid North
5413	Mid North
5414	Mid North
5415	Mid North
5416	Mid North
5417	Mid North
5431	Mid North
5432	Mid North
5451	Mid North
5452	Mid North
5453	Mid North
5454	Mid North
5455	Mid North

Postcode	Localised Zone Name
5460	Mid North
5461	Mid North
5462	Mid North
5464	Mid North
5470	Mid North
5471	Mid North
5472	Mid North
5473	Mid North
5137	Mt Lofty Ranges
5138	Mt Lofty Ranges
5139	Mt Lofty Ranges
5140	Mt Lofty Ranges
5141	Mt Lofty Ranges
5142	Mt Lofty Ranges
5144	Mt Lofty Ranges
5150	Mt Lofty Ranges
5151	Mt Lofty Ranges
5152	Mt Lofty Ranges
5153	Mt Lofty Ranges
5154	Mt Lofty Ranges
5155	Mt Lofty Ranges
5156	Mt Lofty Ranges
5233	Mt Lofty Ranges
5234	Mt Lofty Ranges
5235	Mt Lofty Ranges
5236	Mt Lofty Ranges
5237	Mt Lofty Ranges
5240	Mt Lofty Ranges
5241	Mt Lofty Ranges
5242	Mt Lofty Ranges
5243	Mt Lofty Ranges
5244	Mt Lofty Ranges
5245	Mt Lofty Ranges
5250	Mt Lofty Ranges
5251	Mt Lofty Ranges
5252	Mt Lofty Ranges
5255	Mt Lofty Ranges
5256	Mt Lofty Ranges
5353	Mt Lofty Ranges
5355	Mt Lofty Ranges
5356	Mt Lofty Ranges
5238	Murraylands & Riverland
5259	Murraylands & Riverland
5260	Murraylands & Riverland

Postcode	Localised Zone Name
5301	Murraylands & Riverland
5302	Murraylands & Riverland
5303	Murraylands & Riverland
5304	Murraylands & Riverland
5306	Murraylands & Riverland
5307	Murraylands & Riverland
5308	Murraylands & Riverland
5309	Murraylands & Riverland
5310	Murraylands & Riverland
5311	Murraylands & Riverland
5312	Murraylands & Riverland
5320	Murraylands & Riverland
5321	Murraylands & Riverland
5322	Murraylands & Riverland
5330	Murraylands & Riverland
5331	Murraylands & Riverland
5332	Murraylands & Riverland
5333	Murraylands & Riverland
5340	Murraylands & Riverland
5341	Murraylands & Riverland
5342	Murraylands & Riverland
5343	Murraylands & Riverland
5344	Murraylands & Riverland
5345	Murraylands & Riverland
5346	Murraylands & Riverland
5354	Murraylands & Riverland
5357	Murraylands & Riverland
5422	Port Augusta & Pastoral
5433	Port Augusta & Pastoral
5434	Port Augusta & Pastoral
5440	Port Augusta & Pastoral
5650	Port Augusta & Pastoral
5651	Port Augusta & Pastoral
5652	Port Augusta & Pastoral
5653	Port Augusta & Pastoral
5654	Port Augusta & Pastoral
5655	Port Augusta & Pastoral
5660	Port Augusta & Pastoral
5700	Port Augusta & Pastoral
5710	Port Augusta & Pastoral
5720	Port Augusta & Pastoral
5722	Port Augusta & Pastoral
5725	Port Augusta & Pastoral
5261	South East

Postcode	Localised Zone Name
5262	South East
5263	South East
5264	South East
5265	South East
5266	South East
5267	South East
5268	South East
5269	South East
5270	South East
5271	South East
5272	South East
5273	South East
5275	South East
5276	South East
5277	South East
5278	South East
5279	South East
5280	South East
5290	South East
5291	South East
5630	West Coast
5631	West Coast
5632	West Coast
5633	West Coast
5640	West Coast
5641	West Coast
5642	West Coast
5661	West Coast
5670	West Coast
5671	West Coast
5680	West Coast

Postcode	Localised Zone Name
5690	West Coast
5220	Yorke Peninsula & Kangaroo Island
5221	Yorke Peninsula & Kangaroo Island
5222	Yorke Peninsula & Kangaroo Island
5223	Yorke Peninsula & Kangaroo Island
5554	Yorke Peninsula & Kangaroo Island
5556	Yorke Peninsula & Kangaroo Island
5558	Yorke Peninsula & Kangaroo Island
5570	Yorke Peninsula & Kangaroo Island
5571	Yorke Peninsula & Kangaroo Island
5572	Yorke Peninsula & Kangaroo Island
5573	Yorke Peninsula & Kangaroo Island
5575	Yorke Peninsula & Kangaroo Island
5576	Yorke Peninsula & Kangaroo Island
5577	Yorke Peninsula & Kangaroo Island
5580	Yorke Peninsula & Kangaroo Island
5581	Yorke Peninsula & Kangaroo Island
5582	Yorke Peninsula & Kangaroo Island
5583	Yorke Peninsula & Kangaroo Island

B.6 Western Australia

Western Australia is not a NEM jurisdiction and has elected not to implement the EB initiative. Therefore, its Minister did not specify zones

B.7 Northern Territory

The Northern Territory is not a NEM jurisdiction and has elected not to implement the EB initiative. Therefore, its Minister did not specify zones

C Summary of sample

The original sample specification called for 4,750 valid responses split between the jurisdictions and between metropolitan and regional areas as shown in Table C1. Table C1 also includes the number of households surveyed.

A summary of the sample and key demographics is provided in this section. There is sufficient matched consumption data, and it has sufficient diversity, to provide statistically robust models.

Table C1 **Target and achieved sample by jurisdiction and metro/ regional split**

	Targeted surveys			Achieved sample		
	Rural/ Regional	Capital	Total	Rural/ Regional	Capital	Total
New South Wales	500	500	1000	573	575	1148
Australian Capital Territory	0	250	250	31	256	287
Victoria	500	500	1000	573	572	1145
Queensland	500	500	1000	576	575	1151
South Australia	250	250	500	290	290	580
Tasmania	125	125	250	145	144	289
Northern Territory	125	125	250	47	56	103
Western Australia	250	250	500	290	286	576
Total	2375	2375	4750	2525	2754	5279

Not all of the responses collected could be matched to electricity consumption records. The most common reason was that the respondent had given an incorrect NMI (or other identification number in Western Australia and the Northern Territory).

Respondents who could not be matched were contacted a second time and asked to review their response. Some respondents changed the NMI they had provided. Others confirmed their NMI but changed their postcode. These responses were sent back to DNSPs who were able to match more to consumption records.

The final numbers of respondents matched to their electricity consumption were as set out in Table C2(numbers in brackets denote percentage of the target number, not the total collected).

Table C2 **Sample – responses matched to electricity consumption data**

	Rural/Regional	Capital	Total
New South Wales	446 (89%)	460 (92%)	906 (91%)
Australian Capital Territory	26 (n/a)	210 (84%)	236 (94%)
Victoria	435 (87%)	394 (79%)	829 (83%)
Queensland	510 (102%)	495 (99%)	1005 (101%)
South Australia	219 (88%)	230 (92%)	449 (90%)
Tasmania	122 (98%)	125 (100%)	247 (99%)
Northern Territory	39 (31%)	47 (38%)	86 (34%)
Western Australia	230 (92%)	245 (98%)	475 (95%)
Total	2027 (**85%**)	2206 (**93%**)	4233 (**89%**)

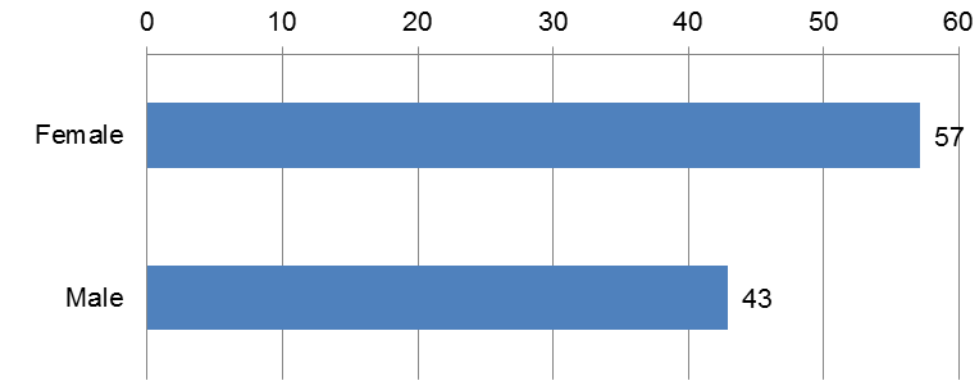
Data source: ACIL Tasman

The sample in the Northern Territory was very small. This is common for online samples and is due partly to the small population in the Northern Territory and partly to the fact that it is not well served by online panels. Consideration was given to supplementing the sample with data collected by telephone survey but the CIIC agreed that this was not necessary.

52 per cent of respondents live in the state capital city. The survey deliberately over sampled respondents from rural and regional areas compared to the actual population because to do otherwise would have given us insufficient data on rural and regional areas to ensure they were representative. This oversampling was corrected by weighting when the benchmarks were produced.

The sample was slightly biased to female respondents as illustrated in Figure C1. This bias is not important as the responses concern households. Gender was controlled during sampling to prevent excessive oversampling of women.

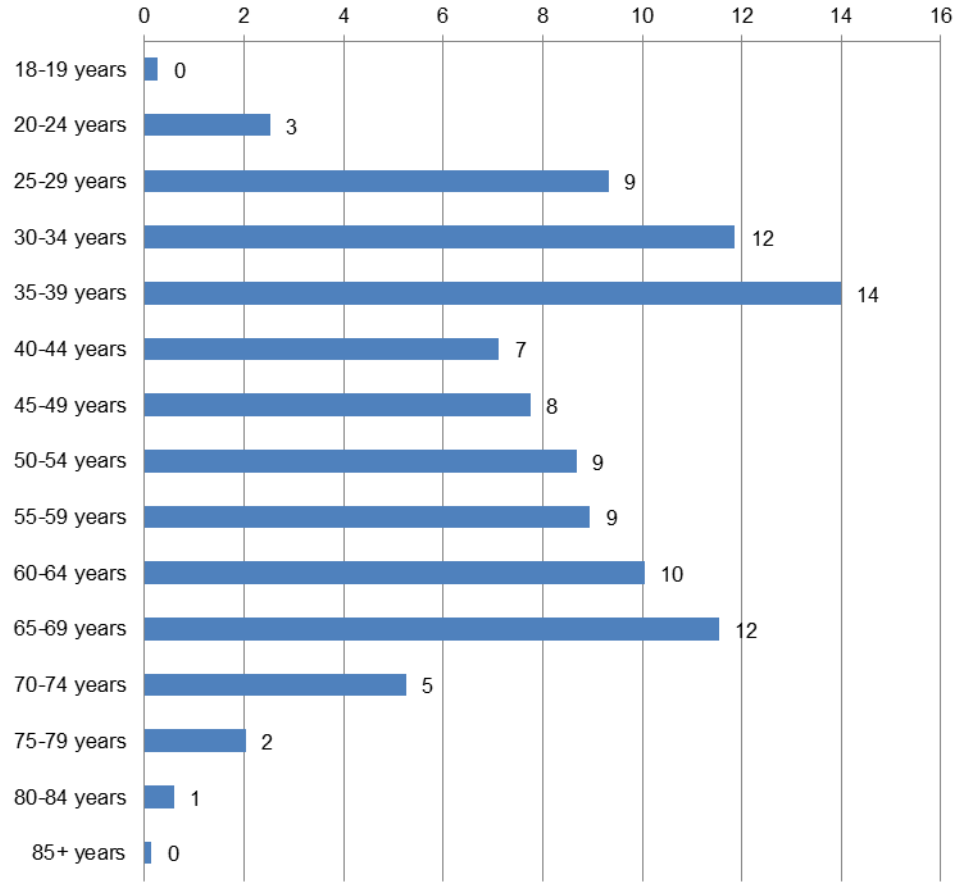
Figure C1 **Sample – gender split**



Data source: ACIL Tasman

The age distribution of the sample is shown in Figure C2. The mean age of respondents was 48 years. Age was controlled during data collection to prevent oversampling of seniors.

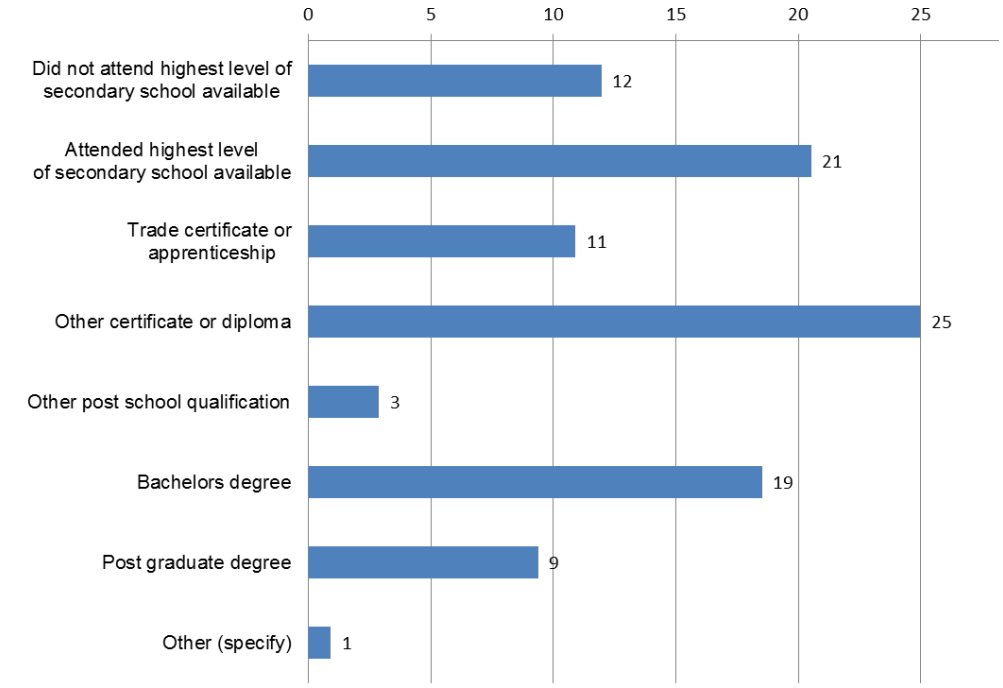
Figure C2 **Sample – age distribution**



Data source: ACIL Tasman

The education distribution of the sample is shown in Figure C3. The proportion of respondents with a degree level of education or higher was 28 per cent. This was controlled during sampling to prevent it from rising above 30 per cent.

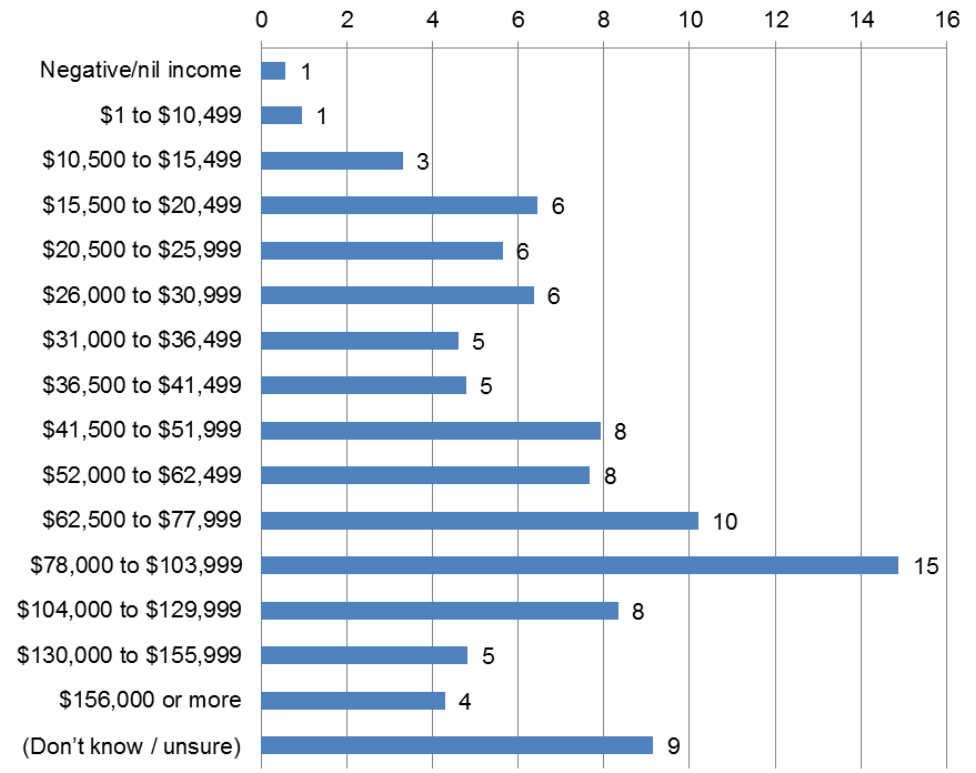
Figure C3 **Sample – education distribution**



Data source: ACIL Tasman

The income distribution of the sample is shown Figure C4. The average income of respondents was $66,700 per annum (approximately $1,280 per week). This falls between the average weekly earnings of full time adult employees ($1,322/week) and all employees ($1,026/week).

Figure C4 **Sample – income distribution**



Data source: ACIL Tasman

The employment status of respondents is shown in Figure C5. Slightly more than half of the respondents were in either part time or full time employment. Slightly more than a quarter were either retired or on a pension

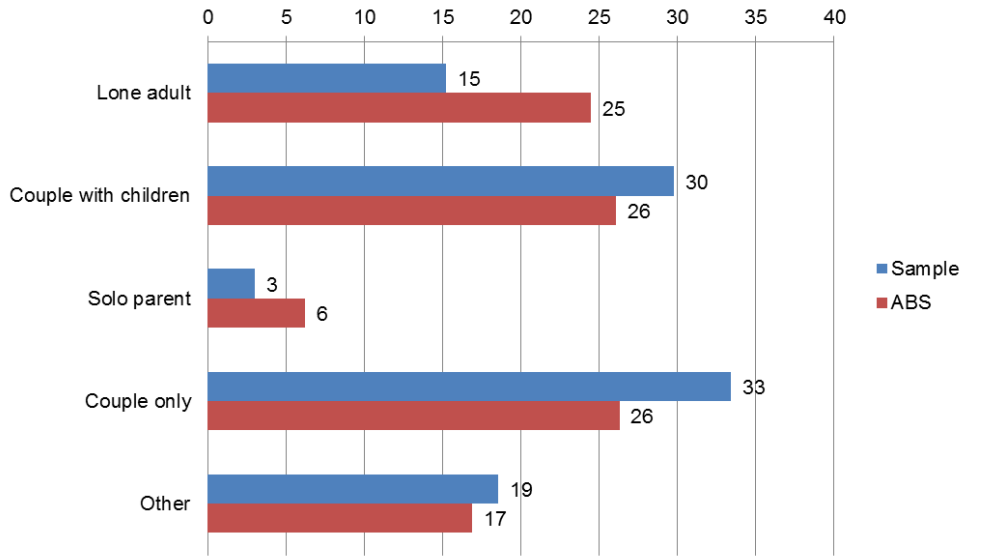
Figure C5 **sample – employment status**

Data source: ACIL Tasman

The household composition of the sample is shown in Figure C6. As the figure shows there were some differences between the household composition of the sample and the population. In particular, the sample is biased towards couples, with and without children and away from lone adults and single parents.

Given that number of people in house is a key electricity consumption driver, the data were reweighted to conform to the population.

Figure C6 **Household composition – sample and population**

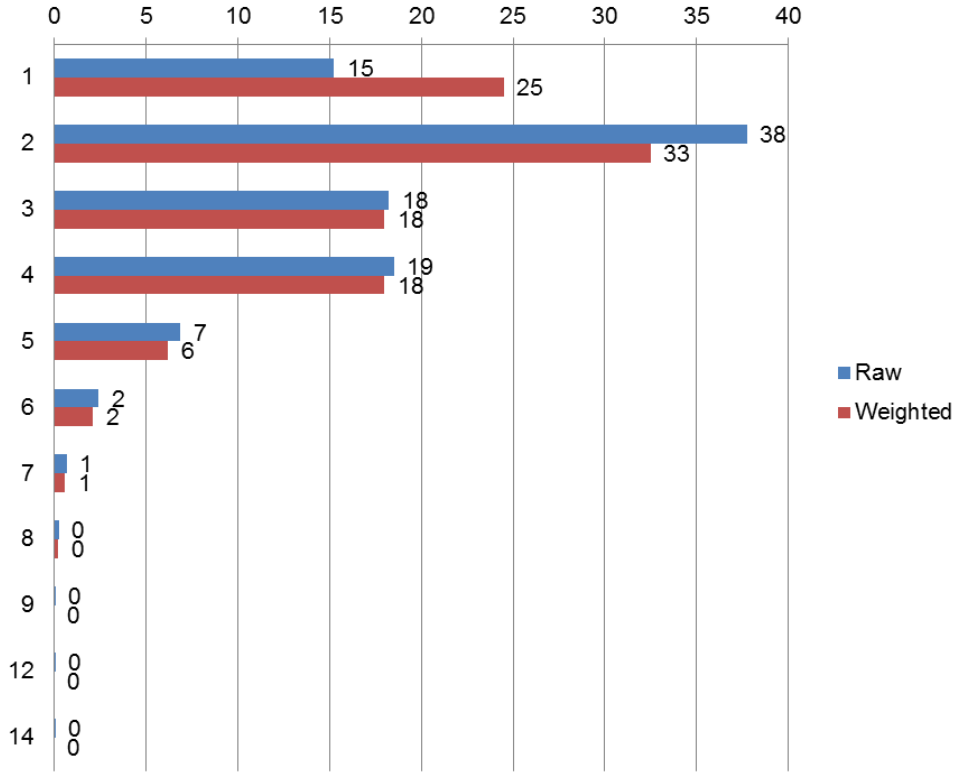


Data source: ACIL Tasman

The household size (number of occupants) distribution of the sample is shown in Figure C7.

The average number of people per house in the sample is 2.7. However, as noted above, the sample is 'overweight' in couples (with and without children) and underweight in lone adult and single parent responses. When the sample is reweighted to conform to the population, the average number of people in a house fell to 2.6.

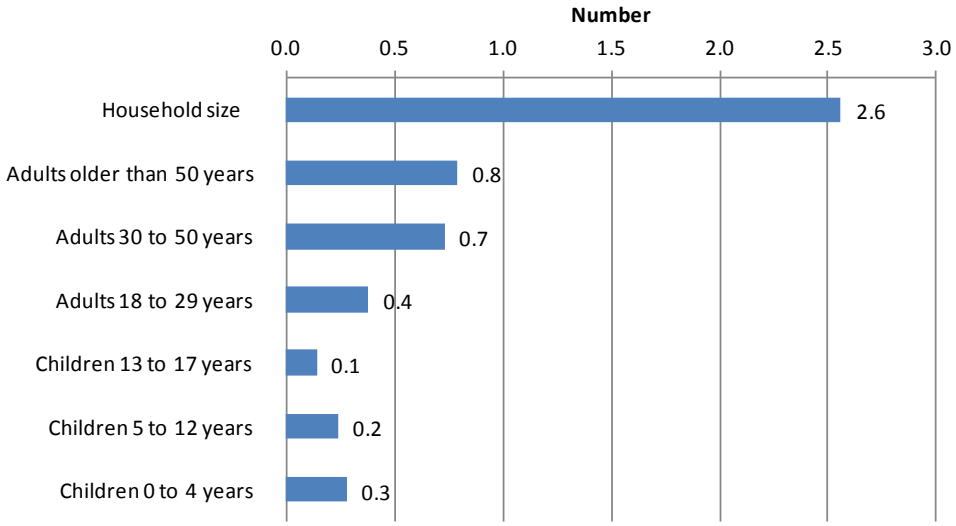
Figure C7 **Household size – sample and population**



Data source: ACIL Tasman

Figure C8 summarises the composition of households in the sample. The sample contains a higher proportion of two person households than the population and a lower proportion of one person households. This is typical of the response rates from these groups to online surveys.

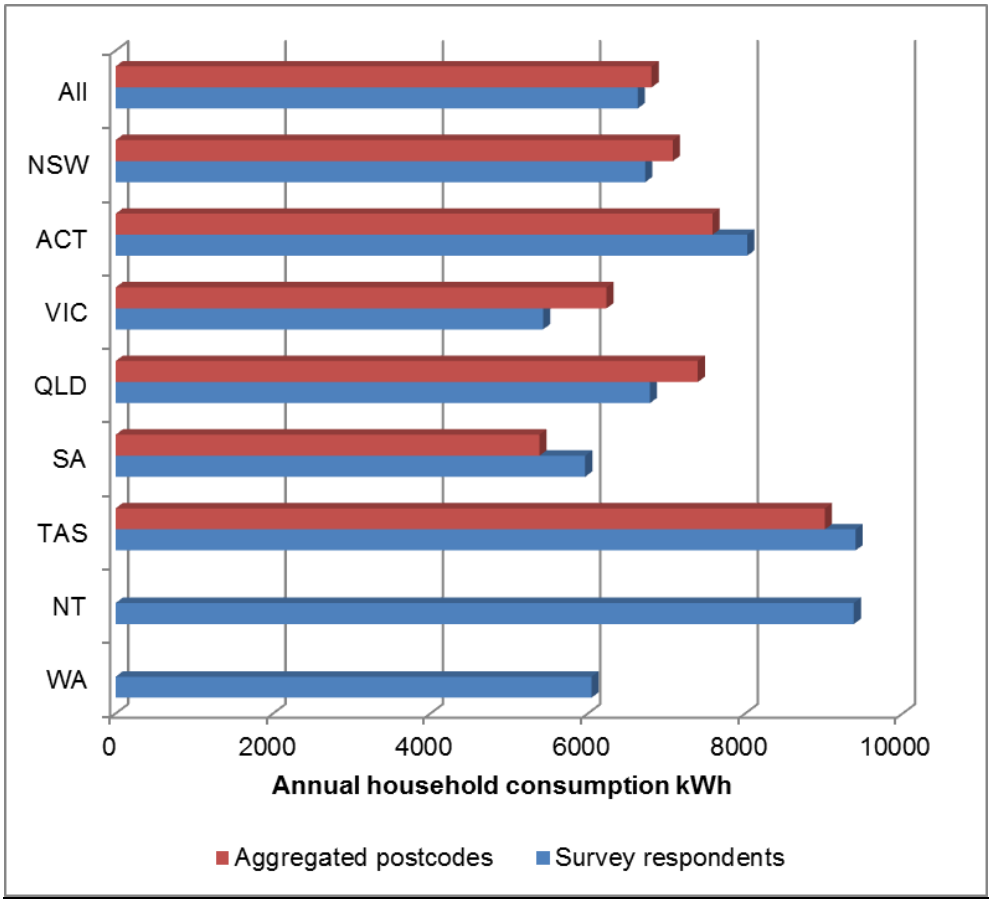
Figure C8 **Sample – household composition**



Data source: ACIL Tasman

It is important to consider whether the sample is representative of the population in respect of its electricity consumption. Figure C9 shows the average annual electricity consumption by jurisdiction for our sample and the population averages as collected by the AER. As is to be expected there are some discrepancies, in particular our sample suggests lower average electricity consumption in Victoria and Queensland than the AER's data. This is probably due to the different time periods covered by the two datasets. Our sample was collected in mid 2011, whereas the AER data covers either calendar year 2009 or financial year 2009/10.

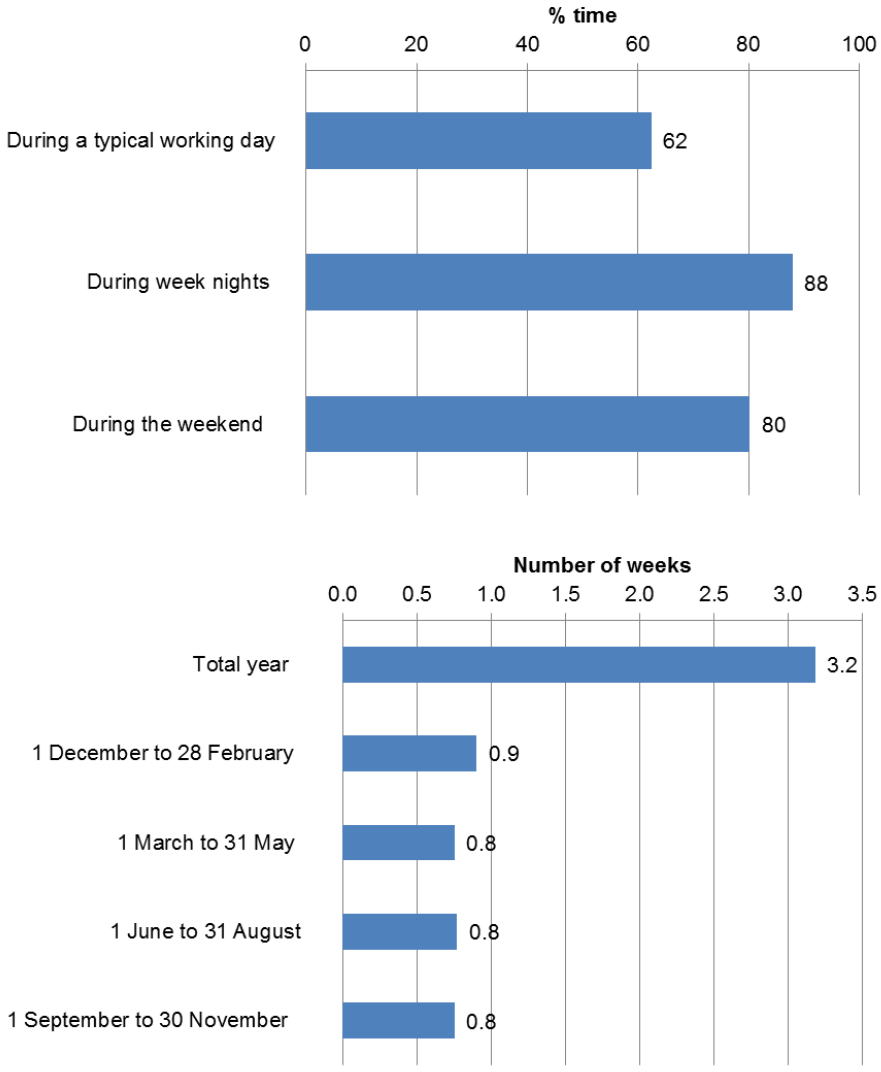
Figure C9 **Annual electricity consumption – sample and AER dataset**



Data source: ACIL Tasman

Electricity is generally used in houses while people are in the house (there are some exceptions such as standby power). Figure C10 shows the proportion of the time that respondents estimated that people are in their house during a typical week. The lower pane summarises respondents' estimates of the number of weeks that their house would be unoccupied each season.

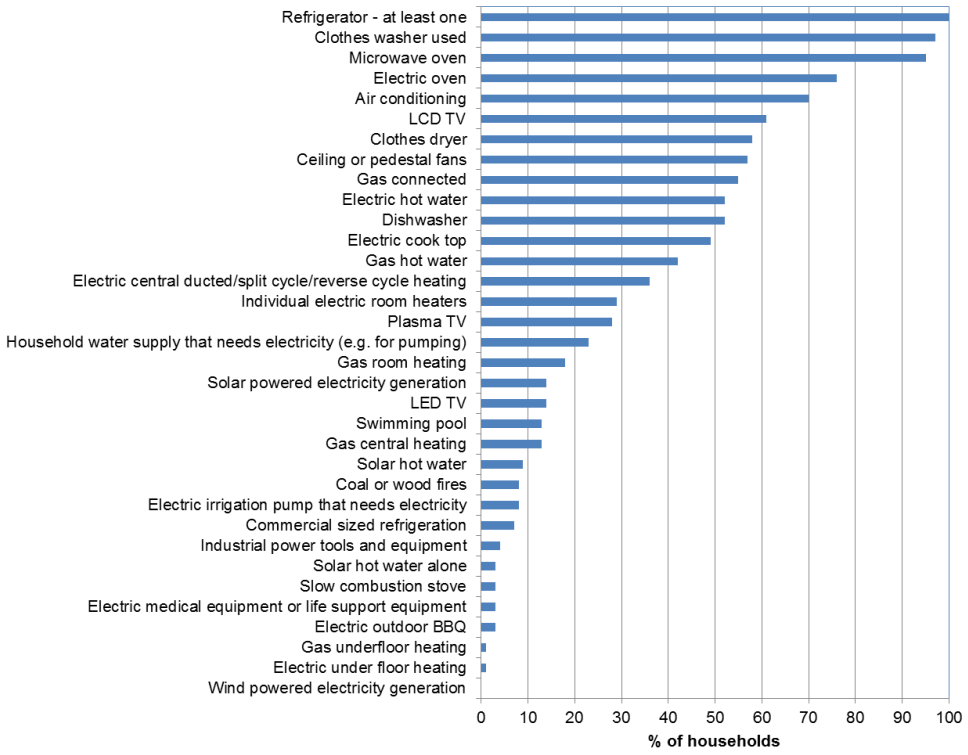
Figure C10 **Time people are at home**



Data source: ACIL Tasman

Electricity use in households is driven by the presence of electric appliances. Figure C11 provides a summary of the proportion of our sample with various household appliances.

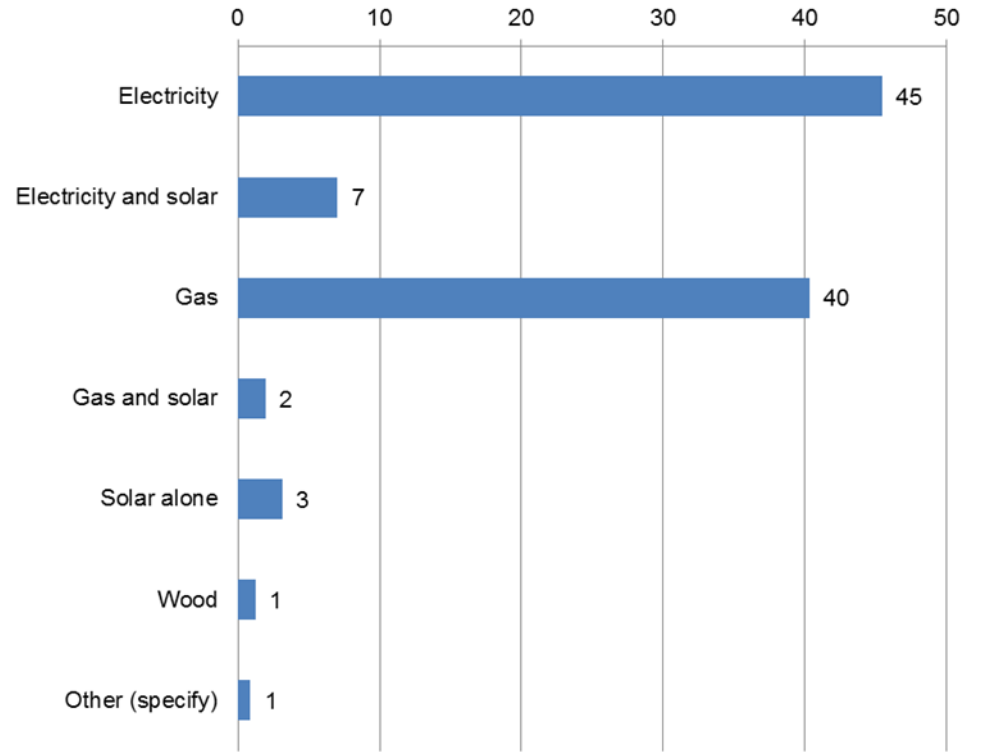
Figure C11 **Appliance penetration rates**



Data source: ACIL Tasman

Water heating accounts for a substantial proportion of electricity use in those households that use electricity for that purpose. Figure C12 shows the take-up rate of different fuels for water heating in our sample.

Figure C12 **Water heating by fuel**

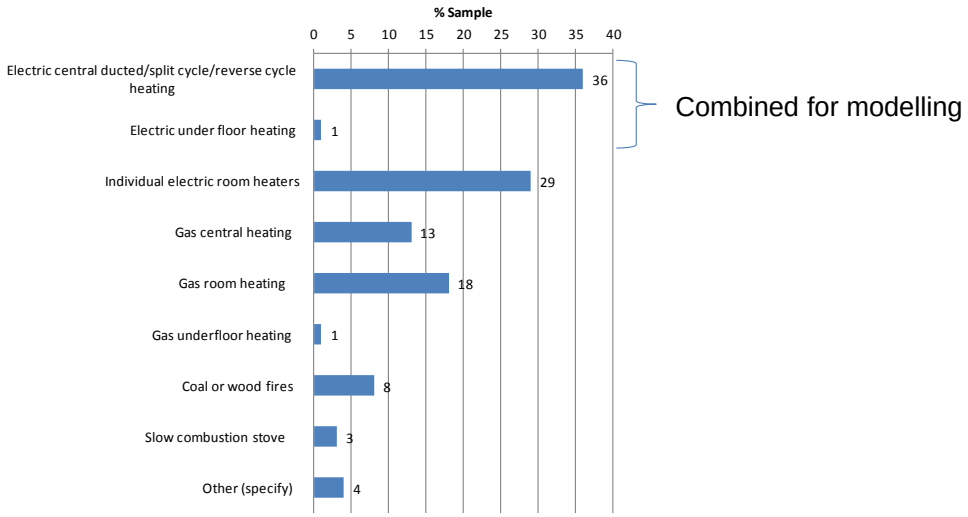


Data source: ACIL Tasman

Similarly to water heating, space heating uses a significant quantity of electricity by those households with electric space heating. Figure C13 shows the take-up rate of space heating by fuel.

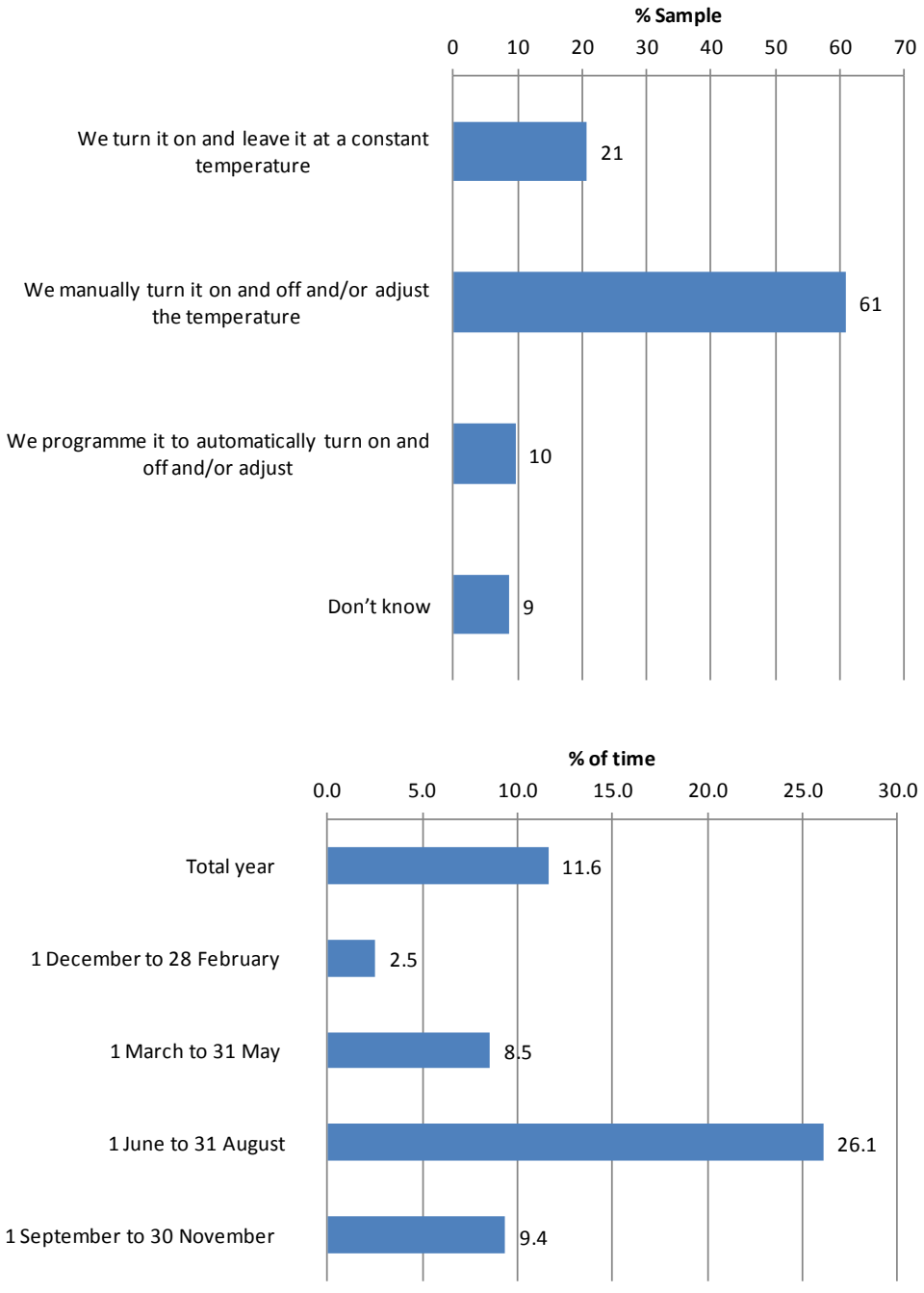
Another factor that drives the extent of electricity use for space heating is the way it is used and in particular how frequently it is adjusted, or turned on and off, up and down. This is likely to vary with season. Respondents with electric space heating were asked to describe the way they use it. The results are in Figure C14

Figure C13 **Space heating – type**



Data source: ACIL Tasman

Figure C14 **Space heating - usage**



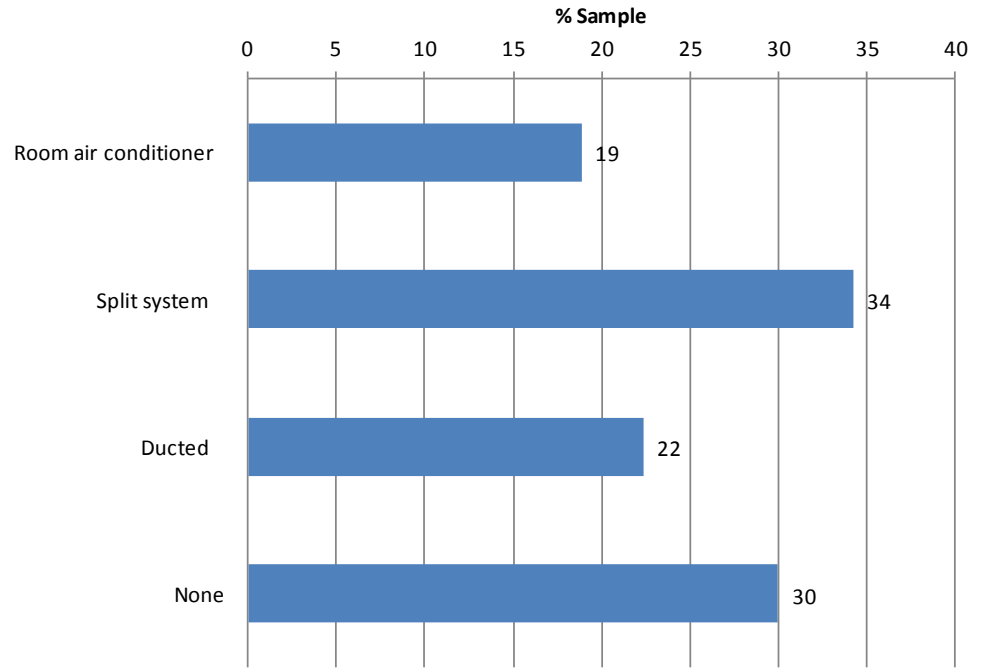
Data source: ACIL Tasman

Similarly to space heating, air-conditioning accounts for a significant proportion of electricity use for some households. The way it is used is an important factor in determining the amount of electricity it uses. The take-up rate of air conditioning is shown in Figure C15.

Figure C16 shows air conditioning usage. Figure C17shows that 70 per cent of respondents with air conditioning have reverse cycle systems.

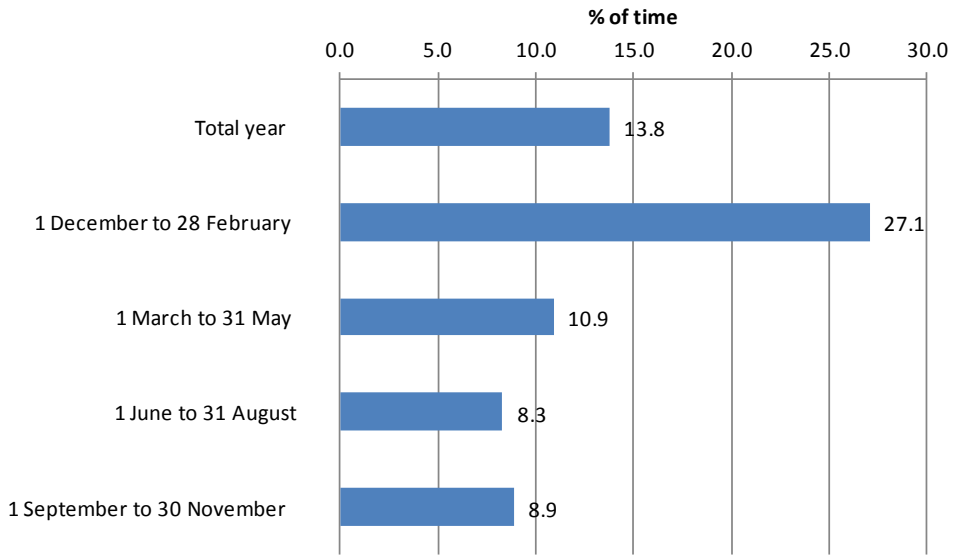
Six per cent of the sample indicated that they intend to install air conditioning, or more air conditioning, in the next year.

Figure C15 **Take-up of air conditioning**



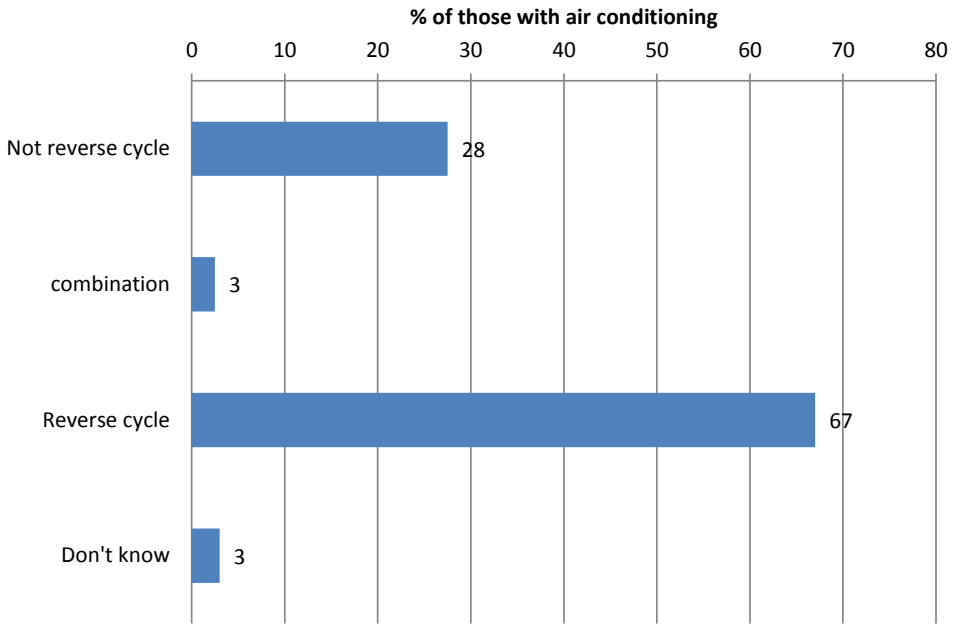
Data source: ACIL Tasman

Figure C16 Air conditioning usage



Data source: ACIL Tasman

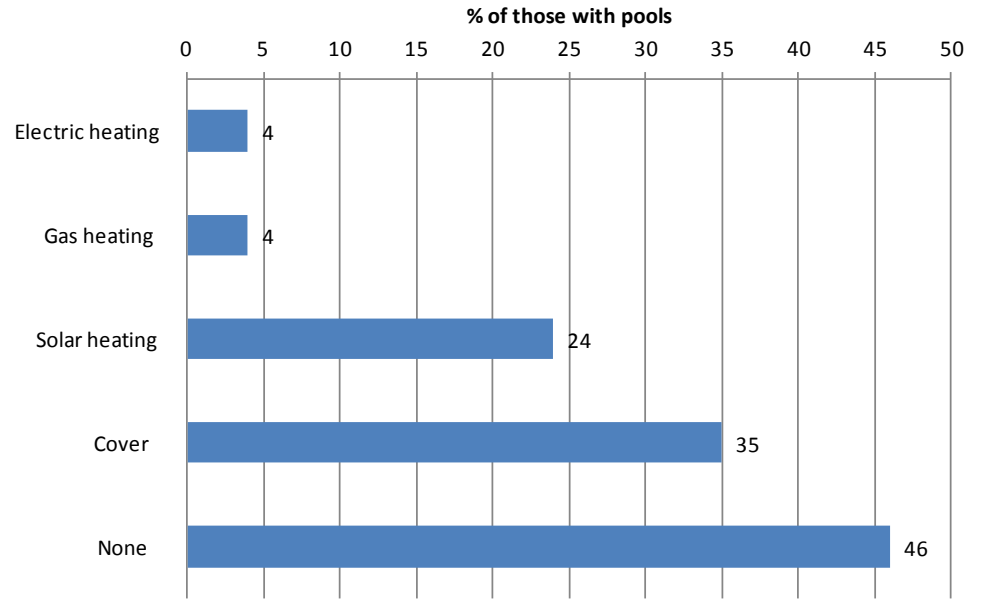
Figure C17 Air conditioning by type



Data source: ACIL Tasman

Swimming pools are another significant user of electricity in some households. 13 per cent of our sample have swimming pools, although this varies significantly by jurisdiction. Of those 13 per cent, nearly half have neither heating nor pool covers. Only four per cent of those with pools (or 0.5 per cent of the whole sample) have electric pool heating. Figure C18 provides a summary of the type of pool heating used by those in the sample who have pools.

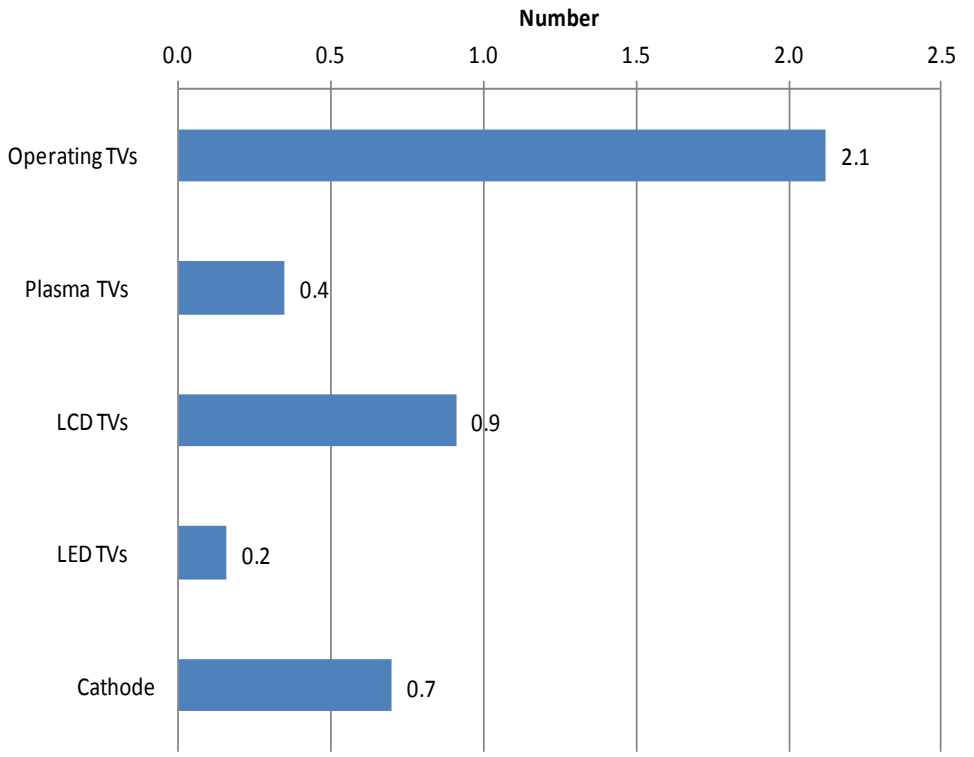
Figure C18 **Pool heating by fuel**



Data source: ACIL Tasman

On average, respondents have 2.1 televisions per house. Almost half are LCD as shown in Figure C19.

Figure C19 **Number and type of operating televisions**

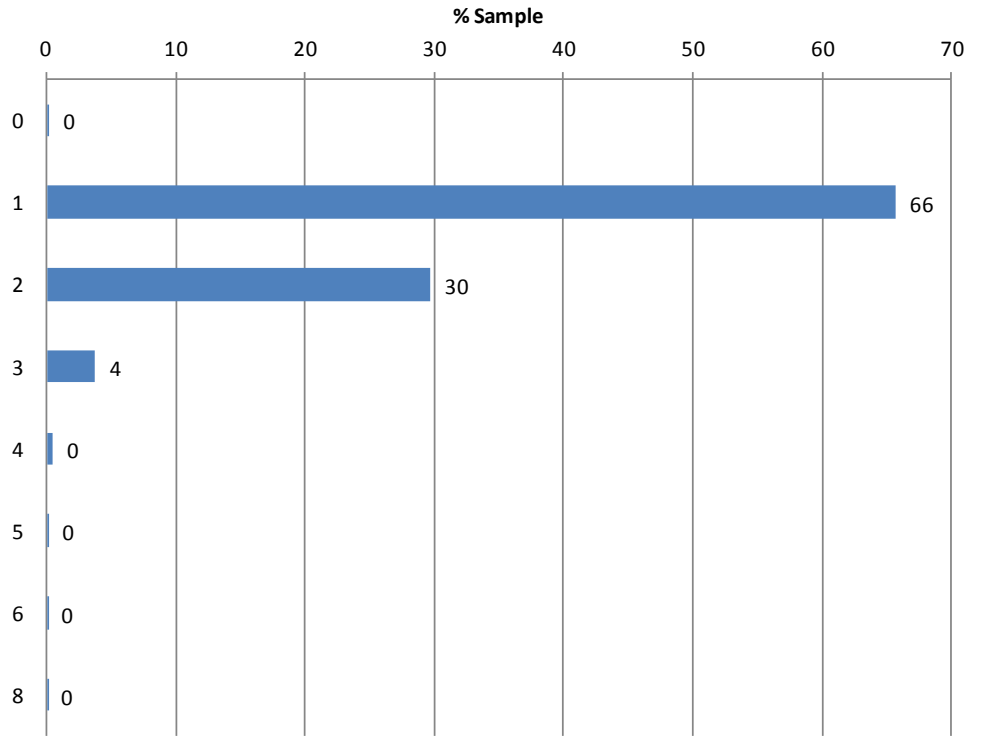


Note: the total does not add due to rounding.

Data source: ACIL Tasman

The majority of respondents have one refrigerator per house, although almost a third have two. A very small proportion have more than two, as shown in Figure C20.

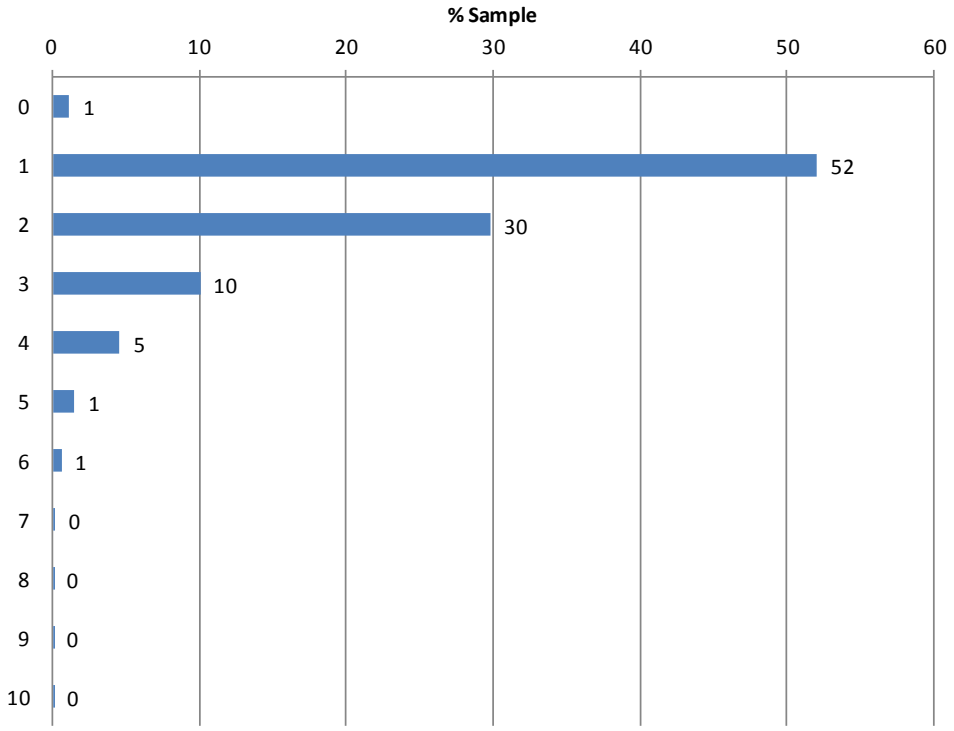
Figure C20 **Number of refrigerators**



Data source: ACIL Tasman

The average household in our sample has 1.7 computers. Figure C21 gives a break down of the sample by the number of computers per household. In our sample, home computers are turned on for an average of 31 hours per week and connected to the internet for 23.3 hours per week, three quarters of the time they are turned on.

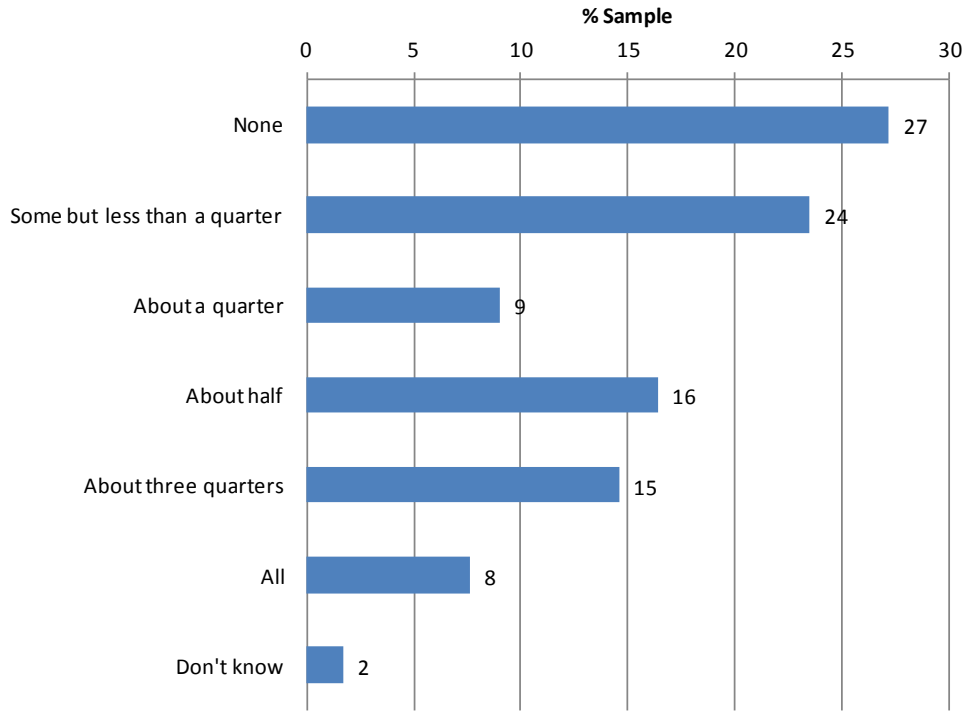
Figure C21 **Number of home computers**



Data source: ACIL Tasman

Standby power is a significant source of electricity use. Appliances can use a substantial quantity of electricity even when they are not in use. To capture this, we asked our sample what proportion of the time their appliances would be turned off at the wall. The responses are summarised in Figure C22. Respondents indicated that most appliances are not turned off at the wall most of the time, less than a quarter indicated that their appliances are turned off three quarters of the time or more. This highlights the value of improving the standby performance of household appliances.

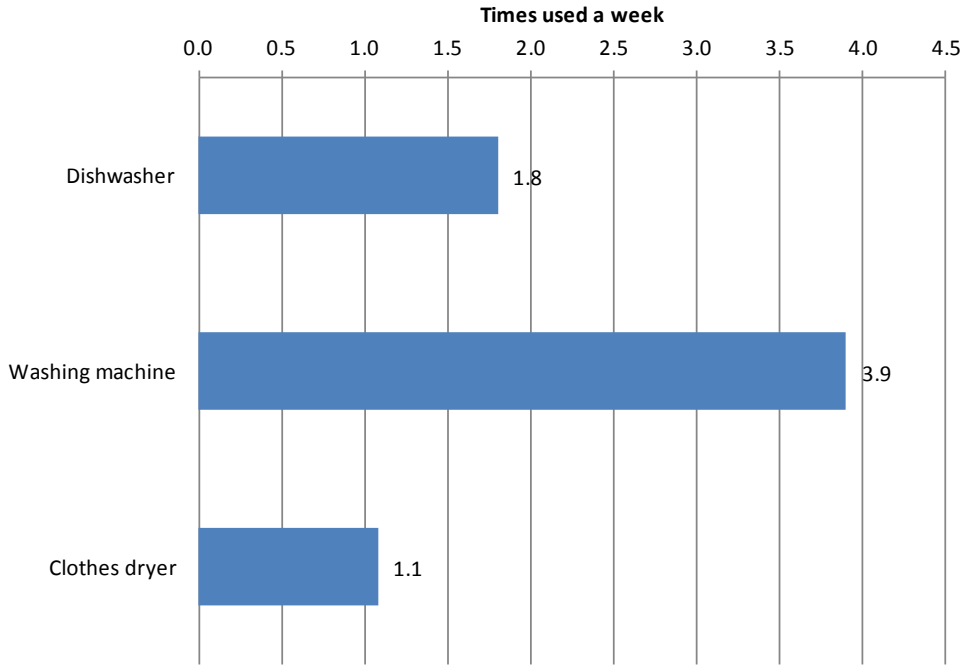
Figure C22 **Proportion of time that appliances are turned off at the wall**



Data source: ACIL Tasman

Dishwashers, washing machines and clothes dryers all use a significant quantity of electricity when they are used. Figure C23 shows the number of time respondents use these appliances in an average week.

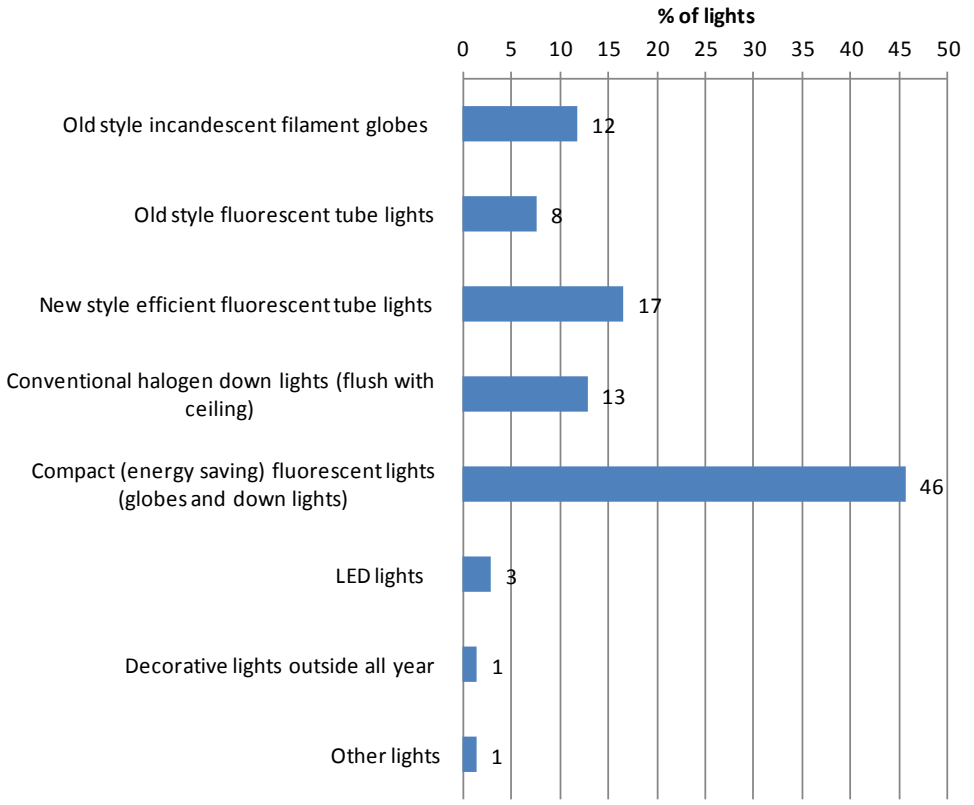
Figure C23 **Dishwasher, washing machine and clothes dryer use**



Data source: ACIL Tasman

Lighting is a significant source of electricity use and, with the diversity of options available, could be a significant source of variability. Figure C24 summarises the type of lights used in respondents' homes (many homes would have more than one type of light in use). The figure shows that more than half of the lights in respondents' homes are energy efficient.

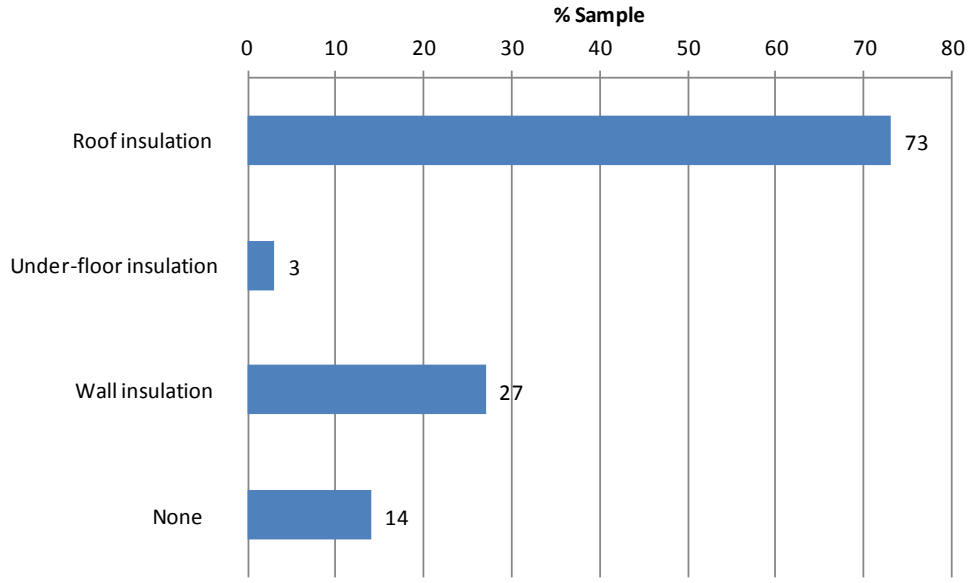
Figure C24 **Type figure title here**



Data source: ACIL Tasman

Insulation can lead to substantial reductions in electricity use with little or no change in comfort level. Figure C25 shows the extent to which respondents' houses are insulated.

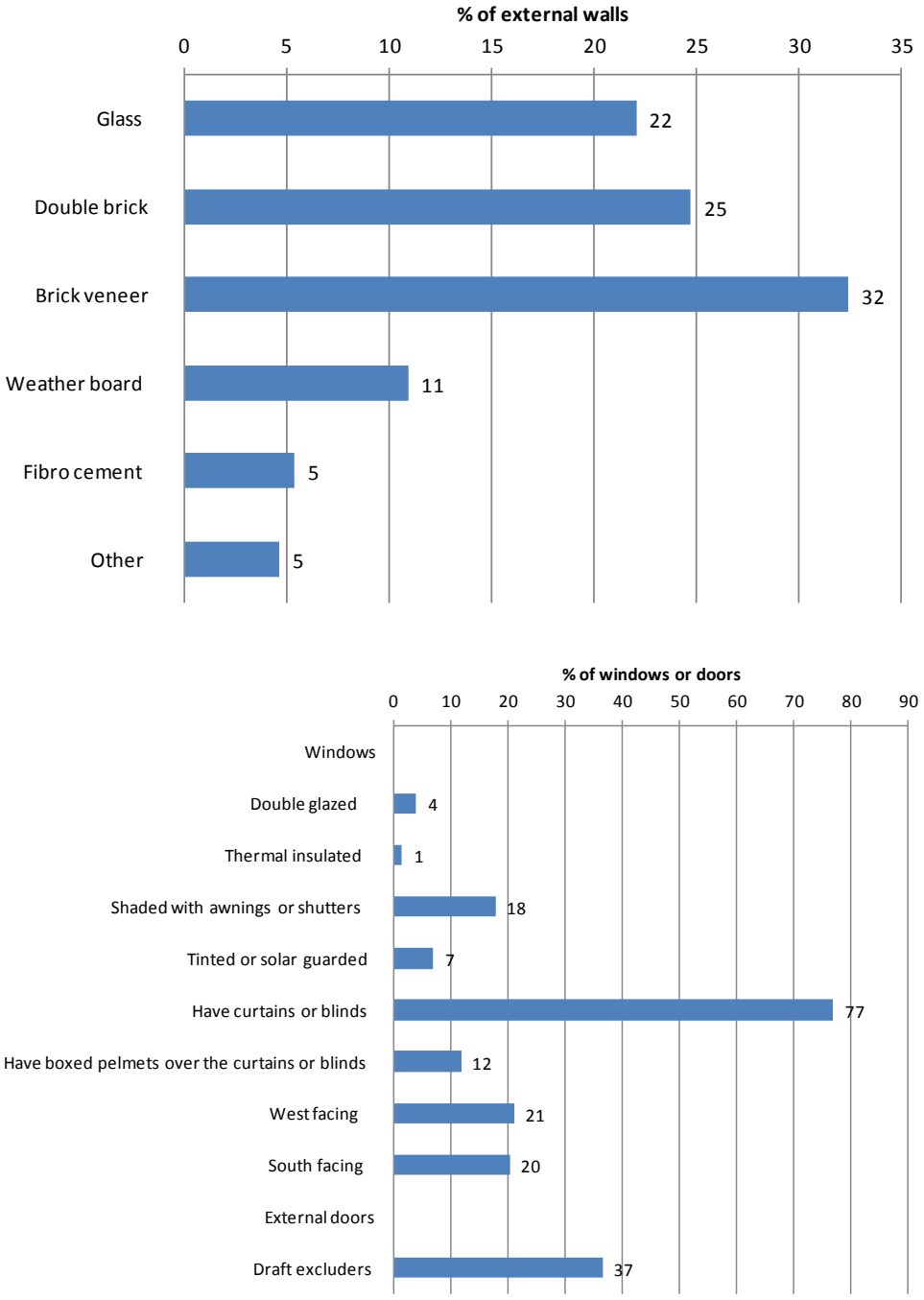
Figure C25 **Insulation**



Data source: ACIL Tasman

The material from which a house was constructed has significant implications for electricity use largely due to the insulating properties of different materials. Figure C26 shows the extent to which different materials are used in the sample. The upper pane deals with (external) walls, while the lower pane relates to doors and windows.

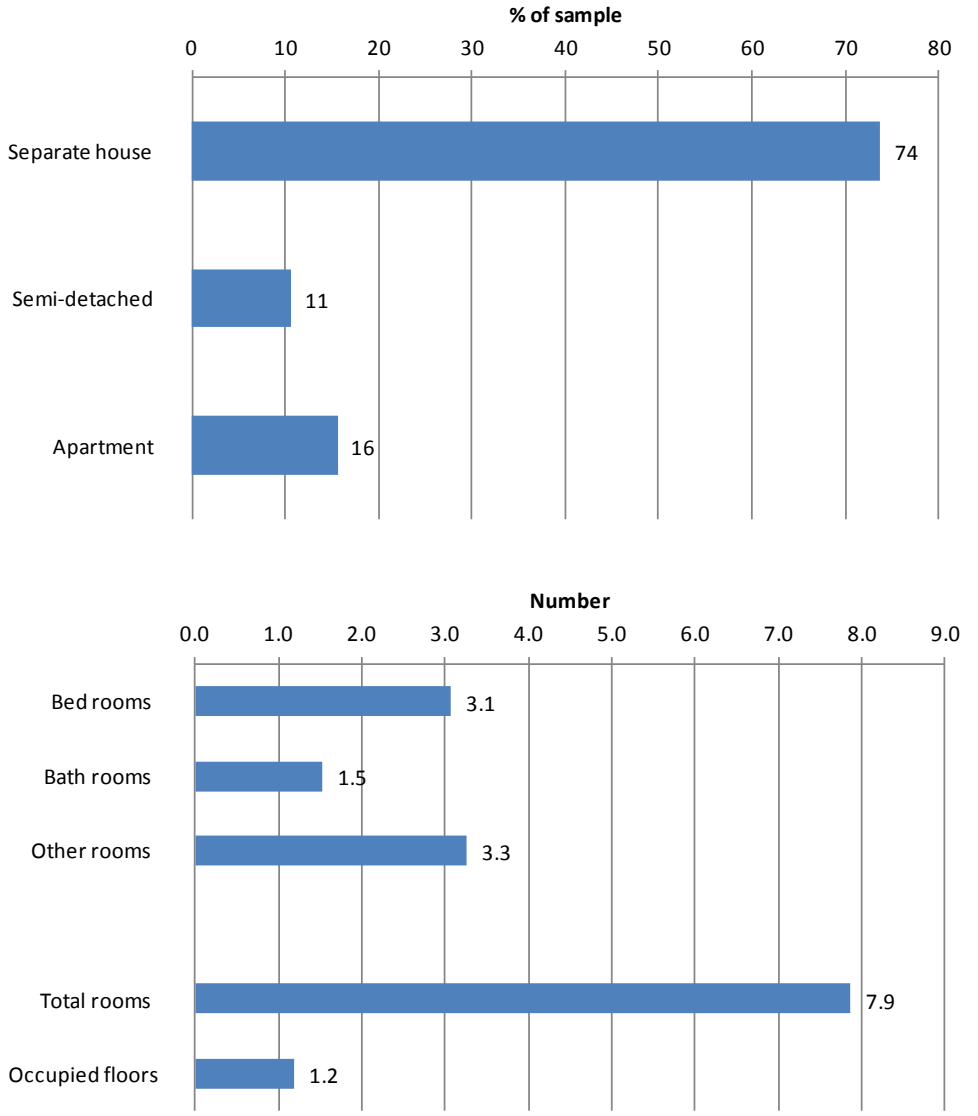
Figure C26 **Construction materials**



Data source: ACIL Tasman

In addition to construction material, the physical structure of the house itself is an important contributor to electricity use. Figure C27 shows the proportion of detached and semi-detached houses and apartments in the sample. The lower pane provides details regarding number of rooms and configuration.

Figure C27 **Dwelling type and configuration**



Data source: ACIL Tasman

D Jurisdictional summary of explanatory variables

In this appendix we present a summary of the variables that were included in the fully simplified jurisdictional models. The summary shows:

Jurisdictional mean (JM) – mean value of each variable for each jurisdiction. For 'yes or no' variables such as "do you have electric water heating?", this is the percentage that said 'yes'

Rest of country mean (RM) – as for jurisdictional mean, but calculated using all other jurisdictions

Difference (Diff) – the difference between the jurisdictional mean and the rest of country mean

Significance (Sig) – whether the difference between the two means is statistically distinguishable from zero (i.e. statistically significant)

Jurisdictional sample size (n)– the sample size for the jurisdiction

Rest of country sample size (Rn) – the sample size for the rest of the country

D.1 Queensland

Table D1 **Summary of Queensland explanatory variables**

Queensland							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Annual Individual Household Electricity consumption kWh	number	6790.5	6588.8	201.7	Y	974	3280
Summer - Actual consumption kWh	number	1708.4	1533.3	175.0	Y	974	3280
Autumn - Actual consumption	number	1716.9	1526.2	190.8	Y	974	3280
Winter - Actual consumption	number	1714.4	1793.7	-79.3	Y	974	3280
Spring - Actual consumption	%age	1650.8	1735.6	-84.8	Y	974	3280
Gas connected	%age	26.0	63.0	-37.0	Y	1116	4208
Electric cook top	%age	74.0	42.0	32.0	Y	1116	4208
Electric oven	%age	85.0	74.0	11.0	Y	1116	4208
Microwave oven	%age	94.0	95.0	-1.0	N	1116	4208
Electric outdoor BBQ	%age	4.0	3.0	1.0	N	1116	4208
Dishwasher	%age	55.0	51.0	4.0	Y	1116	4208
Clothes dryer	%age	57.0	58.0	-1.0	N	1116	4208
Household water supply that needs electricity (e.g. for pumping)	%age	33.0	21.0	12.0	Y	1116	4208
Wind powered electricity generation	%age	0.0	0.0	0.0	N	1116	4208
Solar powered electricity generation	%age	17.0	13.0	4.0	Y	1116	4208
Electric irrigation pump that needs electricity	%age	9.0	8.0	1.0	N	1116	4208
Commercial sized refrigeration	%age	7.0	7.0	0.0	N	1116	4208
Industrial power tools and equipment	%age	4.0	5.0	-1.0	N	1116	4208
Electric medical equipment or life support equipment	%age	3.0	3.0	0.0	N	1116	4208
Electric hot water	%age	74.8	46.6	28.2	Y	1116	4208
Solar boost on electric hot water	%age	10.1	6.2	3.9	Y	1116	4208
Electric central heating	%age	41.7	35.4	6.3	Y	1116	4208
Individual electric room heaters	%age	30.0	29.0	1.0	N	1116	4208
Heating constant temperature	%age	7.1	7.8	-0.7	N	1116	4208
Heating manually adjusted	%age	23.6	22.1	1.5	N	1116	4208
Heating automatically adjusted	%age	3.9	3.5	0.5	N	1116	4208
Heat pump for central heating	%age	94.1	73.8	20.3	Y	356	1025
Off-peak tariff	%age	69.6	45.3	24.4	Y	870	2388
Air conditioning	%age	70.0	70.0	0.0	N	1116	4208
Ceiling or pedestal fans	%age	78.0	51.0	27.0	Y	1116	4208
Refrigerant air conditioning	%age	85.8	64.1	21.7	Y	484	2355

Queensland							
Variable	Units	JM	RM	Diff	Sig	n	Rn
AC constant temperature	%age	16.5	13.6	2.9	Y	1116	4208
AC manually adjusted	%age	42.9	47.3	-4.4	Y	1116	4208
AC automatically adjusted	%age	4.2	5.4	-1.2	N	1116	4208
Room air conditioner	%age	23.0	18.0	5.0	Y	1116	4208
Split system	%age	48.0	31.0	17.0	Y	1116	4208
Ducted	%age	8.0	27.0	-19.0	Y	1116	4208
Room air conditioners - number	number	0.5	0.3	0.2	Y	1116	4208
Proportion of house covered by air conditioning	%age	29.2	39.1	-9.9	Y	1116	4208
Split system air conditioners - number	number	0.9	0.5	0.4	Y	1116	4208
Do you expect to install any (or more) air conditioning units in the next year?	%age	8.0	6.0	2.0	N	1046	3871
Swimming pool	%age	20.0	11.0	9.0	Y	1116	4208
Operating TVs	number	2.1	2.1	0.0	N	1116	4208
Plasma TVs	number	0.4	0.3	0.0	N	1116	4208
LCD TVs	number	0.9	0.9	0.0	N	1116	4208
LED TVs	number	0.1	0.2	0.0	N	1116	4208
Refrigerators - number	number	1.5	1.4	0.1	Y	1116	4208
Computers - number	number	1.8	1.7	0.0	N	1116	4208
Computer use - total time all computers	number	31.0	31.1	-0.2	N	1109	4153
Proportion of the time computers on-line - %age	%age	76.7	74.6	2.1	Y	1077	4025
Proportion of the time appliances turned off at wall - %age	number	37.1	31.2	5.8	Y	1094	4138
Dishwasher - times used in week	number	2.1	1.7	0.4	Y	1116	4208
Washing machine - times used in week	number	4.2	3.8	0.4	Y	1116	4208
Clothes dryer - times used in week	number	0.9	1.1	-0.2	Y	1116	4208
Old style incandescent filament globes - %age	%age	8.7	12.6	-3.9	Y	1043	3956
Old style fluorescent tube lights - %age	%age	8.3	7.3	1.0	Y	1043	3956
New style efficient fluorescent tube lights - %age	%age	18.8	16.0	2.8	Y	1043	3956
Conventional halogen down lights (flush with ceiling) - %age	%age	10.9	13.4	-2.5	Y	1043	3956
Compact (energy saving) fluorescent lights (globes and down lights) - %age	%age	48.2	45.0	3.3	Y	1043	3956
LED lights - %age	%age	2.7	2.9	-0.2	N	1043	3956

Queensland							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Decorative lights outside all year - %age	%age	1.3	1.5	-0.2	N	1043	3956
Other lights - %age	%age	1.2	1.4	-0.2	N	1043	3956
Roof insulation	%age	71.0	74.0	-3.0	Y	1116	4208
Under-floor insulation	%age	2.0	4.0	-2.0	Y	1116	4208
Wall insulation	%age	17.0	29.0	-12.0	Y	1116	4208
None	%age	17.0	13.0	4.0	Y	1116	4208
Glass - %age	%age	21.3	22.3	-1.0	Y	1090	4067
Double brick - %age	%age	16.5	26.9	-10.4	Y	1090	4067
Brick veneer - %age	%age	33.2	32.2	1.0	N	1090	4067
Weather board - %age	%age	18.3	8.9	9.4	Y	1090	4067
Fibro cement - %age	%age	6.7	5.0	1.8	Y	1090	4067
Other - %age	%age	4.0	4.8	-0.8	N	1090	4067
Windows double glazed - %age	%age	3.2	4.2	-0.9	N	1045	3965
Windows thermal insulated - %age	%age	0.9	1.6	-0.7	Y	1054	3955
Windows shaded with awnings or shutters - %age	%age	17.5	17.9	-0.5	N	1077	4094
Windows tinted or solar guarded - %age	%age	11.5	5.8	5.7	Y	1068	4054
Windows have curtains or blinds - %age	%age	75.5	77.4	-1.9	Y	1090	4144
Windows have boxed pelmets over the curtains or blinds - %age	%age	8.8	12.6	-3.7	Y	1065	4054
Windows west facing - %age	%age	20.3	21.3	-1.1	N	989	3696
Windows south facing - %age	%age	20.0	20.4	-0.4	N	987	3693
External doors with draft excluders	%age	31.4	37.8	-6.5	Y	989	3887
People home during a typical working day - %age	%age	65.2	61.6	3.6	Y	1108	4185
People home during week nights - %age	%age	89.0	87.5	1.4	Y	1109	4186
People home during the weekend - %age	%age	81.8	79.6	2.2	Y	1109	4185
Separate house	%age	80.1	72.1	8.0	Y	1116	4208
Semi-detached	%age	8.9	11.2	-2.3	Y	1116	4208
Apartment	%age	11.1	16.8	-5.7	Y	1116	4208
Bed rooms	number	3.2	3.0	0.2	Y	1116	4208
Bath rooms	number	1.6	1.5	0.1	Y	1116	4208
Other rooms	number	3.4	3.2	0.1	Y	1116	4208
Total rooms in house	number	8.2	7.8	0.4	Y	1116	4208
Occupied floors	number	1.3	1.2	0.1	Y	1116	4208

Queensland							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Household size	number	2.7	2.5	0.2	Y	1104	4171
Adults older than 50 years	number	0.8	0.8	0.0	N	1116	4208
Adults 30 to 50 years	number	0.8	0.7	0.1	Y	1116	4208
Adults 18 to 29 years	number	0.4	0.4	0.0	N	1073	3922
Children 13 to 17 years	number	0.2	0.1	0.0	N	1116	4208
Children 5 to 12 years	number	0.3	0.2	0.0	N	1116	4208
Children 0 to 4 years	number	0.4	0.3	0.1	Y	1116	4208
Family members only	number	93.0	93.9	-0.9	N	1111	4184
Weeks unoccupied - 1 December to 28 February	number	0.9	0.9	-0.1	N	1116	4208
Weeks unoccupied - 1 March to 31 May	number	0.8	0.8	0.0	N	1116	4208
Weeks unoccupied - 1 June to 31 August	number	0.7	0.8	-0.1	N	1116	4208
Weeks unoccupied - 1 September to 30 November	number	0.7	0.8	-0.1	N	1116	4208
Weeks unoccupied for year	number	3.0	3.2	-0.2	N	1116	4208
AC use % time - 1 December to 28 February	%age	24.0	27.9	-3.9	Y	1116	4208
AC use % time - 1 March to 31 May	%age	8.7	11.5	-2.9	Y	1116	4208
AC use % time - 1 June to 31 August	%age	8.0	8.4	-0.4	N	1116	4208
AC use % time - 1 September to 30 November	%age	8.5	9.0	-0.5	N	1116	4208
Electric heating use % time - 1 December to 28 February	%age	1.5	2.8	-1.3	Y	1116	4208
Electric heating use % time - 1 March to 31 May	%age	4.0	9.8	-5.8	Y	1116	4208
Electric heating use % time - 1 June to 31 August	%age	15.0	29.1	-14.1	Y	1116	4208
Electric heating use % time - 1 September to 30 November	%age	2.9	11.1	-8.2	Y	1116	4208
AC use % time - year	%age	12.3	14.2	-1.9	Y	1116	4208
Electric heating use % time - year	%age	5.8	13.2	-7.3	Y	1116	4208

Data source: ACIL Tasman modelling

D.2 New South Wales

Table D2 **Summary of New South Wales explanatory variables**

New South Wales							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Annual Individual Household Electricity consumption kWh	number	6729.7	6609.0	120.7	Y	916	3338
Summer - Actual consumption kWh	number	1646.9	1553.2	93.7	Y	916	3338
Autumn - Actual consumption	number	1526.5	1581.7	-55.2	Y	916	3338
Winter - Actual consumption	number	1812.8	1765.3	47.4	Y	916	3338
Spring - Actual consumption	%age	1743.5	1708.7	34.8	Y	916	3338
Gas connected	%age	44.0	58.0	-14.0	Y	1148	4176
Electric cook top	%age	59.0	46.0	13.0	Y	1148	4176
Electric oven	%age	79.0	76.0	3.0	Y	1148	4176
Microwave oven	%age	94.0	95.0	-1.0	N	1148	4176
Electric outdoor BBQ	%age	4.0	3.0	1.0	N	1148	4176
Dishwasher	%age	51.0	52.0	-1.0	N	1148	4176
Clothes dryer	%age	65.0	56.0	9.0	Y	1148	4176
Household water supply that needs electricity (e.g. for pumping)	%age	23.0	24.0	-1.0	N	1148	4176
Wind powered electricity generation	%age	1.0	0.0	1.0	N	1148	4176
Solar powered electricity generation	%age	13.0	14.0	-1.0	N	1148	4176
Electric irrigation pump that needs electricity	%age	4.0	9.0	-5.0	Y	1148	4176
Commercial sized refrigeration	%age	7.0	7.0	0.0	N	1148	4176
Industrial power tools and equipment	%age	4.0	5.0	-1.0	N	1148	4176
Electric medical equipment or life support equipment	%age	4.0	3.0	1.0	Y	1148	4176
Electric hot water	%age	66.4	48.6	17.8	Y	1148	4176
Solar boost on electric hot water	%age	7.7	6.9	0.8	N	1148	4176
Electric central heating	%age	42.1	35.3	6.8	Y	1148	4176
Individual electric room heaters	%age	40.0	26.0	14.0	Y	1148	4176
Heating constant temperature	%age	8.1	7.5	0.6	N	1148	4176
Heating manually adjusted	%age	26.9	21.1	5.8	Y	1148	4176
Heating automatically adjusted	%age	3.3	3.6	-0.3	N	1148	4176
Heat pump for central heating	%age	86.3	76.7	9.6	Y	335	1046
Off-peak tariff	%age	59.7	49.1	10.7	Y	821	2437
Air conditioning	%age	61.0	72.0	-11.0	Y	1148	4176
Ceiling or pedestal fans	%age	57.0	57.0	0.0	N	1148	4176
Refrigerant air conditioning	%age	79.6	65.6	14.0	Y	436	2402

New South Wales							
Variable	Units	JM	RM	Diff	Sig	n	Rn
AC constant temperature	%age	11.0	15.1	-4.2	Y	1148	4176
AC manually adjusted	%age	43.6	47.1	-3.6	Y	1148	4176
AC automatically adjusted	%age	3.3	5.6	-2.3	Y	1148	4176
Room air conditioner	%age	17.0	20.0	-3.0	N	1148	4176
Split system	%age	32.0	35.0	-3.0	Y	1148	4176
Ducted	%age	17.0	24.0	-7.0	Y	1148	4176
Room air conditioners - number	number	0.3	0.4	-0.1	Y	1148	4176
Proportion of house covered by air conditioning	%age	28.7	39.3	-10.6	Y	1148	4176
Split system air conditioners - number	number	0.5	0.6	-0.2	Y	1148	4176
Do you expect to install any (or more) air conditioning units in the next year?	%age	6.0	7.0	-1.0	N	1057	3860
Swimming pool	%age	14.0	12.0	2.0	N	1148	4176
Operating TVs	number	2.1	2.1	-0.1	Y	1148	4176
Plasma TVs	number	0.3	0.4	-0.1	Y	1148	4176
LCD TVs	number	0.9	0.9	0.0	N	1148	4176
LED TVs	number	0.2	0.2	0.0	N	1148	4176
Refrigerators - number	number	1.4	1.4	0.0	Y	1148	4176
Computers - number	number	1.7	1.7	-0.1	N	1148	4176
Computer use - total time all computers	number	29.4	31.6	-2.2	Y	1133	4130
Proportion of the time computers on-line - %age	%age	73.4	75.5	-2.1	Y	1097	4005
Proportion of the time appliances turned off at wall - %age	number	33.9	32.1	1.8	N	1125	4107
Dishwasher - times used in week	number	1.7	1.8	-0.2	N	1148	4176
Washing machine - times used in week	number	3.9	3.9	0.1	N	1148	4176
Clothes dryer - times used in week	number	1.2	1.1	0.2	Y	1148	4176
Old style incandescent filament globes - %age	%age	10.7	12.1	-1.5	Y	1078	3920
Old style fluorescent tube lights - %age	%age	6.9	7.7	-0.8	N	1078	3920
New style efficient fluorescent tube lights - %age	%age	14.7	17.1	-2.5	Y	1078	3920
Conventional halogen down lights (flush with ceiling) - %age	%age	13.1	12.8	0.4	N	1078	3920
Compact (energy saving) fluorescent lights (globes and down lights) - %age	%age	47.9	45.0	2.9	Y	1078	3920
LED lights - %age	%age	3.5	2.7	0.8	Y	1078	3920

New South Wales							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Decorative lights outside all year - %age	%age	1.5	1.4	0.1	N	1078	3920
Other lights - %age	%age	1.8	1.2	0.6	Y	1078	3920
Roof insulation	%age	65.0	76.0	-11.0	Y	1148	4176
Under-floor insulation	%age	4.0	3.0	1.0	N	1148	4176
Wall insulation	%age	19.0	28.0	-9.0	Y	1148	4176
None	%age	20.0	12.0	8.0	Y	1148	4176
Glass - %age	%age	22.0	22.1	-0.1	N	1105	4052
Double brick - %age	%age	24.9	24.7	0.2	N	1105	4052
Brick veneer - %age	%age	32.2	32.4	-0.2	N	1105	4052
Weather board - %age	%age	8.9	11.5	-2.6	Y	1105	4052
Fibro cement - %age	%age	7.6	4.7	2.9	Y	1105	4052
Other - %age	%age	4.4	4.7	-0.3	N	1105	4052
Windows double glazed - %age	%age	4.5	3.8	0.7	N	1064	3945
Windows thermal insulated - %age	%age	1.6	1.5	0.1	N	1064	3946
Windows shaded with awnings or shutters - %age	%age	15.4	18.5	-3.0	Y	1102	4069
Windows tinted or solar guarded - %age	%age	4.8	7.5	-2.7	Y	1091	4031
Windows have curtains or blinds - %age	%age	75.9	77.3	-1.4	N	1120	4114
Windows have boxed pelmets over the curtains or blinds - %age	%age	9.0	12.6	-3.5	Y	1087	4032
Windows west facing - %age	%age	22.1	20.8	1.4	Y	1010	3675
Windows south facing - %age	%age	20.1	20.4	-0.3	N	1012	3668
External doors with draft excluders	%age	36.7	36.5	0.2	N	1054	3822
People home during a typical working day - %age	%age	61.6	62.6	-0.9	N	1138	4154
People home during week nights - %age	%age	86.6	88.1	-1.5	Y	1138	4157
People home during the weekend - %age	%age	78.2	80.6	-2.4	Y	1137	4157
Separate house	%age	63.5	76.6	-13.1	Y	1148	4176
Semi-detached	%age	12.7	10.1	2.6	Y	1148	4176
Apartment	%age	23.8	13.3	10.6	Y	1148	4176
Bed rooms	number	2.9	3.1	-0.2	Y	1148	4176
Bath rooms	number	1.5	1.5	0.0	N	1148	4176
Other rooms	number	3.2	3.3	-0.1	Y	1148	4176
Total rooms in house	number	7.6	7.9	-0.3	Y	1148	4176
Occupied floors	number	1.3	1.2	0.1	Y	1148	4176

New South Wales							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Household size	number	2.6	2.5	0.1	N	1136	4139
Adults older than 50 years	number	0.8	0.8	0.0	N	1148	4176
Adults 30 to 50 years	number	0.8	0.7	0.0	N	1148	4176
Adults 18 to 29 years	number	0.4	0.4	0.1	Y	1074	3921
Children 13 to 17 years	number	0.1	0.1	0.0	N	1148	4176
Children 5 to 12 years	number	0.2	0.2	0.0	N	1148	4176
Children 0 to 4 years	number	0.3	0.3	0.0	N	1148	4176
Family members only	number	93.6	93.7	-0.2	N	1145	4150
Weeks unoccupied - 1 December to 28 February	number	0.9	0.9	0.0	N	1148	4176
Weeks unoccupied - 1 March to 31 May	number	0.7	0.8	-0.1	N	1148	4176
Weeks unoccupied - 1 June to 31 August	number	0.7	0.8	-0.1	N	1148	4176
Weeks unoccupied - 1 September to 30 November	number	0.7	0.8	0.0	N	1148	4176
Weeks unoccupied for year	number	3.0	3.2	-0.2	N	1148	4176
AC use % time - 1 December to 28 February	%age	23.0	28.2	-5.2	Y	1148	4176
AC use % time - 1 March to 31 May	%age	9.5	11.3	-1.9	Y	1148	4176
AC use % time - 1 June to 31 August	%age	12.6	7.1	5.4	Y	1148	4176
AC use % time - 1 September to 30 November	%age	8.4	9.0	-0.6	N	1148	4176
Electric heating use % time - 1 December to 28 February	%age	3.1	2.4	0.7	N	1148	4176
Electric heating use % time - 1 March to 31 May	%age	8.2	8.6	-0.4	N	1148	4176
Electric heating use % time - 1 June to 31 August	%age	26.1	26.1	0.0	N	1148	4176
Electric heating use % time - 1 September to 30 November	%age	7.4	9.9	-2.4	Y	1148	4176
AC use % time - year	%age	13.4	13.9	-0.6	N	1148	4176
Electric heating use % time - year	%age	11.2	11.7	-0.5	N	1148	4176

Data source: ACIL Tasman modelling

D.3 Australian Capital Territory

Table D3 **Summary of Australian Capital Territory explanatory variables**

Australian Capital Territory							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Annual Individual Household Electricity consumption kWh	number	8026.2	6551.9	1474.3	Y	240	4014
Summer - Actual consumption kWh	number	1775.9	1561.3	214.5	Y	240	4014
Autumn - Actual consumption	number	1481.6	1575.1	-93.5	Y	240	4014
Winter - Actual consumption	number	2528.5	1730.6	797.9	Y	240	4014
Spring - Actual consumption	%age	2240.2	1684.9	555.3	Y	240	4014
Gas connected	%age	73.0	54.0	19.0	Y	292	5032
Electric cook top	%age	49.0	49.0	0.0	N	292	5032
Electric oven	%age	83.0	76.0	7.0	Y	292	5032
Microwave oven	%age	96.0	95.0	1.0	N	292	5032
Electric outdoor BBQ	%age	3.0	3.0	0.0	N	292	5032
Dishwasher	%age	61.0	51.0	10.0	Y	292	5032
Clothes dryer	%age	59.0	57.0	2.0	N	292	5032
Household water supply that needs electricity (e.g. for pumping)	%age	22.0	24.0	-2.0	N	292	5032
Wind powered electricity generation	%age	0.0	0.0	0.0	N	292	5032
Solar powered electricity generation	%age	13.0	14.0	-1.0	N	292	5032
Electric irrigation pump that needs electricity	%age	6.0	8.0	-2.0	N	292	5032
Commercial sized refrigeration	%age	4.0	7.0	-3.0	Y	292	5032
Industrial power tools and equipment	%age	3.0	5.0	-2.0	N	292	5032
Electric medical equipment or life support equipment	%age	3.0	3.0	0.0	N	292	5032
Electric hot water	%age	48.4	52.7	-4.3	N	292	5032
Solar boost on electric hot water	%age	3.4	7.3	-3.8	Y	292	5032
Electric central heating	%age	27.2	37.3	-10.1	Y	292	5032
Individual electric room heaters	%age	33.0	28.0	5.0	N	292	5032
Heating constant temperature	%age	5.8	7.8	-2.0	N	292	5032
Heating manually adjusted	%age	13.8	22.9	-9.1	Y	292	5032
Heating automatically adjusted	%age	7.7	3.3	4.4	Y	292	5032
Heat pump for central heating	%age	66.7	79.5	-12.8	Y	55	1327
Off-peak tariff	%age	31.8	52.8	-21.0	Y	156	3102
Air conditioning	%age	60.0	70.0	-10.0	Y	292	5032
Ceiling or pedestal fans	%age	45.0	57.0	-12.0	Y	292	5032
Refrigerant air conditioning	%age	55.0	68.5	-13.5	Y	159	2679

Australian Capital Territory							
Variable	Units	JM	RM	Diff	Sig	n	Rn
AC constant temperature	%age	6.8	14.6	-7.9	Y	292	5032
AC manually adjusted	%age	41.7	46.6	-4.9	N	292	5032
AC automatically adjusted	%age	11.1	4.8	6.4	Y	292	5032
Room air conditioner	%age	8.0	20.0	-12.0	Y	292	5032
Split system	%age	22.0	35.0	-13.0	Y	292	5032
Ducted	%age	34.0	22.0	12.0	Y	292	5032
Room air conditioners - number	number	0.1	0.3	-0.2	Y	292	5032
Proportion of house covered by air conditioning	%age	40.6	36.8	3.8	N	292	5032
Split system air conditioners - number	number	0.3	0.6	-0.3	Y	292	5032
Do you expect to install any (or more) air conditioning units in the next year?	%age	8.0	7.0	1.0	N	274	4643
Swimming pool	%age	9.0	13.0	-4.0	N	292	5032
Operating TVs	number	2.1	2.1	0.0	N	292	5032
Plasma TVs	number	0.4	0.4	0.0	N	292	5032
LCD TVs	number	0.9	0.9	0.0	N	292	5032
LED TVs	number	0.2	0.2	0.0	N	292	5032
Refrigerators - number	number	1.4	1.4	0.0	N	292	5032
Computers - number	number	2.0	1.7	0.3	Y	292	5032
Computer use - total time all computers	number	35.9	30.8	5.0	Y	289	4973
Proportion of the time computers on-line - %age	%age	79.5	74.8	4.7	Y	279	4824
Proportion of the time appliances turned off at wall - %age	number	27.2	32.8	-5.5	Y	284	4948
Dishwasher - times used in week	number	2.5	1.8	0.7	Y	292	5032
Washing machine - times used in week	number	3.8	3.9	-0.1	N	292	5032
Clothes dryer - times used in week	number	1.3	1.1	0.2	N	292	5032
Old style incandescent filament globes - %age	%age	11.6	11.8	-0.2	N	279	4720
Old style fluorescent tube lights - %age	%age	5.7	7.6	-1.9	Y	279	4720
New style efficient fluorescent tube lights - %age	%age	15.6	16.7	-1.0	N	279	4720
Conventional halogen down lights (flush with ceiling) - %age	%age	14.8	12.8	2.1	N	279	4720
Compact (energy saving) fluorescent lights (globes and down lights) - %age	%age	46.5	45.6	0.9	N	279	4720
LED lights - %age	%age	3.1	2.8	0.3	N	279	4720

Australian Capital Territory							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Decorative lights outside all year - %age	%age	0.9	1.5	-0.6	N	279	4720
Other lights - %age	%age	1.7	1.3	0.4	N	279	4720
Roof insulation	%age	79.0	73.0	6.0	Y	292	5032
Under-floor insulation	%age	7.0	3.0	4.0	Y	292	5032
Wall insulation	%age	47.0	25.0	22.0	Y	292	5032
None	%age	8.0	14.0	-6.0	Y	292	5032
Glass - %age	%age	22.9	22.0	0.9	N	280	4877
Double brick - %age	%age	19.3	25.0	-5.7	Y	280	4877
Brick veneer - %age	%age	51.7	31.3	20.4	Y	280	4877
Weather board - %age	%age	2.2	11.4	-9.2	Y	280	4877
Fibro cement - %age	%age	1.7	5.6	-3.9	Y	280	4877
Other - %age	%age	2.2	4.7	-2.5	Y	280	4877
Windows double glazed - %age	%age	4.7	3.9	0.8	N	280	4729
Windows thermal insulated - %age	%age	1.7	1.5	0.3	N	275	4734
Windows shaded with awnings or shutters - %age	%age	16.0	17.9	-1.9	N	286	4884
Windows tinted or solar guarded - %age	%age	3.0	7.2	-4.1	Y	286	4836
Windows have curtains or blinds - %age	%age	80.1	76.8	3.3	Y	290	4943
Windows have boxed pelmets over the curtains or blinds - %age	%age	12.9	11.7	1.2	N	282	4837
Windows west facing - %age	%age	20.4	21.1	-0.7	N	252	4434
Windows south facing - %age	%age	21.2	20.3	0.9	N	252	4428
External doors with draft excluders	%age	46.1	35.9	10.2	Y	274	4602
People home during a typical working day - %age	%age	57.7	62.6	-4.9	Y	291	5001
People home during week nights - %age	%age	89.2	87.7	1.5	N	291	5004
People home during the weekend - %age	%age	81.7	80.0	1.7	N	291	5002
Separate house	%age	69.6	74.0	-4.5	N	292	5032
Semi-detached	%age	19.2	10.2	9.1	Y	292	5032
Apartment	%age	11.2	15.8	-4.6	Y	292	5032
Bed rooms	number	3.2	3.1	0.1	N	292	5032
Bath rooms	number	1.6	1.5	0.1	Y	292	5032
Other rooms	number	3.4	3.3	0.2	N	292	5032
Total rooms in house	number	8.2	7.8	0.4	Y	292	5032
Occupied floors	number	1.1	1.2	-0.1	Y	292	5032

Australian Capital Territory							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Household size	number	2.4	2.6	-0.1	N	289	4986
Adults older than 50 years	number	0.8	0.8	0.0	N	292	5032
Adults 30 to 50 years	number	0.7	0.7	0.0	N	292	5032
Adults 18 to 29 years	number	0.4	0.4	0.0	N	273	4722
Children 13 to 17 years	number	0.2	0.1	0.0	N	292	5032
Children 5 to 12 years	number	0.2	0.2	0.0	N	292	5032
Children 0 to 4 years	number	0.2	0.3	-0.1	Y	292	5032
Family members only	number	92.4	93.8	-1.4	N	289	5005
Weeks unoccupied - 1 December to 28 February	number	0.9	0.9	0.0	N	292	5032
Weeks unoccupied - 1 March to 31 May	number	0.8	0.8	0.0	N	292	5032
Weeks unoccupied - 1 June to 31 August	number	0.8	0.8	0.1	N	292	5032
Weeks unoccupied - 1 September to 30 November	number	0.7	0.8	0.0	N	292	5032
Weeks unoccupied for year	number	3.2	3.2	0.0	N	292	5032
AC use % time - 1 December to 28 February	%age	26.0	27.2	-1.2	N	292	5032
AC use % time - 1 March to 31 May	%age	7.4	11.1	-3.7	Y	292	5032
AC use % time - 1 June to 31 August	%age	6.4	8.4	-2.1	N	292	5032
AC use % time - 1 September to 30 November	%age	6.9	9.0	-2.1	Y	292	5032
Electric heating use % time - 1 December to 28 February	%age	1.9	2.6	-0.6	N	292	5032
Electric heating use % time - 1 March to 31 May	%age	12.6	8.3	4.3	Y	292	5032
Electric heating use % time - 1 June to 31 August	%age	41.3	25.2	16.0	Y	292	5032
Electric heating use % time - 1 September to 30 November	%age	15.0	9.0	6.0	Y	292	5032
AC use % time - year	%age	11.7	13.9	-2.3	Y	292	5032
Electric heating use % time - year	%age	17.7	11.3	6.4	Y	292	5032

Data source: ACIL Tasman modelling

D.4 Victoria

Table D4 **Summary of Victorian explanatory variables**

Victoria							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Annual Individual Household Electricity consumption kWh	number	5432.1	6918.3	-1486.2	Y	811	3443
Summer - Actual consumption kWh	number	1219.8	1656.7	-437.0	Y	811	3443
Autumn - Actual consumption	number	1265.4	1641.5	-376.1	Y	811	3443
Winter - Actual consumption	number	1489.9	1842.9	-353.0	Y	811	3443
Spring - Actual consumption	%age	1457.1	1777.2	-320.1	Y	811	3443
Gas connected	%age	86.0	46.0	40.0	Y	1151	4173
Electric cook top	%age	23.0	56.0	-33.0	Y	1151	4173
Electric oven	%age	67.0	79.0	-12.0	Y	1151	4173
Microwave oven	%age	94.0	95.0	-1.0	N	1151	4173
Electric outdoor BBQ	%age	2.0	3.0	-1.0	N	1151	4173
Dishwasher	%age	59.0	50.0	9.0	Y	1151	4173
Clothes dryer	%age	58.0	57.0	1.0	N	1151	4173
Household water supply that needs electricity (e.g. for pumping)	%age	19.0	25.0	-6.0	Y	1151	4173
Wind powered electricity generation	%age	0.0	0.0	0.0	N	1151	4173
Solar powered electricity generation	%age	12.0	14.0	-2.0	N	1151	4173
Electric irrigation pump that needs electricity	%age	6.0	8.0	-2.0	Y	1151	4173
Commercial sized refrigeration	%age	7.0	7.0	0.0	N	1151	4173
Industrial power tools and equipment	%age	4.0	5.0	-1.0	N	1151	4173
Electric medical equipment or life support equipment	%age	3.0	3.0	0.0	N	1151	4173
Electric hot water	%age	24.8	60.1	-35.3	Y	1151	4173
Solar boost on electric hot water	%age	2.4	8.3	-5.9	Y	1151	4173
Electric central heating	%age	22.1	40.8	-18.7	Y	1151	4173
Individual electric room heaters	%age	19.0	31.0	-12.0	Y	1151	4173
Heating constant temperature	%age	4.9	8.4	-3.5	Y	1151	4173
Heating manually adjusted	%age	14.1	24.7	-10.6	Y	1151	4173
Heating automatically adjusted	%age	2.4	3.9	-1.5	Y	1151	4173
Heat pump for central heating	%age	84.3	78.4	5.9	N	147	1234
Off-peak tariff	%age	52.0	51.7	0.3	N	442	2816

Victoria							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Air conditioning	%age	72.0	69.0	3.0	N	1151	4173
Ceiling or pedestal fans	%age	49.0	59.0	-10.0	Y	1151	4173
Refrigerant air conditioning	%age	55.2	72.1	-16.9	Y	730	2108
AC constant temperature	%age	14.1	14.3	-0.2	N	1151	4173
AC manually adjusted	%age	48.4	45.8	2.6	N	1151	4173
AC automatically adjusted	%age	5.9	4.9	1.0	N	1151	4173
Room air conditioner	%age	22.0	18.0	4.0	Y	1151	4173
Split system	%age	27.0	37.0	-10.0	Y	1151	4173
Ducted	%age	27.0	21.0	6.0	Y	1151	4173
Room air conditioners - number	number	0.3	0.3	0.0	N	1151	4173
Proportion of house covered by air conditioning	%age	38.4	36.6	1.7	N	1151	4173
Split system air conditioners - number	number	0.4	0.6	-0.2	Y	1151	4173
Do you expect to install any (or more) air conditioning units in the next year?	%age	7.0	6.0	1.0	N	1052	3865
Swimming pool	%age	7.0	14.0	-7.0	Y	1151	4173
Operating TVs	number	2.1	2.1	0.0	N	1151	4173
Plasma TVs	number	0.4	0.4	0.0	N	1151	4173
LCD TVs	number	0.9	0.9	0.0	N	1151	4173
LED TVs	number	0.2	0.2	0.0	N	1151	4173
Refrigerators - number	number	1.3	1.4	-0.1	Y	1151	4173
Computers - number	number	1.7	1.7	0.0	N	1151	4173
Computer use - total time all computers	number	31.0	31.2	-0.2	N	1135	4127
Proportion of the time computers on-line - %age	%age	74.8	75.2	-0.3	N	1108	3994
Proportion of the time appliances turned off at wall - %age	number	30.1	33.1	-3.0	Y	1137	4095
Dishwasher - times used in week	number	1.8	1.8	0.1	N	1151	4173
Washing machine - times used in week	number	3.7	4.0	-0.2	Y	1151	4173
Clothes dryer - times used in week	number	1.2	1.1	0.1	N	1151	4173
Old style incandescent filament globes - %age	%age	11.8	11.8	0.0	N	1083	3915
Old style fluorescent tube lights - %age	%age	6.7	7.7	-1.0	Y	1083	3915
New style efficient fluorescent tube lights - %age	%age	14.9	17.1	-2.1	Y	1083	3915
Conventional halogen down lights (flush with ceiling) - %age	%age	16.2	12.0	4.2	Y	1083	3915

Victoria							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Compact (energy saving) fluorescent lights (globes and down lights) - %age	%age	45.0	45.8	-0.9	N	1083	3915
LED lights - %age	%age	2.6	2.9	-0.2	N	1083	3915
Decorative lights outside all year - %age	%age	1.5	1.4	0.2	N	1083	3915
Other lights - %age	%age	1.2	1.4	-0.1	N	1083	3915
Roof insulation	%age	77.0	72.0	5.0	Y	1151	4173
Under-floor insulation	%age	3.0	3.0	0.0	N	1151	4173
Wall insulation	%age	37.0	24.0	13.0	Y	1151	4173
None	%age	9.0	15.0	-6.0	Y	1151	4173
Glass - %age	%age	22.3	22.0	0.3	N	1119	4038
Double brick - %age	%age	14.4	27.6	-13.2	Y	1119	4038
Brick veneer - %age	%age	42.8	29.5	13.3	Y	1119	4038
Weather board - %age	%age	12.8	10.4	2.4	Y	1119	4038
Fibro cement - %age	%age	4.0	5.7	-1.8	Y	1119	4038
Other - %age	%age	3.7	4.8	-1.1	Y	1119	4038
Windows double glazed - %age	%age	5.0	3.7	1.3	Y	1105	3905
Windows thermal insulated - %age	%age	1.9	1.4	0.5	N	1093	3917
Windows shaded with awnings or shutters - %age	%age	19.8	17.3	2.5	Y	1125	4045
Windows tinted or solar guarded - %age	%age	4.0	7.8	-3.8	Y	1119	4003
Windows have curtains or blinds - %age	%age	77.3	76.9	0.5	N	1134	4100
Windows have boxed pelmets over the curtains or blinds - %age	%age	14.9	10.9	4.0	Y	1120	3999
Windows west facing - %age	%age	20.9	21.1	-0.2	N	1025	3661
Windows south facing - %age	%age	19.9	20.4	-0.5	N	1025	3654
External doors with draft excluders	%age	38.8	35.9	3.0	Y	1073	3804
People home during a typical working day - %age	%age	61.9	62.5	-0.5	N	1148	4144
People home during week nights - %age	%age	87.7	87.9	-0.2	N	1148	4146
People home during the weekend - %age	%age	79.1	80.4	-1.3	Y	1148	4145
Separate house	%age	72.2	74.2	-2.0	N	1151	4173
Semi-detached	%age	10.3	10.8	-0.5	N	1151	4173
Apartment	%age	17.5	15.0	2.4	Y	1151	4173
Bed rooms	number	3.0	3.1	-0.1	N	1151	4173
Bath rooms	number	1.6	1.5	0.1	Y	1151	4173

Victoria							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Other rooms	number	3.2	3.3	-0.1	N	1151	4173
Total rooms in house	number	7.8	7.9	-0.1	N	1151	4173
Occupied floors	number	1.2	1.2	-0.1	Y	1151	4173
Household size	number	2.6	2.6	0.0	N	1137	4138
Adults older than 50 years	number	0.8	0.8	0.0	N	1151	4173
Adults 30 to 50 years	number	0.7	0.7	0.0	N	1151	4173
Adults 18 to 29 years	number	0.4	0.4	0.0	N	1081	3914
Children 13 to 17 years	number	0.1	0.2	0.0	N	1151	4173
Children 5 to 12 years	number	0.2	0.2	0.0	N	1151	4173
Children 0 to 4 years	number	0.3	0.3	0.0	N	1151	4173
Family members only	number	93.7	93.7	-0.1	N	1141	4154
Weeks unoccupied - 1 December to 28 February	number	0.9	0.9	0.0	N	1151	4173
Weeks unoccupied - 1 March to 31 May	number	0.8	0.8	0.0	N	1151	4173
Weeks unoccupied - 1 June to 31 August	number	0.8	0.8	0.1	N	1151	4173
Weeks unoccupied - 1 September to 30 November	number	0.8	0.7	0.1	N	1151	4173
Weeks unoccupied for year	number	3.3	3.1	0.2	N	1151	4173
AC use % time - 1 December to 28 February	%age	25.5	27.5	-2.0	N	1151	4173
AC use % time - 1 March to 31 May	%age	8.5	11.6	-3.1	Y	1151	4173
AC use % time - 1 June to 31 August	%age	2.7	9.9	-7.1	Y	1151	4173
AC use % time - 1 September to 30 November	%age	5.3	9.9	-4.6	Y	1151	4173
Electric heating use % time - 1 December to 28 February	%age	2.5	2.5	0.0	N	1151	4173
Electric heating use % time - 1 March to 31 May	%age	11.4	7.8	3.6	Y	1151	4173
Electric heating use % time - 1 June to 31 August	%age	30.5	24.9	5.6	Y	1151	4173
Electric heating use % time - 1 September to 30 November	%age	13.0	8.4	4.6	Y	1151	4173
AC use % time - year	%age	10.5	14.7	-4.2	Y	1151	4173
Electric heating use % time - year	%age	14.3	10.9	3.5	Y	1151	4173

Data source: ACIL Tasman modelling

D.5 Tasmania

Table D5 **Summary of Tasmanian explanatory variables**

Tasmania							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Annual Individual Household Electricity consumption kWh	number	9403.6	6477.0	2926.6	Y	230	4024
Summer - Actual consumption kWh	number	1870.1	1556.5	313.6	Y	230	4024
Autumn - Actual consumption	number	1900.9	1551.0	349.9	Y	230	4024
Winter - Actual consumption	number	2976.5	1707.1	1269.4	Y	230	4024
Spring - Actual consumption	%age	2656.2	1662.6	993.6	Y	230	4024
Gas connected	%age	14.0	58.0	-44.0	Y	298	5026
Electric cook top	%age	77.0	47.0	30.0	Y	298	5026
Electric oven	%age	93.0	75.0	18.0	Y	298	5026
Microwave oven	%age	97.0	95.0	2.0	Y	298	5026
Electric outdoor BBQ	%age	4.0	3.0	1.0	N	298	5026
Dishwasher	%age	50.0	52.0	-2.0	N	298	5026
Clothes dryer	%age	56.0	58.0	-2.0	N	298	5026
Household water supply that needs electricity (e.g. for pumping)	%age	26.0	23.0	3.0	N	298	5026
Wind powered electricity generation	%age	0.0	0.0	0.0	N	298	5026
Solar powered electricity generation	%age	8.0	14.0	-6.0	Y	298	5026
Electric irrigation pump that needs electricity	%age	9.0	8.0	1.0	N	298	5026
Commercial sized refrigeration	%age	8.0	7.0	1.0	N	298	5026
Industrial power tools and equipment	%age	7.0	4.0	3.0	N	298	5026
Electric medical equipment or life support equipment	%age	3.0	3.0	0.0	N	298	5026
Electric hot water	%age	87.4	50.4	37.0	Y	298	5026
Solar boost on electric hot water	%age	3.8	7.2	-3.4	Y	298	5026
Electric central heating	%age	54.4	35.7	18.7	Y	298	5026
Individual electric room heaters	%age	42.0	28.0	14.0	Y	298	5026
Heating constant temperature	%age	16.8	7.1	9.7	Y	298	5026
Heating manually adjusted	%age	29.0	22.0	7.0	Y	298	5026
Heating automatically adjusted	%age	6.7	3.4	3.3	Y	298	5026
Heat pump for central heating	%age	10.2	88.0	-77.8	Y	159	1222
Off-peak tariff	%age	37.9	52.9	-15.0	Y	237	3020
Air conditioning	%age	45.0	71.0	-26.0	Y	298	5026
Ceiling or pedestal fans	%age	22.0	59.0	-37.0	Y	298	5026
Refrigerant air conditioning	%age	73.1	67.7	5.4	N	48	2790

Tasmania							
Variable	Units	JM	RM	Diff	Sig	n	Rn
AC constant temperature	%age	6.2	14.7	-8.5	Y	298	5026
AC manually adjusted	%age	30.2	47.3	-17.1	Y	298	5026
AC automatically adjusted	%age	4.8	5.1	-0.4	N	298	5026
Room air conditioner	%age	7.0	20.0	-13.0	Y	298	5026
Split system	%age	33.0	35.0	-2.0	N	298	5026
Ducted	%age	3.0	24.0	-21.0	Y	298	5026
Room air conditioners - number	number	0.1	0.3	-0.3	Y	298	5026
Proportion of house covered by air conditioning	%age	11.8	38.5	-26.7	Y	298	5026
Split system air conditioners - number	number	0.4	0.6	-0.2	Y	298	5026
Do you expect to install any (or more) air conditioning units in the next year?	%age	4.0	7.0	-3.0	N	275	4642
Swimming pool	%age	3.0	13.0	-10.0	Y	298	5026
Operating TVs	number	2.3	2.1	0.2	Y	298	5026
Plasma TVs	number	0.3	0.4	0.0	N	298	5026
LCD TVs	number	0.9	0.9	0.0	N	298	5026
LED TVs	number	0.3	0.2	0.1	Y	298	5026
Refrigerators - number	number	1.4	1.4	0.0	N	298	5026
Computers - number	number	1.8	1.7	0.0	N	298	5026
Computer use - total time all computers	number	30.9	31.1	-0.2	N	296	4966
Proportion of the time computers on-line - %age	%age	75.4	75.1	0.3	N	284	4819
Proportion of the time appliances turned off at wall - %age	number	29.2	32.7	-3.5	N	295	4937
Dishwasher - times used in week	number	1.8	1.8	0.0	N	298	5026
Washing machine - times used in week	number	4.5	3.9	0.7	Y	298	5026
Clothes dryer - times used in week	number	1.4	1.1	0.3	Y	298	5026
Old style incandescent filament globes - %age	%age	17.3	11.5	5.9	Y	284	4714
Old style fluorescent tube lights - %age	%age	7.0	7.5	-0.6	N	284	4714
New style efficient fluorescent tube lights - %age	%age	13.9	16.8	-2.9	N	284	4714
Conventional halogen down lights (flush with ceiling) - %age	%age	13.4	12.8	0.5	N	284	4714
Compact (energy saving) fluorescent lights (globes and down lights) - %age	%age	43.4	45.8	-2.5	N	284	4714
LED lights - %age	%age	2.8	2.8	0.0	N	284	4714

Tasmania							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Decorative lights outside all year - %age	%age	0.7	1.5	-0.8	Y	284	4714
Other lights - %age	%age	1.6	1.3	0.3	N	284	4714
Roof insulation	%age	79.0	73.0	6.0	Y	298	5026
Under-floor insulation	%age	7.0	3.0	4.0	Y	298	5026
Wall insulation	%age	37.0	26.0	11.0	Y	298	5026
None	%age	11.0	14.0	-3.0	N	298	5026
Glass - %age	%age	23.8	21.9	1.8	Y	288	4869
Double brick - %age	%age	19.7	25.0	-5.3	Y	288	4869
Brick veneer - %age	%age	29.2	32.6	-3.4	N	288	4869
Weather board - %age	%age	19.3	10.4	8.9	Y	288	4869
Fibro cement - %age	%age	2.9	5.5	-2.6	Y	288	4869
Other - %age	%age	5.1	4.6	0.6	N	288	4869
Windows double glazed - %age	%age	6.3	3.8	2.5	Y	290	4720
Windows thermal insulated - %age	%age	2.0	1.4	0.6	N	289	4721
Windows shaded with awnings or shutters - %age	%age	4.8	18.6	-13.8	Y	294	4876
Windows tinted or solar guarded - %age	%age	7.3	6.9	0.4	N	292	4831
Windows have curtains or blinds - %age	%age	79.4	76.8	2.6	Y	298	4936
Windows have boxed pelmets over the curtains or blinds - %age	%age	16.0	11.5	4.4	Y	294	4825
Windows west facing - %age	%age	24.9	20.9	4.0	Y	272	4413
Windows south facing - %age	%age	17.9	20.5	-2.6	Y	272	4408
External doors with draft excluders	%age	45.0	36.0	9.0	Y	292	4585
People home during a typical working day - %age	%age	62.9	62.3	0.6	N	298	4995
People home during week nights - %age	%age	89.0	87.8	1.2	N	298	4997
People home during the weekend - %age	%age	83.2	79.9	3.3	Y	298	4996
Separate house	%age	83.4	73.2	10.2	Y	298	5026
Semi-detached	%age	4.1	11.1	-7.0	Y	298	5026
Apartment	%age	12.5	15.7	-3.2	N	298	5026
Bed rooms	number	3.0	3.1	-0.1	N	298	5026
Bath rooms	number	1.4	1.5	-0.1	Y	298	5026
Other rooms	number	3.3	3.3	0.0	N	298	5026
Total rooms in house	number	7.7	7.9	-0.1	N	298	5026
Occupied floors	number	1.3	1.2	0.1	Y	298	5026

Tasmania							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Household size	number	2.3	2.6	-0.3	Y	296	4979
Adults older than 50 years	number	0.8	0.8	0.0	N	298	5026
Adults 30 to 50 years	number	0.6	0.7	-0.2	Y	298	5026
Adults 18 to 29 years	number	0.4	0.4	0.0	N	269	4726
Children 13 to 17 years	number	0.2	0.1	0.0	N	298	5026
Children 5 to 12 years	number	0.2	0.2	0.0	N	298	5026
Children 0 to 4 years	number	0.2	0.3	-0.1	Y	298	5026
Family members only	number	96.6	93.5	3.1	Y	296	4999
Weeks unoccupied - 1 December to 28 February	number	0.8	0.9	-0.2	N	298	5026
Weeks unoccupied - 1 March to 31 May	number	0.6	0.8	-0.1	N	298	5026
Weeks unoccupied - 1 June to 31 August	number	0.7	0.8	-0.1	N	298	5026
Weeks unoccupied - 1 September to 30 November	number	0.6	0.8	-0.1	N	298	5026
Weeks unoccupied for year	number	2.7	3.2	-0.5	N	298	5026
AC use % time - 1 December to 28 February	%age	9.3	28.1	-18.9	Y	298	5026
AC use % time - 1 March to 31 May	%age	6.8	11.2	-4.4	Y	298	5026
AC use % time - 1 June to 31 August	%age	11.9	8.1	3.8	Y	298	5026
AC use % time - 1 September to 30 November	%age	7.7	8.9	-1.3	N	298	5026
Electric heating use % time - 1 December to 28 February	%age	7.2	2.2	5.0	Y	298	5026
Electric heating use % time - 1 March to 31 May	%age	21.3	7.8	13.5	Y	298	5026
Electric heating use % time - 1 June to 31 August	%age	52.0	24.6	27.4	Y	298	5026
Electric heating use % time - 1 September to 30 November	%age	28.4	8.2	20.2	Y	298	5026
AC use % time - year	%age	8.9	14.1	-5.2	Y	298	5026
Electric heating use % time - year	%age	27.2	10.7	16.5	Y	298	5026

Data source: ACIL Tasman modelling

D.6 South Australia

Table D6 **Summary of South Australian explanatory variables**

South Australia							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Annual Individual Household Electricity consumption kWh	number	5967.5	6716.9	-749.4	Y	465	3789
Summer - Actual consumption kWh	number	1353.5	1600.4	-246.9	Y	465	3789
Autumn - Actual consumption	number	1370.6	1594.3	-223.7	Y	465	3789
Winter - Actual consumption	number	1601.3	1796.9	-195.6	Y	465	3789
Spring - Actual consumption	%age	1642.0	1725.3	-83.3	Y	465	3789
Gas connected	%age	66.0	54.0	12.0	Y	584	4740
Electric cook top	%age	38.0	50.0	-12.0	Y	584	4740
Electric oven	%age	65.0	78.0	-13.0	Y	584	4740
Microwave oven	%age	94.0	95.0	-1.0	N	584	4740
Electric outdoor BBQ	%age	3.0	3.0	0.0	N	584	4740
Dishwasher	%age	41.0	53.0	-12.0	Y	584	4740
Clothes dryer	%age	50.0	59.0	-9.0	Y	584	4740
Household water supply that needs electricity (e.g. for pumping)	%age	22.0	24.0	-2.0	N	584	4740
Wind powered electricity generation	%age	0.0	0.0	0.0	N	584	4740
Solar powered electricity generation	%age	19.0	13.0	6.0	Y	584	4740
Electric irrigation pump that needs electricity	%age	6.0	8.0	-2.0	N	584	4740
Commercial sized refrigeration	%age	9.0	7.0	2.0	Y	584	4740
Industrial power tools and equipment	%age	4.0	5.0	-1.0	N	584	4740
Electric medical equipment or life support equipment	%age	4.0	3.0	1.0	N	584	4740
Electric hot water	%age	41.8	53.8	-11.9	Y	584	4740
Solar boost on electric hot water	%age	4.7	7.3	-2.6	Y	584	4740
Electric central heating	%age	48.0	35.4	12.7	Y	584	4740
Individual electric room heaters	%age	28.0	29.0	-1.0	N	584	4740
Heating constant temperature	%age	12.1	7.1	5.0	Y	584	4740
Heating manually adjusted	%age	30.6	21.4	9.2	Y	584	4740
Heating automatically adjusted	%age	3.0	3.6	-0.7	N	584	4740
Heat pump for central heating	%age	83.9	78.4	5.5	N	169	1212
Off-peak tariff	%age	54.1	51.5	2.6	N	340	2918
Air conditioning	%age	86.0	68.0	18.0	Y	584	4740

South Australia							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Ceiling or pedestal fans	%age	52.0	57.0	-5.0	Y	584	4740
Refrigerant air conditioning	%age	66.2	68.1	-1.9	N	452	2386
AC constant temperature	%age	19.3	13.6	5.7	Y	584	4740
AC manually adjusted	%age	58.4	44.9	13.5	Y	584	4740
AC automatically adjusted	%age	4.6	5.2	-0.6	N	584	4740
Room air conditioner	%age	24.0	19.0	5.0	Y	584	4740
Split system	%age	27.0	36.0	-9.0	Y	584	4740
Ducted	%age	44.0	20.0	24.0	Y	584	4740
Room air conditioners - number	number	0.4	0.3	0.1	N	584	4740
Proportion of house covered by air conditioning	%age	56.7	34.6	22.1	Y	584	4740
Split system air conditioners - number	number	0.4	0.6	-0.2	Y	584	4740
Do you expect to install any (or more) air conditioning units in the next year?	%age	6.0	7.0	-1.0	N	529	4388
Swimming pool	%age	7.0	13.0	-6.0	Y	584	4740
Operating TVs	number	2.2	2.1	0.1	Y	584	4740
Plasma TVs	number	0.3	0.4	0.0	N	584	4740
LCD TVs	number	0.9	0.9	0.0	N	584	4740
LED TVs	number	0.2	0.2	0.0	N	584	4740
Refrigerators - number	number	1.3	1.4	-0.1	Y	584	4740
Computers - number	number	1.7	1.7	-0.1	N	584	4740
Computer use - total time all computers	number	30.5	31.2	-0.6	N	578	4685
Proportion of the time computers on-line - %age	%age	73.1	75.3	-2.2	N	558	4544
Proportion of the time appliances turned off at wall - %age	number	33.7	32.3	1.4	N	572	4660
Dishwasher - times used in week	number	1.4	1.9	-0.5	Y	584	4740
Washing machine - times used in week	number	3.6	3.9	-0.4	Y	584	4740
Clothes dryer - times used in week	number	1.1	1.1	0.0	N	584	4740
Old style incandescent filament globes - %age	%age	13.1	11.7	1.4	N	547	4451
Old style fluorescent tube lights - %age	%age	6.7	7.6	-0.9	N	547	4451
New style efficient fluorescent tube lights - %age	%age	18.1	16.4	1.7	N	547	4451
Conventional halogen down lights (flush with ceiling) - %age	%age	11.4	13.0	-1.6	N	547	4451

South Australia							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Compact (energy saving) fluorescent lights (globes and down lights) - %age	%age	46.1	45.6	0.5	N	547	4451
LED lights - %age	%age	2.0	2.9	-0.9	N	547	4451
Decorative lights outside all year - %age	%age	1.6	1.4	0.2	N	547	4451
Other lights - %age	%age	1.0	1.4	-0.4	N	547	4451
Roof insulation	%age	82.0	72.0	10.0	Y	584	4740
Under-floor insulation	%age	2.0	3.0	-1.0	Y	584	4740
Wall insulation	%age	38.0	25.0	13.0	Y	584	4740
None	%age	5.0	15.0	-10.0	Y	584	4740
Glass - %age	%age	21.9	22.1	-0.2	N	560	4597
Double brick - %age	%age	30.4	24.0	6.3	Y	560	4597
Brick veneer - %age	%age	35.0	32.1	2.9	N	560	4597
Weather board - %age	%age	4.5	11.7	-7.2	Y	560	4597
Fibro cement - %age	%age	3.6	5.6	-1.9	Y	560	4597
Other - %age	%age	4.7	4.6	0.2	N	560	4597
Windows double glazed - %age	%age	2.1	4.2	-2.1	Y	536	4474
Windows thermal insulated - %age	%age	1.9	1.4	0.5	N	543	4466
Windows shaded with awnings or shutters - %age	%age	27.2	16.7	10.5	Y	564	4606
Windows tinted or solar guarded - %age	%age	6.4	7.0	-0.6	N	561	4562
Windows have curtains or blinds - %age	%age	79.3	76.7	2.6	Y	573	4661
Windows have boxed pelmets over the curtains or blinds - %age	%age	15.3	11.4	4.0	Y	555	4564
Windows west facing - %age	%age	19.6	21.3	-1.7	N	509	4177
Windows south facing - %age	%age	21.9	20.1	1.8	Y	506	4173
External doors with draft excluders	%age	43.4	35.7	7.7	Y	537	4339
People home during a typical working day - %age	%age	64.3	62.1	2.2	N	580	4712
People home during week nights - %age	%age	87.8	87.8	-0.1	N	582	4713
People home during the weekend - %age	%age	79.5	80.2	-0.6	N	582	4712
Separate house	%age	78.4	73.2	5.2	Y	584	4740
Semi-detached	%age	9.0	10.9	-1.9	N	584	4740
Apartment	%age	12.6	15.9	-3.3	Y	584	4740
Bed rooms	number	3.0	3.1	-0.1	Y	584	4740
Bath rooms	number	1.4	1.6	-0.2	Y	584	4740

South Australia							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Other rooms	number	3.3	3.3	0.0	N	584	4740
Total rooms in house	number	7.6	7.9	-0.3	Y	584	4740
Occupied floors	number	1.1	1.2	-0.1	Y	584	4740
Household size	number	2.5	2.6	0.0	N	582	4693
Adults older than 50 years	number	0.8	0.8	0.0	N	584	4740
Adults 30 to 50 years	number	0.7	0.7	0.0	N	584	4740
Adults 18 to 29 years	number	0.3	0.4	-0.1	Y	544	4451
Children 13 to 17 years	number	0.2	0.1	0.0	N	584	4740
Children 5 to 12 years	number	0.3	0.2	0.1	Y	584	4740
Children 0 to 4 years	number	0.2	0.3	0.0	N	584	4740
Family members only	number	95.9	93.4	2.5	Y	579	4716
Weeks unoccupied - 1 December to 28 February	number	0.9	0.9	0.0	N	584	4740
Weeks unoccupied - 1 March to 31 May	number	0.8	0.8	0.0	N	584	4740
Weeks unoccupied - 1 June to 31 August	number	0.8	0.8	0.0	N	584	4740
Weeks unoccupied - 1 September to 30 November	number	0.9	0.7	0.1	N	584	4740
Weeks unoccupied for year	number	3.3	3.2	0.1	N	584	4740
AC use % time - 1 December to 28 February	%age	36.2	26.0	10.3	Y	584	4740
AC use % time - 1 March to 31 May	%age	13.1	10.7	2.5	Y	584	4740
AC use % time - 1 June to 31 August	%age	11.8	7.9	3.9	Y	584	4740
AC use % time - 1 September to 30 November	%age	11.0	8.6	2.5	Y	584	4740
Electric heating use % time - 1 December to 28 February	%age	2.3	2.5	-0.3	N	584	4740
Electric heating use % time - 1 March to 31 May	%age	8.4	8.6	-0.2	N	584	4740
Electric heating use % time - 1 June to 31 August	%age	28.7	25.8	2.9	Y	584	4740
Electric heating use % time - 1 September to 30 November	%age	10.0	9.3	0.8	N	584	4740
AC use % time - year	%age	18.1	13.3	4.8	Y	584	4740
Electric heating use % time - year	%age	12.4	11.5	0.8	N	584	4740

Data source: ACIL Tasman modelling

D.7 Western Australia

Table D7 **Summary of Western Australian explanatory variables**

Western Australia							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Annual Individual Household Electricity consumption kWh	number	6047.3	6710.8	-663.5	Y	486	3768
Summer - Actual consumption kWh	number	1461.9	1587.8	-125.9	Y	486	3768
Autumn - Actual consumption	number	1708.3	1552.0	156.3	Y	486	3768
Winter - Actual consumption	number	1459.2	1816.4	-357.2	Y	486	3768
Spring - Actual consumption	%age	1417.9	1754.7	-336.8	Y	486	3768
Gas connected	%age	81.0	52.0	29.0	Y	580	4744
Electric cook top	%age	23.0	52.0	-29.0	Y	580	4744
Electric oven	%age	72.0	77.0	-5.0	Y	580	4744
Microwave oven	%age	97.0	94.0	3.0	Y	580	4744
Electric outdoor BBQ	%age	2.0	3.0	-1.0	N	580	4744
Dishwasher	%age	41.0	53.0	-12.0	Y	580	4744
Clothes dryer	%age	55.0	58.0	-3.0	N	580	4744
Household water supply that needs electricity (e.g. for pumping)	%age	16.0	24.0	-8.0	Y	580	4744
Wind powered electricity generation	%age	1.0	0.0	1.0	N	580	4744
Solar powered electricity generation	%age	7.0	15.0	-8.0	Y	580	4744
Electric irrigation pump that needs electricity	%age	17.0	7.0	10.0	Y	580	4744
Commercial sized refrigeration	%age	5.0	7.0	-2.0	Y	580	4744
Industrial power tools and equipment	%age	6.0	4.0	2.0	N	580	4744
Electric medical equipment or life support equipment	%age	2.0	3.0	-1.0	N	580	4744
Electric hot water	%age	30.4	55.2	-24.8	Y	580	4744
Solar boost on electric hot water	%age	10.1	6.7	3.5	Y	580	4744
Electric central heating	%age	38.2	36.6	1.6	N	580	4744
Individual electric room heaters	%age	23.0	29.0	-6.0	Y	580	4744
Heating constant temperature	%age	6.3	7.8	-1.5	N	580	4744
Heating manually adjusted	%age	25.4	22.0	3.4	N	580	4744
Heating automatically adjusted	%age	3.3	3.6	-0.3	N	580	4744
Heat pump for central heating	%age	92.3	77.4	15.0	Y	153	1228
Off-peak tariff	%age	8.4	56.5	-48.1	Y	321	2937
Air conditioning	%age	79.0	69.0	10.0	Y	580	4744

Western Australia							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Ceiling or pedestal fans	%age	50.0	58.0	-8.0	Y	580	4744
Refrigerant air conditioning	%age	60.4	69.0	-8.7	Y	418	2420
AC constant temperature	%age	16.0	14.0	2.0	N	580	4744
AC manually adjusted	%age	53.1	45.5	7.5	Y	580	4744
AC automatically adjusted	%age	6.0	5.0	1.0	N	580	4744
Room air conditioner	%age	13.0	20.0	-7.0	Y	580	4744
Split system	%age	35.0	35.0	0.0	N	580	4744
Ducted	%age	38.0	21.0	17.0	Y	580	4744
Room air conditioners - number	number	0.2	0.3	-0.1	Y	580	4744
Proportion of house covered by air conditioning	%age	49.8	35.5	14.3	Y	580	4744
Split system air conditioners - number	number	0.6	0.6	0.0	N	580	4744
Do you expect to install any (or more) air conditioning units in the next year?	%age	6.0	7.0	-1.0	N	535	4381
Swimming pool	%age	15.0	12.0	3.0	N	580	4744
Operating TVs	number	2.1	2.1	0.0	N	580	4744
Plasma TVs	number	0.4	0.4	0.0	N	580	4744
LCD TVs	number	0.9	0.9	0.0	N	580	4744
LED TVs	number	0.2	0.2	0.0	N	580	4744
Refrigerators - number	number	1.5	1.4	0.1	Y	580	4744
Computers - number	number	1.7	1.7	-0.1	N	580	4744
Computer use - total time all computers	number	33.4	30.8	2.5	Y	568	4695
Proportion of the time computers on-line - %age	%age	75.6	75.0	0.5	N	552	4550
Proportion of the time appliances turned off at wall - %age	number	29.5	32.8	-3.3	Y	573	4659
Dishwasher - times used in week	number	1.5	1.8	-0.3	Y	580	4744
Washing machine - times used in week	number	3.6	3.9	-0.3	N	580	4744
Clothes dryer - times used in week	number	1.0	1.1	-0.1	N	580	4744
Old style incandescent filament globes - %age	%age	16.0	11.3	4.7	Y	544	4454
Old style fluorescent tube lights - %age	%age	6.5	7.6	-1.1	N	544	4454
New style efficient fluorescent tube lights - %age	%age	20.3	16.1	4.2	Y	544	4454
Conventional halogen down lights (flush with ceiling) - %age	%age	10.6	13.1	-2.5	Y	544	4454

Western Australia							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Compact (energy saving) fluorescent lights (globes and down lights) - %age	%age	40.9	46.2	-5.3	Y	544	4454
LED lights - %age	%age	2.8	2.8	-0.1	N	544	4454
Decorative lights outside all year - %age	%age	1.9	1.4	0.6	Y	544	4454
Other lights - %age	%age	1.0	1.4	-0.4	N	544	4454
Roof insulation	%age	77.0	73.0	4.0	Y	580	4744
Under-floor insulation	%age	3.0	3.0	0.0	N	580	4744
Wall insulation	%age	14.0	28.0	-14.0	Y	580	4744
None	%age	16.0	14.0	2.0	N	580	4744
Glass - %age	%age	21.7	22.1	-0.4	N	571	4586
Double brick - %age	%age	58.9	20.5	38.5	Y	571	4586
Brick veneer - %age	%age	6.8	35.6	-28.7	Y	571	4586
Weather board - %age	%age	5.2	11.6	-6.4	Y	571	4586
Fibro cement - %age	%age	4.5	5.4	-0.9	N	571	4586
Other - %age	%age	2.8	4.8	-2.1	Y	571	4586
Windows double glazed - %age	%age	2.8	4.1	-1.3	N	546	4464
Windows thermal insulated - %age	%age	1.0	1.5	-0.5	N	549	4460
Windows shaded with awnings or shutters - %age	%age	16.2	18.0	-1.8	N	568	4603
Windows tinted or solar guarded - %age	%age	8.7	6.7	1.9	Y	554	4568
Windows have curtains or blinds - %age	%age	78.7	76.8	1.9	Y	573	4660
Windows have boxed pelmets over the curtains or blinds - %age	%age	11.0	11.9	-0.9	N	560	4559
Windows west facing - %age	%age	21.1	21.1	0.0	N	506	4179
Windows south facing - %age	%age	20.1	20.3	-0.2	N	503	4177
External doors with draft excluders	%age	28.7	37.4	-8.7	Y	512	4365
People home during a typical working day - %age	%age	60.8	62.5	-1.8	N	574	4718
People home during week nights - %age	%age	88.5	87.7	0.8	N	574	4720
People home during the weekend - %age	%age	80.8	80.0	0.8	N	574	4719
Separate house	%age	78.2	73.2	5.0	Y	580	4744
Semi-detached	%age	12.4	10.5	2.0	N	580	4744
Apartment	%age	9.4	16.3	-6.9	Y	580	4744
Bed rooms	number	3.2	3.1	0.2	Y	580	4744
Bath rooms	number	1.5	1.5	0.0	N	580	4744

Western Australia							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Other rooms	number	3.5	3.2	0.3	Y	580	4744
Total rooms in house	number	8.3	7.8	0.4	Y	580	4744
Occupied floors	number	1.1	1.2	-0.1	Y	580	4744
Household size	number	2.4	2.6	-0.2	Y	576	4699
Adults older than 50 years	number	0.9	0.8	0.1	N	580	4744
Adults 30 to 50 years	number	0.7	0.7	-0.1	Y	580	4744
Adults 18 to 29 years	number	0.3	0.4	-0.1	N	536	4459
Children 13 to 17 years	number	0.2	0.1	0.0	N	580	4744
Children 5 to 12 years	number	0.2	0.2	0.0	N	580	4744
Children 0 to 4 years	number	0.2	0.3	-0.1	Y	580	4744
Family members only	number	92.8	93.8	-1.0	N	578	4716
Weeks unoccupied - 1 December to 28 February	number	0.8	0.9	-0.1	N	580	4744
Weeks unoccupied - 1 March to 31 May	number	0.8	0.8	0.0	N	580	4744
Weeks unoccupied - 1 June to 31 August	number	0.8	0.8	0.0	N	580	4744
Weeks unoccupied - 1 September to 30 November	number	0.7	0.8	-0.1	N	580	4744
Weeks unoccupied for year	number	3.0	3.2	-0.2	N	580	4744
AC use % time - 1 December to 28 February	%age	39.1	25.6	13.5	Y	580	4744
AC use % time - 1 March to 31 May	%age	19.0	9.9	9.1	Y	580	4744
AC use % time - 1 June to 31 August	%age	6.5	8.5	-2.1	Y	580	4744
AC use % time - 1 September to 30 November	%age	9.5	8.8	0.7	N	580	4744
Electric heating use % time - 1 December to 28 February	%age	1.8	2.6	-0.8	N	580	4744
Electric heating use % time - 1 March to 31 May	%age	5.5	8.9	-3.4	Y	580	4744
Electric heating use % time - 1 June to 31 August	%age	21.0	26.7	-5.8	Y	580	4744
Electric heating use % time - 1 September to 30 November	%age	7.1	9.6	-2.5	Y	580	4744
AC use % time - year	%age	18.5	13.2	5.3	Y	580	4744
Electric heating use % time - year	%age	8.8	12.0	-3.1	Y	580	4744

Data source: ACIL Tasman modelling

D.8 Northern Territory

Table D8 **Summary of Northern Territory explanatory variables**

Northern Territory							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Annual Individual Household Electricity consumption kWh	number	9381.5	6546.8	2834.7	Y	132	4122
Summer - Actual consumption kWh	number	2537.6	1542.5	995.1	Y	132	4122
Autumn - Actual consumption	number	2428.6	1542.3	886.4	Y	132	4122
Winter - Actual consumption	number	2044.2	1766.9	277.2	Y	132	4122
Spring - Actual consumption	%age	2371.1	1695.2	675.9	Y	132	4122
Gas connected	%age	22.0	56.0	-34.0	Y	156	5168
Electric cook top	%age	58.0	48.0	10.0	Y	156	5168
Electric oven	%age	74.0	76.0	-2.0	N	156	5168
Microwave oven	%age	94.0	95.0	-1.0	N	156	5168
Electric outdoor BBQ	%age	2.0	3.0	-1.0	N	156	5168
Dishwasher	%age	42.0	52.0	-10.0	Y	156	5168
Clothes dryer	%age	43.0	58.0	-15.0	Y	156	5168
Household water supply that needs electricity (e.g. for pumping)	%age	23.0	24.0	-1.0	N	156	5168
Wind powered electricity generation	%age	0.0	0.0	0.0	N	156	5168
Solar powered electricity generation	%age	18.0	14.0	4.0	N	156	5168
Electric irrigation pump that needs electricity	%age	15.0	8.0	7.0	Y	156	5168
Commercial sized refrigeration	%age	9.0	7.0	2.0	N	156	5168
Industrial power tools and equipment	%age	6.0	4.0	2.0	N	156	5168
Electric medical equipment or life support equipment	%age	1.0	3.0	-2.0	N	156	5168
Electric hot water	%age	57.5	52.3	5.1	N	156	5168
Solar boost on electric hot water	%age	24.8	6.5	18.3	Y	156	5168
Electric central heating	%age	6.6	37.7	-31.1	Y	156	5168
Individual electric room heaters	%age	5.0	29.0	-24.0	Y	156	5168
Heating constant temperature	%age	2.5	7.8	-5.3	Y	156	5168
Heating manually adjusted	%age	3.3	23.0	-19.7	Y	156	5168
Heating automatically adjusted	%age	0.8	3.6	-2.8	N	156	5168
Heat pump for central heating	%age	100.0	78.9	21.1	Y	8	1374
Off-peak tariff	%age	14.3	52.6	-38.3	Y	70	3188
Air conditioning	%age	89.0	69.0	20.0	Y	156	5168
Ceiling or pedestal fans	%age	92.0	56.0	36.0	Y	156	5168
Refrigerant air conditioning	%age	75.3	67.5	7.8	Y	111	2727

Northern Territory							
Variable	Units	JM	RM	Diff	Sig	n	Rn
AC constant temperature	%age	26.5	13.8	12.7	Y	156	5168
AC manually adjusted	%age	45.8	46.4	-0.6	N	156	5168
AC automatically adjusted	%age	7.9	5.0	2.8	N	156	5168
Room air conditioner	%age	32.0	19.0	13.0	Y	156	5168
Split system	%age	66.0	34.0	32.0	Y	156	5168
Ducted	%age	10.0	23.0	-13.0	Y	156	5168
Room air conditioners - number	number	1.0	0.3	0.7	Y	156	5168
Proportion of house covered by air conditioning	%age	64.4	36.2	28.3	Y	156	5168
Split system air conditioners - number	number	2.2	0.5	1.6	Y	156	5168
Do you expect to install any (or more) air conditioning units in the next year?	%age	6.0	7.0	-1.0	N	149	4768
Swimming pool	%age	34.0	12.0	22.0	Y	156	5168
Operating TVs	number	2.0	2.1	-0.2	N	156	5168
Plasma TVs	number	0.3	0.4	0.0	N	156	5168
LCD TVs	number	1.0	0.9	0.0	N	156	5168
LED TVs	number	0.1	0.2	0.0	N	156	5168
Refrigerators - number	number	1.6	1.4	0.2	Y	156	5168
Computers - number	number	1.8	1.7	0.1	N	156	5168
Computer use - total time all computers	number	30.9	31.1	-0.2	N	154	5109
Proportion of the time computers on-line - %age	%age	74.0	75.1	-1.1	N	148	4955
Proportion of the time appliances turned off at wall - %age	number	28.8	32.6	-3.7	N	151	5081
Dishwasher - times used in week	number	1.4	1.8	-0.4	N	156	5168
Washing machine - times used in week	number	3.9	3.9	0.0	N	156	5168
Clothes dryer - times used in week	number	0.5	1.1	-0.6	Y	156	5168
Old style incandescent filament globes - %age	%age	12.2	11.8	0.4	N	141	4858
Old style fluorescent tube lights - %age	%age	24.1	7.0	17.0	Y	141	4858
New style efficient fluorescent tube lights - %age	%age	14.8	16.6	-1.9	N	141	4858
Conventional halogen down lights (flush with ceiling) - %age	%age	9.4	13.0	-3.6	N	141	4858
Compact (energy saving) fluorescent lights (globes and down lights) - %age	%age	34.1	46.0	-11.9	Y	141	4858
LED lights - %age	%age	2.9	2.8	0.1	N	141	4858

Northern Territory							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Decorative lights outside all year - %age	%age	1.0	1.4	-0.5	N	141	4858
Other lights - %age	%age	1.6	1.3	0.2	N	141	4858
Roof insulation	%age	56.0	74.0	-18.0	Y	156	5168
Under-floor insulation	%age	1.0	3.0	-2.0	N	156	5168
Wall insulation	%age	18.0	27.0	-9.0	Y	156	5168
None	%age	23.0	14.0	9.0	Y	156	5168
Glass - %age	%age	23.1	22.0	1.1	N	144	5013
Double brick - %age	%age	28.5	24.6	3.9	N	144	5013
Brick veneer - %age	%age	7.2	33.1	-25.9	Y	144	5013
Weather board - %age	%age	3.8	11.1	-7.4	Y	144	5013
Fibro cement - %age	%age	9.6	5.2	4.3	Y	144	5013
Other - %age	%age	27.9	3.9	24.0	Y	144	5013
Windows double glazed - %age	%age	3.0	4.0	-1.0	N	144	4866
Windows thermal insulated - %age	%age	0.2	1.5	-1.3	N	142	4867
Windows shaded with awnings or shutters - %age	%age	22.9	17.7	5.3	Y	155	5016
Windows tinted or solar guarded - %age	%age	14.9	6.7	8.2	Y	151	4971
Windows have curtains or blinds - %age	%age	67.2	77.3	-10.0	Y	156	5077
Windows have boxed pelmets over the curtains or blinds - %age	%age	9.5	11.9	-2.4	N	155	4965
Windows west facing - %age	%age	19.9	21.1	-1.2	N	123	4563
Windows south facing - %age	%age	25.8	20.2	5.6	Y	124	4556
External doors with draft excluders	%age	20.3	37.0	-16.7	Y	146	4730
People home during a typical working day - %age	%age	56.8	62.5	-5.8	Y	155	5138
People home during week nights - %age	%age	82.5	88.0	-5.5	Y	155	5140
People home during the weekend - %age	%age	79.2	80.1	-1.0	N	155	5139
Separate house	%age	71.6	73.8	-2.3	N	156	5168
Semi-detached	%age	7.8	10.8	-3.0	N	156	5168
Apartment	%age	20.7	15.4	5.3	N	156	5168
Bed rooms	number	2.8	3.1	-0.3	Y	156	5168
Bath rooms	number	1.5	1.5	-0.1	N	156	5168
Other rooms	number	2.5	3.3	-0.8	Y	156	5168
Total rooms in house	number	6.8	7.9	-1.1	Y	156	5168
Occupied floors	number	1.2	1.2	0.0	N	156	5168

Northern Territory							
Variable	Units	JM	RM	Diff	Sig	n	Rn
Household size	number	2.3	2.6	-0.2	Y	155	5120
Adults older than 50 years	number	0.7	0.8	-0.1	N	156	5168
Adults 30 to 50 years	number	0.8	0.7	0.0	N	156	5168
Adults 18 to 29 years	number	0.3	0.4	-0.1	N	145	4850
Children 13 to 17 years	number	0.1	0.1	0.0	N	156	5168
Children 5 to 12 years	number	0.2	0.2	0.0	N	156	5168
Children 0 to 4 years	number	0.3	0.3	0.0	N	156	5168
Family members only	number	92.1	93.8	-1.7	N	156	5138
Weeks unoccupied - 1 December to 28 February	number	1.8	0.9	0.9	Y	156	5168
Weeks unoccupied - 1 March to 31 May	number	1.1	0.7	0.4	Y	156	5168
Weeks unoccupied - 1 June to 31 August	number	1.5	0.8	0.8	Y	156	5168
Weeks unoccupied - 1 September to 30 November	number	1.3	0.7	0.6	Y	156	5168
Weeks unoccupied for year	number	5.7	3.1	2.6	Y	156	5168
AC use % time - 1 December to 28 February	%age	48.0	26.5	21.5	Y	156	5168
AC use % time - 1 March to 31 May	%age	32.0	10.3	21.7	Y	156	5168
AC use % time - 1 June to 31 August	%age	11.1	8.2	2.9	N	156	5168
AC use % time - 1 September to 30 November	%age	36.8	8.0	28.8	Y	156	5168
Electric heating use % time - 1 December to 28 February	%age	1.2	2.6	-1.4	N	156	5168
Electric heating use % time - 1 March to 31 May	%age	2.9	8.7	-5.8	Y	156	5168
Electric heating use % time - 1 June to 31 August	%age	4.8	26.8	-22.0	Y	156	5168
Electric heating use % time - 1 September to 30 November	%age	2.1	9.6	-7.5	Y	156	5168
AC use % time - year	%age	32.0	13.3	18.7	Y	156	5168
Electric heating use % time - year	%age	2.7	11.9	-9.2	Y	156	5168

Data source: ACIL Tasman modelling

Melbourne (Head Office)

Level 4, 114 William Street
Melbourne VIC 3000

Telephone (+61 3) 9604 4400
Facsimile (+61 3) 9604 4455

Email melbourne@aciltasman.com.au

Brisbane

Level 15, 127 Creek Street
Brisbane QLD 4000
GPO Box 32
Brisbane QLD 4001

Telephone (+61 7) 3009 8700
Facsimile (+61 7) 3009 8799

Email brisbane@aciltasman.com.au

Canberra

Level 2, 33 Ainslie Place
Canberra City ACT 2600

GPO Box 1322
Canberra ACT 2601

Telephone (+61 2) 6103 8200
Facsimile (+61 2) 6103 8233

Email canberra@aciltasman.com.au

Perth

Centa Building C2, 118 Railway Street
West Perth WA 6005

Telephone (+61 8) 9449 9600
Facsimile (+61 8) 9322 3955

Email perth@aciltasman.com.au

Sydney

PO Box 1554
Double Bay NSW 1360

Telephone (+61 2) 9389 7842
Facsimile (+61 2) 8080 8142

Email sydney@aciltasman.com.au

ACIL Tasman

ACIL Tasman Pty Ltd

www.aciltasman.com.au