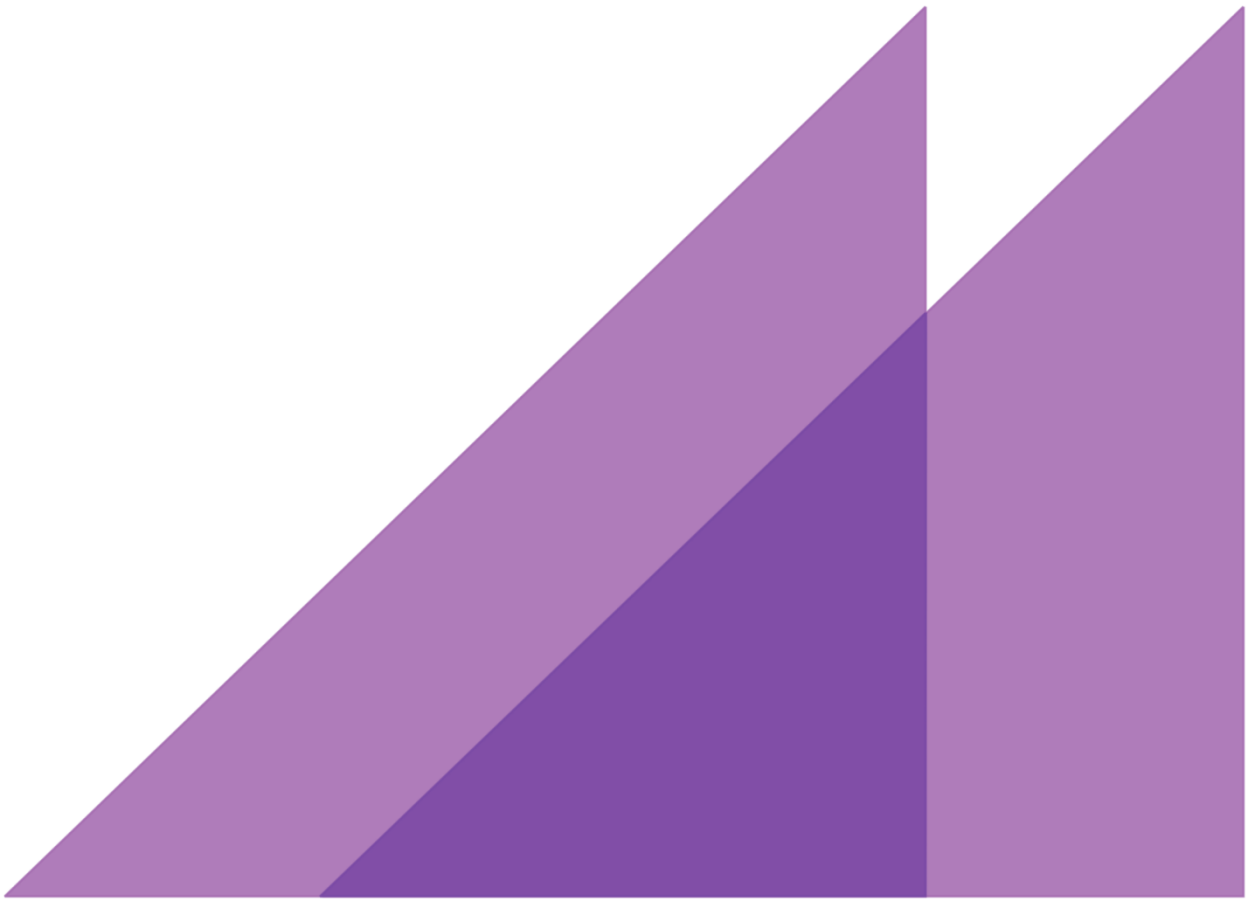
ACIL ALLEN CONSULTING

REPORT TO
THE DEPARTMENT OF INDUSTRY ON BEHALF OF THE EQUIPMENT ENERGY EFFICIENCY COMMITTEE

27 MARCH 2014

ENERGY RATING LABELS REVIEW

FINAL REPORT



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Executive summary

The Equipment Energy Efficiency (E3) Program is conducting a comprehensive review of the energy rating labelling scheme in Australia and New Zealand (known as the E3 Label Review Project). Each component of the E3 Label Review Project examines an element of the Energy Rating Label (ERL), its place in the changing appliance market and the effectiveness of the label as an information tool. As part of the E3 Label Review Project, ACIL Allen Consulting have been commissioned by the Department of Industry (on behalf of the E3 Committee) to undertake an independent review of the ERL used in Australia and New Zealand.

The objectives of this review are to assess the effectiveness of the current ERL and to identify possible changes and improvements to it. The approach used to meet these objectives was to undertake a comprehensive assessment of the existing national and international literature on energy labelling and two online surveys of Australian consumers.[1]

Each survey sample consisted of approximately 1,200 consumers geographically spread throughout Australia.[2] The first survey was administered during late October and early November 2013. The second survey was in the field from mid-January until early February 2014. Both surveys were administered by Roy Morgan Research.

The number of consumers surveyed was chosen to ensure the surveys targeted a representative sample of consumers over 18, across income ranges, ages and gender that allows for statistically significant conclusions to be made. At the analysis stage, data was weighted to realign the sample with population proportions.

The sections below outline this review's key findings and recommendations.

Key findings

The key findings of this review are as follows:

- The ERL is almost universally recognised — 97 per cent of consumers in Australia have noticed the label on new appliances being sold in stores.
- The level of recognition of the ERL has increased significantly over the last 22 years. A 1991 Victorian survey found that awareness of the energy label among the general public was 45 per cent, compared to 94 per cent in Victoria in 2005 (Artcraft Research, 2006). A national survey in 2006 found that 94 per cent of consumers Australia wide recalled the label unaided (Artcraft Research, 2006), compared to around 97 per cent in the analysis conducted for this review.
- Most consumers interpret the ERL correctly — 72 per cent of consumers correctly interpret an increase in the star rating as an increase in an appliance's energy efficiency.

[1] Notably, the surveys conducted for this review only included Australian consumers. New Zealand consumers were not included as the Energy Efficiency and Conservation Authority (EECA) of New Zealand regularly conducts labelling surveys of New Zealand consumers.

[2] Participants in the surveys were recruited through the Roy Morgan Research Online Panels.

- The ERL is the primary research tool for information about an appliance's energy efficiency — over 62 per cent of consumers use ERLs to research the energy use or energy efficiency of appliances.
- The ERL provides new and helpful information to a large proportion of consumers and plays a significant role in consumers' final decisions.
  - It provides *new* information to 52 per cent of consumers.
  - It provides *useful* information to 79 per cent of consumers.
  - It affects the final purchasing decision of 54 per cent of consumers.
- When used in the final decision making process, the ERL plays a significant role. Of the 54 per cent of consumers who indicated that the ERL affected their final decision to purchase an appliance, around 40 per cent indicated that the ERL had a large influence and 50 per cent indicated that the ERL had a moderate influence.
- The four most important factors in a consumer's decision to purchase an appliance are:
  - price (85 per cent of consumers indicated this is a helpful factor);
  - product features (80 per cent of consumers indicated this is a helpful factor);
  - brand reputation (76 per cent of consumers indicated this is a helpful factor); and
  - energy use (67 per cent of consumers indicated this is a helpful factor).
- Consumers generally buy first on price, features and brand and having energy use as the next most important factor when purchasing an appliance is a satisfactory finding.
- Seventy three per cent of consumers who purchase air conditioners consider energy use as the third most important factor when considering their purchase, more than any other product features (like brand, warranty and aesthetics).
- The majority of consumers (80 per cent) compare the annual energy consumption of similar appliances when making their purchasing decision. Furthermore, if a figure for operating cost were to be included on the label, only 14 per cent of consumers indicated that their preference would be to replace the energy consumption (kWh) figure with the operating cost (62 per cent indicated a preference for having both figures in the label). Together these results indicate that the kWh figure is useful and should be maintained on the label.
- Thirty one per cent of consumers are aware of the industry/government partnership arrangements behind the ERL.
- Of those consumers who are aware of this partnership, 61 per cent are confident about the information contained on the label.
- Sixty two per cent of consumers think that the energy rating labelling scheme should remain a joint industry/government partnership.
- Eighty one per cent of consumers would find information about operating costs useful when buying an appliance.
  - The literature on the topic supports the potential merits of including operating costs on energy labels as an effective mechanism to induce behavioural change.
  - However, literature also recognises that it is difficult to provide meaningful and precise information about energy costs (this would require a number of assumptions regarding the use of the appliance and the price of electricity, which varies regionally and over time) and the potential for confusion between operating costs, operating savings and even purchase costs.
- Just under half (45 per cent) of the consumers would prefer to use Internet tools to estimate an appliance's operating cost that take account of their family location and circumstances, rather than rely on an approximate amount reported on the label. In

contrast, around 35 per cent of consumers would prefer to rely on an approximate amount reported on the label.

- There is a core set of consumers motivated by environmental concerns who would value the inclusion of greenhouse gas (GHG) emissions on the ERL. The survey found that 55 per cent of consumers would find information about GHG emissions useful when buying an appliance. However, the inclusion of GHG emissions is not considered as helpful as the inclusion of other types of information (it ranks well down the list of information that consumers would find helpful when buying an appliance — 8th out of 10 items)
- In terms of communicating change from one label algorithm to another, the majority of consumers (69 per cent) think including the year that the star rating changed is the most effective way of communicating change. Furthermore, most consumers (91 per cent) think that periodic updating of the methods and label to reflect technology improvements is a good idea.
- There is a slight preference for allowing some variation in size of label to better suit the available space on individual appliance types, with 43 per cent of consumers indicating they would prefer some variation in the size of the label and 38 per cent indicating they would prefer keeping the label size the same for all appliances.

Recommendations

The investment in the energy rating labelling scheme in Australia has resulted in a highly recognised, highly understood label. The ERL is contributing to behavioural change throughout the community and is successfully addressing a market failure for appliances.

In order to add to the label's effectiveness, this review recommends the following.

Avoid a complete overhaul of the label or its components

It is recommended that the current features used in the label are maintained and that its design is not varied too widely. A complete overhaul of the label or its components (such as the stars) could result in all the recognition (the brand) of the existing products (the stars) being lost.

Make greater use of smart technologies

It is recommended that the energy rating labelling scheme makes greater use of smart technologies to provide consumers with more information about an appliance and its energy use. These can include, amongst others, a purpose built smartphone/tablet application (app) or a Quick Response (QR) code. The second survey conducted for this review found that 84 per cent of consumers use a smartphone or tablet, and that 76 per cent of these consumers have either used their smartphone or tablet in store to access more information about appliances or would be interested to try it. This indicates that information that can be accessed with a smartphone or tablet could potentially service the needs of a considerable proportion of appliance purchasers. The preferred method of consumers through which to access this information requires further investigation.

Smart technology could also be used to provide personalized information to different consumers based on their individual preferences/needs (e.g. GHG emissions for environmentally conscious consumers and operating costs for cost conscious consumers).

Explore the inclusion of operating costs

It is recommended to explore the possibility of including information about operating costs in future label designs. Consumers would find information about operating costs useful when buying an appliance, but a meaningful way to provide this information would need to be found. A solution to address the issues relating to the inclusion of operating costs would be the use of smart technologies that could account for the cost of electricity in different regions and over time.

Explore options to communicate changes to the star rating system

Being able to communicate changes in the star rating system is essential to the ongoing success of the label. The first consumer survey revealed that two out of three consumers consider including the year that the star rating changed the most effective way of communicating change. It is recommended that this and other alternative transitional arrangements (including the use of a smartphone/tablet app, a QR code or other electronic means) are investigated further with industry and consumers.

Explore the use of endorsement labels

It is recommended that the possibility of using endorsement labels in tandem with the ERL is further explored. The literature on the topic suggests that endorsement labels may have a significant impact on encouraging energy efficient choices; however, a more detailed analysis of the costs and benefits of its inclusion would be desirable.

Highlight the government/industry partnership

It is recommended that the role played by the government/industry partnership be highlighted in future ERL designs. Knowing that the energy rating labelling scheme is a government/industry partnership gives confidence to consumers about the trustworthiness and relevance of the label and about the accuracy of information contained in it. However, the first survey showed that only 31 per cent of consumers are aware of the partnership arrangements behind the ERL.

Explore ways to increase and improve the use of the E3 website

This review found that, while 55 per cent of consumers say that they would use a website address on an ERL to access more information about the energy use of an appliance, only 17 per cent of air conditioner purchasers and 7 per cent purchasers of all other appliances actually used the E3 website as a resource to select their recently purchased appliance. In light of this, it is recommended that the reasons for the low use of the E3 website and possible improvements to increase and improve its use are further investigated.

Keep abreast of international developments

It is recommended that the E3 Committee keeps abreast with international developments in the energy labelling field to take account of lessons learned from other labelling programs. For instance, after reviewing the results of a current trial by the UK Department of Energy and Climate Change evaluating whether consumers are more likely to purchase energy efficient goods if their label contains lifetime electricity running, the Australian Government could consider undertaking a similar trial.

Undertake regular evaluations

It is recommended that regular evaluations (every three to five years) are undertaken to ensure that the label continues to be relevant and useful to consumers, in particular for the purposes of:

- monitoring the progress of the energy label in general, and with regard to any changes made to it;
- guiding the development and implementation of the proposed climate label;
- evaluating the performance of new electronic means of providing information; and
- evaluating any changes made in relation to labelling transitions.

1 Introduction

1.1 This review

The Equipment Energy Efficiency (E3) Program is conducting a comprehensive review of the energy rating labelling scheme in Australia and New Zealand (known as the E3 Label Review Project). This review coincides with a number of other projects currently occurring across the world including a review of the European Union Energy Rating Label and Ecodesign Directives and the on-going efforts of the ENERGY STAR® Program.

Each component of the E3 Label Review Project examines an element of the ERL, its place in the changing appliance market and the effectiveness of the label as an information tool. These components include:

1. an independent review of the ERL;
2. a climate label for climate sensitive products;
3. the use of smart phone technology and mobile applications;
4. the development of 'Labelling Principles'; and
5. disclosure of the ERL in advertising.

ACIL Allen Consulting have been commissioned by the Department of Industry (on behalf of the E3 Committee) to address the first of these elements and undertake an independent review of the ERL used in Australia and New Zealand. The aim of this review is to identify possible changes and improvements to the present version of ERL. In particular, this report:

- describes the ERL;
- summarises issues raised by stakeholders since the previous review in 2000;
- reviews international labelling developments;
- identifies any perceived shortcomings of the ERL; and
- outlines the findings of two market research surveys and analysis.

This review is supported by a comprehensive assessment of the literature and two online surveys of some 1,200 Australian consumers.[3] The first survey was undertaken by Roy Morgan Research during late October and early November 2013, with a subsequent survey conducted in undertaken by Roy Morgan from mid-January until early February 2014.

1.2 Report structure

The remainder of this report is structured as follows.

- Chapter 2 provides an overview of the significance of appliances to household energy consumption and the market failures that prevent consumers from making fully informed decisions when purchasing appliances.

[3] Notably, the surveys conducted for this study only included Australian consumers. New Zealand consumers were not included as the Energy Efficiency and Conservation Authority (EECA) of New Zealand regularly conducts labelling surveys of New Zealand consumers.

- Chapter 3 provides an overview of the energy rating labelling scheme and its components.
- Chapter 4 reports the key results of the consumer surveys undertaken for this review.
- Chapter 5 summarises the empirical evidence regarding best practice label design.
- Chapter 6 summarises the key findings of the review and outlines the recommendations of this review.
- Appendix A discusses the common market failures associated with household appliances and the effectiveness of energy labelling in overcoming them.
- Appendix B contains a historical timeline of the energy rating labelling scheme.
- Appendix C provides information on international energy labels.
- Appendix D provides a summary of the available literature regarding the effectiveness of providing information about operating costs on energy rating labels.
- Appendix E contains an annotated bibliography of the literature reviewed for this study.
- Appendix F contains copies of the consumer surveys conducted for this study.
- Appendix G contains a copy of a report summarising the discussion, outcomes and action items of an Advisory Forum held with industry to discuss the preliminary findings of this review.

2 Household energy consumption and appliances

This first chapter provides an overview of the significance of appliances to household energy consumption and the market failures that prevent consumers from making informed decisions when purchasing appliances.

2.1 Household appliances and household energy consumption

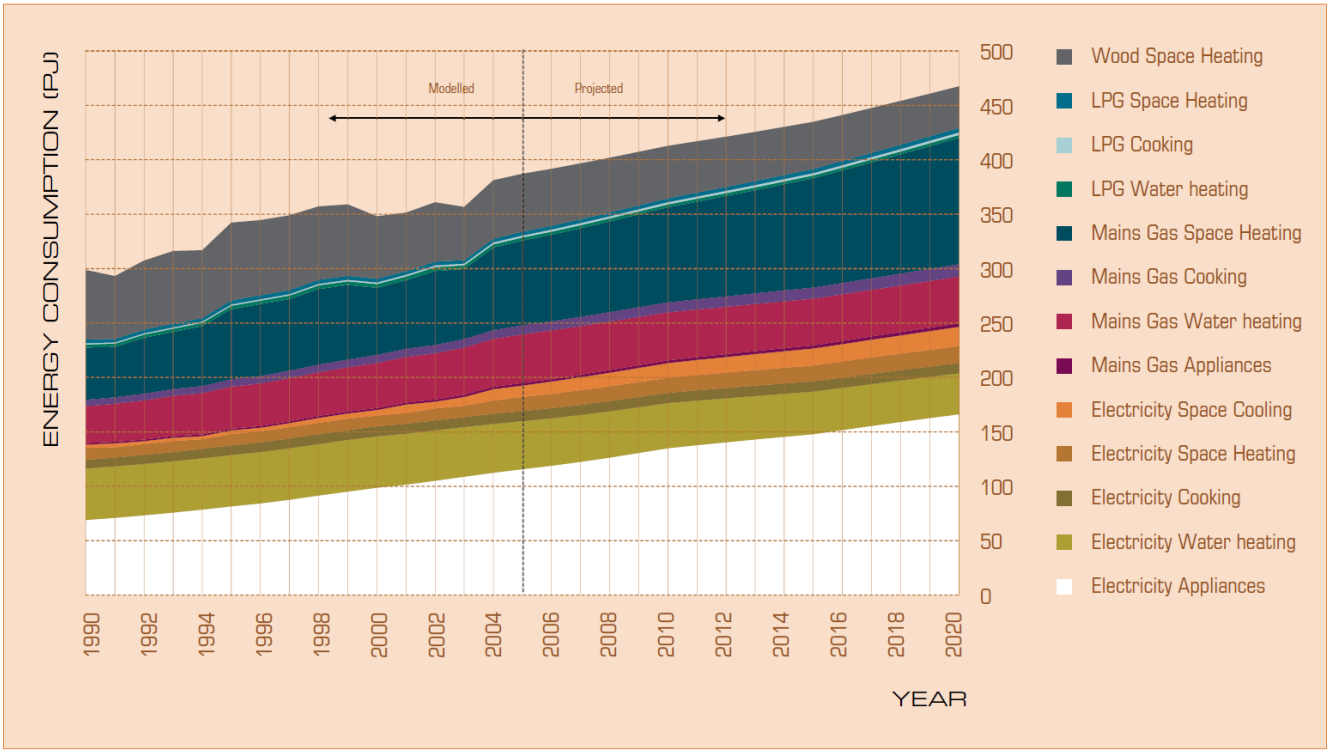
According to the Australian Bureau of Statistics (ABS), average weekly expenditure on energy for Australian households was $99 in 2012, of which 39 per cent ($39.40) was for energy sources within the dwelling, such as electricity or gas. Total household expenditure on energy represented 5.3 per cent of total gross weekly household income, with dwelling energy comprising two per cent. (ABS, 2012).

The same study surveyed the intended household energy efficiency improvements of 639 households. In the study period (between 1 January 2012 and 31 March 2013), 31 per cent of households made energy efficiency improvements to their dwelling. Of those households that intended to make an improvement, 38 per cent replaced a heater, cooler or major whitegood to improve energy efficiency. This occurrence was more common than installing window treatments (36 per cent), installing solar electricity or hot water system (21 per cent), ceiling fans (12 per cent), insulation (seven per cent) or a hot water system (two per cent) (ABS, 2012). The results suggest that households are more likely to replace appliances as a means of improving energy efficiency than other readily available means.

Another study by the Australian Government found that in 1990, 2007 and 2020, electrical appliances and equipment have (or will) constitute the single largest use of residential energy in Australia. The share of energy used by electrical appliances has increased from 24 per cent in 1990 to an estimated 31 per cent in 2007, with projections of 36 per cent in 2020. The trends for major end uses of residential energy presented in this report, including the dominance of electrical appliances, are shown in Figure 1 (Department of Environment, Water, Heritage and the Arts, 2008).

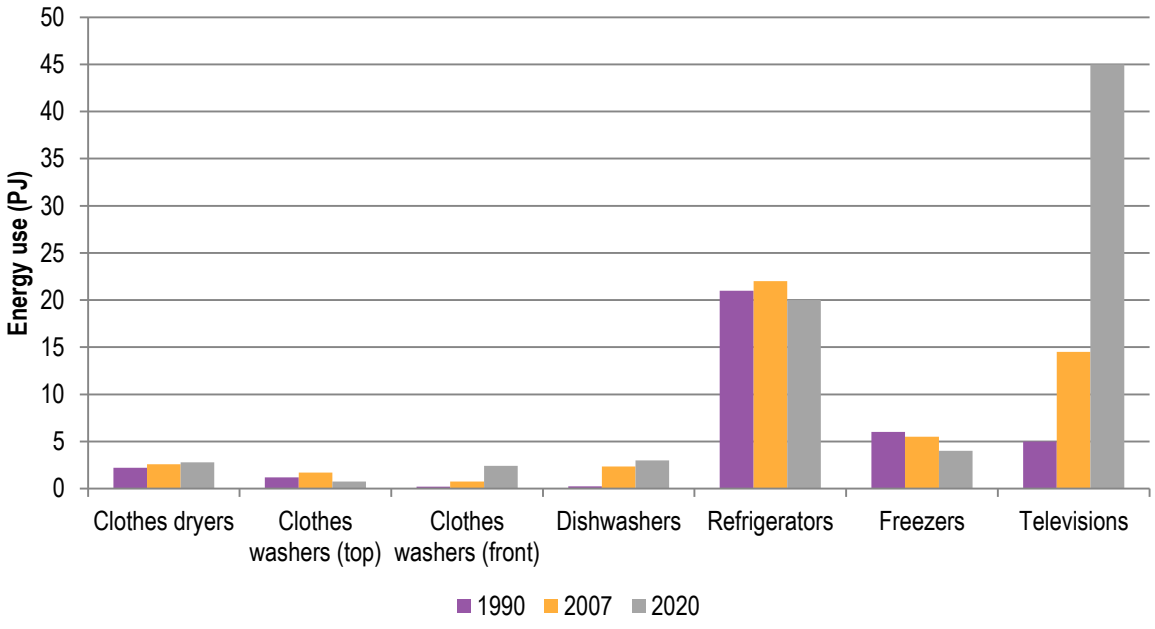
In terms of how energy consumption will change for each appliance, the same report projects a considerable increase in the amount of energy consumed by televisions (from approximately five petajoules (PJ) in 1990 to 45 PJ in 2020). The other appliances modelled have much smaller changes (up and down) projected (see Figure 2).

Figure 1 **Trends in energy consumption**



Source: (Department of Environment, Water, Heritage and the Arts, 2008)

Figure 2 **Past and future energy use by appliance type, 1990, 2007 and 2020**



Note: Values are estimates from graphs contained in the report.
Source: Department of Environment, Heritage and the Arts, 2008

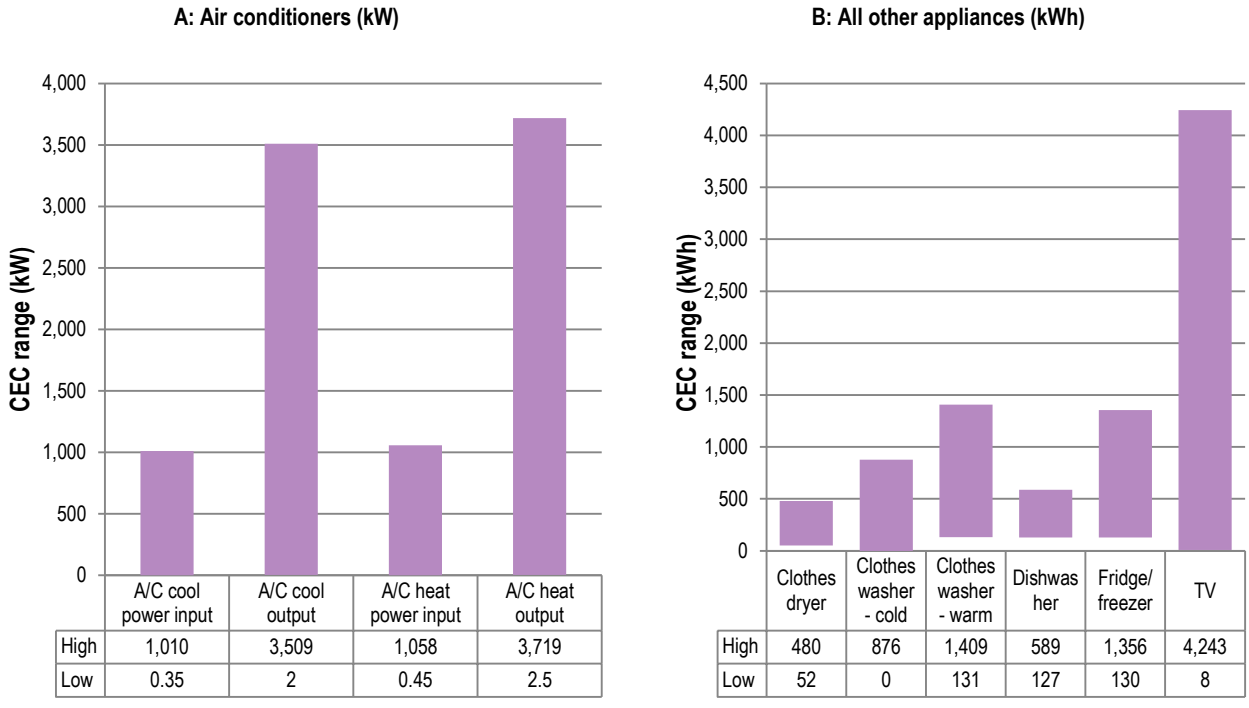
2.1.1 Choosing an appliance

Given the significance of energy costs to the household budget, as well as environmental concerns, the decision about which appliance to choose is an important one.

The energy consumed by an appliance varies greatly, not only between appliance types but also within appliance types. The Australian Government's E3 comparator tool[4] (Australian Government) provides energy consumption data for ERL appliances available in Australia and New Zealand. The highest and lowest estimate of energy consumption for each appliance has been assessed using this tool.

As demonstrated in Figure 3, there is variation in the estimated Comparative Energy Consumption[5] (CEC) for appliances of the same type. For example, the energy consumption of an air conditioner[6] available in Australia and New Zealand running cool output varies between 2 kilowatts (kW) and 3,509 kW (see Panel A). Similarly, the energy consumption of televisions varies between 8 kilowatt-hours (kWh) and 4,243 kWh per annum. There is also variation in the energy used by the same appliance performing different functions. For example clothes washers using cold water have a CEC range between zero and 876 kWh per 365 uses and when using hot water the range is between 131 and 1,409 kWh per 365 washes (see Panel B).

Figure 3 **Indicative power consumption for air conditioners and energy consumption for all other appliances**



Note: CEC units for each appliance are: Air conditioners (A/C) – kW; Clothes dryer kWh/52 uses; Clothes washer – kWh/365 uses; Dishwasher – kWh/365 uses; Fridge/freezer – kWh/annum; Television (TV) – kWh/annum.
Source: http://reg.energyrating.gov.au/comparator/product_types/, 4 October 2013

[4] Available at: http://reg.energyrating.gov.au/comparator/product_types/

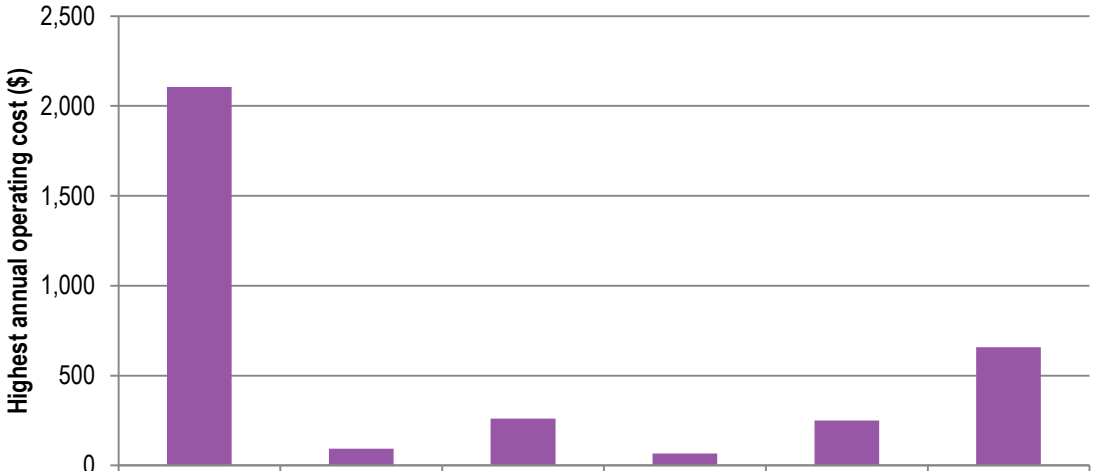
[5] CEC is the energy consumption of an appliance measured under specific Australian Standard conditions over one year

[6] Air conditioners are considered separately as their energy use is reported on the E3 website in kW whereas all other appliances are reported in kWh.

Directly related to the amount of energy consumed by an appliance is the consequent cost of running that appliance. The cost of operating an appliance is dependent on two main factors – the actual usage and the price of electricity. For example, at a cost of 25.9 cents per kWh and based on the 'average' usage, the annual operating cost for televisions can reach $657, while the annual operating cost of a dishwasher can $66 per annum (see Figure 4). These costs should be considered indicative only; while these estimates are based on assumptions about average use made using the E3 comparator tool and a conservative price of electricity, it does clearly demonstrate variation in the operating costs of appliances, both within the same appliance type and across appliance types.

The inclusion of energy consumption on the ERL ensures that consumers are informed about how much energy is required to run an appliance and the potential ongoing costs under a test scenario, and can make a decision having taken this information into consideration. They can also use this information to estimate the consequent operating costs of an appliance.

Figure 4 **Variations in the highest annual operating costs for appliances**



Note: Assumptions: 1. Cost of electricity is 25.9/kWh; 2. Air conditioners (A/C) have 200 cooling and 200 heating hours per year (figure provided based on cooling only); 3. Clothes dryers are used once per week; 4. Dishwashers are used four times per week. 5. Clothes washers are used 365 times per year; 4. Refrigerators/freezers and televisions have no set use.

Source: http://reg.energyrating.gov.au/comparator/product_types/, 25 March 2014

2.2 Appliances and market failure

For a variety of reasons, consumers are often unable to make fully informed purchasing decisions. It can be difficult for example, for a consumer to determine the energy efficiency of an appliance prior to using it. When information is missing, hidden, or in the possession of only one party, this can lead to poor decisions and inefficiencies across the economy.

This 'information failure' (or asymmetric information) is a specific type of 'market failure'— a situation when the market is unable to produce an efficient allocation of resources. A market works best when consumers and producers have sufficient information about energy-using technologies and services to make choices that will maximise their welfare and profit respectively. However, consumers might not be able to access the necessary information on the energy efficiency of a product, or the price and performance of competing products.

Similarly, producers might not have sufficient information about their competitors or their consumers' preferences. Consequently, consumers and producers may make choices that they later regret when they become better informed (Productivity Commission 2005).

Information asymmetries are common in the market for appliances (and products that consume energy more generally). The International Energy Agency (2011, p.13) writes that:

> Insufficient, inaccurate or costly information on the energy performance of different technologies, and on the costs and benefits of energy efficiency measures, leads to sub-optimal decisions by consumers and investors, and an under-investment in energy efficiency. Energy efficiency is often one of several features of a product or service, as is the case with vehicles, appliances, or home retrofits…
>
> Accurate and sufficient information is difficult to obtain easily (at little cost) since energy efficiency comprises a wide range of products and services that are not always separately available. The market thus doesn't always produce or transmit sufficient information to allow for optimal energy-efficiency investment decisions.

In the appliances market, manufacturers have more information about an appliance than consumers and consumers are unable to distinguish between products.

The energy rating labelling scheme is an attempt by the Australian Government to overcome this market failure. The Productivity Commission (2005, p. xxxiii) writes:

> Labelling is used to indicate the energy efficiency of electrical and gas appliances and cars. Mandatory labelling directly addresses a source of market failure — the asymmetry of information between buyers and sellers of energy-using products. By providing information in a readily-accessible and easily-understandable format, labelling can help consumers to make better-informed choices about energy efficiency.

It should be noted that there are a number of other market failures associated with energy efficiency and appliances. These include 'split incentives' and 'bounded rationality'. While ERLs contribute towards addressing these barriers[7], governments have typically responded to these barriers by adopting other policy mechanisms, for example, Minimum Energy Performance Standards (MEPS) which are recommended when buyers and users of energy-using products have limitations of both knowledge and processing abilities that affect their ability to make informed decisions about energy efficiency (i.e. they respond to bounded rationality).

ERLs also work best for energy-using products that are purchased by the actual user — energy labelling has more limited impacts in product markets where purchases are conducted by intermediaries (such as builders or rental property owners), whose financial incentive is to install the cheapest possible products (i.e. they respond to split-incentives).

Appendix A reviews the literature on market failures in more detail.

MEPS for example, are another key mechanism that the government employs in this space. MEPS specify the minimum level of energy performance that selected appliance, lighting and electrical equipment must meet before they can be offered for sale or used for commercial purposes. MEPS are mandatory for a range of products in Australia and New Zealand, including air conditioners, commercial and industrial appliances, water heaters, home entertainment and Information Communications Technology (ICT) units, lighting systems and white goods.

MEPS are important when the consumer doesn't necessarily consider energy efficiency in the purchasing decision, one example being televisions, or when the 'economic stakes' for the consumer are very low. Working together, energy labelling promotes technical

[7] As suggested by the Productivity Commission (2005, p. XXVIII) 'Some existing policies and programs arguably address several perceived barriers and impediments at the same time.'

innovation and the introduction of more efficient products, and MEPS influence the gradual removal of the least efficient appliances from the market (World Energy Council, 2013).

Introduced in October 1999 and updated in 2005, MEPS are viewed as a means of preventing inefficient products from being sold and increasing average product efficiency over time. Usually MEPS cover appliances that are not required to have an ERL, however there is some overlap.

Table 1 **Australian appliances covered by ERLs and MEPS**

Product or broad product group	ERL	MEPS
Household refrigerators and freezers	✓	✓
Electric storage water heaters		✓
Clothes washers, dishwashers and clothes dryers	✓	
Household air conditioners	✓	✓
Packaged air conditioners, chillers, close control air conditioners		✓
Televisions	✓	✓

Source: ACIL Allen Consulting, George Wilkenfeld and Associates, 2009.

3 Energy rating labels

This chapter provides an overview of the energy rating labelling scheme and its components.

3.1 Energy rating labels overview

Energy performance labelling schemes are a common policy tool used by governments around the world to help overcome information barriers faced by consumers when purchasing new appliances.[8]

The energy rating labelling scheme is a mandatory scheme operated by the E3 Committee, of which the Department of Industry (the Department) is the member on behalf of the Commonwealth and the chair. The E3 Committee additionally consists of officials from state and territory government agencies as well as representatives of the New Zealand Government.[9]

The energy rating labelling scheme applies to a range of appliances offered for sale across Australia and New Zealand. Appliances currently covered by the scheme include:

- refrigerators;
- freezers;
- clothes washers;
- clothes dryers;
- dishwashers;
- air conditioners; and
- televisions.

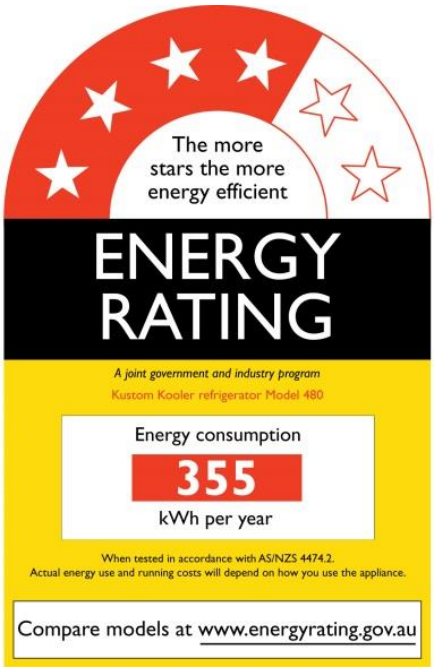
When offered for sale, these appliances must display a label that shows the star rating and energy consumption in kilowatt hours per year (kWh/year) (see example in Figure 5). It enables consumers to compare the energy efficiency of domestic appliances on a fair and equitable basis as well as providing an incentive for manufacturers to improve the energy performance of appliances.

Other information on the label includes: the make and model of the appliance; the Australian/New Zealand standard against which the energy efficiency of the appliance is tested; and a link to the Energy Rating website where the energy consumption of different models of appliances can be compared.

[8] Throughout this report the word 'appliance' refers only to new (not second hand) refrigerators, freezers, clothes washers, clothes dryers, dishwashers, air conditioners and televisions. No other items are considered appliances for the purposes of this report.

[9] Membership of the E3 Committee includes Department of Industry (chair); NSW Department of Water and Energy; Energy Safe Victoria; Sustainability Victoria; Electrical Safety Office, QLD Department of Justice and Attorney-General; Office of Clean Energy, QLD Department of Environment and Resource Management; Energy Safety, WA Department of Commerce; WA Office of Energy; Office of the Technical Regulator, SA Department for Transport, Energy and Infrastructure.

Figure 5 **Example of the Australian and New Zealand ERL**



Source: Label provided by the Department of Industry.

3.2 History of the ERL in Australia

The move towards the ERL for major appliances was first proposed in the late 1970s by the New South Wales (NSW) and Victorian Governments. In 1982, the concept was raised with the appliance industry and met with considerable resistance – it was the view of industry that there should be a national scheme and it should be voluntary. Three years of negotiation could not produce agreement on a suitable voluntary labelling program, so the Governments of NSW and Victoria decided to make energy labelling mandatory. Consequently, mandatory labelling for refrigerators and freezers was introduced in NSW in 1986 and Victoria in 1987.

In 1987 and 1988, NSW and Victoria expanded their regulations to include room air conditioners and dishwashers, with Victoria also including clothes dryers and clothes washers in 1989 and 1990 respectively. In 1991, South Australia introduced labelling regulations, with all other states and territories progressively introducing energy rating labels on appliances.

The ERL has two main features that provide consumers with the following information:

- the star rating gives a comparative assessment of the model's energy efficiency; and
- the comparative energy consumption (usually expressed as kWh/year) provides an estimate of the annual energy consumption of the appliance based on the tested energy consumption and information about the typical use of the appliance in the home.

The star rating of an appliance is determined from the energy consumption and size of the product. These values are measured under Australian Standards which define test procedures for measuring energy consumption.

As the energy efficiency of appliances improved, so did the clustering of appliances near the top (most efficient) end of the efficiency (star) scale. This resulted in a revision in the late 1990s of the algorithms by which appliances were assigned an energy efficiency rating. This

revision of the algorithms was also used as an opportunity to redesign the label in 2001 (Artcraft Research, 2006).

New Zealand's involvement in the ERL Scheme

New Zealand has worked closely with Australia to establish energy labels and standards, with appliance and equipment energy efficiency programs linked technically, commercially and administratively to the Australian programs. Similarly, the testing procedures, comparative labelling and MEPS requirements are mostly incorporated into joint Australia/New Zealand standards. Prior to April 2002 when mandatory labelling became effective, the program was voluntary and identical to the Australian program Separately, New Zealand has a voluntary program for water heaters and is involved in the international ENERGY STAR program.

The Parliament of New Zealand passed the Energy Efficiency and Conservation Act in May 2002, which made labelling mandatory and set MEPS levels. The mandatory labelling requirements became effective in April 2002, with the same types of appliances as in Australia requiring labelling: refrigerators, refrigerator/freezers, air conditioners (central, room and split-system), dishwashers, freezers, clothes dryers and clothes washers. Most recently, televisions were introduced to labelling in 2012 (Energy Efficient Strategies and Maia Consulting, October 2013).

More on the history of the ERL can be found in Appendix B.

3.3 Objective of the label

The ERL has various aims directed at multiple targets. It provides a mechanism to assist consumers in their purchasing decisions by providing information about the appliance's energy performance at the point-of-sale. At the same time, the ERL aims to increase consumer awareness of the energy efficiency of appliances, and also to encourage manufacturers to produce more energy efficient products.

In addition, the program plays an important role in reducing Australia's greenhouse gas emissions. The ERL program aims to reduce greenhouse gas emissions by (Equipment Energy Efficiency 2013a):

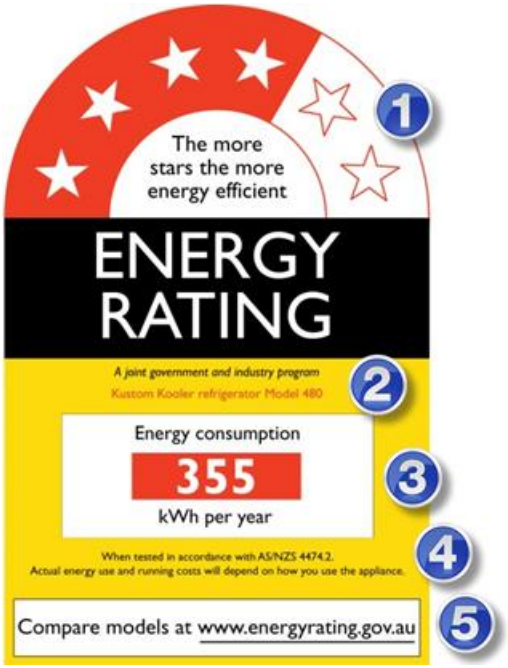
- encouraging consumers to select the appliance that uses the least energy and which meets their needs;
- enabling consumers to understand the approximate running costs of an appliance before buying, minimise the total life cycle cost of the appliance where possible and reduce the peak load for some equipment (like air conditioners); and
- providing incentives for manufacturers and importers to improve the energy efficiency of the products they supply to the market.

3.4 Elements of the label

The original ERL was displayed until October 2000 and contained two key features; a figure for comparative energy consumption (in kWh per year) and an efficiency (star) rating. The comparative energy consumption provided an estimate of the annual energy consumption of the appliance, while the star rating gave a comparative assessment of the model's energy efficiency. This information was complemented by the brand and model number and the standard against which the appliance was assessed.

The current ERL (an example of which is shown in Figure 6) has kept these key features and added more.

Figure 6 **Elements of the Energy Rating Label**



Source: Department of Industry; Harrington & Wilkenfeld, 1997.

Deconstructed, the current label contains five key components.

1. The **six-star rating** which indicates the energy efficiency of the appliance, with more stars corresponding with greater efficiency. This star rating is calculated using an algorithm that takes into account energy consumption and volume/capacity. Star rating algorithms provide a geometric progression of stars; a fixed percentage reduction in energy per additional star. The previous label used a fixed kWh reduction per star which made it harder to achieve a higher star rating.
2. The **make and model of the appliance**.
3. **Annual energy consumption** measured in kWh per year. This figure is based on tested energy consumption (measured against the relevant standard) of the appliance and information about the typical use of the appliance in the household.
4. The **standard against which the appliance is tested**. Different appliances are tested against different standards, which generally correspond with international standards. Australian Standards define the test procedures for measuring energy consumption and set minimum performance criteria that appliances must meet before they qualify for labelling. Check tests are regularly conducted against these standards by accredited laboratories on behalf of state and territory governments (Harrington & Wilkenfeld, 1997).
5. A **link to the Energy Rating website** where the energy consumption of different models of appliances can be compared.

Accompanying these key pieces of information are several explanatory statements:

— *'The more stars the more energy efficient';*

— *'A joint government and industry program';* and

— *'Actual energy use and running costs will depend on how you use the appliance'*

It has been necessary to introduce some variants of the ERL reflecting changing regulations and differences in the functions of appliances. These variants are discussed below.

3.4.1 Refrigerators and freezers

Regulatory changes commencing in April 2010 resulted in a revised star rating scale for refrigerators and freezers. For a period following this change, there was overlap in stock labelled under the old and new systems. To ensure that consumers knew if their appliance was rated under the old scale or the new scale, a green stripe was introduced for labels on appliances measured under the old scale (see Panel A in Figure 7). Appliances with star ratings measured under the new scale were given a different sticker (see Panel B in Figure 7).

Figure 7 **Different labels for refrigerators and freezers**

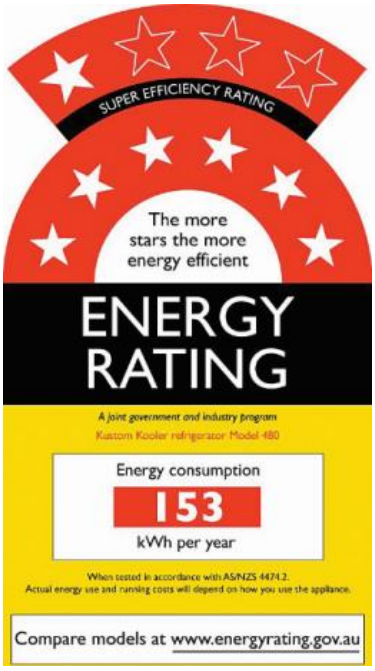
Source: Labels provided by the Department of Industry.

As an example, *Refrigerator X* was rated 4.5 stars under the old star rating scale but only received 1.5 stars under the new scale. Older stock of *Refrigerator X* would be labelled with the label in Panel A and newer stock of *Refrigerator X* would receive the label in Panel B. *Refrigerator X*'s performance has not changed, as demonstrated by the same annual energy consumption figure (530kWh per year), but consumers could identify if *Refrigerator X* was measured under the old or new star rating scale.

At the same time, continuous improvement in the energy efficiency of refrigerators, freezers and air conditioners resulted in a clustering of appliances at the top of the star rating range (four to six stars).[10] The new rating scale extended the star rating to 10 stars, with an extra four stars indicating 'super efficiency'. The additional stars are placed in a four-star coronet over the initial six stars (see Figure 8).

[10] Energy Rating Labels work best when there is a meaningful variation in performance of product — having all product models clustering around a same star rating reduces the comparative information supplied by the label to consumers, and also the value of the energy rating for suppliers who wish to differentiate their products as being of higher energy efficiency.

Figure 8 **Energy label for super-efficient appliances**



Source: Labels provided by the Department of Industry.

3.4.2 Air conditioners

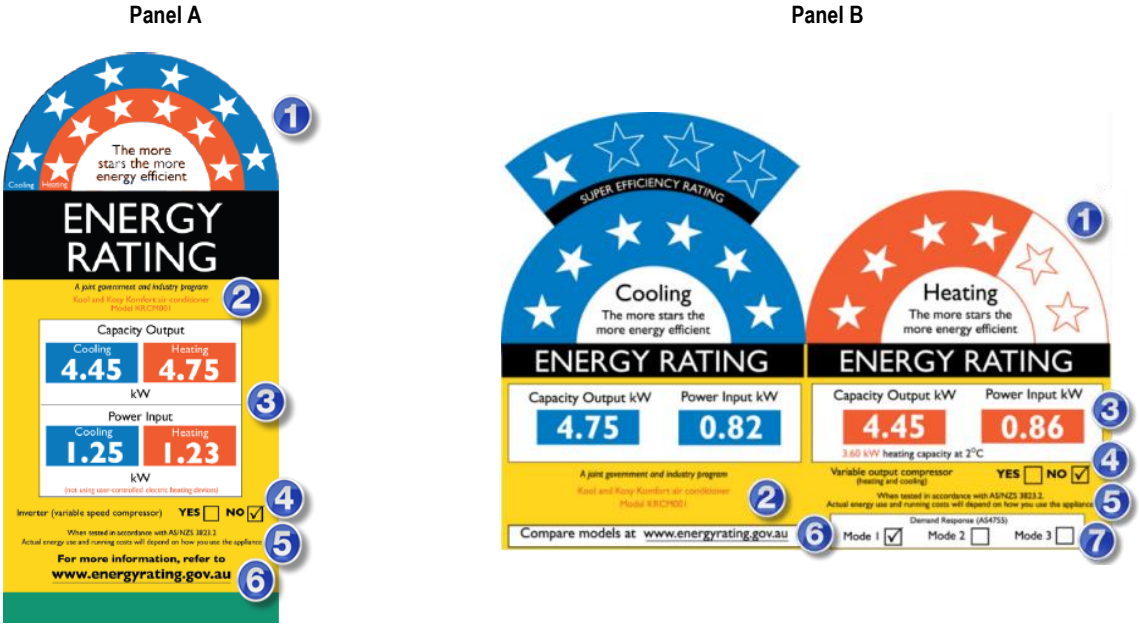
The current ERL for air conditioners (Panel A and Panel B in Figure 9) is slightly different to the label for other appliances to accommodate the dual heating and cooling functions of many air conditioners. While the ERL for air conditioners contains the same key features as the labels for other appliances, there are also some differences, including:

1. **Star ratings** are provided for both heating and cooling.
2. The **make and model of the appliance**.
3. The **electricity input and capacity output** for both heating and cooling are displayed in kW (not kWh per year).
4. It is indicated whether or not the unit has a **variable output compressor**.
5. The **standard against which the appliance is tested**.
6. A **link to the Energy Rating website** where the energy consumption of different models of appliances can be compared.
7. In Panel B only, it is indicated whether the appliance has **demand response capabilities**. (Demand response indicates whether the model can respond to a signal from the power supplier in terms of demand management.)

Accompanying these key pieces of information are the same explanatory statements as on labels for other appliances: *'The more stars the more energy efficient'; 'A joint government and industry program'; 'Actual energy use and running costs will depend on how you use the appliance'.*

In addition, similar to the refrigerator and freezer label described above, a green stripe was introduced for labels on appliances measured under the old scale (Panel A in Figure 9) and appliances with star ratings measured under the new scale were given a different sticker in 2010 (Panel B in Figure 9).

Figure 9 **Variations to the label for air conditioners**



Source: Labels provided by the Department of Industry.

Climate labelling — under investigation

As mentioned in Chapter 1, the E3 Committee is examining a climate-based energy efficiency labelling system as part of the E3 Label Review Project. Climate has a large impact on the energy efficiency of certain appliances, including air conditioners, water heaters and space heaters. Together these appliance types can account for over 60 per cent of the energy use of an average household (Department of Environment, Water, Heritage and the Arts, 2008). Of these climate influenced appliances, currently only air conditioners are labelled by the E3 Committee.

Currently the air conditioner ERL presents consumers with the energy efficiency of a unit tested for one particular climate (nominally a Sydney-type climate – zone 3). Because of this, consumers who live in areas with warmer or cooler climates may find that the units they purchase may not function as expected. An air conditioner that rates well in a moderate climate such as Sydney may not be the best option in the hot-humid climate of Darwin, or may struggle to heat effectively in freezing conditions in Canberra. The existing label does not convey this information to the consumer. Consequently, consumers may purchase a unit that is not appropriate for their climate zone, despite potentially having a high star rating.

While the existing ERL provides important, trusted information to its users, the E3 Committee has identified some key opportunities to improve the availability of energy efficiency information for climate influenced appliances. These include incorporating ratings for different climates, expanding label coverage to all climate affected products and providing additional performance information to allow consumers to make better informed decisions when purchasing climate affected appliances.

The main benefits of climate labelling as highlighted by the E3 Committee include:

> The introduction of a climate rating label that will cover all climate influenced appliances in a consistent way will enable consumers and other decision makers to make informed decisions on purchases. By having a consistent label that applies to appliances of all fuel types, consumers will be able to make an accurate comparison between the costs of operating

appliances to decide what will be the cheapest to run in their particular circumstances. Introducing a label that will allow all water heaters and space heaters to be compared in a consistent and meaningful way will allow these technology switches to take place where appropriate.

Additionally, a new label will allow for the display of information that is particularly important for space conditioners and water heaters. Sizing of these appliance types can be difficult, so providing a consistent measure to compare will assist in consumers and advisers making informed decisions. The label will also have the option to display noise levels where applicable, or other key performance information (Equipment Energy Efficiency 2013b).

Australia/New Zealand progress

The development of an Australian and New Zealand climate rating label involves extensive design and research stages. Label design options are being drafted and tested in a range of locations across Australia and New Zealand. This work will examine the best way to display the climate information in a way that will be meaningful to both consumers and the range of advisers who supply or recommend these types of products.

A methodology to establish the climate zones that will be displayed on the label is also being developed. Research is taking place to examine a range of climatic data and conditions balanced with population data to determine the best distribution of climate zones.

Further research is anticipated to determine the best way to present the labels and the focus of any accompanying education campaigns. Should the research and development process result in a decision to progress a climate rating label, it would be implemented on an appliance basis through a regulation impact statement that also examines MEPS.

International progress

The European Union (EU) introduced a new label for air conditioners in January 2013 that displays energy efficiency and performance information for three climate zones. They have since agreed to adopt a similar labelling scheme for space heaters and water heaters, to be implemented from 2015. The European label allows direct comparisons between energy use of electric and gas operated appliances, as well as other key product information, and provides an energy rating (equivalent to the Australian and New Zealand star rating), annual energy consumption and coefficient of performance figure for a cold zone, a moderate zone and a warm zone.

The United States (US) is also currently investigating the introduction of a climate rating label. Energy Star in the US and in Canada also operates a climate based rating label for windows.

3.5 Alignment with international labels

Energy labelling is gradually being accepted as a means of minimising household electricity consumption around the world, with many countries adopting labelling programs. The aim of energy labelling is universal – provide consumers with information to compare the energy efficiency of different appliances available to them in the market.

Energy rating labels exist around the world albeit in formats that suit the needs of the countries' consumers, appliance suppliers and trade blocs. Some examples used in this report include EU, US, Canadian, Korean, Indian and Chinese labels. These labels represent different points of progression or coverage for energy rating labels:

- the US and Canadian labels are well established, having been in operation for more than three decades;

— the EU label encompasses a range of different countries, therefore needs to address different cultural and language requirements;

— the Korean label displays a different format to the more established labels; and

— the Chinese and Indian labels are relatively new tools that have been in operation for less than 10 years.

A summary of the types of information included in each of these labels is shown in Table 2 (more information on international labels is provided in Appendix C). The more common pieces of information contained on the labels analysed are energy consumption (six out of seven labels contained this information, including Australia/New Zealand), make and model (six out of seven, including Australia/New Zealand), efficiency rating (five out of seven, including Australia/New Zealand) and capacity (four out of seven, not including Australia/New Zealand).

Table 2 **Information contained on selected international ERLs**

	Efficiency rating	Energy consumption	Comparison with similar models (kWh or $)	Operating cost	CO_2 emissions	Make and model	Assessment standard	Capacity	Features	Year of manufacture	Appliance specific [a]
Australia/New Zealand	✓	✓				✓	✓				
EU	✓	✓						✓			✓
US		✓	✓	✓		✓		✓	✓		
Canada		✓	✓			✓					
Korea	✓	✓			✓	✓		✓			
India	✓	✓				✓		✓		✓	
China	✓					✓					
Total included	5	6	2	1	1	6	1	4	1	1	1
Australia included	Yes	Yes	No	No	No	Yes	Yes	No	No	No	No

[a] For example noise level, water consumption, load size.
Source: Energy Efficiency Solutions, 2004.

The Australian label does not contain the following pieces of information (that are contained in other labels).

— A comparison with similar models, either kWh or dollar/cost comparisons (two out of six labels contained this information).

— Operating costs (one out of six).

— CO_2 emissions (one out of six).

— Capacity (four out of six).

— Features (one out of six).

— Appliance specific information, such as noise level, water consumption, load size (one out of six).

The only piece of information the Australia/New Zealand label exclusively contains is identification of the assessment standard against which the appliance is tested.

Compared to the EU, US, Canadian, Korean, Indian and Chinese labels, it is apparent that the Australia/New Zealand label aligns in terms of the key pieces of information most commonly identified, specifically energy efficiency, energy consumption, make and model and capacity.

4 Consumer insights

This chapter analyses two online consumer surveys conducted as part of this review. To assist with this aspect of the project, ACIL Allen Consulting commissioned Roy Morgan Research to undertake two online surveys.

- The first survey was based on the existing labelling survey regularly conducted by the Energy Efficiency and Conservation Authority (EECA) of New Zealand and a recently released survey from the European Union.
- The second survey built on the findings of the first survey as was designed by the Department of Industry in conjunction with ACIL Allen Consulting to address specific information gaps.

ACIL Allen worked closely with the Department and Roy Morgan to tailor the surveys to obtain the required information in an Australian context.

4.1 Surveys overview

Each survey sample consisted of approximately 1,200 consumers geographically spread throughout Australia.[11] This number of consumers was chosen to ensure the surveys targeted a representative sample of consumers over 18, across income ranges, ages and gender that allows for statistically significant conclusions to be made. At the analysis stage, data was weighted to realign the sample with population proportions (see Appendix F). Participants in the surveys were members of Roy Morgan Research Online Panels.

The first survey was administered online during late October and early November 2013. In terms of respondent characteristics:

- 51.0 per cent were female and 49.0 per cent were male;
- in terms of age:
  - 1.8 per cent were aged 18-19;
  - 20.7 per cent were aged 20-29;
  - 19.7 per cent were aged 30-39;
  - 19.9 per cent were aged 40-49;
  - 13.4 per cent were aged 50-59;
  - 17.2 per cent were aged 60-69; and
  - 7.3 per cent were aged 70+;
- 41.5 per cent were the main decision maker, with 58.5 per cent considering themselves joint decision makers;
- 48.1 per cent of respondents bought an appliance in the last six months, 28.8 per cent between seven and twelve months ago, and 23.1 per cent between 13 and 24 months ago; and
- the appliances bought by the respondent group most recently were televisions (40.7 per cent), clothes washers (17.6 per cent), refrigerators (16.5 per cent), dish

[11] Notably, the surveys conducted for this review only included Australian consumers. New Zealand consumers were not included as the EECA regularly conducts labelling surveys of New Zealand consumers.

washers (9.7 per cent), reverse cycle air conditioners (5.1 per cent), clothes dryers (4.6 per cent), freezers (3.6 per cent) and air conditioners (cooling only) (2.2 per cent).

The respondents that most recently purchased an air conditioning product (87 out of 1,200 or 7.2 per cent) were asked slightly different questions for some topics compared to all other respondents, with these responses drawn out where applicable. This was done because the current ERL for air conditioners is slightly different to the label for other appliances to accommodate the dual heating and cooling functions of many air conditioners.

The second survey was undertaken from mid-January until early February 2014. In terms of respondent characteristics:

- 51 per cent were female and 49 per cent were male;
- in terms of age:
  - 2.3 per cent were aged 18-19;
  - 19.8 per cent were aged 20-29;
  - 19.6 per cent were aged 30-39;
  - 20.3 per cent were aged 40-49;
  - 13.2 per cent were aged 50-59;
  - 16.6 per cent were aged 60-69; and
  - 8.3 per cent were aged 70+;
- 41.1 per cent were the main decision maker, with 58.9 per cent considering themselves joint decision makers;
- 49.6 per cent of respondents bought an appliance in a physical store in the last six months, 27.9 per cent between seven and twelve months ago, and 22.4 per cent between 13 and 24 months ago;
  - of these 11.7 per cent of respondents had last bought a new appliance online; and
- the appliances bought by the respondent group most recently were televisions (39.7 per cent), clothes washers (15.2 per cent), refrigerators (18.8 per cent), dish washers (8.5 per cent), reverse cycle air conditioners (5.8 per cent), clothes dryers (5.6 per cent), freezers (3.0 per cent) and air conditioners (cooling only)(3.4 per cent).

As demonstrated above, survey respondents had very similar characteristics across the two surveys (i.e. they are representative of the population). Hence, the weighted results of the two surveys are discussed interchangeably throughout the chapter (except where similar questions were asked in both surveys, in which case they are separately identified).

In general terms, the surveys were designed to address three high level questions.

1. What information do consumers need to make a decision?
2. How effective is the current energy label?
3. How could the labels be more effective?

The following sections discuss the findings for each survey on each of these questions. Copies of the complete surveys are attached in Appendix F.

4.2 What information do consumers need?

This section considered the types of information that consumers need to help them purchase an appliance and how helpful different types of information are to the decision making process. Reflecting the fact that the current ERL for air conditioners is slightly

different to the label for other appliances, respondents were separated according to their most recent purchase.

4.2.1 Factors considered when purchasing appliances

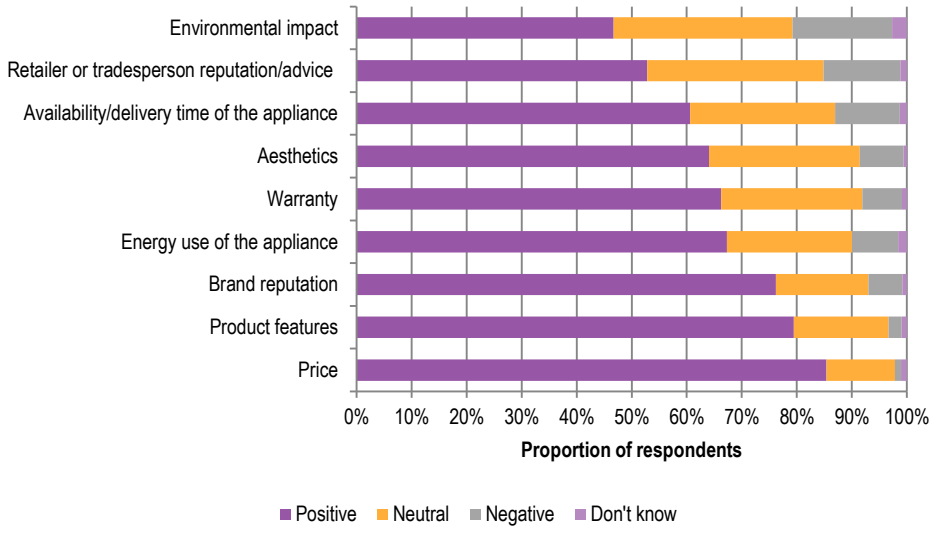
Having an understanding of the factors that consumers find helpful when purchasing an appliance can assist in identifying the information consumers need to inform their purchasing decision. To this end, consumers were asked to identify the relative helpfulness of different factors in the decision to purchase their most recent appliance.

Price and product features were deemed the two factors considered most helpful by the majority of respondents for all other appliances (not including air conditioners), receiving positive indications from 85.4 per cent and 79.5 per cent of 1,113 respondents purchasing appliances (other than air conditioners) respectively. Brand reputation was deemed the most helpful for the third largest proportion of respondents with 76.2 per cent providing a positive response. Energy use was fourth with 67.3 per cent of respondents indicating it was helpful (see Figure 10).

When asked how helpful certain factors were in the decision to purchase an air conditioner, respondents rated its energy use highly (third with 73.1 per cent of 87 respondents purchasing an air conditioner indicating positive helpfulness) behind price (82.8 per cent) and product features (75.8 per cent). Environmental impact was considered helpful by the least number of respondents; only 52.5 per cent indicated it was useful in their decision to purchase an air conditioner (see Figure 11).

Additional information about the features considered when purchasing air conditioners is provided in

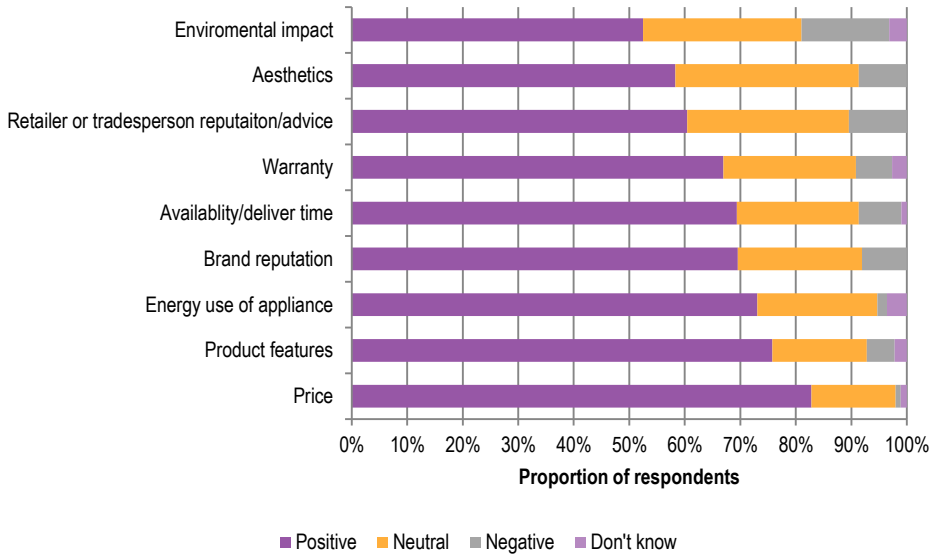
Figure 10 **Factors considered when purchasing latest appliance (other than air conditioners)**



Note: 1. n = 1,113. 2. *Question 12: For each item below, indicate how helpful it was in your decision to purchase your latest appliance, the [INSERT APPLIANCE]. Use the scale of 0-10 where 0 means 'not at all helpful' and 10 means 'extremely helpful'.* 3. Using a scale ranging from 0 ('Not at all …') to 10 ('Extremely …'), 'Positive' includes 7, 8, 9, 10, 'Neutral' includes 4, 5, 6 and 'Negative' includes 0, 1, 2, 3.

Source: ACIL Allen/Roy Morgan survey.

Figure 11 **Factors considered when purchasing latest appliance (air conditioners)**



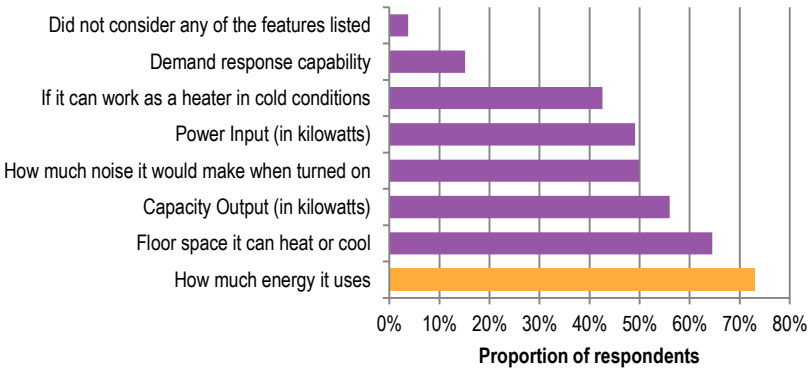
Note: 1. n = 87 (respondents who did not purchase an air conditioner were not required to answer this question hence the lower number of respondents). 2. Question 4: *For each item below, indicate how helpful it was in your decision to purchase your [air conditioner / reverse cycle air conditioner]. Use the scale of 0-10 where 0 means 'not at all helpful' and 10 means 'extremely helpful.'* 3. Using a scale ranging from 0 ('Not at all …') to 10 ('Extremely …'), 'Positive' includes 7, 8, 9, 10, 'Neutral' includes 4, 5, 6 and 'Negative' includes 0, 1, 2, 3.

Source: ACIL Allen/Roy Morgan survey.

Box 1 **Features considered when purchasing air conditioners**

Respondents purchasing air conditioners considered the energy use of the appliance more than any other factor, with 72.9 per cent of respondents indicating that they considered energy usage when recently purchasing an air conditioner. The amount of floor space that could be heated or cooled was the second most considered factor (64.5 per cent) followed by capacity output (in kW) (56.0 per cent). The extent to which all factors were considered in the purchase of an air conditioner is shown in Figure 12.

Figure 12 Features considered when purchasing an air conditioner



Note: 1. n = 87. 2. Question 4: *When you purchased your air conditioner/reverse cycle air conditioner, which of the following features did you consider?*

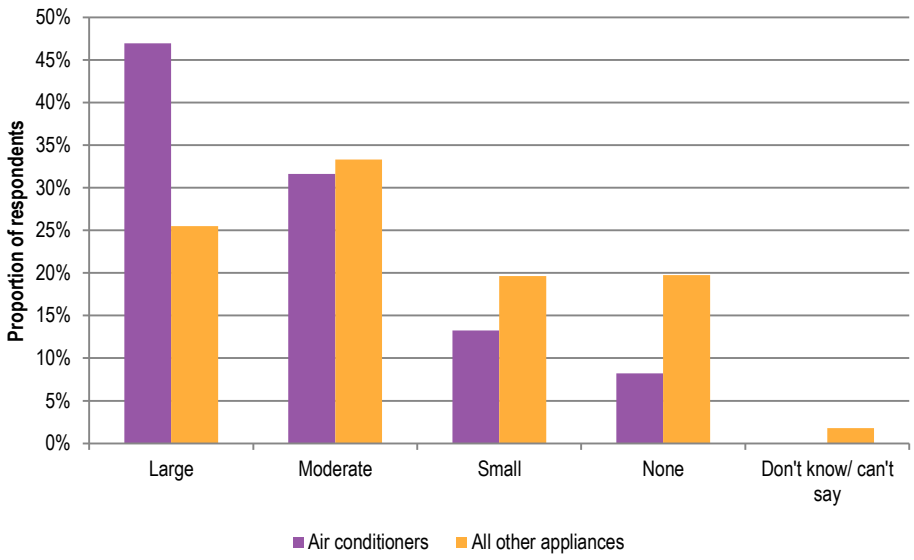
Source: ACIL Allen/Roy Morgan survey.

The relative importance of energy use information is more evident for purchasers of air conditioners (73.1 per cent found it helpful to some degree) than it is for purchasers of all other appliances (67.3 per cent). Further, a lower proportion of respondents purchasing air conditioners indicated that energy use information was *not* helpful compared to respondents purchasing all other appliances (1.8 per cent versus 8.3 per cent).

This is reinforced through respondent views on the extent to which energy use of an appliance influences their decision to purchase (see Figure 13). Around 79 per cent of respondents who purchased an air conditioner stated that energy use had a large or moderate influence on the purchasing decision, with 58.8 per cent of respondents who purchased other appliances indicating energy use had a large or moderate influence.

The relative importance of energy use for purchasers of air conditioners versus purchasers of all other appliances is again clearly demonstrated; 46.9 per cent of air conditioner purchasers indicated energy use had a large influence compared to only 25.5 per cent of purchasers of all other appliances. A further 19.7 per cent of purchasers of all other appliances said that energy use had no influence, compared to 8.2 per cent of air conditioner purchasers. The importance of energy use information for purchasers of air conditioners is likely reflecting the fact that lifetime energy cost represents a large component of the cost of owning and operating an air conditioner.

Figure 13 **Extent to which energy use influences purchasing decisions**



Note: 1. n (air conditioners) = 87 and n (all other appliances) = 1,113. 2. Question 5a*: For the [air conditioner/reverse cycle air conditioner], did information about how much energy it uses influence your decision to purchase it?* **or** Question 14: *For your latest purchased appliance, the [appliance], did information about how much energy it uses influence your decision to purchase it?*

Source: ACIL Allen/Roy Morgan survey.

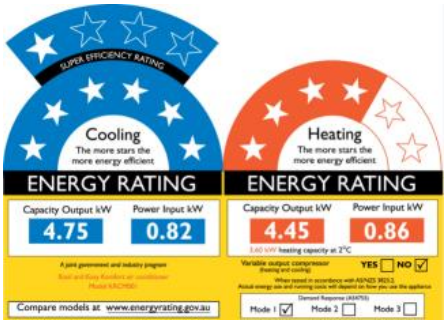
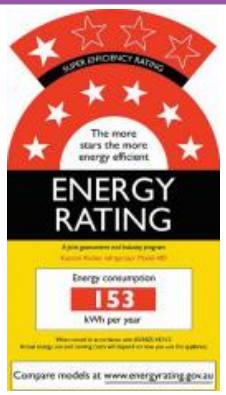
4.3 Is the ERL effective?

The second high-level question the surveys sought information about related to how effective the ERL is in providing consumers with information and encouraging behavioural change. This section investigates consumer awareness of, and confidence in, the ERL. It considers how the label is interpreted by consumers in terms of whether they associate the stars with cost, environment or efficiency. It also investigates the extent to which the ERL is being used as a research tool as well as its effectiveness as a research tool.

4.3.1 Awareness of the ERL

The survey results strongly indicate that ERLs are being noticed by consumers (see Table 3); 94.9 per cent of the survey respondents that purchased an air conditioner have noticed the label on air conditioners being sold in store and 96.7 per cent of the purchasers of other appliances have noticed the general label on appliances in stores. Respondents were also asked if they had noticed the 'super efficiency' label with a considerably different result – 29.9 per cent of the purchasers of other appliances have noticed this label on appliances in stores. This result is not surprising given that the super efficiency label incidence on whitegoods is fairly low.

Table 3 **Respondents that have noticed different energy labels**

Air conditioner label	General label	Super-efficient label
		
Noticed by **94.9%** (of 87) of air conditioner purchasers	Noticed by **96.7%** (of 1,200) purchasers of any appliance	Noticed by **29.9%** (of 1,160) of purchasers of any appliance

Note: 1. Air conditioner n = 87, any appliance: total n = 1,200. 2. Question 9: *Have you noticed this energy rating label on air conditioners or reverse cycle air conditioners being sold in stores?* ***Or*** *Question 16: Have you noticed this energy rating label o new appliances being sold in stores?* ***Or*** *Question 23: A new energy rating label for certain appliances was introduced in 2009. It included a second layer of 'super efficiency' stars to further distinguish those appliances at the top of the energy efficiency range. Have you noticed this label on new appliances being sold in stores?* [Only 1,160 survey participants responded to this question; all participants were allowed to respond.]

Source: ACIL Allen/Roy Morgan Survey. Labels provided by the Department of Industry.

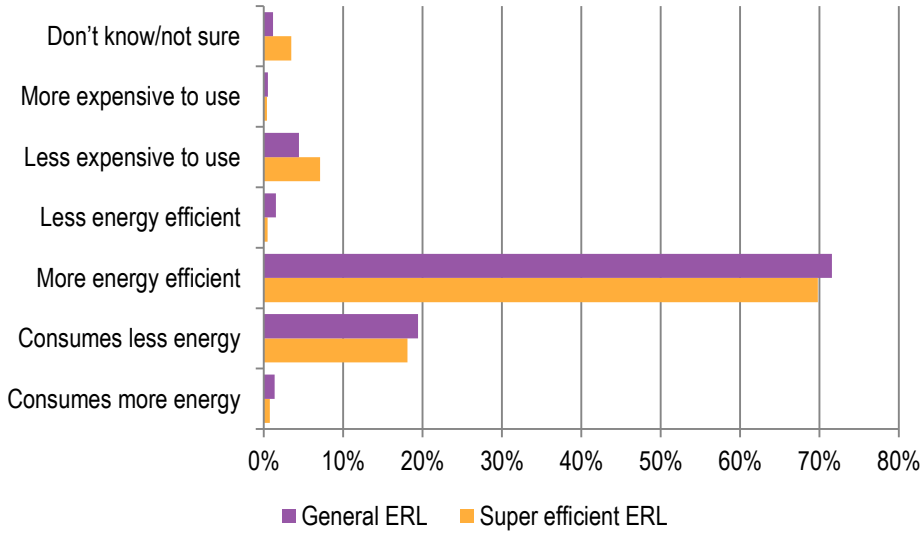
4.3.2 Interpretation of the ERL

The survey results also indicate that the ERL is generally interpreted correctly, with 71.6 per cent of respondents correctly identifying the meaning of the stars on the ERL (i.e. more stars means more energy efficient). A further 19.4 per cent of respondents associated more stars with less energy consumption and another 4.4 per cent of respondents associated more stars with the appliance being less expensive to use, which are not the intended meanings of the stars. The stars were incorrectly interpreted by 3.4 per cent of respondents, with a further 1.2 per cent uncertain about what the stars meant.

There were similar results for the understanding of the super-efficient label – 69.8 per cent correctly identified the meaning of the super-efficient stars on the ERL, 18.1 per cent of respondents associated more super-efficient stars with less energy consumption and 7.1 per cent of respondents associated more super-efficient stars with the appliance being less expensive to use. Fewer incorrectly interpreted the super-efficient stars (1.6 per cent) but more did not know the meaning of the super-efficient label (3.4 per cent) (see Figure 14).

These results suggest that the ERL is known, understood and interpreted correctly by most consumers.

Figure 14 **How the ERL is interpreted by consumers**



Note: 1. n = 1,160 (General ERL) and n=359 (Super-efficient ERL). 2. Question 17: *Which one of the following statements most closely corresponds to your understanding of what the stars mean on the energy rating label?* **and** Question 24: *Which one of the following statements most closely corresponds to your understanding of what the extra stars mean on the energy rating label?*

Source: ACIL Allen/Roy Morgan survey.

4.3.3 Awareness of partnership arrangement

Around one third of consumers were aware of the partnership arrangement behind the ERL, with 31.2 per cent (375 of 1,200) of survey respondents aware that the labelling scheme is based on a partnership between the Government and industry. Of the remaining 825 respondents, 61.7 per cent (740) did not know about the partnership and 7.1 per cent (85) were not sure/did not know.

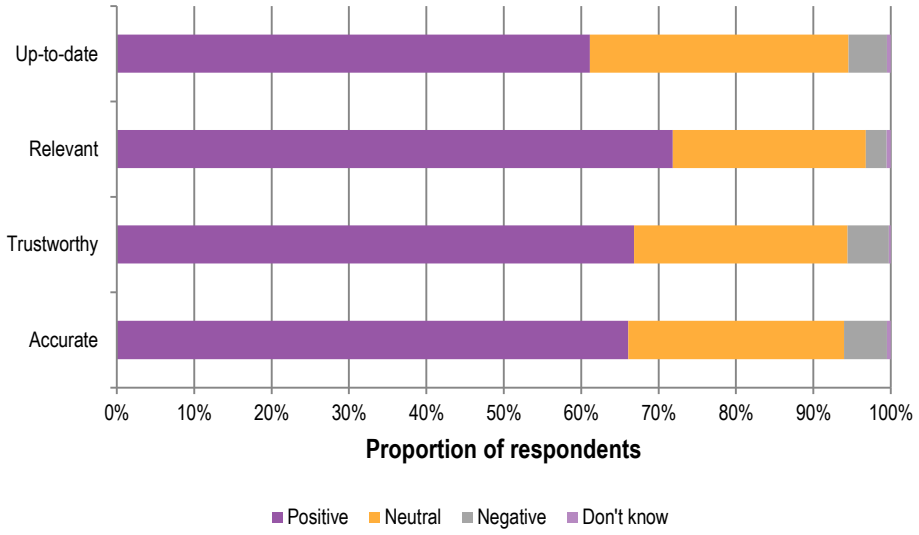
Knowing that the ERL scheme is an industry/government partnership, around two thirds of consumers were confident about the information contained in the label. Of the 374 respondents aware of the partnership (see Figure 15):

- 61.1 per cent were confident that the information was up-to-date;
- 71.8 per cent were confident that it was relevant;
- 66.8 per cent were confident it was trustworthy; and
- 66.1 per cent were confident it was accurate.

Around two-thirds (61.5 per cent) of all 1,200 survey respondents, regardless of whether they were aware of the partnership of not, believed that the labelling scheme should remain a joint government/industry partnership, with 15.7 per cent of respondents indicating it should be only an Government scheme and 3.1 per cent believing it should be an industry-only scheme.

These results suggest that highlighting the industry/government partnership in future ERL designs could increase consumers' confidence about the trustworthiness, relevance and accuracy of the label.

Figure 15 **Confidence in the ERL**



Note: 1. n = 374. 2. Question 26: *Knowing that the energy rating label is based on a partnership between the Australian Government and industry, how confident are you that the energy rating label provides information that is [up-to-date, relevant, trustworthy, accurate].* 3. Using a scale ranging from 0 ('Not at all …') to 10 ('Extremely …'), 'Positive' includes 7, 8, 9, 10, 'Neutral' includes 4, 5, 6 and 'Negative' includes 0, 1, 2, 3.

Source: ACIL Allen/Roy Morgan survey.

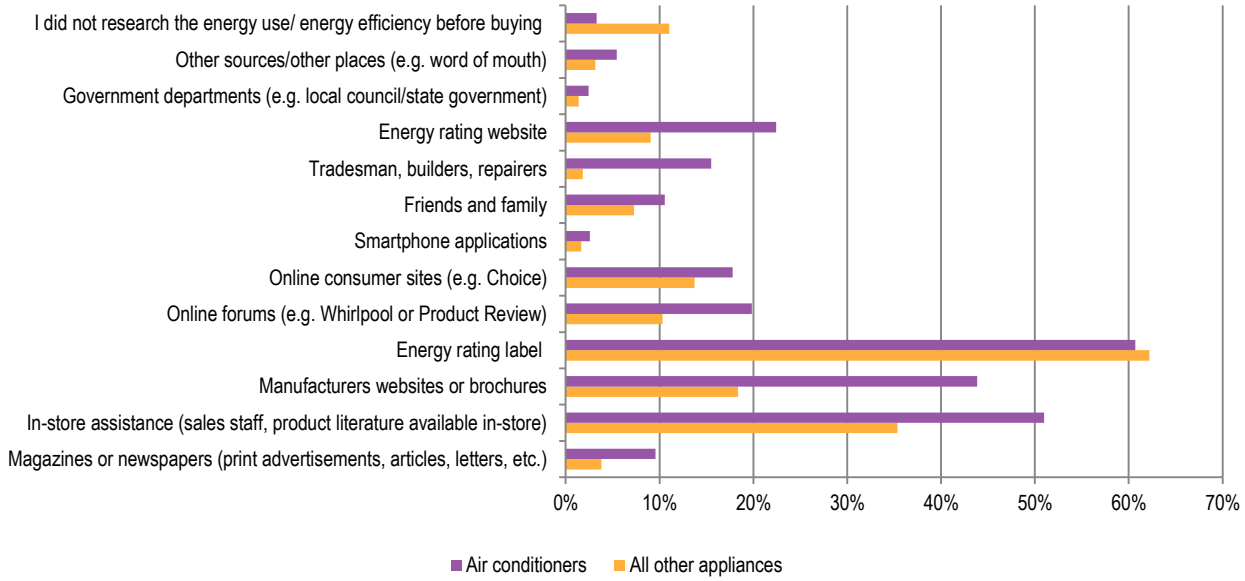
4.3.4 Using the ERL

The energy rating label is a leading resource used in researching the energy credentials of an appliance with 60.7 per cent (48 of 80) of purchasers of air conditioners and 62.2 per cent of responding purchasers (543 of 873) of all other appliances having used energy rating labels to research the energy use or energy performance of the appliance they bought, which was more than any other resource identified (see Figure 16).

For purchasers of air conditioners, the next most used resources were in-store assistance (51.0 per cent) and manufacturer's websites or brochures (44.0 per cent). The second and third most used resources for purchasers of all other appliances were the same as those that purchased air conditioners, but fewer respondents indicated they used the resources; in-store assistance (35.4 per cent) and manufacturer's websites or brochures (18.4 per cent).

A greater proportion of respondents that purchased all other appliances admitted to not researching the energy use/energy efficiency of the appliance before purchasing compared to respondents that purchased air conditioners (11.0 per cent versus 3.3 per cent).

Figure 16 **Resources used to research the energy use or energy efficiency of an appliance**



Note: 1. n (air conditioners) = 80 and n (all other appliances) = 873. 2. Question 6*: Which, if any, of the following resources did you use to research the energy use or energy efficiency of your [air conditioner/reverse cycle air conditioner]? Select all that apply.* ***or*** *Question 15: Which, if any, of the following resources did you use to research the energy use or energy performance of your latest purchased appliance, the [appliance]? Select all that apply. 2. It should be noted that, for unknown reasons, seven air conditioner purchasers and 247 purchasers or all other appliances did not answer this question.*

Source: ACIL Allen/Roy Morgan survey.

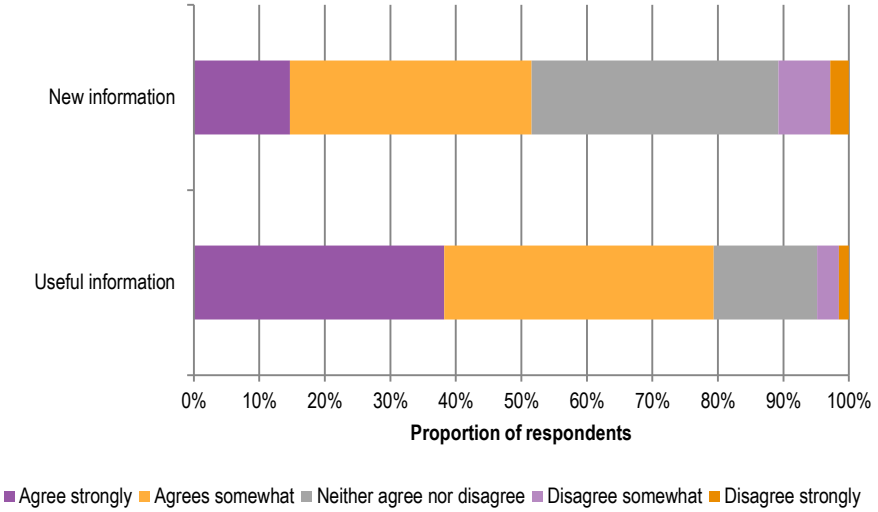
Around half of survey respondents indicated that the ERL was filling an information gap; 51.5 per cent of respondents strongly or somewhat agreed that the ERL provided them with new information for their most recent appliance purchase, 10.7 per cent somewhat or strongly disagreed.

More respondents agreed that the ERL was providing useful information; 79.4 per cent of respondents strongly or somewhat agreed that the label provided them with useful information for their most recent appliance purchase, 4.8 per cent somewhat or strongly disagreed (see Figure 17).

The contents of the ERL affected the final purchasing decision of just over half of survey respondents; 53.7 per cent of 1,160 respondents indicated that the rating or information on the ERL affected their final decision to purchase an appliance. With respect to how much influence the label had on this decision, the ERL had a large influence on 39.7 per cent (247) of respondents who indicated it affected their final purchasing decision and a moderate influence on a further 50.0 per cent (311) (see Figure 18).

The majority of survey respondents (80.1 per cent) had compared the annual energy consumption with other similar appliances when making their purchasing decision. However, only 28.1 per cent of survey respondents had used the annual energy consumption to estimate the annual operating costs for the appliance.

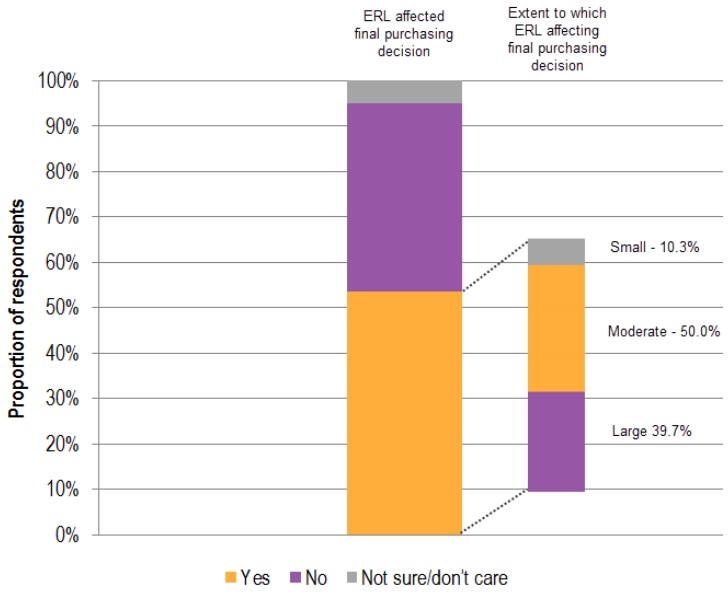
Figure 17 **Label providing new and useful information**



Note: 1. n = 1,160. 2. Question 18: *Using a scale of 1-5 where 1 = agree strongly and 5 = disagree strongly, how much do you agree or disagree with the following statements about the energy rating label for your most recently purchased appliance, the [appliance]?*

Source: ACIL Allen/Roy Morgan survey.

Figure 18 **The ERL affecting and influencing the final purchasing decision**



Note: 1. n = 1,160 and **(if yes)** n = 622. 2. Question 19: *Did the rating or information on the label affect your final decision when you purchased your most recent appliance, the [appliance]?* **If yes** Question 20: *To what extent did the energy rating label influence the purchase of your most recent appliance, the [appliance]?*

Source: ACIL Allen/Roy Morgan survey.

4.4 How could the ERL be made more effective?

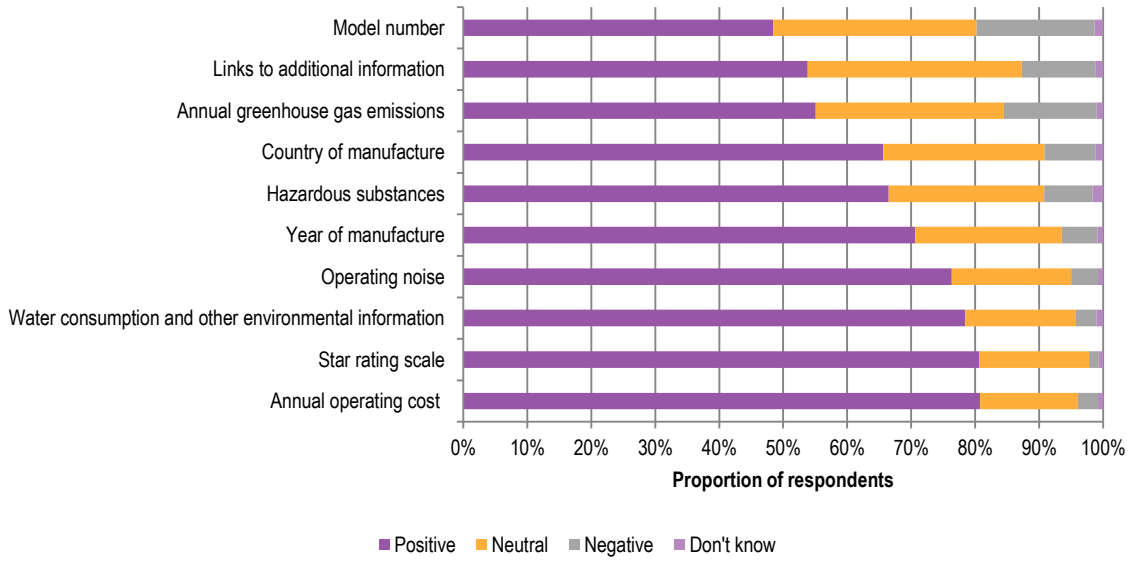
The final high level question explored through the two online surveys considered how the ERLs could be improved. This section looks at the types of information that consumers find helpful when purchasing an appliance. The section also considers consumers' perceptions of the relative effectiveness of how different labels present different types of information.

4.4.1 Consumer needs

Survey respondents were asked how helpful different pieces of information would be when purchasing an appliance. The extent to which each type of information was deemed helpful to consumers is shown in Figure 19. Survey respondents suggested that the most useful pieces of information when purchasing an appliance would be:

- an appliance's annual operating costs (80.8 per cent of respondents viewed it as helpful to some degree);
- the star rating scale (80.6 per cent of respondents viewed it as helpful to some degree);
- water consumption and other environmental information (78.4 per cent of respondents viewed it as helpful to some degree);
- operating noise (76.3 per cent of respondents viewed it as helpful to some degree); and
- year of manufacture (70.7 per cent of respondents viewed it as helpful to some degree).

Figure 19 **Types of information that would be helpful when purchasing an appliance**



Note: 1. n = 1,200. 2. Question 28: *Indicate how helpful to you each item below would be when you purchase an appliance. Use the scale of 0-10 where 0 means 'not at all helpful' and 10 means 'extremely helpful.'* 3. Using a scale ranging from 0 ('Not at all …') to 10 ('Extremely …'), 'Positive' includes 7, 8, 9, 10, 'Neutral' includes 4, 5, 6 and 'Negative' includes 0, 1, 2, 3.

Source: ACIL Allen/Roy Morgan survey.

It is noted that in determining which pieces of information could be considered for inclusion on the label, the overarching aims of the label need to be considered; it would be inappropriate to include information on the ERL that, while being 'helpful' to consumers, does not address an aim of the label or the underlying information failure. Of the pieces of information that survey respondents thought would be helpful when purchasing an appliance, the types currently not included, but within the remit of the label are:

— annual operating cost;

— water consumption and other environmental information; and

— annual GHG emissions.

Of these items, water consumption is covered by the water efficiency label (where relevant), which leaves annual operating cost and annual GHG emissions. These are discussed in more detail in the sections below.

Operating costs

As outlined above, 80.8 per cent of respondents viewed an appliance's annual operating costs as helpful to some degree. Just under half (45.4 per cent) of the consumers would prefer to use Internet tools to estimate an appliance's operating cost that takes account of their family location and circumstances, rather than rely on an approximate amount reported on the label. In contrast, around 35 per cent of consumers would prefer to rely on an approximate amount reported on the label. An additional 19.7 per cent of respondents were unsure of their preference.

Of the consumers who would prefer to use Internet tools to estimate an appliance's operating cost:

— 53.6 per cent would prefer a website link on the label;

— 36.6 per cent would prefer a QR code on the label;

— 7.2 per cent were not sure what they would prefer; and

— 2.7 per cent would prefer not to include a website or QR code on the label.

Of the respondents who would prefer to rely on an annual operating cost estimate on the label reported on the label or were not sure of their preference (54.6 per cent of total survey respondents):

— 62.3 per cent preferred keeping the existing number for energy consumption and adding the operating cost. That is, both energy consumption and operating cost would appear in the red box on the appliance label;

— 23.4 per cent had no preference;

— 13.5 per cent preferred replacing the number for energy consumption in the red box with the operating cost; and

— 0.8 per cent suggested other preferences including:

  – outlining the energy consumption the appliances uses when on standby in red box, with website details for calculating operating cost;

  – putting the approximate operating cost, then the amount of stars following for its energy rating; and

  – showing the energy consumption, with retail staff adding the operating cost based on a conversion they know for the specific area.

Year of manufacture

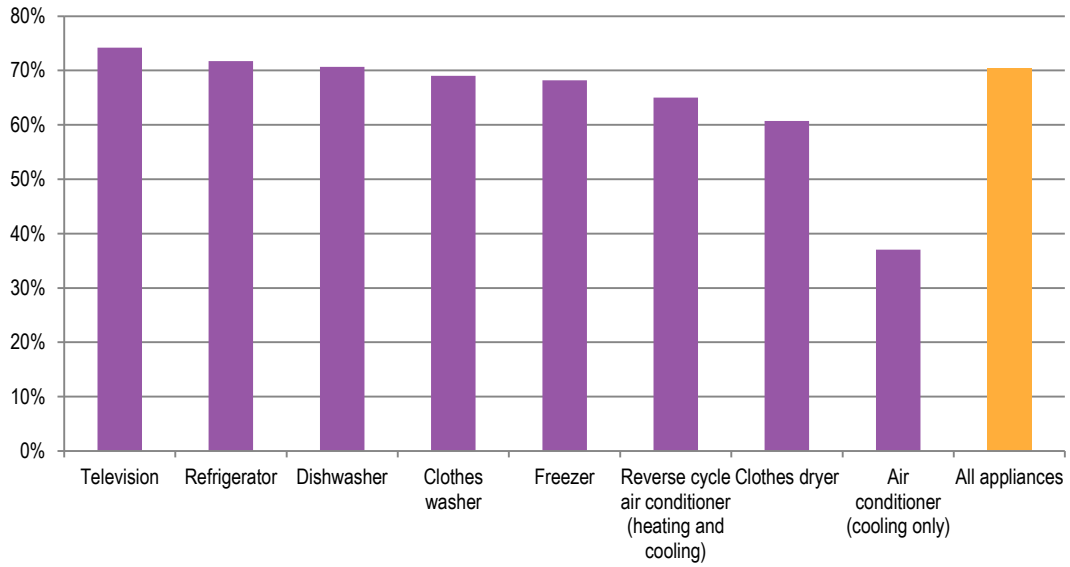
As shown in Figure 19, 70.7 per cent of respondents indicated that they would find year of manufacture helpful when purchasing an appliance. During the advisory forum mentioned above, it was suggested that the importance of the year of manufacture may be related to specific appliances. In particular, industry suggested that the large number of TV purchasers included in the sample (around 41 per cent of the total) could have skewed the preference for including the year of manufacture on the ERL – TV is a technology that constantly

changes and TV purchasers might have a greater desire for year of manufacture information to ensure they are getting the latest technology.

Further analysis of the survey results does not suggest a strong bias that purchasers of any one appliance, such as televisions, would find year of manufacture more helpful than purchasers of other appliances (see Figure 20). While television purchasers were the highest proportion of consumers indicating they would find year of manufacture helpful (74.2 per cent), it was closely followed by purchasers of refrigerators (71.7 per cent) and dishwashers (70.7 per cent). The only significant difference was for purchasers of air conditioners; only 37 per cent indicated they would find year of manufacture helpful.

This finding suggests that the preference to include year of manufacture on the ERL is uniform across product types (except air conditioners).

Figure 20 **Extent to which year of manufacture would be helpful for different appliance groups**



Source: ACIL Allen/Roy Morgan survey.

GHG emissions

As mentioned before, 55.1 per cent of respondents would find information about an appliance's GHG emissions as helpful to some degree. This indicates that there is a core set of consumers who would value the inclusion of GHG emissions on the ERL.

Notably, during an advisory forum held between industry and Department of Industry representatives on 29 November 2013 discussing the preliminary findings of this review, industry suggested to analyse the proportion of consumers who thought GHG emissions were important and those who interpreted the label correctly to examine if the energy information is a sufficient proxy for greenhouse to satisfy this greenhouse request.

Further analysis of the survey results shows that 250 of all survey respondents linked more stars on the ERL with the product being more energy efficient. Of these, slightly over half (56.4 per cent) indicated that they would find GHG emissions information helpful when purchasing an appliance. This finding suggests that GHG emissions information is perhaps more a 'nice to know' for these particular consumer types rather than a 'must have' piece of information.

4.4.2 Displaying information to consumers

Survey respondents were asked to review energy labels from the United States (US), the European Union (EU), and Canada in comparison to the ERL and indicate which label presented different pieces of information most effectively. The labels are reproduced in Table 4 along with the relative effectiveness of each label in terms of presenting information about operating cost, energy consumption and to easily compare with similar models.

Energy consumption

Over half (55.1 per cent) of all survey respondents considered the ERL as the most effective at informing purchasers about the energy consumption of an appliance, followed by the Canada label (19.5 per cent), the US label (16.0 per cent) and the EU label (9.4 per cent). The positioning of the energy consumption information is prominent in the ERL, Canadian and US labels, although arguably it is more prominent in the Canadian label (it appears to be the focal point of the label due to its large font and central placement). The ERL, US, and EU labels all appear to have two focal points; stars and energy consumption on the ERL, operating cost and energy consumption on the US label and energy efficiency scale and energy consumption on the EU label.

This result indicates that the ERL is adequately displaying energy consumption information (although it is important to note that the relative dominance of the ERL could be linked to familiarity). This could remove the need for changes to the ERL to make energy consumption information the main focal point of the label (as in the case of the Canadian label) or a shared focal point (as in the case of the US label).

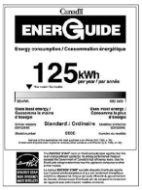
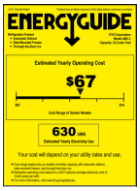
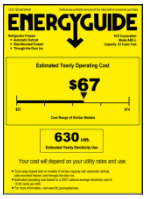
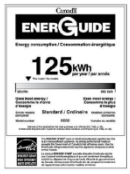
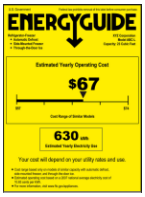
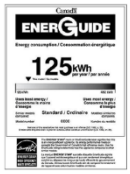
Operating cost

The majority of survey respondents (75.8 per cent) ranked the US label as the most effective in informing purchasers about the operating cost of an appliance. This is expected given that the estimated yearly operating cost is centrally placed on the US label. The ERL was deemed the most effective by 15.3 per cent of respondents despite not reporting the actual operating cost.

While the main feature of the Canadian *EnerGuide* label is the energy consumption figure, only 3.2 per cent of respondents deemed this label the most effective at informing about operating costs. Energy consumption is prominently placed on the ERL and Canadian labels but the Canadian label does not have an energy efficiency rating. Comparing the relative effectiveness of these labels, it could be suggested that some Australian purchasers[12] link the energy efficiency stars with operating cost rather than the energy consumption (shown in kWh).

[12] While the ERL is used in both Australia and New Zealand, the conclusion drawn here is limited to Australian purchasers only as the survey was conducted only within Australia.

Table 4 **Relative effectiveness of overseas labels in presenting information**

Effectiveness ranking (→) Information (↓)	First	Second	Third	Fourth
Energy consumption				
	Australia/New Zealand	**Canada**	**United States**	**European Union**
	55.1%	**19.5%**	**16.0%**	**9.4%**
Operating cost				
	75.8%	**15.3%**	**5.8%**	**3.2%**
Providing information for easily comparing models				
	45.6%	**24.0%**	**22.5%**	**7.8%**

Note: 1. n = 1,200. 2. Question 29: *Different countries present information on the energy use of appliances in different ways. Consider the following four labels which are used by different countries to inform purchasers about the amount of energy used by an appliance. Please indicate which label you think is the most effective in informing you about the following features of the appliance:[operating cost, energy consumption, providing information for easily comparing models.*

Source: ACIL Allen/Roy Morgan survey.

Providing information to easily compare with similar models

Just under half (45.6 per cent) of the survey respondents ranked the ERL as the most effective in providing information for easily comparing similar models, followed by the EU (24.0 per cent), US (22.5 per cent) and Canada (7.8 per cent). The relative dominance of the ERL compared to the US and Canada is an interesting result given that the latter two labels are actual range labels wherein the information is provided on the energy consumption of the labelled model and compared with the actual range of models on the market. By comparison, the ERL (and the EU label which was ranked slightly above the US and more so above the Canadian label) is an absolute scale label whereby the information on the label allows comparisons by means of numerical or other categorical rating or ranking (see Appendix C.1 for more information on actual range and absolute scale labels).

It cannot be ascertained exactly why more respondents thought the ERL was more effective at providing information for easily comparing models, although familiarity with the label must again be considered. In considering the top two rankings (the ERL and the EU label), it could be suggested that survey respondents found it easier to compare energy efficiency ratings, something which neither the US nor Canadian label have, rather than considering a sliding scale of similar models (as per the US and Canadian labels).This suggests that, in

terms of providing information for easily comparing models, Australian consumers[13] prefer absolute scale labels, as opposed to actual range labels.

Considering the US and Canadian labels alone, the label from the US was clearly more effective for a larger number of respondents at providing information than the Canadian label. Given that both labels use a sliding scale to show where the appliance rates against other similar models, the difference could be explained by a preference for a comparison of operating costs ($ per annum) rather than a comparison of energy consumption (kWh per annum).

4.4.3 Label size

Currently there is some variation in how big or small the ERL is to suite the physical size of an appliance. Survey respondents were asked about their preference on label size. The survey found that:

- the majority of survey respondents (43.2 per cent) had a preference for allowing for some variation in size of label to better suit the available space on individual appliance types;
- 38.0 per cent of respondents preferred keeping the label size the same for all appliances;
- 17.3 per cent of respondents have no preference and the remaining 1.5 per cent were not sure.

These results suggest that there is only slight support for allowing for variations in size of the ERL.

4.4.4 Smart technology

This section investigates the potential use of different smart technology tools such as smartphones or tablets as a means of providing information about appliances' energy use.

Survey respondents were asked to consider electronic links for information on energy labels, with some information accessible through a smartphone or tablet and other information only requiring the internet.

Use of smartphones and tablets

With respect to smartphone accessible information, just over three quarters of respondents to the first survey (915 respondents or 76.3 per cent) reported using a smartphone, increasing to 84.2 per cent of respondents in the second survey. It should be noted that the second survey expanded the question to include tablet use which may account for the increase in respondent numbers. Without extrapolating to determine large scale ownership of smartphones or tablets, this figure indicates at the very least that information that can be accessed with smartphones or tablets could potentially service the needs of a considerable proportion of appliance purchasers.

Quick Response Codes

A Quick Response (QR) Code is a visual logo that smartphone users can scan to access website information; potentially about an appliance they are considering purchasing. Of the 915 respondents to the first survey that use a smartphone, 42.5 per cent indicated they

[13] Ibid.

would scan a QR Code on an ERL to access additional information about an appliance. Nearly the same proportion of respondents (41.8 per cent) said they would not use a QR Code and 15.7 per cent were not sure.

Use of applications and websites

A greater proportion of respondents to the first survey using smartphones (49.8 per cent) indicated that they would use a smartphone application (or 'app') to access more information (if the app was available to download through a website link or QR Code on an ERL) than would just scan a QR Code. Of the remaining respondents, 34.1 per cent would not use an app and 16.1 per cent were not sure.

Respondents to the first survey were also asked whether they would use a website address on an ERL to access more information about the energy use of an appliance; 55.1 per cent of respondents said they would, 26.7 per cent of respondents would not and 18.2 per cent were not sure.

Notably, a website address link is currently provided to consumers via inclusion of the text '*Compare models at www.energyrating.gov.au'*, which only 17.2 per cent (15 out of 87) of air conditioner purchasers and 7.0 per cent (78 out of 1,113) purchasers of all other appliances actually used as a resource to select their recently purchased appliance. It is unknown if these respondents were aware that the Energy Rating website contained information on the energy use of an appliance.

Of the respondents to the second survey who did use a smartphone or tablet (84.2 per cent):

- 23.3 per cent had used one or more applications ('apps') to help them choose their most recently purchased appliance.[14]
  - Apps used include Lasoo, ebay, gumtree, PriceGrabber, Masters home hardware, product review, appliance advisor and Choice.
- 48.0 per cent had used one or more websites to help them choose their most recently purchased appliance.[15]
  - Websites used included those of various manufacturers and retailers such as Harvey Norman, Samsung, Dick Smith, Whirlpool, Sony, Good Guys, as well as product review, Choice magazine and appliance online.
- 4.2 per cent had used one or more apps on their tablet or smartphone to help them research the energy efficiency or power costs when choosing their most recently purchased appliance.
  - Apps used include njn, choice, smart home and momentum energy.
- 12.5 per cent had used one or more websites on their tablet or smartphone to help them research the energy efficiency or power costs when choosing their most recently purchased appliance.
  - Websites used include Good Guys, appliances online, Choice, David Jones, Whirlpool, the energy rating website, Harvey Norman and youtube.

[14] It is noted that the respondents who had used apps on their tablet or smartphone to help them choose their most recently purchased appliance were generally from younger age groups, with 79.2 per cent of these respondents being less than 50 years old.

[15] It is noted that the respondents who had used websites on their tablet or smartphone to help them choose their most recently purchased appliance were generally from younger age groups, with 79.2 per cent of these respondents being less than 50 years old.

- 42.8 per cent accessed information about appliances using their smartphone or tablet. A further 33.6 per cent have not used their smartphone or tablet to access information about appliances but would be interested to try it.
  - When asked about their preferred method of accessing more information about an appliance using a smartphone or tablet when shopping in a store, the respondents who have either used their smartphone or tablet to access information about appliances or have not but would be interested to try it suggested:
    - An app (once downloaded will work in a store without connection to the Internet) – 31.8 per cent;
    - Scanning a QR code printed on the label to link to a website tool (requires connection to the Internet) – 29.2 per cent;
    - Keying in a web address printed on the label to link to a website tool (requires connection to the Internet) – 8.8 per cent;
    - Any of the above – 24.0 per cent; and
    - None of the above – 6.2 per cent.

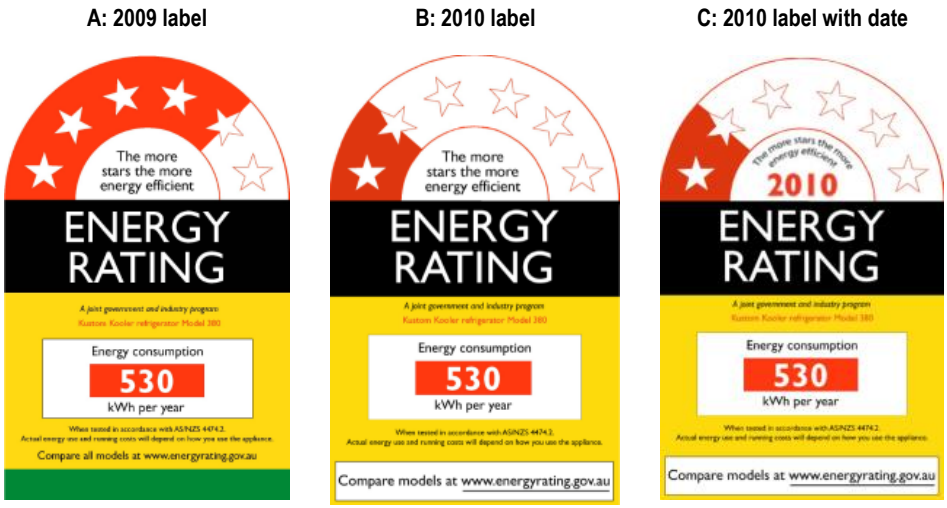
4.4.5 Communicating changes to the energy rating labelling Scheme

Being able to communicate changes in the star rating system is essential to the ongoing success of the label. In the past, communicating change to the label has been indicated through the addition of the green stripe (for more information on this change refer to Section 3.4). For future changes in the star rating system, including the year that the rating system changed (year of validity) has also been identified as an alternative method of communicating change.

The way in which consumers would like changes to the ERL communicated to them was examined in the consumer survey. In the first instance, consumers were made aware of how changing the star rating system resulted in a change to the label in 2010, being shown the labels in Panels A and B in Figure 21 as an example. Just over two thirds of all respondents (67.6 per cent) did not think that removing the green stripe was an effective way of communicating the revised star rating system. Of the remaining respondents, 18.7 per cent thought it was effective and 13.7 per cent were not sure.

An alternative method of distinguishing between the labels was also examined in the survey, with consumers being shown an ERL that includes the year (see Panel C) as a means of communicating the change in the star rating system. Just over two thirds (68.9 per cent) of respondents indicated that an ERL that includes the year is a more effective way of communicating the change in the star rating system with 21.3 per cent thinking including the year on the ERL was not more effective and 9.8 per cent unsure.

Figure 21 **Methods of communicating changes to the star rating system**



Source: Labels provided by the Department of Industry.

When the three labels in Figure 21 were considered together, 70.3 per cent of respondents preferred the year-date label to communicate change, with only 4.7 per cent preferring removal of the green stripe. Of the remainder, 17.8 per cent had no preference and 7.2 per cent preferred some other method. Of the 86 respondents preferring another method, two common preferences were:

- some kind of statement that indicated the update/change (45 respondents or 52.3 per cent indicated this); and
- some kind of change to the design of the label (19 respondents or 22.1 per cent).

These results indicate that including on the label the year that the energy star rating system is updated is the preferred means of communicating change.

The vast majority of respondents (90.8 per cent) suggested that they thought that periodic updating of the methods and label to reflect technology improvements is a good idea. Of the remaining respondents, 4.7 per cent did not think it was a good idea and 4.5 per cent did not know/care.

The majority of respondents (76.9 per cent) would prefer a system where the cost of labelling transition for appliances could be minimised or avoided altogether. In addition, the majority of respondents (64.1 per cent) would prefer a system where the need for the relabelling of appliances could be minimised or avoided altogether.

4.5 Key points from the consumer surveys

The following box summarises the key points from the consumer surveys.

KEY POINTS

- The ERL is almost universally recognised — almost 97 per cent of consumers have noticed the label on new appliances being sold in stores.
- Most consumers interpret the ERL correctly — 72 per cent of consumers correctly interpret an increase in the star rating as an increase in the appliance's energy efficiency.
- Information about energy use was considered one of the most important factors (behind only price, features and brand reputation) in the decision to purchase an appliance.
- Energy use information has a larger influence on purchasers of air conditioners than it does on purchasers of other appliances.
- Only one-third of consumers are aware of the partnership arrangements behind the ERL. Knowing that the energy rating labelling scheme is an industry/government partnership gives consumers confidence about the information contained in the label.
- The ERL is the primary research tool for information on the energy efficiency of an appliance. It is providing new information for around half of consumers and useful information to 4 out of 5 consumers.
- The ERL affects the final purchasing decision for more than half of consumers. When it is used in the final decision making process, it plays a significant role.
- Four out of five consumers would find information about operating costs useful when buying an appliance.
- The majority of consumers (80.1 per cent) compare the annual energy consumption of similar appliances when making their purchasing decision.
- If a figure for operating cost were to be included on the label, only 13.5 per cent of consumers indicated that their preference would be to replace the energy consumption (kWh) figure with the operating cost (62.3 per cent indicated a preference for having both figures in the label).
- Slightly more than half the consumers would find information about greenhouse gas emissions useful when buying an appliance. However, this option ranked well down the list of information that consumers would find helpful (8th out of 10 items).
- Just under half (45.4 per cent) of the consumers would prefer to use Internet tools to estimate an appliance's operating cost that takes account of their family location and circumstances, rather than rely on an approximate amount reported on the label. In contrast, around 35 per cent of consumers would prefer to rely on an approximate amount reported on the label.
- When comparing energy labels from the US, EU, Canada and Australia, consumers considered Australia's ERL the most effective at presenting energy consumption information and at providing information for easily comparing models. The US' EnergyGuide was considered the most effective at presenting operating cost information.
- There is a slight preference for allowing some variation in size of label to better suit the available space on individual appliance types, with 43 per cent of consumers indicating they would prefer some variation in the size of the label and 38 per cent indicating they would prefer keeping the label size the same for all appliances.
- The majority of consumers (69 per cent) think including the year that the star rating system changed as the most effective way of communicating labelling transitions.

- The vast majority of respondents (90.8 per cent) think that periodic updating of the methods and label to reflect technology improvements is a good idea.
- The majority of respondents would prefer a system where the cost of labelling transition for appliances (76.9 per cent) and the need for the relabeling of appliances (64.1 per cent) could be minimised or avoided altogether.
- When asked about their preferences regarding the use of different electronic tools as a means of accessing information about an appliance's energy use, a slightly larger proportion of consumers using smartphones would use an app than a QR code.
- Slightly more than half of consumers indicate they would use a website to access more information about the energy use of an appliance. However, intentions not always result in outcomes as only around 17 per cent of air conditioner purchasers and 7 per cent of purchasers of all other appliances used the Energy Rating website to select their recently purchased appliance.

5 Best practice label design

This chapter summarises the empirical evidence regarding best practice label design. Where possible, literature from Australia and overseas has been reviewed to assess how different concepts have been applied, successfully or otherwise, on energy labels. The key concepts considered are:

- ERL design;
- operating costs;
- greenhouse gas emissions;
- communicating change to the star rating system; and
- endorsement labels.

Each of these issues is explored in the sections that follow.

5.1 ERL design

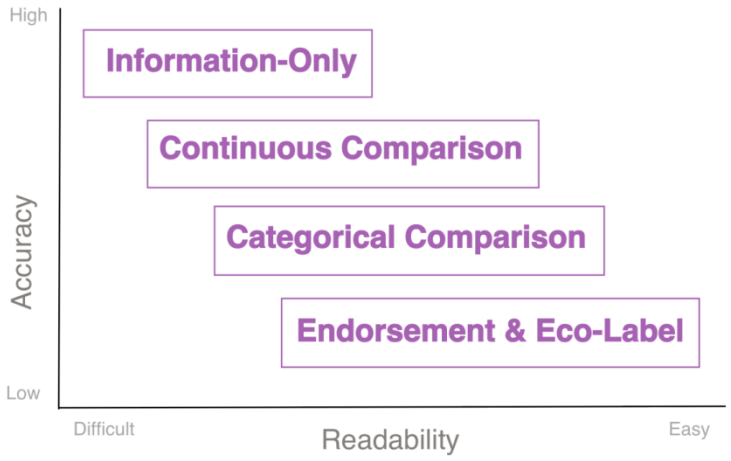
There is no uniform label design around the world; different energy labels contain different types of information, often accompanied by different methods of displaying the information. Ultimately, the design of a label is driven by its purpose (i.e. by what the label is trying to achieve). For example, the ERL and EU label both display energy efficiency, however the EU label has opted for coloured bars and the ERL has opted for stars. Both are displaying the same information but in a different form. The Korean label displays the energy efficiency of an appliance but with a dial display (refer to Appendix C for detailed information on international energy labels). A review of international energy labels by Energy Efficient Solutions (2004) classified the visual designs of labels in use around the world into three basic types.

- **Dial Labels —** this type of label has a 'dial' or gauge, with greater efficiency linked to advancement along the gauge (more efficient represented by a clockwise arc). This type of label is used in Australia, New Zealand, Thailand, Korea and India. The number of stars or the 'grading' numeral on the scale depends on the highest pre-set threshold for energy performance that the model is able to meet.
- **Bar Labels —** this type of label uses a bar chart with a grading from best to worst. All grade bars are visible on every label with a marker next to the appropriate bar indicating the grade of the model. This label is used primarily in Europe and South America.
- **Linear Labels —** this label type has a linear scale indicating the highest and lowest energy use of models on the market, locating the specific model within that scale. As energy is used as the comparator (rather than efficiency), it is necessary to group models into similar size categories for comparison. This model is used in North America.

(A further discussion of international labels can be found in Table 2 and Appendix C.)

Ultimately, how information is displayed is a trade-off between accuracy and readability. As demonstrated in Figure 22, at one end of the scale is an information only label which is highly accurate but difficult to read. On the other end is an endorsement or eco label (such as ENERGY STAR®) which is easy to read but has a low accuracy insofar as it does not necessarily contain specific information about energy use or efficiency.

Figure 22 **Trade-off between accuracy and readability across energy label types**



Source: (Ipsos MORI, London Economics and AEA, 2012)

In order to have a discernible impact on consumers' choices and behaviour, a label needs to present information to consumers that is useful, and otherwise costly to obtain, in a format that can be readily understood (Productivity Commission 2005). The first labelling scheme in the United States, for example, was ignored by many consumers because it had too much information and was difficult to interpret (World Energy Council 2004).

In their inquiry into *The Private Cost Effectiveness of Improving Energy Efficiency* in 2005, the Productivity Commission highlighted the concern of one stakeholder about the complexity of label design. This submission argued that:

> [Labels] should avoid wording which is functionally irrelevant for end-users, such as kilowatts and instead provide information on dollar impacts (p. 177).

Similar comments were made during the re-design of the EU's energy rating label, which also highlighted the importance of label design.

> International research into labels to date has demonstrated that the design of the label is crucial in its success. Using comparative scales to compare the performance of similar appliances is better understood, and more motivating, than those that present technical information only… Product labelling can very successful in driving market changes. The current [EU] Energy label has been an undeniable market transformation success and much of the credit must be attributed to its design… (Ipsos MORI, London Economics and AEA, 2012, p. 68).

Numerous market research studies have researched consumer attitudes to different elements of the ERL at different points in time. A summary of the findings relevant to ERL design from these studies is provided in Table 5.

Table 5 **Consumer views on different elements of the ERL's design**

Study	Objective	Relevant findings
Artcraft Research, 2006, *Appliance Performance Labelling In Australia and New Zealand: Final Report on a Major Quantitative Study among Consumers and Retailers on the Labelling of Household Appliances*, report to the Australian Greenhouse Office Department of the Environment and Heritage	To investigate awareness and use of the labels among the general public, recent buyers of appliances, retailers, and installers of appliances.	▪ Consumers valued the information provided by both the stars and the numbers displayed. ▪ Consumers put cost savings and energy savings ahead of helping the environment as the main reasons that they consulted the label.
Winton Sustainable Research Strategies, 2007, *Consumer research to guide the next round of refrigerator and air-conditioner labels*, report to www.energyrating.gov.au, Department of the Environment, Water, Heritage and the Arts..	To test views on changing the colour of the band to indicate the revised energy ratings system. This report included refrigerators and air conditioners.	▪ On old stock, consumer preference to retain the current label and add a new label with reduced stars and purple band containing message 'revised star rating' and 'from 2009'. ▪ For new stock, preference for a new label with the reduced number of stars and a purple band containing 'revised star rating' message and 'from 2009'. Air-conditioners should also contain a rating against the old scale.
Winton Sustainable Research Strategies, 2008, *Towards a 10-Star Energy Efficiency Rating System for Major Household Appliances: Final Report on a Series of Focus Group Discussions in Australia and New Zealand*, report for Department of the Environment, Water, Heritage and the Arts,.	To explore the views of consumers and industry regarding various ways in which the 10-star idea might be approached.	▪ Almost all are aware that more stars mean greater energy efficiency, and half stars are clearly recognised and understood. ▪ Consumers do not read the number of stars or half stars on a 6-star label, they tend to recognise the rating in its entirety. ▪ Most people also refer to the numbers (energy consumption figure), and while they may be unclear as to precisely what the numbers represent, most do understand that the larger the number, the more energy that appliance consumes and/or the more it will cost to run.
Sweeney Research, 2012, *Consumer understanding of energy efficiency and star rating*, report to the NSW Office of Environment and Heritage.	To get general views on star ratings, energy efficiency and decision making.	▪ Knowledge and understanding of the star rating is very poor; consumers are unsure how to interpret the ERL.[16] ▪ In terms of their information needs for star rating, consumers do not want to be overwhelmed with information. ▪ Information should be comparable, tangible, personal/relevant and easily accessible

Source: Various.

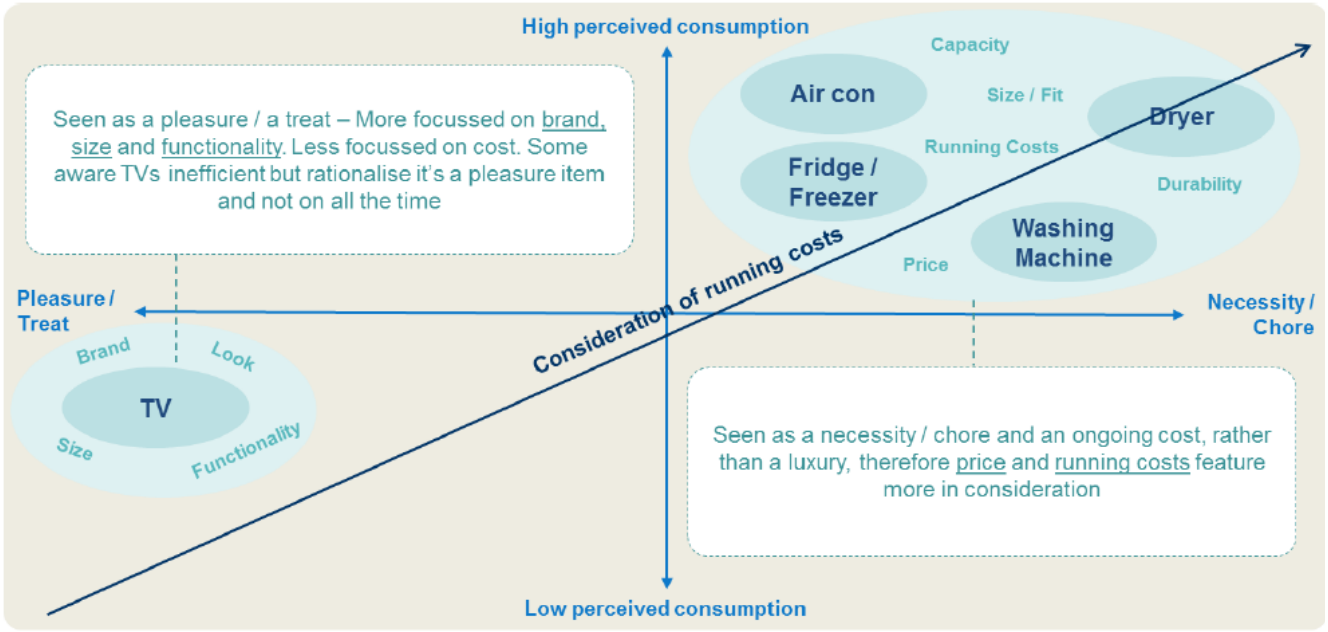
5.2 Operating costs

The literature outlines varied opinions regarding the effectiveness of including operating costs on energy labels. For example, studies by Winton Sustainable Research Strategies (2009) and (2009a) indicate that operating costs are taken into consideration by a limited set of buyers of air conditioners and pool pumps. In contrast, a study by Artcraft (2006) indicates that, once prompted, operating costs were taken into consideration by nearly two thirds of consumers. A study by Sweeney Research (2012) indicated that consumers are motivated by operating costs but do not easily make the link between star ratings and running costs.

Sweeney Research draws a link between the consideration of running cost and the type of appliance (see Figure 23). They suggest that consumers are more focussed on brand, size and functionality when an appliance is regarded as a 'pleasure item' (e.g. televisions) and more focussed on price and running costs when the appliance is regarded as a 'necessity' (e.g. washing machines, dryers). We note that the inclusion of air conditioners in Sweeney's items of 'necessity' is contrary to the findings of Winton Sustainable Research Strategies (2009a).

[16] These findings were based on 6 focus groups conducted with purchasers and considered of electrical appliances across Sydney and Orange (a total of 48 consumers).

Figure 23 **Perceptions of running cost by product**



Source: (Sweeney Research, 2012)

A number of countries/regions have either included operating costs[17] on their labels or have debated its inclusion:

- The US energy rating label was changed in 1994 to resolve issues associated with including the annual operating cost when the national average electricity price changed from year to year. As part of the change, annual energy use became the more prominent value and comparative indicator of the label rather than average annual operating cost.

  Interestingly, a US study from 1998 cited by Wilkenfeld found that, despite the majority of consumers surveyed finding the revised label easier to understand, many consumers had trouble using operating cost information contained in the new label and were confused about what the dollar value meant. That said, it was suggested by salespeople that the dollar amount made it easier for them to explain and compare appliances (George Wilkenfeld and Assoicates, 1998).

  Interestingly, the US label was again modified a decade later to include estimated annual operating cost after consultation found that there was a strong preference for operating costs as opposed to kWh usage (Heinzle, 2012).

- The EU decided in the course of developing its energy rating label that including monetised annual operating cost would be too problematic because the price of electricity varied not only between EU states, but within the same state (George Wilkenfeld and Assoicates, 1998).

- A 1998 review of the Australian ERL conducted by the Energy Labelling Review Committee[18] found that including operating costs on the label was more 'consumer

[17] Notably, the operating cost information that is included (or could be included) in energy labels is an estimate. How much electricity the appliance will use and the associated running costs will depend on how the appliance is used, the electricity prices in the jurisdiction where it is used, and for some products (like air conditioners), the climate where the appliance is used.

[18] The Energy Labelling Review Committee comprised selected members of government, manufacturers, importers and consumer groups.

friendly' but confusing. It decided that including operating costs on the label would be hampered by the wide ranging price tariffs for residential electricity (especially in New Zealand where there is a different currency) and the need for labels to be constantly updated (Energy Efficient Strategies, 1998).

Wilkenfeld (1998) summarised the international experience of including operating costs on energy labels:

> Most consumers would prefer dollar running costs somewhere on the label, but no labelling program appears to have satisfactorily resolved how to do this, given that energy prices vary regionally and over time and that there is potential confusion between operating costs and savings (and in some cases purchase costs) (p. v).

Energy Efficient Strategies (1998) observed that there was an international tendency to provide information on operating costs in supplementary material such as brochures or on the internet. However Artcraft Research (1998a) found that few consumers claimed to have ever seen such brochures. The information presented by the various key studies cited above is presented in more detail in Appendix D.

Despite the potential merits of including operating costs on energy labels, the Productivity Commission (2005) warns of its inherent difficulties.

> While purchasers may find it easier to interpret a label that measures energy use in terms of dollars, such a label could be misleading for purchasers who do not face the assumed electricity or gas price. For example, in 2003-04, the average residential electricity price in South Australia was 65 per cent higher than in New South Wales (ESAA 2004). In Victoria, it was 42 per cent higher. Notwithstanding the large variation in prices, the inclusion of a dollar operating cost on labels may help purchasers compare different appliances (p. 177).

While it has been recognised that including operating costs on energy labels has the potential to be a problematic (as evidenced in the US, EU and Australia), the UK is using the results of a Norwegian study to trial the inclusion of *lifetime* operating costs on the energy label (rather than an *annual* cost). The Norwegian research (which used a natural field experiment rather than hypothetical scenarios) found that, under the study conditions, better information about the lifetime energy cost of an appliance can induce consumers to purchase more energy efficient models, at least when it comes to appliances with high energy costs (e.g. dryers) (Kallbekken, Saelen, & Hermansen, 2012).

Among other evidence, the Norwegian study cites research by Heinzle (2012) that found disclosing annual energy costs is less effective than disclosing energy use in watts, *however* the disclosure of lifetime energy costs is the most effective measure for 'guiding consumers towards more energy-efficient shopping behaviour' (Kallbekken, Saelen, & Hermansen, 2012).

A six-month trial by the UK Department of Energy and Climate Change and retailer John Lewis launched on 9 September 2013, will see lifetime electricity running costs printed on washing machines, washer dryers and tumble dryers (Resource Magazine, 2013).

5.3 Greenhouse gas emissions

Several studies have considered the impact of including carbon dioxide (CO_2) emissions (one of many greenhouse gases) information and the carbon footprint of the product[19] on the energy label, or providing an environmental sticker on the appliance.

A recent US study (Newell & Siikamaki, 2013) found that including information on CO_2 emissions on an energy label supported more cost efficient investments in appliance energy

[19] Defined as the total greenhouse gases released through the product's life from manufacture and use to disposal.

efficiency. However, the study also found that information on physical energy use and CO_2 emissions had additional but lesser importance than simple information on the economic value of saving energy. Under the study conditions, the authors found that the presence of CO_2 information on the energy label decreases the willingness to pay (WTP) for lower operating costs for around 15 per cent of the study population, but increased the WTP for lower operating costs for the remaining 85 per cent.

Newell and Siikamaki suggested that the presence of CO_2 information and the decrease in the WTP were consistent with findings from another recent US study. Gromet, Kunreuther and Larrick (2013) found that promoting the environment can adversely affect the adoption of energy efficient technologies due to the political polarisation of environmental issues. Specifically, the first phase of this study found that, in the US, political conservatives (typically corresponding with Republicans) placed lower psychological value on reducing carbon emissions, dependence on foreign oil and reducing the financial cost of energy use than political liberals (Democrats), with the lowest value placed on reducing carbon emissions.

The second phase of the study tested how this polarisation would affect the purchase of energy efficient products. This component of the study found that the more conservative study participants were deterred from purchasing a more energy efficient product (compact fluorescent light) when it had an environment label (specifically a sticker that said 'Protect the Environment'). The authors concluded that:

> Our findings demonstrate the influence of framing and contextual effects on people's selection of energy-efficient options … and the importance of individual-level, behavioral [sic] factors in adopting energy-efficient measures… These results also speak to the importance of recognizing that people's choices can be based on noneconomic sources of value. The present results complement previous research demonstrating the influence of identity-related concerns on people's economic decisions … because people make choices that align with important identities and provide distance from unwanted identities … Our results demonstrate that individuals will forego economically beneficial options if these options promote a value that is in conflict with their political ideology (Gromet, Kunreuther, & Larrick, 2013, p. 5).

A comprehensive study conducted by Ipsos MORI, London Economics and AEA[20] for the European Commission into options for including additional environmental information on the EU energy rating label, considered the presence of the carbon footprint on the label. This study defined carbon footprint as the total greenhouse gases released *through the product's life* from manufacture and use to disposal [the definition linked greenhouse gases to climate change] (Ipsos MORI, London Economics and AEA, 2012).

While the Ipsos study considered the through life carbon footprint, it provides good insight of the issues pertaining to the inclusion of such information on the ERL. Some of the key findings are outlined below.

- There are a number of different methodologies in the EU for ascertaining the carbon footprint of a product. This makes carbon footprinting the most mature measure of environmental performance (compared to water footprint, resource depletion and water eco-toxicology) and it will soon be underpinned by an ISO standard.
- Consumer choices could be affected by the addition of a carbon footprint symbol on the label.
- All environmental impacts of a product must be given balanced consideration, however the addition of carbon footprint information is a good indicator of the overall impact of a product category, in particular for those that are highly energy intensive and have simple

[20] Ricardo-AEA is a provider of analysis, advice, and data on economically sustainable solutions for energy and environmental challenges (www.ricardo-aea.com).

emissions sources. For some product groups, GHG emission information is not the most significant environmental aspect and other environmental impacts, such as resource depletion and water eco-toxicity, need to be taken into account as a means of providing balanced life cycle information.

- Low carbon 'literacy' among consumers makes communication of carbon emissions and footprint a difficult prospect; generally speaking consumers do not engage with grams of carbon dioxide and do not understand carbon terminology. Labels containing carbon footprint information (carbon labels) must be simple, clear and engaging, and hence a 'best in class' or product banded approach (e.g. traffic light or A-G [EU scale]) could be suitable.
- Experiments undertaken in the course of the Ipsos study found that:
  - environmental ratings on a proposed carbon label had a positive effect on product choices and WTP for washing machines and televisions;
  - the proposed carbon label encouraged respondents to be willing to pay more for products than when they were only shown the standard energy label;
  - an improved carbon footprint rating made a product more desirable; and
  - consumers made 'better' choices if they had a higher level of understanding about the carbon label.

UK research referred to in the Ipsos study found that it is difficult for consumers to make sense of grams of carbon in relation to their lifestyle emissions so a numerical label may not provide a reference for consumers to judge product-related emissions. The main benefits of carbon labelling are not likely to be realised through communicating emissions values to consumers (downstream), but rather via manufacturers looking for ways to reduce emissions (upstream). The study also claimed that carbon labels needed to be simple, intuitive, provide context, cut through the 'noise', be from a trusted voice and fit with other sustainability labels.

5.4 Communicating change to the star rating system

As appliances' technology improves over time, there is a need to revise the star rating algorithms so that there is a good spread of efficiencies across models and so that most models earn considerably less than six stars (this allows room for future models with greater efficiency to remain within the one to six scale for some years) (Winton Sustainable Research Strategies, 2013).

The issue about how best to communicate these changes to consumers has been explored for more than 15 years. It was first tackled with refrigerators in 1998 (Artcraft Research, 1998a and 1998b) and again with refrigerators and air conditioners in a 2007 study (Winton Sustainable Research Strategies, 2007) .

In the first of Artcraft's 1998 studies (Artcraft Research, 1998a), consumers were given a simple explanation of appliance efficiency improvements and the problem of bunching near the top of the scale. Then, they were asked about their preferences to the following two alternative solutions:

- adding more stars (e.g. a 10-star scale), with current products retaining their current rating; or
- retaining a 6-star scale, but scaling current products down to allow room for more efficient ones (e.g. a 5-star model may become a 3-star or 2-star model).

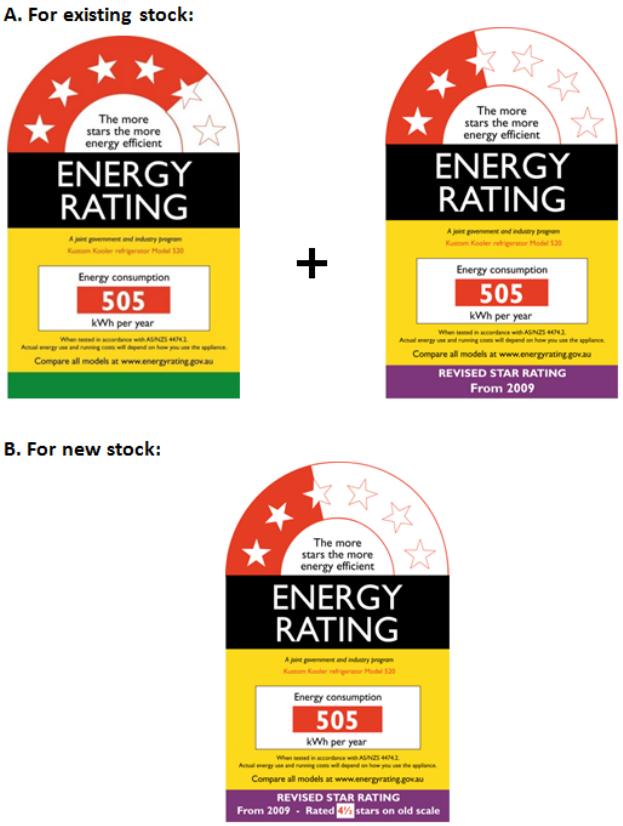
According to Winton Sustainable Research Strategies (2013, p.7) '[t]he scaling back option enjoyed clear support in six of the seven focus groups, and was subsequently implemented successfully.'

For the first rescaling in 2000, a 'green band was used on the label on new stock to differentiate it from existing stock for the first rescaling, with suppliers given the option of putting a message in the green band indicating that the appliance had earned more stars on the old scale. This worked reasonably well.' (Winton Sustainable Research Strategies 2013, p.7).

For the second rescaling of the ERL in 2010 research conducted by Winton Sustainable Research Strategies investigated consumer views on replacing the green band with a purple band. This research found that (Winton Sustainable Research Strategies, 2013):

- on existing stock the clear preference was for retention of the current label and addition of the new label with the reduced number of stars and a purple band containing the messages of 'revised star rating' and 'from 2009' (See panel A in Figure 24); and
- for labelling new stock the clear preference according to most consumers and retailers was for the new label with the reduced number of stars and a purple band containing the messages of 'revised star rating' and 'from 2009', as well as a clear indication of its rating on the old scale (See panel B in Figure 24).

Figure 24 **Previously assessed options to communicate rescaling of the ERL**

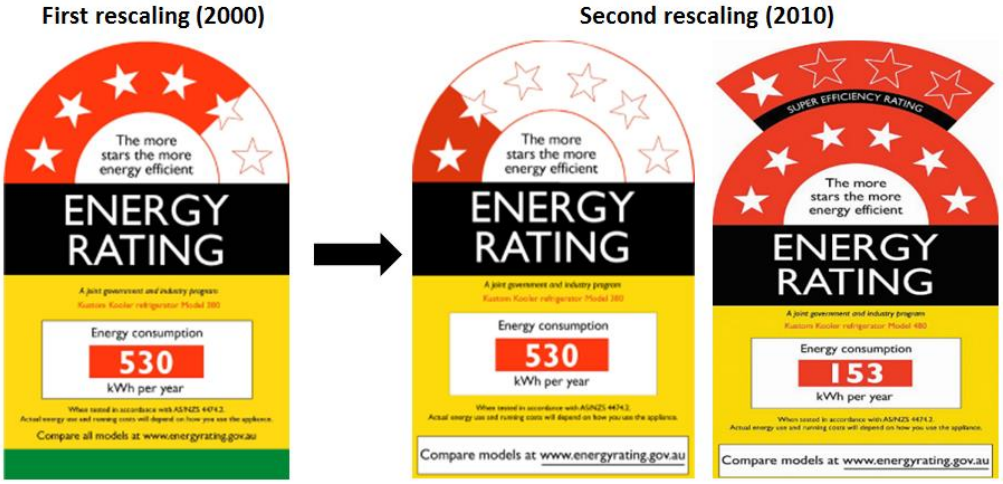


Source: (Winton Sustainable Research Strategies, 2013).

At the end, for the second rescaling of the ERL in 2010 a decision was made to use a different label rather than replacing the green band with a purple band. The new labels did not have a green bar on the bottom, and they were able to accommodate super energy

efficient appliances up to 10 stars by adding a four-star crown above the label (see Figure 25).

Figure 25 **Second ERL rescaling**



Source: Labels provided by the Department of Industry.

For future rescalings, further research was conducted in 2011 (Winton Sustainable Research Strategies, 2011). In this study, consumers were asked to consider three broad approaches that may be used when rescaling occurs. These are (Winton Sustainable Research Strategies, 2013):

1. the approach used previously — a message in a coloured band at the bottom of the label, with or without a date in the message;
2. replacement of all old labels with new labels in all store displays and on warehouse stock, so that all stock displayed and delivered carries the new (rescaled) ratings. (No date depiction); and
3. placing a date somewhere in the body of the label.

The study found that consumers preferred to have a date somewhere in the body of the label as a means of communicating change (i.e. option 3 above), with option 1 (a message in a coloured band at the bottom of the label) somewhat behind. In contrast, the study found that industry and retailer stakeholders preferred a label containing a message with a coloured band (i.e. option 1), well ahead of having a date on the label, which was their second best option. Notably, the option of replacing the old labels with new labels in all store displays and warehouse stock had no supporters amongst either industry or retail stakeholders, and only one consumer supporter (Winton Sustainable Research Strategies, 2013).

The inclusion of an appliance's year of manufacture on an energy label as a means of communicating change has also been investigated previously. Winton Sustainable Research Strategies (2012) investigated the views of consumers, industry and retailers about this issue and found the following:

- Consumers were generally supportive of the label including year of manufacture as it provided:
  - assurance that the appliance is the latest model (or not);

  - bargaining power when discussing price with retailers; and
  - information to help the consumer decide if the star rating they were looking at was based on a new or old star rating algorithm.

- Suppliers and retailers were generally against the label including year of manufacture. Their main concerns were as follows:
  - expensive to replace damaged or lost labels on older showroom stock with a label printed with the no-longer current year of manufacture; and
  - older stock would quickly lose value (if not sold before new stock arrived).

5.5 Endorsement labels

Endorsement labels are effectively a 'seal of approval'. Products displaying an endorsement label are generally in the top 10 to 40 per cent of products in terms of energy efficiency. These products meet or exceed established criteria for energy consumption and/or energy efficiency. Endorsement labels can be sponsored by governments, although industry, utilities providers and environmental groups have also been known to sponsor these labels. Endorsement labels do not provide much information on energy or performance, unlike comparison labels (such as the ERL) which show key energy and performance information (George Wilkenfeld and Assoicates, 1998).

A widely recognised endorsement label is the ENERGY STAR®, a variant of which is shown in Panel A in Figure 26. The ENERGY STAR® is a voluntary program created by the US Environmental Protection Agency in 1992 that identifies and promotes energy efficient products and buildings and has now been adopted by several countries around the world, including Australia and New Zealand. The aim is to reduce energy consumption, improve energy security and reduce pollution through labelling or providing information about products and buildings that have the highest energy efficiency standards. Third-party certification ensures the integrity of the program; appliances are tested in EPA-recognised laboratories as well as subject to 'off-the-shelf' verification testing (Environmental Protection Agency (US)).

Research investigating New Zealand's experience with the ENERGY STAR® program found that (Murray, 2011):

- ENERGY STAR® was a 'short-cut, brand mark to the right decision';
- recognition of the ENERGY STAR® is relatively high (78 per cent of NZ consumers in the survey were aware of the label);
- modelling indicated there was a significant increase in the purchase likelihood of ENERGY STAR® labelled appliances as well as an ability to get consumers to upgrade to more efficient models;
- manufacturers recognised that the label was a source of competitive advantage; and
- the ERL and endorsement label have mutually supportive roles.

Newell and Siikamaki (2013) also investigated the effect of placing an endorsement label (for example, the US ENERGY STAR®) on an energy label along with the simple monetary or physical information. The authors found that the inclusion of the endorsement label significantly raises the value placed on energy efficiency.

Figure 26 **Examples of endorsement labels**

A: ENERGY STAR®

B: Energy Saving Trust Recommended

Source: US EPA http://www.energystar.gov/index.cfm?c=about.ab_index; http://upload.wikimedia.org/wikipedia/en/5/59/Energy-Saving-Trust-Recommended-logo.jpg

There is also an endorsement label used in the United Kingdom, the *Energy Saving Trust Recommended* label (the *Energy Saving Recommended* label) shown in Panel B in Figure 26. Research conducted on this label in 2004-05 found that consumers were aware and influenced by the presence of the label when purchasing an appliance. This survey of nearly 5,000 customers surveyed two types of consumers – those that had contacted the Energy Savings Trust (i.e. the label administrators) via one of the Trust's advice centres, its telephone hotline or its website, as well as members of the general public (i.e. who had not interacted with the trust), some of which had purchased an appliance in the last 12 months.

In terms of awareness, more than 50 per cent of customers surveyed that had interacted with the Trust recognised the label, specifically; contact via an advice centre (56 per cent), telephone hotline (62 per cent) or the website (77 per cent). With respect to how influential the label is, between 10 and 21 per cent of customers surveyed that had interacted with the Trust indicated that they purchased an appliance as a result of the presence of the label, specifically; contact via an advice centre (10 per cent), telephone hotline (17 per cent) or the website (21 per cent).

Of greater interest are the results of those that did not interact with the Trust (i.e. the general public) as this group is seemingly more random given they have had no contact with the Trust. Of this group (Lock & Hindson, 2006):

- 54 per cent were aware of the label, of which:
  - 70 per cent that purchased an appliance in the last 12 months were aware; and
  - 46 per cent of those that did not purchase an appliance were aware of the label.
- 33 per cent had bought an appliance in the last 12 months, of which:
  - 43 per cent looked for or asked about the label;
  - 65 per cent bought an appliance with the label; and
  - 10 per cent bought an appliance with the label and would not have bought the appliance if it had not been labelled.

The results from the general public customer group for the 2004-05 survey suggest:

- more bought a labelled appliance than actually looked for/asked about the label; and
- the label was a 'deal maker' for one in 10 customers.

The examples provided by ENERGY STAR® and *Energy Saving Trust Recommended* demonstrate that the presence of an endorsement label can influence the decision to purchase an energy efficient appliance.

5.6 Key points from the literature

The following box summarises the key points from the literature on energy rating labels.

KEY POINTS

Label design

- International research to date demonstrates that the design of the label is crucial in its success.
- Ultimately, how information is displayed is a trade-off between accuracy and readability.
- To have a discernible impact on consumers' choices and behaviour, a label needs to present information that is useful, and otherwise difficult or costly to obtain, in a format that can be readily understood by consumers.
- Labels should only include information that is relevant to consumers.

Operating costs

- The literature supports the potential merits of including operating costs on energy labels as an effective mechanism to induce behavioural change.[21]
- However, it also recognises that it is difficult to provide meaningful and precise information about energy costs because this requires a number of assumptions regarding the price of electricity, which varies regionally and over time.
- The literature also recognises the potential for confusion between operating costs, operating savings and even purchase costs.

Greenhouse emissions

- The literature suggests that there is a core set of consumers that are primarily motivated by environmental concerns; however it also suggests that there are other consumers who are de-motivated by environmental concerns.
- The inclusion of information about greenhouse gas emissions from an appliance's operation or the total carbon footprint through the product's life could be an effective way to reach environmentally concerned consumers.

Communicating change to the star rating system

- The literature suggests that the two most preferred methods by consumers of communicating change to the star rating algorithms are placing a date (year) in the label, and the approach used previously (a message in a coloured band at the bottom of the label) as the second best option.

Endorsement labels

- Literature related to two endorsement labels, ENERGY STAR® and *Energy Saving Trust Recommended* suggests that:
  - Endorsement labels can work in tandem with categorical labels (and do so in many countries); and
- the presence of an endorsement label can have an influence on the decision to purchase an appliance.

[21] It is noted that any operating cost information that could be included in energy labels is an estimate. How much electricity the appliance will use and the associated running costs will depend on how the appliance is used, the electricity prices in the jurisdiction where it is used, and for some products (like air conditioners), the climate where the appliance is used.

6 Key findings and recommendations

6.1 Key findings

This section brings together the findings outlined throughout the report and discusses the key insights on which the recommendations of this review are based. It is organised around the following issues:

- label design;
- the inclusion of operating costs in the label;
- the inclusion of greenhouse gas emissions and other environmental information in the label;
- how to communicate change to the star rating system;
- the use of electronic information to provide additional information to consumers; and
- the use of endorsement labels.

Each of these issues is discussed below.

6.1.1 Label design

International research into energy labels to date demonstrates that the design of the label is crucial in its success. To have a discernible impact on consumers' choices and behaviour, a label needs to present information that is useful, and otherwise costly to obtain, in a format that can be readily understood by consumers. Furthermore, the label should actively seek to avoid 'clutter' (such as complex or technical information) and information that is ultimately irrelevant for consumers.

There is no uniform label design around the world, different labels contain different types of information and display information in different ways. Irrespective of design, how information is ultimately displayed is a trade-off between accuracy and readability.

With respect to the ERL, the survey results strongly indicate that the current label design is working and trusted. In particular, the survey results show that the ERL:

- is practically universally recognised (97 per cent of consumers surveyed in Australia have noticed the label on new appliances being sold in stores);
- is mostly interpreted correctly by consumers (72 per cent of consumers correctly interpret an increase in the star rating as an increase in the appliance's energy efficiency) and is their primary research tool for information about an appliance's energy efficiency (over 62 per cent of consumers use the ERL to research the energy use or energy efficiency of appliances);
- is providing *useful* information to 79 per cent of consumers and *new* information to 52 per cent of consumers;
- is affecting the final purchasing decision of 54 per cent of consumers;
- gives confidence about the information it provides to 61 per cent of the consumers who are aware of the industry/government partnership arrangements behind the ERL; and

— when compared to energy labels from the US, EU and Canada, it is considered by consumers as the most effective at presenting energy consumption information and at providing information for easily comparing models.

6.1.2 Operating costs

The survey findings show that 81 per cent of consumers would find information about operating costs useful when buying an appliance. Including this information on the label broadly falls under the aims of the ERL as it would enable consumers to understand the approximate running costs of an appliance before buying it and to minimise the total lifecycle cost.

The literature on the topic supports the potential merits of including operating costs on energy labels as an effective mechanism to induce behavioural change. However, it also recognises that it is difficult to provide meaningful and precise information about energy costs (this would require a number of assumptions regarding the appliance's use and the price of electricity, which varies regionally and over time) and the potential for confusion between operating costs, operating savings and even purchase costs.

Some international labels include operating cost information (e.g. labels from US, Canada and Mexico). The first survey conducted for this review found that, when comparing energy labels from the US, EU, Canada and the ERL, Australian consumers consider the US's EnergyGuide label as the most effective at presenting operating cost information. Further, a Norwegian study published in (2012) found that better information about the lifetime energy cost of an appliance can induce consumers to purchase more energy efficient models, at least when it comes to appliances with high energy costs (e.g. dryers).

To provide this information to consumers, the use of electronic tools is an alternative to including the operating cost information on the label itself.[22] In addition to the Energy Rating Website, smart technologies could be a means of overcoming the key problem associated with operating costs (dynamic electricity prices). The label could — through a web link, app or QR code — direct the consumer to further information that can be tailored to specific circumstances, such as location, year, electricity price and household size. Further, the app or QR code could 'piggy back' off the current label by linking the currently reported kWh with operating cost. Ultimately, the app or QR code could bring together disparate data to the point where it is easily understood by the consumer. Notably, in this respect, the second survey findings show that:

— of those respondents who would prefer to use Internet tools to provide a better estimate of operating costs (45.4 per cent of total survey respondents):
  - 53.6 per cent would prefer a website link on the label;
  - 36.6 per cent would prefer a QR code on the label;
  - 7.2 per cent where not sure what they would prefer; and
  - 2.7 per cent would prefer not to include a website or QR code on the label;

— of those respondents who would prefer to rely on an estimate of approximate operating costs reported on the label (or were unsure of their preference — 54.6 per cent of total survey respondents):

[22] Notably, the survey findings show that just under half of consumers would prefer to use Internet tools to better estimate operating costs that take into account their family location and circumstances, rather than rely on an approximate amount reported on the label.

- 62.3 per cent prefer keeping the existing number for energy consumption and adding the operating cost. That is, both energy consumption and operating cost would appear in the red box on the appliance label;
- 23.4 per cent had no preference;
- 13.5 per cent prefer replacing the number for energy consumption in the red box with the operating cost; and
- 0.8 per cent suggested other preferences.[23]

6.1.3 Communicating change to the star rating system

In the past, changes to the star rating algorithm have been communicated to consumers through the addition of a green (2000) and a different sticker (2010) (see Figure 7 in Chapter 3). Research conducted on the subject (Winton Sustainable Research Strategies, 2013) found that the use of this approach in both rescalings went fairly well.

Further research undertaken to asses different ways of communicating future changes to the star rating algorithm (Winton Sustainable Research Strategies, 2011) found that, when asked to consider three options to communicate change (including a colour band like in previous rescalings; replacing all labels with new ones; and including a date on the label):

- consumers preferred to have a date somewhere in the body of the label as a means of communicating change. A message in a coloured band at the bottom of the label was their second best option;
- industry and retailer stakeholders preferred a label containing a message with a coloured band well ahead of having a date on the label, which was their second best option; and
- the option of replacing the old labels with new labels in all store displays and warehouse stock had no supporters amongst either industry or retail stakeholders, and only one consumer supporter.

The first survey conducted for this review found that the majority of consumers (69 per cent) think including the year that the star rating changed is the most effective way of communicating changes to the star rating algorithm, with only 5 per cent of consumers preferring the removal of the green stripe as a means of communicating change. Of the remainder, 18 per cent had no preference and 7 per cent preferred some other method. Furthermore, the second survey also found that:

- the vast majority of consumers (91 per cent) think that the periodic updating of the methods and label to reflect technology improvements is a good idea;
- 77 per cent of consumers would prefer a system where the cost of labelling transition for appliances could be minimised or avoided altogether; and
- 64 per cent of consumers would prefer a system where the need for the relabeling of appliances could be minimised or avoided altogether.

The inclusion of an appliance's year of manufacture on an energy label as a means of communicating change to the rating algorithms has also been investigated previously. Winton Sustainable Research Strategies (2012) investigated the views of consumers, industry and retailers about this issue and found that consumers were generally supportive

[23] These included: Outlining the energy consumption the appliances uses when on standby in red box, with website details for calculating operating cost; putting the approximate operating cost, then the amount of stars following for its energy rating; and showing the energy consumption, with staff adding the operating cost based on a conversion they know for the specific area.

of the label including year of manufacture. However, the primary reasons for its inclusion were not related to energy efficiency or the overarching objectives of the ERL. The study found that consumers would like the label to include year of manufacture mainly because it would provide them with assurance that the appliance is the latest model (or not) and would give them bargaining power when discussing price with retailers.

Suppliers and retailers included in the study were generally against the label displaying year of manufacture. Their main concerns were that it would be expensive to replace damaged or lost labels on older showroom stock with a label printed with the no-longer current year of manufacture and that older stock would quickly lose value (if not sold before new stock arrived).

Interestingly, the first survey conducted for this review found that around 70 per cent of consumers would find year of manufacture helpful when purchasing an appliance. However, it was not a high-ranked option (it ranked 5th out of 10 items in the list of information that consumers would find helpful).

6.1.4 Smart Technology

Technology already exists that allows for the ERL to provide consumers with more information than what is currently printed on the label. The E3 website (www.energyrating.gov.au) provides information that compares models of appliances available in Australia and New Zealand, such as the energy consumption, star rating and the operating cost.

To assess the potential use of different electronic tools as a means of providing information about appliances' energy use, the surveys undertaken for this review asked consumers to consider electronic links for information on energy labels, with some information accessible through a smartphone or tablet and some only requiring the Internet.

The first survey found that just over three quarters of survey respondents (76 per cent) use a smartphone. The second survey asked about smartphone *and* tablet ownership and found that more than four in five consumers (84 per cent) use a smartphone or tablet. This suggests that information that can be accessed with smartphones or tablets could potentially service the needs of a considerable proportion of appliance purchasers.[24]

Of the 915 respondents to the first survey that use a smartphone, around 42 per cent indicated they would scan a QR Code on an ERL to access additional information about an appliance, while around 50 per cent indicated that they would use a smartphone application (or 'app') to access more information. The second survey asked respondents who used a smartphone or tablet and used it to access information about appliance about their preferred method of accessing more information and it found that:

- 32 per cent would prefer to use an app (once downloaded will work in a store without connection to the Internet);
- 29 per cent would prefer to scan a QR code printed on the label to link to a website tool;
- 9 per cent would prefer keying in a web address printed on the label to link to a website tool;
- 24 per cent would use any of the above; and
- 6 per cent would not prefer any of the above.

[24] Notably, the first survey only asked respondents about the use of smartphones, not smartphones and tablets.

Respondents were also asked whether they would use a website address on an ERL to access more information about the energy use of an appliance, with slightly more than half of consumers saying they would. However, consumer intentions do not always result in outcomes as survey results also showed that only 17 per cent (15 out of 87) of air conditioner purchasers and 7 per cent purchasers of all other appliances actually used the E3 website as a resource to select their recently purchased appliance. In this respect, as discussed above, the use of smart technologies could change the way the label provides extra information through electronic sources by providing a convenient portal to the energy rating website (and other sources), making it more useable and accessible.

These findings are generally supportive of making greater use of smart technologies to provide consumers with more information about an appliances' energy use. Furthermore, as discussed in Section 6.1.2 above, electronic platforms such as an app can also be a useful tool to overcome the problems associated with dynamic information (for example changing electricity prices which restrict the ability to report operating costs). Future label designs therefore should consider the use of these technologies and the opportunities they provide in terms of engagement, behavioural change and accuracy.

6.1.5 Endorsement labels

Endorsement labels are effectively a 'seal of approval'. Products displaying an endorsement label are generally in the top 10 to 40 per cent of products in terms of energy efficiency. These products meet or exceed established criteria for energy consumption and/or energy efficiency.

The literature that investigates the effects of placing an endorsement label on an energy label found that the presence of an endorsement label can influence the decision to purchase an energy efficient appliance. In particular:

- research by Newell and Siikamaki (2013) found that the inclusion of an endorsement label (for example, the US ENERGY STAR®) on an energy label (along with the simple monetary or physical information) significantly raises the value placed on energy efficiency;
- research conducted in the UK in relation to the *Energy Saving Trust Recommended* label found that consumers were aware and influenced by the presence of the label when purchasing an appliance. Indeed, for the general public customer (i.e. those who had not interacted with the administrators of the label), the study found that more bought a labelled appliance than actually looked for/asked about the label; and that the label was a 'deal maker' for one in 10 customers (Lock & Hindson, 2006); and
- research investigating New Zealand's experience with the ENERGY STAR® program found that (Murray, 2011):
  - ENERGY STAR® was a 'short-cut, brand mark to the right decision';
  - Recognition of the ENERGY STAR® is relatively high (78 per cent of NZ consumers in the survey were aware of the label);
  - modelling indicated there was a significant increase in the purchase likelihood of ENERGY STAR® labelled appliances as well as an ability to get consumers to upgrade to more efficient models;
  - manufacturers recognised that the label was a source of competitive advantage; and
  - the ERL and endorsement label have mutually supportive roles.

6.1.6 Greenhouse gas emissions

The literature suggests that there is a core set of consumers that are primarily motivated by environmental concerns and that including information about greenhouse gas emissions and/or other environmental information would be a good way of reaching these consumers. However, there is also evidence that placing environmental information on a label can also adversely affect purchases of energy efficient appliances if the purchaser does not sufficiently value the environment.

In particular, a recent US study (Newell & Siikamaki, 2013) found that information on carbon dioxide emissions (one of many greenhouse gases) on an energy label increased the willingness to pay for an appliance for 85 per cent of participants in the study. However, for the remaining 15 per cent of study participants it actually decreased willingness to pay. This finding is consistent with another US study (Gromet, Kunreuther, & Larrick, 2013) that found that people make choices that align with their beliefs and that they are willing to forego economically beneficial options if they promote a value that is in conflict with their ideology.

In the Australian context, the first survey conducted for this review found that including GHG emissions information would be helpful for around 55 per cent of consumers.[25] However, the inclusion of GHG emissions is not considered as helpful as the inclusion of other types of information (it ranks well down the list of information that consumers would find helpful when buying an appliance — 8th out of 10 items).

If information about greenhouse gas emissions were to be included in the label, the literature suggests that labels containing this information:

- must be simple, clear and engaging with a 'best in class' or product banded approach (e.g. traffic light or EU scale); and
- need to be intuitive, provide context, cut through the 'noise', be from a trusted voice and fit with other sustainability labels.

6.2 Recommendations

The investment in the ERL has resulted in a highly recognised, highly understood label. The ERL is contributing to behavioural change throughout the community and is successfully addressing a market failure in the market for appliances.

In light of the key findings above and to add to the label's effectiveness, this review recommends the following.

Avoid a complete overhaul of the label or its components

It is recommended that the current features used in the label are maintained and that its design is not varied too widely. A complete overhaul of the label or its components (such as the stars) could result in all the recognition (the brand) of the existing products (the stars) being lost.

Make greater use of smart technologies

It is recommended that the energy rating labelling scheme makes greater use of smart technologies to provide consumers with more information about an appliance and its energy use. These can include, amongst others, a purpose built smartphone/tablet application (app)

[25] Question 28 of the first survey asked respondents to indicate how helpful different types of information would be when purchasing an appliance. The scale used in this question was 0-10 where 0 meant 'not at all helpful' and 10 meant 'extremely helpful'. Using this scale, information was considered 'helpful' when respondents rated it 7, 8, 9 or 10.

or a Quick Response (QR) code. The second survey conducted for this review found that 84 per cent of consumers use a smartphone or tablet, and that 76 per cent of these consumers have either used their smartphone or tablet in store to access more information about appliances or would be interested to try it. This indicates that information that can be accessed with a smartphone or tablet could potentially service the needs of a considerable proportion of appliance purchasers. The preferred method of consumers through which to access this information requires further investigation.

Smart technology could also be used to provide personalized information to different consumers based on their individual preferences/needs (e.g. GHG emissions for environmentally conscious consumers and operating costs for cost conscious consumers).

Explore the inclusion of operating costs

It is recommended to explore the possibility of including information about operating costs in future label designs. Consumers would find information about operating costs useful when buying an appliance, but a meaningful way to provide this information would need to be found. A solution to address the issues relating to the inclusion of operating costs would be the use of smart technologies that could account for the cost of electricity in different regions and over time.

Explore options to communicate changes to the star rating system

Being able to communicate changes in the star rating system is essential to the ongoing success of the label. The first consumer survey revealed that two out of three consumers consider including the year that the star rating changed the most effective way of communicating change. It is recommended that this and other alternative transitional arrangements (including the use of a smartphone/tablet app, a QR code or other electronic means) are investigated further with industry and consumers.

Explore the use of endorsement labels

It is recommended that the possibility of using endorsement labels in tandem with the ERL is further explored. The literature on the topic suggests that endorsement labels may have a significant impact on encouraging energy efficient choices; however, a more detailed analysis of the costs and benefits of its inclusion would be desirable.

Highlight the government/industry partnership

It is recommended that the role played by the government/industry partnership be highlighted in future ERL designs. Knowing that the energy rating labelling scheme is a government/industry partnership gives confidence to consumers about the trustworthiness and relevance of the label and about the accuracy of information contained in it. However, the first survey showed that only 31 per cent of consumers are aware of the partnership arrangements behind the ERL.

Explore ways to increase and improve the use of the E3 website

This review found that, while 55 per cent of consumers say that they would use a website address on an ERL to access more information about the energy use of an appliance, only 17 per cent of air conditioner purchasers and 7 per cent purchasers of all other appliances actually used the E3 website as a resource to select their recently purchased appliance. In light of this, it is recommended that the reasons for the low use of the E3 website and possible improvements to increase and improve its use are further investigated.

Keep abreast of international developments

It is recommended that the E3 Committee keeps abreast with international developments in the energy labelling field to take account of lessons learned from other labelling programs. For instance, after reviewing the results of a current trial by the UK Department of Energy and Climate Change evaluating whether consumers are more likely to purchase energy efficient goods if their label contains lifetime electricity running, the Australian Government could consider undertaking a similar trial.

Undertake regular evaluations

It is recommended that regular evaluations (every three to five years) are undertaken to ensure that the label continues to be relevant and useful to consumers, in particular for the purposes of:

- monitoring the progress of the energy label in general, and with regard to any changes made to it;
- guiding the development and implementation of the proposed climate label;
- evaluating the performance of new electronic means of providing information; and
- evaluating any changes made in relation to labelling transitions.

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Appendix A Appliances and market failure

This appendix discusses the common market failures associated with household appliances and the effectiveness of the ERL (and similar programs from around the world) in overcoming them.

A.1 Market failure

Under the right conditions, markets can be incredibly effective in providing efficient outcomes. However, when one or more of these conditions are not met, then the resulting outcomes can often be 'sub-optimal' or inefficient.

'Market failure' describes a situation when the market is unable to produce an efficient allocation of resources. In the market for appliances, market failure can occur for a number of reasons. The major sources of market failure relating to appliances include the following.

- **Information failures** — occurs when two parties to a transaction do not have equal access to relevant information (information asymmetry). Potentially significant information asymmetries exist where industrial equipment (such as appliances) is not 'energy rated', making it difficult for non-experts to assess the product's level of energy efficiency or determine its energy costs.
- **Bounded-rationality** — the concept that individuals and firms may not be able to always make perfect or optimum decisions as their knowledge and processing abilities are limited; they apply their rationality only after having greatly simplified the choices available to them. In some cases, socially suboptimal outcomes result. For example, an individual may not have the ability or time to fully process and evaluate the information they have about an appliance.
- **Split incentives** (also known as principle-agent problems) — occurs when one party (the principal) pays another party (the agent) for a good or service, but the parties have different incentives. For example, an appliance may be purchased for a household tenant by a landlord or a builder. The landlord or builder may have the goal of wanting to minimise the capital cost of the appliance (with little concern for efficiency and related cost) whereas the tenant may want maximum energy efficiency in order to reduce running costs.
- **Externalities** — where, as the result of a decision, costs are imposed upon parties external to the transaction.

Governments have an interest in correcting market failures for several reasons:

- An efficient society is one where there are no market failures, in this case when consumers are well informed.
- Poor choices of appliances (i.e. purchasing 'bad' instead of 'good' appliances) leads to excessive energy consumption and adverse environmental impacts.
- Arming consumers with information about the energy consumption of appliances incentivizes producers to make better appliances.

While the ERL does not aim to address each of these market failures per se, it is still worthwhile understanding the role they each play in this space. This will help to guide the analysis and provide a scope as to what can and cannot be achieved through the ERL. Each of the market failures are discussed in turn below.

A.1.1 Information failures

For a variety of reasons, consumers are often unable to make fully informed purchasing decisions. It can be difficult for example, for a consumer to determine the energy efficiency

of an appliance prior to using it. When information is missing, hidden, or in the possession of only one party, then this can lead to poor decisions and inefficiencies across the economy.

Asymmetric information exists when the market provides insufficient information to consumers. This concept is famously described in 'the market for lemons' theory by George Akerlof. Akerlof's paper uses the market for used cars as an example of information asymmetry:

> The individuals in this market buy a new automobile without knowing whether the car they buy will be good or a lemon. But they do know that with probability q it is a good car and with probability $(1- q)$ it is a lemon; by assumption, q is the proportion of good cars produced and $(1-q)$ is the proportion of lemons.
>
> After owning a specific car, however, for a length of time, the car owner can form a good idea of the quality of this machine; i.e., the owner assigns a new probability to the event that his car is a lemon. This estimate is more accurate than the original estimate. An asymmetry in available information has developed: for the sellers now have more knowledge about the quality of a car than the buyers. But good cars and bad cars must still sell at the same price- since it is impossible for a buyer to tell the difference between a good car and a bad car (Akerlof, 1970, p. 489).

A market works best when consumers and producers have sufficient information about energy-using technologies and services to make choices that will maximise their welfare and profit respectively. However, consumers might not be able to access the necessary information on the energy efficiency of a product, or the price and performance of competing products. Similarly, producers might not have sufficient information about their competitors or their consumers' preferences. Consequently, consumers and producers may make choices that they later regret when they become better informed (Productivity Commission 2005).

Information asymmetries are common in the market for appliances (and products that consume energy more generally). The IEA (2011) writes that:

> Insufficient, inaccurate or costly information on the energy performance of different technologies, and on the costs and benefits of energy efficiency measures, leads to suboptimal decisions by consumers and investors, and an under-investment in energy efficiency. Energy efficiency is often one of several features of a product or service, as is the case with vehicles, appliances, or home retrofits…
>
> Accurate and sufficient information is difficult to obtain easily (at little cost) since energy efficiency comprises a wide range of products and services that are not always separately available. The market thus doesn't always produce or transmit sufficient information to allow for optimal energy-efficiency investment decisions (p. 13).

In the appliances market, manufacturers have more information about an appliance than consumers and consumers are unable to distinguish between products in terms of energy efficiency. Buyers do not know if the appliance is 'good' (i.e. more energy efficient) or 'bad (i.e. less energy efficient) and will therefore only be willing to pay for an 'average' appliance. The consequences of this can be that buyers revise their expectations of appliances down, which motivates the manufacturers of good appliances to not put them on the market.

The energy rating labelling scheme is an attempt by the Government to overcome this market failure. The Productivity Commission (2005) writes:

> Labelling is used to indicate the energy efficiency of electrical and gas appliances and cars. Mandatory labelling directly addresses a source of market failure — the asymmetry of information between buyers and sellers of energy-using products. By providing information in a readily-accessible and easily-understandable format, labelling can help consumers to make better-informed choices about energy efficiency (p. xxxiii).

A.1.2 Bounded rationality

Related to the issue of information failure is bounded rationality. In some cases, individuals may have access to full information, however they still do not make perfect or optimum decisions, as their knowledge and processing abilities are inherently limited. Rational decision-making only applies after having greatly simplified the choices available to them. For example, an individual may not have the ability or time to fully process and evaluate the information available to them about an appliance.

The IEA (2011) writes:

> Bounded rationality is a behavioural failure in that decision makers do not make choices rationally, as generally assumed in classical economic theory. Energy equipment purchasers and users may have 'limitations of both knowledge and computational capacity' that affect their consumption of electricity by appliances. The evidence that consumer decisions are not always perfectly rational is quite strong... Behavioural failures may be relevant as an explanation for irrational behaviour and choices, and may reinforce existing market failures (p. 16).

It is not uncommon for households to adopt a decision-making strategy, such as 'satisficing', rather than optimising. When satisficing, individuals may downgrade the standard of their goals, and settle for outcomes that are less than ideal but which are reasonable in the circumstances (PC 2005).

Individuals can also follow a rule-of-thumb routine when arriving at a decision. Routines can include:

- purchasing the same make or brand of equipment that a competitor, family member or friend purchases (following the pack);
- purchasing the same make or brand of equipment as previously (relying on past experience); and/or
- using simplified selection criteria that focus on key features and overlook more technical and other considerations such as energy efficiency.

ERLs are recommended when buyers and users of energy-using products have limitations of both knowledge and processing abilities that affect their ability to make informed decisions about energy efficiency.

A.1.3 Split incentives

Split incentives occur when the two parties to a transaction have different goals or incentives. This is a common problem in the rental market, where tenants and landlords have different objectives. According to the IEA (2011)

> …a classic principal-agent problem where the benefits of an investment (e.g. lower energy costs) do not accrue to the party making the investment. The landlord-tenant example is often given since the tenant most often pays the electricity bill but does not select and install major appliances affecting energy use, such as refrigerators and washing machines, or heating systems.
>
> Split incentives also occur where tenants do not pay for electricity, but where this is included in the rent. In this situation, though landlords may have an incentive to purchase energy-efficient appliances, the tenant has no incentive to control energy-use (p. 15).

A.1.4 Externalities

Finally there are also externalities associated with the choice of appliances. An externality arises when a transaction imposes costs (or benefits) onto third parties.

Here, the negative externalities associated with the generation and use of energy are the excessive GHG emissions imposed on society as a result of the appliance choice. Where the costs of these negative environmental consequences are not borne solely by those who

produce and consume energy, more energy will be used than is socially desirable, and the level of energy efficiency will be less than socially optimal.

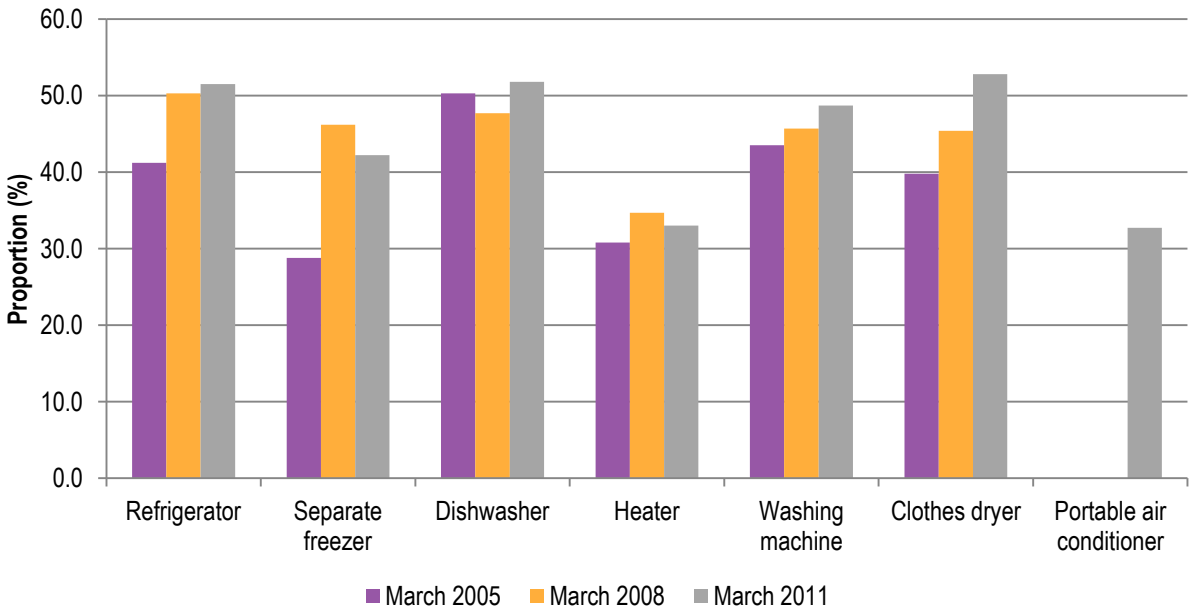
A.2 Effectiveness of the ERL

The implementation of energy rating labels across the world has produced a large amount of evidence that the labels are meeting their aims. This section considers the extent to which ERL may be having an effect on consumer behaviour, manufacturers and the environment.

A.2.1 Influencing consumer behaviour

According to the Australian Bureau of Statistics, energy star ratings are being considered by consumers in the purchase of an appliance, often increasingly. A survey of 12,841 households found that an increasing proportion of households in 2005, 2008 and 2011 were considering energy star ratings when purchasing refrigerators (41.2 per cent in 2005, up to 51.5 per cent in 2011), washing machines (43.5 per cent in 2005, up to 48.7 per cent in 2011) and clothes dryers (39.8 per cent in 2005, up to 52.8 per cent in 2011) (ABS, 2011) (see Figure A1).

Figure A1 **Households considering energy ratings when purchasing an appliance**



Source: (ABS, 2011)

The World Energy Council provides anecdotal evidence from the EU about how energy labelling transformed the market due to increased interest in energy efficiency and changes to the models placed on the market. The former was evidenced through increased sales in higher efficiency refrigerators and washing machines.

> In the EU for instance, there was a rapid increase in the market share of the most energy efficient appliances [as a result of labelling programs]. Sales of refrigerators in Class A increased from less than 5% of total sales in 1995 to 23 % in 2000 and 61% in 2005; in addition, 19% of refrigerators sold in 2005 were in the two new more efficient classes (A+ and A++). For washing machines, the progress was even more rapid (1% in 1996, 38% in 2000 and 90% in 2005). Labelling has resulted in market transformation that can be attributed both to the increased interest of consumers in energy efficiency and to changes in the models made

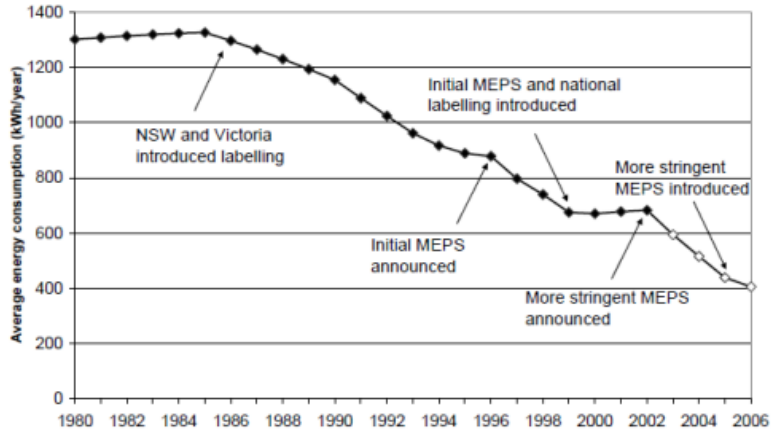
available by manufacturers, as well as to other accompanying measures (rebates, information campaigns) (World Energy Council, 2013).

A.2.2 Manufacturers

The Productivity Commission (2005) provided evidence to suggest that the ERL played some role in encouraging manufacturers to produce more energy efficient products. It reported that there was a trend of improving energy efficiency for a range of appliances sold in Australia since the introduction of the ERL:

> …[T]he introduction of labelling in New South Wales and Victoria in 1986 was followed by a decline in the average energy consumption of new frost-free refrigerator-freezers (figure 9.2). While it is difficult to attribute this decrease (and the increase in energy efficiency) to one explanatory variable, it appears that labelling of new frost free refrigerator-freezers has been influential.

Figure 9.2 **Average energy consumption of new frost-free refrigerator-freezers[a]**



[a] Average energy consumption is calculated as a weighted average with weights based on sales volume. The data for the period 1980–1985 are based on energy labelling tests conducted by Choice Magazine. The data for the period 1986–1992 are based on energy labelling registrations. The data for the period 2003–2006 are based on projected estimates and are not accurate sales-weighted estimates. The data relate to both top-mounted and bottom-mounted refrigerator-freezers.

Data source: S. Holt (Department of the Environment and Heritage, pers. comm., 1 August 2005).

Source: Productivity Commission, 2005, pp. 181-182).

The Commission also noted that other factors had contributed to increased energy efficiency of appliances, including changes in energy prices, technological change that cannot be attributed to government policy, and standards in other countries becoming more stringent. It also commented that the increase in energy efficiency could have occurred in the absence of a labelling scheme (Productivity Commission, 2005).

There is additional evidence that ERLs are inducing suppliers to introduce more efficient models. A report by Energy Consult (2006) considered the role of energy labelling and MEPS. It reported that following the introduction of mandatory labelling in 1986, the number of higher star rated models of refrigerators and freezers increased, with the number of models at the lowest end of the range also growing but proportionally. With the announcement of MEPS in 1999, the number of lowest rated models started to decline while higher rated models grew. In 2005, the number of models with the lowest star rating was almost negligible. Energy Consult concluded that:

> This clearly demonstrate[s] that the two policy options, appliance labelling and MEPS, both have had complementary, if differing, impacts. Appliance labelling appears to have induced the suppliers to introduce efficient models among their historic mix of product offering, while the introduction of MEPS effectively forced low efficiency models out of the market (Energy Consult, 2006, p. 42).

The World Energy Council also provided anecdotal evidence that the effect of energy labelling on manufacturers was enhanced by the introduction of MEPS, with the average energy consumption of refrigerators falling by nearly 20 per cent:

> The effect of labelling was reinforced by the progressive introduction of MEPS for refrigerators and by the agreement with [the European Committee of Domestic Appliance Manufacturers] for washing machines. In anticipation of standards, manufacturers withdrew their less efficient models that had become hard to sell and introduced new more efficient designs to meet new demand and to differentiate themselves from their competitors. The average energy consumption of refrigerators fell from 370 kWh/year in 1990 to around 300 kWh/year[26] (World Energy Council, 2013).

A.2.3 Environmental impacts

The ERL plays an important role in reducing Australia's GHG emissions. In terms of the actual reductions in GHG emissions, Holt and Harrington reported in 2003 that there had been a cumulative abatement of 5 Mt CO_2-e as a result of the energy labelling program, which was a small contribution to national stationary emissions in the same year of 295 Mt CO_2-e (Holt & Harrington, 2003).

There is further evidence to suggest some reduction in GHG emissions has taken place as a result of energy labelling due simply to reduced energy use contributing to reductions in greenhouse gas emissions. In a 2009 study, Wilkenfeld estimated that if there was no labelling or MEPS (the 'BAU case'), the average household energy use for refrigeration would decline by 16 per cent between 1985 and 2020. However with labelling and MEPS the total energy consumption of household refrigerators would decline by 48 per cent:

> It is estimated that even in the BAU case, the average energy used in household refrigeration would have declined by about 16%, from about from 1250 kWh/yr per household in 1985 to 1050 kWh/HH in 2020. However, accelerated efficiency improvements brought about by energy labelling and two rounds of MEPS will have reduced refrigeration energy requirement per household to about 650 kWh/yr, or 48% less than in 2005. This is about 38% lower than if E3 measures had not been implemented (George Wilkenfeld and Associates, 2009, p. 15).

It is recognised that Wilkenfeld's estimate included both the implementation of the ERL and MEPS programs, however it suggests that the ERL is playing a role in reducing GHG emissions by reducing energy consumption. Another study in 2006 on the impact of energy labelling and MEPS on refrigerators and freezers found that energy labelling for refrigerators and freezers resulted in energy savings rising from 20 GWh in 1986 to more than 750 GWh in 2005 (Energy Consult, 2006).

[26] The reference year is not specified in this publication.

Appendix B ERL historical timeline

Table B1 **ERL historical timeline**

Year	Item	Milestone
1981	1	Study by Winton to establish patterns of appliance use. *Household Appliance Energy and Use: A major quantitative study to establish patterns of household use of a wide range of domestic electrical appliances, to assist in developing algorithms for an appliance labelling scheme, Energy Authority of NSW, Les Winton*
1982	2	First qualitative research study to develop the ERL by Winton. *Towards an Energy Efficiency Label: A qualitative research project to evaluate a series of possible designs for an appliance energy efficiency label, Energy Authority of NSW, Les Winton, 1982.*
December 1986	3	Scheme commences with labelling of refrigerators and freezers in NSW and Victoria.
1987	4	Air conditioner labelling introduced.
1988	5	Dishwasher labelling introduced.
1989	6	Clothes dryer labelling introduced.
1990	7	All other states progressively introduce energy labelling.
September 1991	8	First extensive review of labelling conducted by George Wilkenfeld and Associates (GWA). This report reviewed the technical basis for labelled appliances and marked the start of a national labelling program in Australia. *George Wilkenfeld and Associates, Test Research and Artcraft Research (Winton), "Review of Residential Appliance Energy Labelling", for the State Electricity Commission of Victoria, September 1991.*
1992	9	National Appliance and Equipment Energy Efficiency Committee (NAEEEC) established to co-ordinate and expand the national energy labelling program and to manage the introduction of MEPS.
1992	10	Study by Artcraft to assist revision of label design. *Appliance labelling revision: Research among recent and intending appliance purchasers to assist with revision of the label design of energy efficiency labelling of household appliances —Artcraft Research for State Electricity Commission of Victoria (SECV), Mar 1992*
1996	11	First cost benefit analysis of labelling program by GWA. *Title unknown.*
October 1997	12	Steering committee implemented to oversee studies to "identify improvements to the pertinence and accuracy of information provided on labels" (i.e. the Brown and Patterson studies below) and prepare for future work on the label transition process.
December 1997	13	NAEEC holds a national industry forum to discuss review of existing labelling scheme. Key recommendations included: that a steering committee be formed (The Energy Label Review Committee [ELRC]); a review of overseas experience would be of interest; summary of household energy use was needed to understand relative importance of various labelled appliances; the Sustainable Energy Authority of Victoria prepare a brief for marketing studies; cost-benefit assessment was needed.
1998	14	NAEEEC recommends the introduction of new labelling algorithms to expand scope for improvements in energy efficiency and stop bunching at the higher end of the efficiency scale. Algorithms were revised to provide a geometric progression of stars (i.e. fixed percentage reduction in energy per additional star) rather than a fixed kWh reduction per star. The label design was also updated.
January 1998	15	Two studies published on behalf of NAEEEC to "identify improvements to the pertinence and accuracy of information provided on labels. One study (Patterson 1998) considered the consumer perspective and the other study (Brown 1998) considered the industry perspective. *Patterson, Neill, "Energy Labelling Review: Consumer Research", January 1998.* *R A Brown & Associates, "Energy Labelling Review: Options for Improvement of Labels", January 1998.*
February 1998	16	ELRC assumes control of the project.
March 1998	17	Technical study by Energy Efficient Strategies that examines the technical basis for appliance labelling. *Energy Efficient Strategies, "Appliance Energy Labelling Review Committee, Support Documentation", prepared 20 March 1998, revision 1 for public review by EES - October 1998.*
March 1998	18	Technical study by GWA examining household energy consumption in Australia by end use. It provides information on energy savings and greenhouse gas abatement potential from the Scheme and considers potential extensions to new appliances/applications. *George Wilkenfeld & Associates, "Household Energy Use in Australia – End Uses. Greenhouse Gas Emissions and Energy Efficiency Program Coverage", March 1998.*

Year	Item	Milestone
March 1998	19	Market research study by Energy Efficient Strategies which contains a review of international appliance energy labelling programs. *Energy Efficient Strategies, "International Update on the Status of Energy Labelling and MEPS", March 1998.*
April 1998	20	Australian Greenhouse Office (AGO) created.
April 1998	21	Market research study by Artcraft Research to provide benchmarks for current consumer use and understanding of the existing energy label. *Artcraft, Qualitative Market Research Study Regarding Appliance Energy Rating Labels, April 1998.*
April 1998	22	"Algorithm working groups" are set up to analyse and consider algorithm options for air conditioners, refrigerators and freezers, and "wet products" (i.e. clothes dryers, clothes washers and dishwashers). The groups would provide recommendations to the ELRC.
June – August 1998	23	Shadow shop survey by Yann Campbell Hoare Wheeler to examine how labels were being displayed. *Yann Campbell Hoare Wheeler, "Energy Rating Shadow Shop", August 1998.*
August 1998	24	Market research study by Artcraft to gain feedback from consumers on options for changes to the labelling scheme. *Artcraft, Summary of Key Findings from the Second Qualitative Market Research Study regarding Appliance Energy Rating Labels, August 1998.*
August 1998	25	ELRC prepares final recommendations for NAEEEC on label transition arrangements and communications strategies.
1999	26	Following the GWA RIS, all jurisdictions implement regulations requiring energy labelling and (except for the NT) MEPS.
1999	27	Commonwealth responsibility for the program passes to the AGO.
1999	28	Ministerial Council on Energy endorses model regulations enforcing Australia Standards.
February 1999	29	Regulatory Impact Statement (RIS) prepared by GWA considers four main aspects of the scheme: the proposal to introduce model regulations in each jurisdiction covering mandatory labelling and MEPS for household electrical appliances; the proposal to introduce MEPS for fridges, freezers an electric water heaters; introduction of label designs; assessment of the consequences of the regulations on the Trans Tasman Mutual Recognition Agreement 1997. *George Wilkenfeld & Associates, Regulatory Impact Statement: Energy Labelling and Minimum Energy Performance Standards for Household Electrical Appliances in Australia, February 1999.*
August 1999	30	NAEEEC publishes first triennial work program.
November 1999	31	Second RIS by GWA which considers four main aspects: proposed process of transition to revised labels; estimated costs of the process; establishing if costs were consistent with original RIS; providing benefit/cost ratios for measures to enhance labelling effectiveness. *George Wilkenfeld & Associates, "Regulatory Impact Statement: Energy Labelling and Minimum Energy Performance Standards for Household Electrical Appliances in Australia Supplementary Cost-Benefit Analysis on Transition to a Revised Energy Label", November 1999.*
January 2000	32	Communications strategy developed by The Phillips Group to inform stakeholders about the transition to the new label. The activities undertaken under this strategy include: update bulletins for manufacturers, retailers/buying groups; industry education material for retailers, shop floor staff; point-of-sale materials for consumers, sales floor staff; inquiry line for all stakeholders; website for all stakeholders; catalogue/advertising inserts for consumers; manufacturers product events and store visits for sales floor staff; retailer/buying group sales meetings for retail store managers; retail / buying group internal communication for retail store managers; coordination with "Reach for the Stars" Program for sales floor staff; energy information centres for consumers; industry publication advertising for retailers and manufacturers; industry media for manufacturers, retailers/buying groups, retail store managers, sales floor staff; consumer media for consumers, interest groups. *Phillips Group, "Communications Strategy: Energy Rating Label Transition Program", January 2000.*
May 2000		NZ Parliament passed the *Energy Efficiency and Conservation Act*, which made labelling mandatory and set MEPS levels.
August – October 2000	33	Transition to revised label.
November 2000	34	Evaluation of the Communications Strategy (January 2000) undertaken by The Phillips Group. *Phillips Group, "Appliance Energy Rating Label Transition Program – Communication Strategy Evaluation", November 2000.*
December 2000	35	Follow up to shadow shop survey (June – August 1998) to determine compliance with new labelling program. *Millward Brown, Energy Rating Audit, "Shadow Shop" – Stage One Report, December 2000.*
April 2001	36	Six month follow up of second shadow shop survey (December 2000) to obtain more comprehensive assessment of compliance for displaying the label. *Millward Brown Australia, "Energy Rating Audit: "Shadow Shop" – Stage Two Report", April 2001.*
May 2001	37	Update of the Energy Efficient Strategies market research (March 1998) focussing on the part of the study covering energy labelling and MEPS. The study also gained feedback from consumers to help determine the nature and extent of any changes to the labelling scheme and energy label.

Year	Item	Milestone
April 2002	38	Mandatory labelling requirements became effective in New Zealand. Refrigerators, refrigerator/freezers, air conditioners (central, room and split-system), dishwashers, freezers, clothes dryers and clothes washers required labelling
July 2002	39	Algorithm review of dishwashers to review the transition to the new test procedure.
2003	40	Research conducted by Winton Sustainable Research Strategies investigating possible changes to refrigerator labels to accompany the revision of the rating algorithm and rescaling of star ratings. This research considered consumer views on replacing the green band with a red band. Subsequent research found investigated the implication of adding more red to the label. An outcome was therefore to test a purple band to replace the green band.
November 2003	41	Study into future direction of the label by Artcraft. *A Major Qualitative Research-Based Review and Scoping of Future Directions for Appliance Efficiency Labels in Australia and NZ – Artcraft Research for AGO, November 2003.*
May 2004	42	NAEEEC restyled as the Equipment Energy Efficiency (E3) program managed by the E3 Committee.
July 2004	43	Update of the Energy Efficient Strategies market research (May 2001).
February2005	44	*Water Efficiency Labelling and Standards Act 2005* introduced.
August 2006	45	Research was conducted by Artcraft Research to investigate the awareness and use of labels among the general public, recent buyers of appliances, retailers and installers of appliances. This research also considered gas and water labels which were about to be covered by mandatory efficiency labelling schemes, alongside electricity. *Artcraft Research, "Appliance Performance Labelling in Australia and New Zealand, Final Report on a Major Quantitative Study among Consumers and Retailers on the Labelling of Household Appliances, Conducted During September-October 2005", August 2006.*
October 2006	46	EnergyConsult conducts a study into trends in household refrigerators, refrigerator-freezers and freezers. *EnergyConsult, "Retrospective Analysis of the Impacts of Energy Labelling and MEPS: Refrigerators and Freezers" October 2006.*
October 2007	47	Research was conducted by Winton Sustainable Research Strategies to build on the findings of research conducted in 2003. This research tested a purple band to replace the green band as well as explanatory communication at point of sale and a statement in the band itself. This research was related to refrigerator and air conditioner labels.
October 2007	48	Study by Winton Sustainable Research Strategies to address the issue of bunching of models. *Revising the Energy Efficiency Label for Refrigerators, Freezers and Air Conditioners: Research in Australia and New Zealand to assist in revising the energy efficiency rating labels to accommodate new algorithms, WSRS for AGO, February-November 2007.*
2008	49	Label enhancements for household refrigerators and freezers.
May 2008	50	Research by Winton Sustainable Research Strategies into the concept of a 10-star label. *Towards a 10-Star Energy Efficiency Rating System for Major Household Appliances: Final Report on a series of qualitative research studies throughout Australia and New Zealand – WSRS for AGO, January to May 2008.*
June 2008	51	E3 Committee publishes the major study "Energy use in the Residential Sector 1986-2020".
July 2008	52	Further research by Winton Sustainable Research Strategies into the concept of a 10-star label. *Towards a 10-Star Energy Efficiency Rating System for Major Household Appliances: Two Final Focus Group Discussions to Resolve the Coronet Colour – WSRS for the Department of the Environment, Water, Heritage and the Arts, July 2008.*
July 2009	53	Agreement from the Council of Australian Governments (COAG) to develop national legislation for standards and labelling. This would later be knows as Greenhouse and Energy Minimum Standards (GEMS).
November 2009	54	Additional 4-star 'tiara' or 'coronet' was introduced to the label to show more information about appliance efficiency.
2010	55	Revision of labelling in New Zealand for refrigerators, refrigerator/freezers, air conditioners (central, room and split-system) and freezers.
January 2010	56	Consultation RIS prepared by GWA to consider changes to the ERL and MEPS programs driven by problems relating to administration, monitoring, scope and targeting and risk of unintended environmental consequences. This RIS considered GEMS. *George Wilkenfeld and Associates, "Consultation Regulation Impact Statement: National Legislation for Appliance and Equipment Minimum Energy Performance Standards (MEPS) and Energy Labelling, January 2010.*
April 2010	57	Regulatory changes to introduce super efficiency and green stripe.
April 2010	58	Study by Winton Sustainable Research Strategies to assist revisions to the clothes washer label. *Labelling of Washing Machines: Report on research to assist with major revisions of the labelling of clothes washers. WSRS for Department of Climate Change and Energy Efficiency (DCCEE), April 2010.*

Year	Item	Milestone
April 2011	59	Study by Winton Sustainable Research Strategies to investigate the inclusion of a year of the label. *Market Research Assessing the Potential for Including Date Information on Energy Rating Labels, in order to manage MEPS Rescaling Transitions, WSRS for DCCEE, April 2011.*
2012	60	Appliance labelling for televisions introduced in New Zealand.
October 2012	61	GEMS Act commences. It provides a nationally consistent legislation and policy framework for the regulation of energy-using equipment and appliances, and the regulation of equipment and appliances that affect the energy used by other products.
2013	62	Comprehensive label review commences which includes the following components: independent review of the ERL; a climate label for climate sensitive products; the use of smart phone technology and mobile applications; the development of "Labelling Principles"; mandatory disclosure of the ERL in advertising

Source documents*:*

Energy Efficient Strategies, 'Energy Label Transition-The Australian Experience: Main Report', July 2004

Energy Efficient Strategies and Maia Consulting, 'Energy Labelling and Standards Programs Throughout the World (Draft), October 2013

Winton Sustainable Research Strategies, 'Thoughts from the Past on the Future of the Energy Rating Label, Draft Report, 13 December 2013

George Wilkenfeld and Associates, 'Consultation Regulation Impact Statement: National Legislation for Appliance and Equipment Minimum Energy Performance Standards (MEPS) and Energy Labelling', January 2010

Greenhouse and Energy Minimum Standards (GEMS) Compliance Policy: Equipment Energy Efficiency (E3) Program - http://www.energyrating.gov.au/wp-content/uploads/Energy_Rating_Documents/Library/Compliance/Compliance/GEMS-Compliance-Policy-20131016-4.pdf

http://www.un.org/esa/sustdev/sdissues/energy/op/clasp_wilkenfeld.pdf

http://epress.anu.edu.au/agenda/015/03/mobile_devices/ch04s04.html; http://www.energyrating.gov.au/wp-content/uploads/Energy_Rating_Documents/Library/Washing_and_Drying/Household_Appliances/gwa-meps1993.pdf

http://www.mediastatements.wa.gov.au/pages/StatementDetails.aspx?listName=StatementsCourt&StatId=15181

http://archive.coag.gov.au/coag_meeting_outcomes/2004-06-25/docs/coagpg04.rtf; http://www.energyrating.gov.au/wp-content/uploads/2011/02/aceee-2002a.pdf

http://www.energyrating.gov.au/products-themes/water-heating/electric-water-heaters/meps-and-labelling-electric/

http://www.energyrating.gov.au/products-themes/water-heating/water-heaters/meps/; http://www.energyrating.gov.au/products-themes/cooling/air-conditioners/meps/

http://www.energyefficient.com.au/reports/200405-labeltransition-appendices.pdf; http://www.energyrating.gov.au/wp-content/uploads/Energy_Rating_Documents/Fact_Sheets/General/factsheet01.pdf

http://www.environment.gov.au/minister/archive/ps/2004/psmr09jun04.html; http://www.energyrating.gov.au/products-themes/industrial-equipment/distribution-transformers/meps/

http://www.energyrating.gov.au/products-themes/refrigeration/domestic-refrigeration/meps/; http://www.comlaw.gov.au/Details/C2005A00004

http://www.energyrating.gov.au/wp-content/uploads/Energy_Rating_Documents/Library/Whitegoods/Whitegoods/2009-media-release-1-nov-09.pdf

http://www.environment.gov.au/minister/archive/env/2008/pubs/mr20080605.pdf; http://www.coag.gov.au/node/503

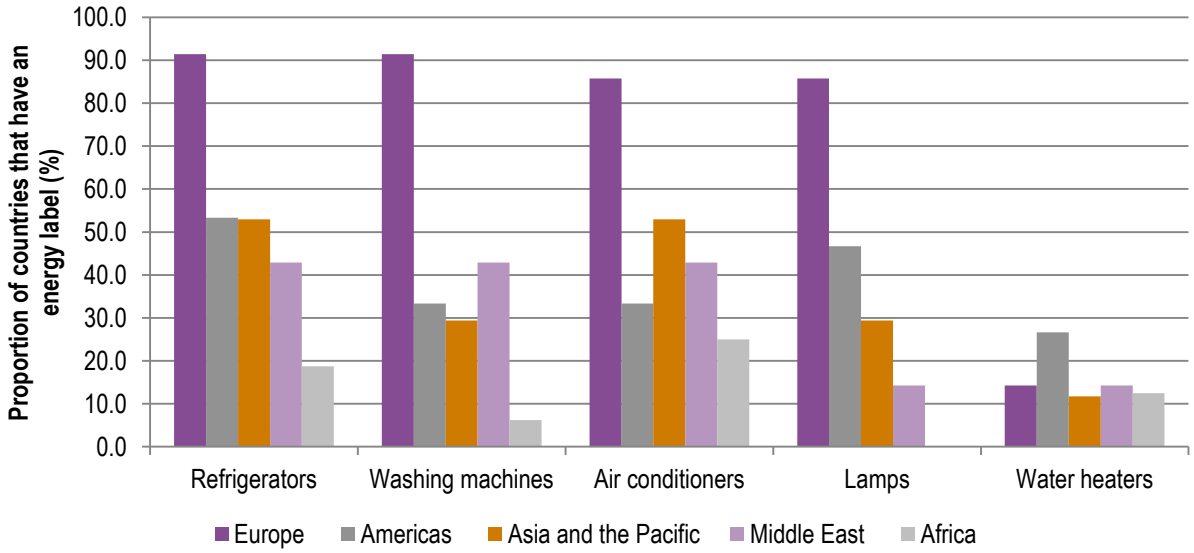
http://www.energyrating.gov.au/wp-content/uploads/Energy_Rating_Documents/Fact_Sheets/Refrigeration/Domestic_Refrigeration/2010-rf-factsheet-revised-label1.pdf

Appendix C International energy labels

Energy labelling is gradually being accepted as a means of minimising household electricity consumption around the world, with many countries adopting labelling programs. The aim or energy labelling is universal – provide consumers with information to compare the energy efficiency of different appliances available to them in the market. Similar to Australia, international labelling programs are often accompanied by MEPS.

Adoption of energy labels around the world is illustrated by a comprehensive survey conducted by the World Energy Council (World Energy Council, 2010). This survey of around 90 countries queried, among other things, the extent to which energy labelling had been adopted. Europe was a clear leader with 91.4 per cent of countries surveyed having labels for refrigerators and washing machines, and 85.7 per cent having labels for air conditioners and lamps. Africa had the lowest adoption of energy labels for all appliances (see Figure C1).

Figure C1 **Energy label adoption rates by region**



Note: Europe includes Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, UK, Norway, Croatia, Iceland, Serbia, Montenegro, Switzerland, Turkey and Russia plus Croatia, Iceland, Norway, Russia, Serbia, Switzerland and Turkey. Americas include Argentina, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, El Salvador, Mexico, Paraguay, Peru, Uruguay, US and Venezuela. Asia and the Pacific includes Australia, China, Hong Kong China, India, Indonesia, Japan, Malaysia, Mongolia, Myanmar, New Zealand, Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand and Vietnam. Africa includes Algeria, Botswana, Cote d"Ivoire, Egypt, Ethiopia, Ghana, Guinea, Guinea Bissau, Kenya, Mali, Mauritania, Morocco, Nigeria, Senegal, South Africa and Tunisia. Middle East includes Iran, Israel, Jordan, Kuwait, Lebanon, Syria and Yemen.

Source: (World Energy Council, 2010).

The survey also queried plans for energy labels. As demonstrated in Table C1, plans for energy labelling were also underway in a small proportion of countries which would, over time, increase the number of countries with some type of energy rating label.

Table C1 **Proportion of countries in each region that already have or plan to have energy labelling for appliances**

		Refrigerators	Washing machines	Air conditioners	Lamps	Water heaters
Europe (n=35)	Label exists	91.4	91.4	85.7	85.7	14.3
	Label planned	0.0	0.0	0.0	0.0	8.6
Americas (n=15)	Label exists	53.3	33.3	33.3	46.7	26.7
	Label planned	6.7	13.3	13.3	6.7	6.7
Asia and the Pacific (n=17)	Label exists	52.9	29.4	52.9	29.4	11.8
	Label planned	23.5	5.9	17.6	5.9	11.8
Middle East (n=7)	Label exists	42.9	42.9	42.9	14.3	14.3
	Label planned	42.9	28.6	42.9	28.6	28.6
Africa (n=16)	Label exists	18.8	6.3	25.0	0.0	12.5
	Label planned	25.0	25.0	18.8	25.0	12.5

Source: (World Energy Council, 2010)

C.1 Review of comparative labels from selected countries

Energy rating labels exist around the world albeit in formats that suit the needs of the countries' consumers, appliance suppliers and trade blocs. There are two main types of energy labels which focus on displaying different information:

- Endorsement labels – help distinguish between a range of similar products by providing a 'seal of approval' for products meeting or exceeding certain criteria. They tend not to contain information on energy or performance.
- Comparative labels (the primary subject of this paper) – show key information on energy consumption and/or performance in such a way that different products can be compared with the actual range in the market or by using an absolute scale:
  - Actual range provides information on the energy consumption of the labelled model and compares it with the actual range of models on the market. Energy labels in the US and Canada use actual range scales.
  - Absolute scale allows comparisons by means of numerical or other categorical rating or ranking. The user is made aware that there are a range of efficiency levels on the market, for example appliance labels in the EU have a rating from A (best) to G (worst). Energy labels in Australia, the EU, Korea and India use absolute scales (George Wilkenfeld and Assoicates, 1998).

A review of international energy labels by Energy Efficient Strategies (2004) further identified the visual designs of comparison labels in use around the world can be grouped into three basic types.

- **Dial Labels —** this type of label has a 'dial' or gauge, with greater efficiency linked to advancement along the gauge (more efficient represented by a clockwise arc). This type of label is used in Australia, Thailand and Korea. The number of stars or the 'grading' numeral on the scale depends on the highest pre-set threshold for energy performance that the model is able to meet.
- **Bar Labels** —this type of label uses a bar chart with a grading from best to worst. All grade bars are visible on every label with a marker next to the appropriate bar indicating the grade of the model. This label is used primarily in Europe and South America.
- **Linear Labels** — this label has a linear scale indicating the highest and lowest energy use of models on the market, locating the specific model within that scale.

As energy is used as the comparator (rather than efficiency), it is necessary to group models into similar size categories for comparison. This model is used in North America.

The following sections consider six international labels – the United States, Canada, the EU, Korea, China and India. These labels provide an informative spread of the types of labels employed around the world.

C.1.1 United States – EnergyGuide

Energy labelling of appliances commenced in the US in 1980, with the gradual inclusion of different appliances between 1980 and 1994. The first US label only showed the annual cost of operating the appliance however there were problems with this indicator because of the changing national average price of electricity. In 1994 the label was revised so that annual energy use (in kWh) became the main feature of the label rather than annual operating cost. The label was again revised in 2007 (to the version pictured in Figure C2) which prominently displays estimated yearly operating costs (Federal Trade Commission (US), 2007)

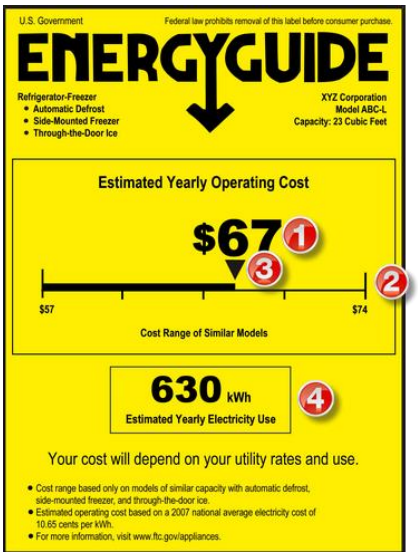
The US *EnergyGuide* label is required on furnaces, refrigerators, refrigerator-freezers, water heaters, clothes washers, dishwashers, room air conditioners, central air conditioners, and heat pumps. It is an actual range label that compares the labelled model with a range of other similar models on the market.

The US label provides quantified energy and operating cost information (see Figure C2). The main features of the label are:

1. the estimated yearly operating cost of running the appliance (based on the appliance's electricity use and the national average cost of electricity);
2. the estimated yearly operating cost range for models with similar features;
3. estimated yearly operating cost of the appliance relative to similar models; and
4. how much electricity the appliance uses (kWh) in a year based on typical use.

Other information on the label includes appliance specific information, for example key features, make, model and size.

Figure C2 **US EnergyGuide label**



Source: Labels provided by the Department of Industry.

C.1.2 Canada – EnerGuide

Energy labelling of appliances commenced in Canada in 1978 with the introduction of labelling for air conditioners, freezers, refrigerators and refrigerator/freezers, with other household appliances requiring labelling from 1995.

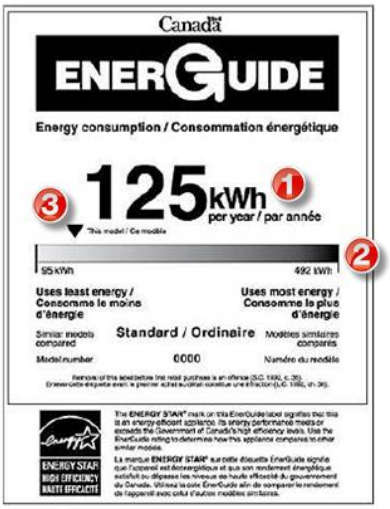
The Canadian *EnerGuide* label is required on refrigerators, freezers, dishwashers, clothes washers, clothes dryers, washer-dryers, electric ranges and room air conditioners. It is an actual range label that compares the labelled model with a range of other similar models on the market.

The Canadian label provides appliance energy consumption information only (see Figure C3). The main features of the label are:

1. how much electricity the appliance uses (kWh) in a year;
2. annual energy consumption range for models with similar features; and
3. estimated energy consumption of appliance relative to similar models.

Other information on the label includes appliance specific information, for example model and size.

Figure C3 **Canadian EnerGuide label**



Source: Labels provided by the Department of Industry.

C.1.3 European Union – Energy Label

EU members are required to implement harmonised energy efficiency regulations. Prior to the EU energy labelling program, individual states were running or developing their own standards, starting with France and Germany in the mid-1970s. An attempt to implement a voluntary EU label in the 1980s failed. A directive for mandatory labelling came into force in 1992 and the first labels became effective in 1995. In 2003 the label for refrigerators and freezers was amended to include the A+ to A+++ categories.

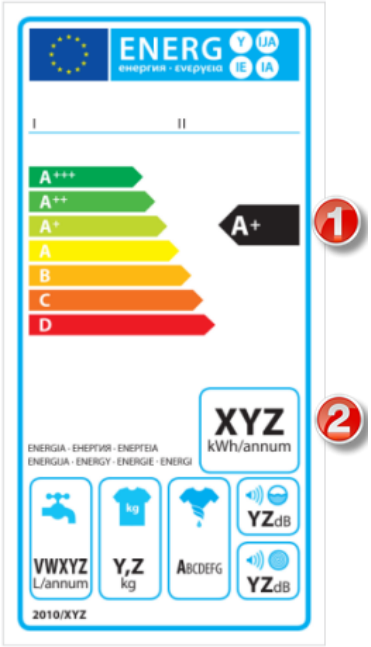
The EU energy label is required on refrigerators, freezers, clothes washers, clothes dryers, combination washer-dryers, dishwashers and lamps. It is an absolute scale label that allows purchasers to make comparisons by means of numerical or other categorical rating or ranking, in this case a seven-level scale (A+++ to D where A+++ is best).

The EU label provides an appliance's energy efficiency rating and energy consumption (see Figure C4). The main features of the label are:

1. rating from dark green to red (dark green = A+++) with an indication of where the appliance's energy efficiency lies on this scale; and
2. how much electricity the appliance uses (kWh) in a year.

Other information on the label includes appliance specific information, for example water consumption, load size and noise.

Figure C4 **EU's Energy Label**



Source: Labels provided by the Department of Industry.

C.1.4 Korea – Energy Efficiency Rating Labelling Program

The Act introducing labelling of appliances in Korea was amended in 1992, with the labelling of appliances in Korea commencing in that year with gradual roll out across additional appliances at regular intervals.

The Korean energy efficiency label is required on refrigerators, freezers, kimchi refrigerators, air conditioners, washing machines, drum washing machines, dish washers, dish driers, hot and cold water dispensers, rice cookers, vacuum cleaners, electric fans, air cleaners, incandescent lamps, fluorescent lamps, ballasts for fluorescent lamp, compact fluorescent lamps, three-phase electric motors, domestic gas boilers, external power supplies, electric cooling and heating equipment, commercial refrigerators, gas water heaters, TVs, window sets, electric transformers, electric fan heaters, electric stoves, variable refrigerant flow (VRF) multi-split heat pumps, dehumidifiers, tyres, and automobiles.

The Korean label uses an absolute scale that allows purchasers to make comparisons by means of numerical or other categorical rating or ranking, in this case a five-grade scale (1st to 5th grade where 1st is best).

The Korean label provides an appliance's energy efficiency rating, energy consumption and CO_2 emissions (see Figure C5). The main features of the label are:

1. efficiency rating from green to red (1st grade to 5th grade) with an indication of where the appliance's energy efficiency lies on this scale;
2. how much electricity the appliance uses (kWh) in a year and

3. the appliance's CO_2 emissions (g)

Figure C5 **Korean Energy Efficiency Rating label**

Source: http://www.kemco.or.kr/nd_file/kemco_eng/KoreaEnergyStandards&Labeling.pdf; http://www.china-certification.com/en/what-is-cel.

C.1.5 China – Energy Efficiency Label

The first appliance labelled under the Chinese program was refrigerators (around 2004).

The Chinese energy label is required on motors, air conditioners, refrigerators, washing machines, gas kettles, photocopiers, air compressors and flat-screen televisions. It is an absolute scale that allows purchasers to make comparisons by means of numerical or other categorical rating or ranking, in this case a five-level scale (1 to 5 where 1 is best).

The Chinese label provides an appliance's energy efficiency rating (see Figure C6).

The main feature of the label is a rating from dark green to red (dark green = 1) with an indication of where the appliance's energy efficiency lies on this scale.

Figure C6 **Chinese Energy Efficiency label**

Source: http://entropy2.com/2010/03/china-energy-label/china-energy-label/.

C.1.6 India – Star Labelling

Energy labelling in India commenced in 2006, with mandatory labelling introduced from 2010 for frost-free refrigerators, tubular fluorescent lamps, room air conditioners and distribution transformers.

The Indian energy efficiency label also applies either voluntarily or mandatorily to refrigerators and refrigerator freezers, room air conditioners, direct cool refrigerators, frost free refrigerators, tubular fluorescent lamps, room air conditioners, distribution transformers, agricultural pump sets, motors (general purpose 3 phase), ceiling fans, water heating storage (geysers), clothes washers (voluntary), laptop computers, televisions, LED Lighting, ballast (electronic/magnetic).

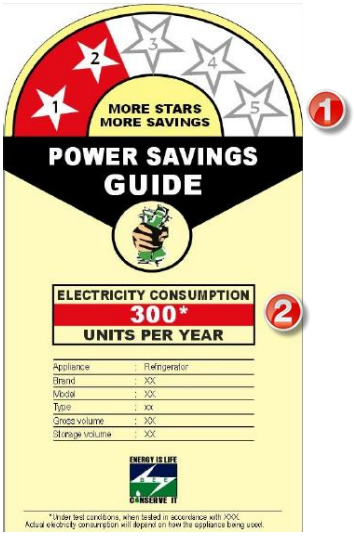
It is an absolute scale that allows purchasers to make comparisons by means of numerical or other categorical rating or ranking, in this case a five-star scale (where 5-stars indicates the most savings in energy and money).

The Indian label provides an appliance's energy efficiency rating and information on energy consumption (see Figure C7). The main features of the label are:

1. efficiency rating from 1 to 5-star with an indication of where the appliance's energy efficiency lies on this scale; and
2. how much electricity the appliance uses (kWh) in a year.

Other information on the label includes appliance specific information, for example brand, model, year of manufacture, gross volume and storage volume.

Figure C7 **Indian Star label**



Source: http://www.sari-energy.org/PageFiles/What_We_Do/activities/SAWIE/wiser/cap_dev_program_for_afghan_women_march_22-30_2010/PRESENTATIONS/24032010/ENGLISH/Nisha_Jose_Star_labelling.pdf; http://eneken.ieej.or.jp/data/3694.pdf;Energy Efficient Strategies and Maia Consulting Australia, Energy Labelling and Standards Programs Throughout the World (Draft), October 2013.

Appendix D Operating costs and energy labels

Table D1 below provides a summary of the available literature regarding the effectiveness of providing information about operating costs on energy rating labels in Australia and around the world.

Table D1 **Summary of evidence pertaining to operating costs on energy rating labels**

Author (Year)	Relevant information
Relevance of operational costs	
Artcraft Research 2006b, *Major Quantitative Study among Consumers and Retailers*, final report to the Australian Greenhouse Office and Department of the Environment and Heritage, January 2006	▪ Not prompted, 14% took the 'cost of running' into consideration when purchasing an appliance (such as a refrigerator). When prompted, 68% took it into consideration.
Winton Sustainable Research Strategies, 2009, *Possible Labelling of Portable Space Conditioners and Spot Coolers: Market Research on Consumer Attitudes and Behaviour*, draft report to Department of the Environment, Water, Heritage and the Arts, June 2009.	▪ 22.5% took the cost of running or energy consumption of a portable air conditioner into consideration when purchasing.
Winton Sustainable Research Strategies, 2009, *Energy Efficiency Labelling of Swimming Pool Pump Units: Report on research to assist with their marketing and promotion*, report to Department of the Environment, Water, Heritage and the Arts, June 2009.	▪ 17% took the cost of running a pool pump into consideration when purchasing.
Sweeney Research, 2012, *Consumer understanding of energy efficiency and star rating*, report to the NSW Office of Environment and Heritage, April 2012.	▪ Consumers don't easily make the link between running costs and star rating; more stars is linked to better' appliances, more energy efficient appliances and more expensive appliances. ▪ Lack of a link from star rating to running costs likely due to no mention of running costs on a label; consumers are motivated by running costs and consumers are disengaged by having to interpret information into running costs. ▪ There is potential for the star rating to link to running costs, e.g. via education and/or amending the label to make the link explicit.
Experiences with labels that have included operating costs	
Energy Efficient Strategies, 1998, *Appliance Energy Labelling Review Committee Support Documentation*, March 1998.	▪ Including operating costs on the label makes it more 'consumer friendly', i.e. consumers prefer $ to kWh. ▪ There is confusion about what the $ means, e.g. is it cost of energy? Energy savings? Related to the cost of the appliance? ▪ Including operating costs on the label would be hampered by wide ranging tariffs in the residential sector (and in NZ where there is a different currency) and need constant updating. There was an international tendency not to put operating costs on energy labels but to provide such information in supplementary material such as brochures or the internet.

Author (Year)	Relevant information
Wilkenfeld, G and Associates, 1998, *International Update on the Status of Energy Labelling and MEPS: Part 1 – Energy Labelling on Household Appliances,* Energy Efficient Strategies, with George Wilkenfeld & Associates, PW Consulting & Peter du Pont, March 1998	▪ A 1998 study in the US found that: ◆ a large number of participants had trouble using operating cost information provided on the US ERL and that participants were confused about what the $ value on the label meant (nearly 1/3 thought it mean amount saved rather than annual operating costs). It should be noted that this may have been due the study looking at an older label, with the new label 'easier to understand'. ◆ Having a $ amount on the label made it easier to explain and compare. This supported the findings of a Canadian study where the notion of kWh was unfamiliar and/or obscure to the majority of participants. That said, the same study found problems with using $ symbols and it was decided that energy was the 'least confusing' alternative. ▪ In the course of developing the EU's energy label, it was decided that including monetised annual operating costs would be too problematic as the price of electricity varied between and even within EU states. ▪ The 1994 revision of the US energy label was designed to deal with problems arising from discrepancies in the annual operating cost when the national average electricity price changed each year. ▪ In summarising labels and evaluations across a number of countries, Wilkenfeld concluded: *'Most consumers would prefer $ running costs somewhere on the label, but no labelling program appears to have satisfactorily resolved how to do this, given that energy prices vary regionally and over time and that there is potential confusion between operating costs and savings (and in some cases purchase costs).'* ▪ It has been argued that energy labels will/should be of most economic value and interest to those who use their appliances most intensively. Therefore values should be calculated for a higher than average frequency of use. Also large 'annual' figure for energy consumption and operating cost will have a stronger influence than smaller numbers. This demonstrates the potential contradiction between energy labels as a consumer information program and as a policy measure to increasing energy efficiency. ▪ Most consumers are interested in the cost of energy used to operate an appliance however conveying this information is problematic when there are different energy tariffs within a country and over time. Further, consumers can confuse cost information on labels, e.g. cost of energy, saving, purchase price. These problems prompted the US to change from a label that primarily showed energy cost data to one that shows energy with some costs.
Artcraft Research, 1998, *Summary of Key Findings From the Second Qualitative Market Research Study regarding Appliance Energy Rating Labels*, Report for The National Appliance & Equipment Energy Efficiency Committee (NAEEEC). August 1998	▪ This research conducted in 1998 found that: *'People tend to agree that replacing the energy use figure with a cost of running figure would make more sense if it were achievable, but then recognise that any change in the unit price of electricity would render the figure inaccurate. While some approve of the idea of placing a simple formula or set of examples of running cost at different unit prices of electricity on the label, others maintain that this would clutter or overcomplicate a simple label that already contains about as much information as they could accept visually.'* ▪ The research also found that: *'The availability of brochures or wall charts listing appliances and their running costs is approved of, but only a couple of our participants claim ever to have seen the brochures that are currently available from energy bodies in all three cities, and distributed to retail stores.'* ▪ Including a cost of running figure on the label was preferred over an energy use figure but only if it was accurate (i.e. changes in the unit price of electricity would render this figure inaccurate). Including simple formulas to examples of running cost would clutter the label.
Haodong, Gu 2009, *Energy Labels: Formats and Impact on Consumption Behaviour*, Australian School of Business, 2009.	With respect to labels that focus on operating costs (such as the US label) compared to labels that focus on the energy rating (such as the Australian label): *'The [operating] cost labels are less effective than [energy] rating labels in activating the environmental attitudes of consumers due to its primary focus on economic persuasion. Meanwhile, the [operating] cost labels cannot clearly symbolise the 'greenness' of the consumer product selection, with no social influences attached to the labeling system.'*
Ipsos MORI, London Economics and AEA, *Research on EU product label options: Final report*, for the European Commission, October 2012	▪ A comprehensive literature review of international research into energy rating labels found that: · *'Consumers often (but not always) express a preference for including operating costs on the label; however, no international labelling programme has resolved how to do this given that energy prices vary regionally and over time and given the high potential for confusion between operating costs and savings.'* · *'Evidence of reduced running costs is key to getting more consumers to buy energy efficient products (such as the kWh used per period by a refrigerator, or the kWh per cycle used by a clothes washer).*
Heinzle, Stefanie Lena, *Disclosure of Energy Operating Cost Information: A Silver Bullet for Overcoming the Energy-Efficiency Gap*, 2012	▪ Research into the inclusion of annual operating costs versus lifetime operating costs versus physical consumption information (e.g. watts) on the energy rating found that (based on the parameters of the study): ◆ Disclosing energy operating cost information as opposed to a physical consumption figure such as watts was more effective at guiding consumers towards paying a higher price premium for energy efficiency TVs when framed over the lifetime of the product. ◆ Framing energy operating costs per year had a significantly lower impact on the willingness to pay for energy efficient TVs compared to providing the physical consumption figure such as watts. ◆ Disclosing energy operating costs over the lifetime of a product encourages consumers to pay a higher price premium for energy efficient TVs than disclosing both the annual operating cost and the information in the form of watts.

Author (Year)	Relevant information
Kallbekken, Steffen, Haakon Saelon and Erland A.T. Hermansen, *Bridging the Energy Efficiency Gap: A Field Experiment on Lifetime Energy Costs and Household Appliances,* 2012.	▪ This study tested the hypothesis that providing information which makes lifetime operating costs more salient to consumers at the point of purchase will lead to purchases of more energy efficient products. The hypothesis was tested with a 'lifetime energy cost' label, trained sales staff and a mixture of both. ▪ The study found that that better information about the lifetime energy cost of an appliance can induce consumers to purchase more energy efficient models at least when it comes to appliances with high energy costs (e.g. dryers). ▪ The study was unable to isolate the effect of labelling alone but the combination of a label and trained staff had a significant effect. Further the effect of trained sales staff may have been stronger than the label.

Source: Various cited.

Appendix E Annotated bibliography

Table E1 **Annotated Bibliography**

Citation	Year	Brief overview of report content/topics	Issues relevant to ERL study
Harrington, Lloyd and George Wilkenfeld*, Appliance Efficiency Programs in Australia: Labelling and Standards,* July 1997	1997	This report provides general information on energy labelling and standards in Australia, including energy, gas and MEPS.	
Artcraft Research, *Summary of Key Findings From the Second Qualitative Market Research Study regarding Appliance Energy Rating Labels*, Report for The National Appliance & Equipment Energy Efficiency Committee (NAEEEC). August 1998	1998	Summary of key findings from focus groups that tested effectiveness of label features, including what should be/would like to see included; and what worked and what didn't.	ERL design
Energy Efficient Strategies, *Appliance Energy Labelling Review Committee Support Documentation*, March 1998.	1998	This report illustrates the process that has been used in the revision of the appliance energy label in Australia through 1998. It contains data and evidence used to support directional changes in the energy label.	ERL design Operating costs Endorsement labels
Wilkenfeld, G and Associates, *International Update on the Status of Energy Labelling and MEPS: Part 1 – Energy Labelling on Household Appliances,* Energy Efficient Strategies, with George Wilkenfeld & Associates, PW Consulting & Peter du Pont, March 1998	1998	This study collected key information on energy labelling programs in other countries to assist in the review of labelling in Australia.	Endorsement labels Operating costs Market failure Energy Star ERL design
Artcraft Research, *Final Report on a Qualitative Market Research Study regarding Appliance Energy Rating Labels*, for The National Appliance & Equipment Energy Efficiency Committee (NAEEEC), April 1998	1998	The report presents findings from a series of focus groups on current consumer use and understanding of the existing appliance energy label	Operating costs
Wilkenfeld, G and Associates *Regulatory Impact Statement: Energy Labelling and MEPS for Household Electrical Appliances in Australia*, George Wilkenfeld & Associates with Energy Efficient Strategies, for Australian Greenhouse Office (AGO) February 1999.	1999	This report is a supplement to the original RIS which presented the costs and benefits of transitioning to the revised energy labelling for household electrical appliances in Australia. The supplement: described the process of transition; estimated the costs of transition; established whether costs are consistent with assumptions made in the original RIS; clarified the benefit/cost ratios of the transition.	
Phillips Group, *Energy Rating Label Transition Program: Communications strategy*, report to the Australian Greenhouse Office, January 2000.	2000	This report is the communications strategy used to inform stakeholders about the transition from the pre-July standard to a new standard. The strategy would minimise consumer misunderstanding and maximise compliance, as well as raise awareness and understanding of the label and the greenhouse emission reduction benefits of purchasing efficient appliances.	
Artcraft Research, *A Major Research-Based Review and Scoping of Future Directions for Appliance Efficiency Labels in Australia and NZ*, report to the Australian Greenhouse Office Department of the Environment and Heritage, November 2003	2003	This report presents the findings and recommendations from a two-phase consumer research study which involved a major research-based review and scoping of future directions for a wide range of appliance efficiency labels in Australia. The study covered: replacing the Galaxy Award, cross promoting the Galaxy Award Replacement on energy rating labels; refining the gas label; refining the water label; refining the air-conditioning label; introducing a 'disendorsement' label for inefficient appliances; introducing a label for luminaries; assessing a label for commercial refrigerated beverage cabinets.	ERL design

Citation	Year	Brief overview of report content/topics	Issues relevant to ERL study
Big Step! Services, *Appliance Industry National Resource Labelling Project*, report to the Australian Greenhouse Office, November 2003.	2003	This report presented findings from a survey of electrical appliance industry leader to gauge reactions to possible changes to the energy rating labelling of appliances and the introduction of an appliance award program for gas and electrical products. The study was exploring support for a voluntary endorsement-type labelling scheme to help promote the 'best of class' products in certain categories of gas and electrical appliances. The study found: there were opportunities for collaboration to deliver a meaningful proposition to consumers; need for simplicity but not having collaboration result in a watered down outcome; recognition of the final product as a progressive act, recognised locally and internationally.	ERL design
Holt, Shane, *Lessons learnt from Australia's standards & labelling program,* 2003	2003	Paper by Lloyd Harrington & Shane Holt presented at ECEEE Summer Study - 2-6, June 2003. It discusses Australia's experience in implementing labelling standards, including the policy and program context and lessons learnt.	Market failure
Wilkenfeld, G and Associates 2003, *A National Strategy for Consumer Product Resource Labelling in Australia*, report to the Australian Greenhouse Office, December 2003.	2003	This report presents a strategy to manage the convergence of the electrical, gas and water labelling systems. This document: describes the structure, scope and functions of the main Australian product labelling programs; identifies areas of convergence, overlap and potential conflict within these programs, and with related resource and efficiency information programs; clarifies the roles of different label modes and formats in maximising reach and effectiveness; proposes strategies to maximise the combined impacts of the three resource labelling programs; and makes a preliminary estimate of the national costs and benefits of implementing the proposed strategic approach. The paper provides a range of recommendations for a coordinated resource labelling strategy, including recommendations for program management, label scales and algorithms, label formats, supporting information and label placement	ERL design Energy Star Galaxy Award, Energy Star
Energy Efficient Strategies, *Energy Label Transition – The Australian Experience: Main Report*, for the Australian Greenhouse Office, July 2004	2004	This report presents the Australian experience of updating its ERL. It includes explanations of the label's features, rationale behind the decision to revise the label, the process for moving towards and through the change, outlines of all studies commissioned to assist the transition, as well as results from evaluation and monitoring studies.	
Harrington, Lloyd and Melissa Camnics, *Energy Labelling and Standards Programs Throughout the World (Ed. 2.0)*, report for the NAEEEC, July 2004	2004	This report provides an outline of various energy ratings labels and programs, and endorsement labels and programs from around the world.	
Winton, L, *Energy Labelling and Star Ratings: How consumers make decisions and how they use the energy labels,* prepared by Artcraft Research, 2005.	2005	This presentation discusses the basic decision making process for consumers.	
Productivity Commission, *The Private Cost Effectiveness of Improving Energy Efficiency, No. 36,* 31 August 2005	2005	This report is a comprehensive investigation by the Productivity Commission on the economic and environmental potential offered by energy efficiency improvements.	Market failures
Artcraft Research, *Appliance Performance Labelling In Australia and New Zealand: Final Report on a Major Quantitative Study among Consumers and Retailers on the Labelling of Household Appliances,* report to the Australian Greenhouse Office Department of the Environment and Heritage, August 2006.	2006	This report presents the findings from a series of quantitative studies that were commissioned to investigate awareness and use of the labels among the general public, recent buyers of appliances, retailers, and installers of appliances.	ERL design
Artcraft Research, *The future of energy efficiency labelling of gas water heaters in Australia and New Zealand: A summary of views,* Artcraft Research for E3 Program, 2006	2006	This report provides a summary of various viewpoints in order to guide discussion of future directions of the gas energy efficiency labelling program for gas water heaters. The report includes: awareness and understanding of the as label and perceived importance on energy efficiency with gas appliances;	Market failures

Citation	Year	Brief overview of report content/topics	Issues relevant to ERL study
Artcraft Research, *Major Quantitative Study among Consumers and Retailers*, final report to the Australian Greenhouse Office and Department of the Environment and Heritage, January 2006	2006	This report presents the findings from a series of quantitative studies that had the following objectives: To provide definitive quantitative measurements of awareness, attitudes, and use of the three labels (electricity, gas and water); to provide definitive measurements of the relative importance of labelling-related factors vis-à-vis other factors in the appliance purchase decision-making process; to confirm, and place definitive numbers on, the range of purchaser segments identified in earlier qualitative research mainly on the energy (electricity) efficiency label (e.g., the 'pro-environment', 'cost conscious', 'energy efficient', 'latent' and 'currently unreachable' segments), and expand our understanding as to how these might relate to the role of the gas efficiency label.	ERL design Operating costs
EnergyConsult, *Retrospective Analysis of the Impacts of Energy Labelling and MEPS: Refrigerators and Freezers*, report to the Australian Greenhouse Office: Equipment Energy Efficiency Program, 2006	2006	This study estimated the energy saving impacts from the Minimum Energy Performance Standards (MEPS) labelling of refrigerators and freezers, and provide a comparison with the projections made before the policy was implemented (anticipated impacts of MEPS were projected/forecast before the introduction of the MEPS policy options.	
Energy Strategies in association with Artcraft Research, *Energy Efficiency information in Australia: Looking for the tipping point*, report for Queensland Department of Energy representing the NFEE Consumer Information Working Group, March 2006	2006	This report considers the energy efficiency information made available to consumers and how it has been used by consumers. It includes the success or otherwise of different information programs (domestic and international) and methods of communicating information	Success of ERL
Winton Sustainable Research Strategies, 2007, *Consumer research to guide the next round of refrigerator and air-conditioner labels*, report to www.energyrating.gov.au, Department of the Environment, Water, Heritage and the Arts, October 2007.	2007	This report presents finding from a series of focus groups and interviews that tested views on changing the colour of the band to indicate the revised energy ratings system. This report included refrigerators and air conditioners.	ERL design Energy Star
Winton Sustainable Research Strategies, 2007, Final Report on Community Attitudes to the Possibility of Energy Efficiency Labelling of Television Sets and Home Computers, WSRS for AGO, April 2007	2007	This report presents findings from research into community attitudes on the possible introduction of energy efficiency labels for television sets and home computers. Support for the introduction of labels for both televisions and home computers was strong.	
Winton Sustainable Research Strategies, *Towards a 10-Star Energy Efficiency Rating System for Major Household Appliances: Final Report on a Series of Focus Group Discussions in Australia and New Zealand,* report for Department of the Environment, Water, Heritage and the Arts, May 2008.	2008	This report presented findings from focus group discussions on whether a 10-star rating scheme would improve the current mandatory energy efficiency labelling scheme. The study found: the current label is adequate but progress is essential; the proposed 10-star label would need to build on the current system; consumer education of the changes would help the transition process.	ERL design Greenhouse gas emissions
Australian Refrigeration Council, *Survey of Compliance with Energy Efficiency Labelling Laws: Whitegoods 2009*, report to the Department of the Environment, Water, Heritage and the Arts, September 2009.	2009	This report presents findings from a store survey to examine the level of compliance of whitegoods to mandatory product registration and energy efficiency labelling. The study found the national compliance rate for Energy Efficiency labelling was 98.1% and the national compliance rate for meeting the legislative requirement to register products prior to offering them for sale was 99.4% for all inspected whitegoods.	
Haodong, Gu, *Energy Labels: Formats and Impact on Consumption Behaviour,* Australian School of Business, 2009.	2009	This paper investigates the moderating role of energy labels on the relationship between consumer predispositions (energy consciousness) and purchase of energy saving products. Two main types of energy labels were tested: 'operating cost' labels and 'energy rating' labels. Experimental data (from China) indicates that 'energy rating' labels are both more effective in encouraging purchase of higher energy efficient appliances, and also in enhancing purchase-consciousness association than 'operating cost' labels.	Operating cost

Citation	Year	Brief overview of report content/topics	Issues relevant to ERL study
Wilkenfeld, G and Associates, *Prevention is Cheaper than Cure - Avoiding Carbon Emissions through Energy Efficiency: Projected Impacts of the Equipment Energy Efficiency Program to 2020,* January 2009.	2009	This report updates an impact analysis published in 2005. It estimates residential and non-residential energy savings, as well as estimating greenhouse gas emissions avoided and costs and benefits of the Equipment Energy Efficiency (E3) program.	
Winton Sustainable Research Strategies, *Energy Efficiency Labelling of Swimming Pool Pump Units: Report on research to assist with their marketing and promotion*, report to Department of the Environment, Water, Heritage and the Arts, June 2009.	2009	This report presents findings from research into how proposed energy rating labels for swimming pool pumps should be marketed and communicated. Previously, very little information about the knowledge, attitudes and purchasing behaviour of buyers of swimming pool pumps was known.	Market failure Operating costs
Winton Sustainable Research Strategies, *Possible Labelling of Portable Space Conditioners and Spot Coolers: Market Research on Consumer Attitudes and Behaviour*, draft report to Department of the Environment, Water, Heritage and the Arts, June 2009.	2009	This report presents findings from a series of focus groups on issues associated with portable space conditioners and spot coolers, including purchaser behaviour (i.e. process, reasons, decision factors), perceptions of the product, reactions to technical descriptions, labelling (need for and design). These findings would be used to produce recommendations to assist with the development of labels for single-ducted portable space conditioners and spot coolers.	Operating costs Market failure ERL design
Winton Sustainable Research Strategies, *Report on Research to Guide Proposed Changes to the Energy Efficiency Label for Clothes Washers (Draft 3),* report to Department of Climate Change and Energy Efficiency, June 2010.	2009	This reports presents findings from a series of focus groups on issues associated with clothes washers, including purchasing decisions, energy labels and the relationship between labels and machine functions. These findings would be used to assist with managing the proposed label changes for clothes washers.	ERL design
Wilkenfeld, G and Associates, 2010, *Consultation Regulation Impact Statement, National Legislation for Appliance and Equipment MEPS and Energy Labelling*, GWA, WSRS and Marsden Jacob, for Department of the Environment, Water Heritage and the Arts (DEWHA), January 2010	2010	This report identifies regulatory options for, as well as estimating the costs and benefits of, the reform to the MEPS and labelling program.	Market failure
Energy Efficient Strategies, *Refrigerator Energy Labelling and MEPS Compliance in the Australian Market*, prepared for the Equipment Energy Efficiency Committee, 2011.	2011	This report investigates is the claims of energy consumption of products regulated for energy efficiency are being met by equipment suppliers, using refrigerator data as a proxy for other regulated equipment types. Findings include: there is a small level of systematic overstatement of energy consumption by some suppliers; around 16% of all models tested in the period 1997 to 2008 appeared to have a measured energy consumption that exceeds the accepted energy labelling tolerance, the 16% of models drops to 10% of sales over the period 2005 to 2008	
Winton Sustainable Research Strategies, 2011, *Revising the clothes washer label*, presentation to Department of Climate Change and Energy Efficiency on March 24, 2011.	2011	This presentation reported findings from the focus groups on issues associated with clothes washers, including purchasing decisions, energy labels and the relationship between labels and machine functions	ERL design
Ryan, Lisa, Sara Moraif, Ellina Levina and Richard Baron (International Energy Agency), *Energy Efficiency Policy and Carbon Pricing*: *Information Paper,* 2011.	2011	Among other things, this report provides an comprehensive discussion on the barriers to energy efficiency, including the market failures that exist.	Market failures
Sweeney Research, *Consumer understanding of energy efficiency and star rating*, report to the NSW Office of Environment and Heritage, April 2012.	2012	This report presented findings from focus groups who generally discussed star ratings, energy efficiency and decision making.	Operating costs ERL design
Winton Sustainable Research Strategies, 2012, *Draft Report [5] on Research on Inclusion of a Date on Energy Rating Labels*, report to Department of Climate Change and Energy Efficiency, May 2012.	2012	This report presents findings from focus groups and interviews held to discuss the inclusion of year of manufacture information on energy rating labels.	Year of manufacture ERL design

Citation	Year	Brief overview of report content/topics	Issues relevant to ERL study
Ipsos MORI, London Economics and AEA, *Research on EU product label options: Final report*, for the European Commission, October 2012	2012	This report presents and evidence based consideration of the inclusion of various environmental indicators on the EU energy rating label, including carbon footprint, water footprint, water eco-toxicity and resource depletion. These indicators would be considered for the life of the product. The study reviews existing studies, and presents results from discussion groups, surveys and behavioural experiments.	Greenhouse gas emissions ERL design Endorsement labels
Heinzle, Stefanie Lena, Disclosure of Energy Operating Cost Information: A Silver Bullet for Overcoming the Energy-Efficiency Gap, 2012	2012	This report presents from research into the framing of energy consumption information and how it affects an individual's discounting of future operating costs. One of the major findings of the research was that disclosing lifetime operating cost information was more effective in guiding consumers towards energy efficient decisions.	Operating costs
Kallbekken, Steffen, Haakon Saelon and Erland A.T. Hermansen, Bridging the Energy Efficiency Gap: A Field Experiment on Lifetime Energy Costs and Household Appliances, 2012.	2012	This reports presents findings into Norwegian research into how including lifetime operating costs of an appliance (study applied to fridge-freezers and tumble dryers) can lead to energy efficient choices.	Operating costs
Waide, P and Watson Navigant, R, 2013, Energy Labelling: The New European Energy Label: Assessing Consumer Comprehension and Effectiveness as a Market Transformation Tool, report produced for the Collaborative Labeling and Appliance Standards Program (CLASP), May 2013.	2013	This report presents the findings of a comprehensive consumer research study which establish how well the revised EU labels work with consumers in order to assess their likely energy saving impact. The research establishes: the ability of consumers to comprehend the information on the label; how salient and motivating they found this information; to what degree they were likely to use the information on the label when making future appliance purchases.	ERL design
Newell, Richard G. and Juha Siikamaaki, Nudging Energy Efficiency Behaviour: The Role of Information Labels, 2013.	2013	This report presents findings from the US study that investigated how the placement of different pieces of information on or near an energy label can influence a consumer's purchasing decision. The types of information tested include placing an Energy Star label next to an energy label and including CO_2 information on the label.	Greenhouse gas emissions Endorsement labels
Gromet, Dean. M, Howard Kunreuther and Richard P. Larrick, *Political ideology affect energy-efficiency attitudes and choices*, 2013.	2013	This report presents findings from research into how consumer behaviour when purchasing appliances is influenced with political ideologies. In particular it examines how adoption of energy efficiency is influenced by the political polarisation of environmental issues.	Greenhouse gas emissions

Appendix F Consumer surveys

To assist with this aspect of the project, ACIL Allen Consulting commissioned Roy Morgan Research to undertake two online surveys.

- The first survey was based on the existing labelling survey regularly conducted by the Energy Efficiency and Conservation Authority of New Zealand and the recently released European Union survey.
- The second survey built on the findings of the first survey as was designed by the Department of Industry in conjunction with ACIL Allen Consulting to address specific information gaps.

Each survey sample consisted of over 1,200 consumers, geographically spread throughout Australia. Participants in the surveys were members of Roy Morgan Research Online Panels.

F.1 Surveys timeline

The first survey was administered during late October and early November 2013. Key dates in relation to the first survey include:

- 11/10/2013: pilot phase/Soft launch to 400 consumers;
- 14/10/13: wider distribution of survey via email invitations; and
- 21/10/13: survey closed with 1,204 completed responses.

The second survey was administered during January and early February 2014. Key dates in relation to the second survey include:

- 20/01/2014: pilot phase/Soft launch to 500 consumers;
- 23/01/2014: wider distribution of survey via email invitations; and
- 3/02/2014: survey closed with 1,200 completed responses.

The Department of Industry was involved in quality assurance of both surveys and gave final approval before they were launched.

F.2 Weighting of results

The raw survey results have been weighted for the analysis contained in this report. Weighting involves assigning a value to individual responses to account for differences in the number of respondents with certain characteristics. As such, where a sample of a population has been surveyed, weighting ensures that the survey analysis is representative of the entire population, and allows the estimation of values that are representative of the entire population.

The main purpose of the weighting is to slightly nudge the impact of the individual respondents' answers up or down to reflect the impact of their response as a proportion of the total population. In this case, weighting has been used to match the distributions of both survey samples to the distribution of the relevant population in relation to age, sex and location.

The weighted results vary slightly from the raw results.

F.3 Consumer surveys

Copies of the surveys are provided in the sections below.

F.3.1 Consumer survey 1

Q1. Are you involved in decisions in your household about the purchase of appliances?

1. Yes, I am the main decision maker
2. Yes, I make the decisions jointly with someone else
3. No, someone else makes the decisions
4. Don't know
5. Prefer not to say

(If code 1 or 2 continue; otherwise thank and close.)

Q2. When did you most recently buy an appliance in a physical store (that is, not online)? Select the closest answer.

1. In the last 6 months
2. 7 to 12 months ago
3. 13 to 24 months ago
4. more than 24 months ago
5. I have never purchased a new appliance in a physical store.

(If code 1, 2 or 3 in Q2, continue. If code 4 or 5 in Q2, thank and close.)

Q3. What is the one appliance you bought most recently?

1. Refrigerator
2. Freezer
3. Clothes washer
4. Clothes dryer
5. Dishwasher
6. Television
7. Air conditioner (cooling only)
8. Reverse cycle air conditioner (heating and cooling)

If you bought more than one of these appliances on your most recent shopping occasion, please select just one.

(If code 1–6 in Q3, skip to Q12. If code 7 or 8 in Q3, continue to Q4)

Q4. When you purchased your [INSERT: air conditioner or reverse cycle air conditioner], which of the following features did you consider? Select all that apply.

1. How much energy it uses
2. Floor space it can heat or cool
3. If it can work as a heater in cold conditions
4. Demand response capability
5. How much noise it would make when turned on
6. Capacity Output (in kilowatts)
7. Power Input (in kilowatts)

8. Not sure/don't remember which features I considered
9. Did not consider any of the features listed

Q4b. For each item below, indicate how helpful it was in your decision to purchase your [air conditioner / reverse cycle air conditioner]. Use the scale of 0-10 where 0 means "not at all helpful" and 10 means "extremely helpful."

PROGRAMMER NOTE: All response columns should be equal width in questions such as this	Not At All Helpful 0	1	2	3	4	Moderately Helpful 5	6	7	8	9	Extremely Helpful 10	Don't Know
Brand reputation												
Price												
Aesthetics (e.g. how it looks, how easy it is to use)												
Environmental impact												
Product features												
Warranty												
Retailer or tradesperson reputation/advice												
Energy use of the appliance												
Availability/delivery time of the appliance												

Q5. Which, if any, of the following resources did you use when selecting your [air conditioner/reverse cycle air conditioner]? Select all that apply.

1. Magazines or newspapers (print advertisements, articles, letters, etc.)
2. In-store assistance (sales staff, product literature available in-store)
3. Manufacturers websites or brochures
4. Energy rating label
5. Online forums (e.g. Whirlpool or Product Review)
6. Online consumer sites (e.g. Choice)
7. Smartphone applications
8. Friends and family
9. Tradesman, builders, repairers
10. Energy rating website
11. Government departments (e.g. local council/state government)
12. Other sources (e.g. word of mouth)
13. I did not use any of these to help select my [air conditioner/reverse cycle air conditioner]

Q5a. For the [air conditioner/reverse cycle air conditioner], did information about how much energy it uses influence your decision to purchase it?

1. Yes, the information had a large influence
2. Yes, the information had a moderate influence
3. Yes, the information had a small influence

4. No, the information did not have an influence
5. Don't know/ can't say

(If code 1–3 in Q5a, continue. If code 4 or 5, do not ask Q6 (skip to appropriate part of Q7 instead)

Q6. Which, if any, of the following resources did you use to research the energy use or energy efficiency of your [air conditioner/reverse cycle air conditioner]? Select all that apply.

1. Magazines or newspapers (print advertisements, articles, letters, etc.)
2. In-store assistance (sales staff, product literature available in-store)
3. Manufacturers websites or brochures
4. Energy rating label
5. Online forums (e.g. Whirlpool or Product Review)
6. Online consumer sites (e.g. Choice)
7. Smartphone applications
8. Friends and family
9. Tradesman, builders, repairers
10. Energy rating website
11. Government departments (e.g. local council/state government)
12. Other sources/other places (e.g. word of mouth)
13. I did not research the energy use/ energy efficiency before buying my [air conditioner/reverse cycle air conditioner]

(Ask Q7a if code 7 selected in Q3)

Q7a. Since buying your air conditioner, have you:

1. Used it about as much as expected
2. Used it more than expected
3. Used it less than expected

(Ask Q7b1 and 2 if code 8 selected in Q3)

Q7b1. Since buying your reverse cycle air conditioner, has your usage of it been different than you expected? Select all that apply.

1. Yes, I've used it more as a heater than I expected
2. No, I've used it as a heater about as much as I expected
3. Yes, I've used it less as a heater than I expected

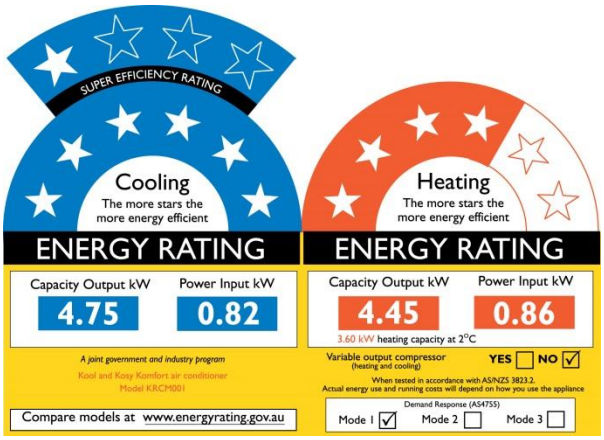
Q7b2. Since buying your reverse cycle air conditioner, has your usage of it been different than you expected? Select all that apply.

1. Yes, I've used it more as a cooler than I expected
2. No, I've used it as a cooler about as much as I expected
3. Yes, I've used it less as a cooler than I expected

Q8. Did you know that your local climate can affect your [air conditioner's or reverse cycle air conditioner's] annual energy use and/or energy efficiency?

1. Yes
2. No
3. Not sure/don't care

Q9. Have you noticed this energy rating label on air conditioners or reverse cycle air conditioners being sold in stores?



1. Yes
2. No
3. Not sure

(If code 1 on Q9, continue. If code 2-3 on Q9, skip to Q11)

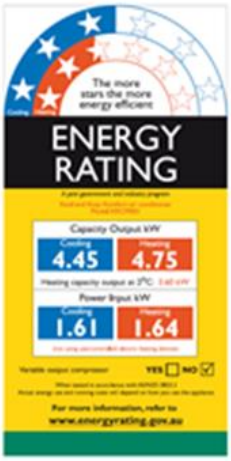
Q10. Which of the following statements most closely corresponds to your understanding of the two arches (blue and red) containing stars in the air conditioner/reverse cycle air conditioner label?

1. I understand why there are star arches on both labels
2. I don't understand/am not sure why there are star arches on both labels

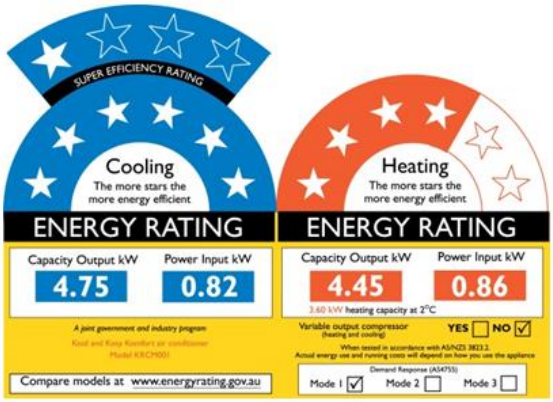
Q11. Indicate how helpful to you each item below would be if you were deciding to purchase an air conditioner or reverse cycle air conditioner. Use the scale of 0-10 where 0 means "not at all helpful" and 10 means "extremely helpful."

PROGRAMMER NOTE: All response columns should be equal width in questions such as this	Not At All Helpful 0	1	2	3	4	Moderately Helpful 5	6	7	8	9	Extremely Helpful 10	Don't Know
Annual operating cost												
Operating noise												
Capacity Output kW and Power Input kW												
Floor space it can heat or cool												
How much noise it would make when turned on												
If it is capable of demand response												
If it can work as a heater in cold conditions												
Energy use information that relates to your location												
Year of manufacture												
Model number												
Links to additional information (e.g. a Quick Reference code or website address)												
Country of manufacture												
Annual greenhouse gas emissions												
Hazardous substances contained in or used by the appliance (e.g. chemical agents, refrigerants)												
Star rating scale												

Q11b. In the past, two different star rating labels have been used to display reverse cycle air conditioner information. The two labels are shown below.



423



679

Noting that a reverse cycle air conditioner is often used to both heat and cool a home, which do you think is the most effective way of showing the heating and cooling information on the one label?

1. 423
2. 679
3. The two labels are equally effective
4. Don't know/not sure

(If code 7 or 8 in Q3, skip to Q16; if code 1-6 in Q3, continue)

Q12. For each item below, indicate how helpful it was in your decision to purchase your latest appliance. Use the scale of 0-10 where 0 means "not at all helpful" and 10 means "extremely helpful

PROGRAMMER NOTE: All response columns should be equal width in questions such as this	Not At All Helpful 0	1	2	3	4	Moderately Helpful 5	6	7	8	9	Extremely Helpful 10	Don't Know
1.Brand reputation												
2. Price												
3. Aesthetics (e.g. how it looks, how easy it is to use)												
4. Environmental impact												
5. Product features												
6. Warranty												
7. Retailer or tradesperson reputation/advice												
8. Energy use of the appliance												
9. Availability/delivery time of the appliance												

Q13. Which, if any, of the following resources did you use to select your latest purchased appliance? Select all that apply.

1. Magazines or newspapers (print advertisements, articles, letters, etc.)
2. In-store assistance (sales staff, product literature available in-store)
3. Manufacturers websites or brochures
4. Energy rating label
5. Online forums (for example, Whirlpool, Product Review)
6. Online consumer sites (for example, Choice)
7. Smartphone applications
8. Friends and family
9. Tradesman, builders, repairers
10. Energy rating website
11. Government departments (e.g. local council/state government)
12. Other sources/ other places (e.g. word of mouth)
13. I did not use any of these to help select my appliance

Q14. For your latest purchased appliance, did information about how much energy it uses influence your decision to purchase it?

1. Yes, the information had a large influence
2. Yes, the information had a moderate influence
3. Yes, the information had a small influence
4. No, the information did not have an influence
5. Don't know/ can't say

(If code 1–3 in Q14, continue. If code 4 or 5, skip to Q16)

Q15. Which, if any, of the following resources did you use to research the energy use or energy performance of your latest purchased appliance? Select all that apply.

1. Magazines or newspapers (print advertisements, articles, letters, etc.)
2. In-store assistance (sales staff, product literature available in-store)
3. Manufacturers websites or brochures
4. Energy rating label
5. Online forums (e.g. Whirlpool or Product Review)
6. Online consumer sites (e.g. Choice)
7. Smartphone applications
8. Friends and family
9. Tradesman, builders, repairers
10. Energy rating website
11. Government departments (e.g. local council/state government)
12. Other sources/other places (e.g. word of mouth)
13. I did not research the energy use/energy performance before buying my appliance

Q16. Have you noticed this energy rating label on new appliances being sold in stores?

1. Yes
2. No
3. Not sure

(If code 1 on Q16, continue. If code 2-3 on Q16, skip to Q25 then continue on from there)

Q17. Which one of the following statements most closely corresponds to your understanding of what the stars mean on the energy rating label?

More stars means the appliance…

1. consumes more energy
2. consumes less energy
3. is more energy efficient
4. is less energy efficient
5. is less expensive to use
6. is more expensive to use
7. don't know/not sure

Q18. Using a scale of 1-5 where 1 = agree strongly and 5 = disagree strongly, how much do you agree or disagree with the following statements about the energy rating label for your most recently purchased appliance?

Alternate attribute order	Agree Strongly 1	Agree somewhat 2	Neither agree nor disagree 3	Disagree somewhat 4	Disagree Strongly 5
The label provided you with new information					
The label provided you with useful information					

Q19. Did the rating or information on the label affect your final decision when you purchased your most recent appliance?

1. Yes
2. No
3. Not sure

(If code 1 on Q19, continue. If code 2-3 on Q19, skip to Q21 then continue on from there)

Q20. To what extent did the energy rating label influence the purchase of your most recent appliance?

1. The energy label information had a large influence
2. The energy label information had a moderate influence
3. The energy label information had a small influence

Q21. Did the in-store sales person or tradesperson provide you with advice when you bought your most recent appliance?

1. Yes
2. No
3. Not sure

(If code 1 on Q21, continue. If code 2-3 on Q21, skip to Q23 then continue on from there)

Q22. Did the in-store sales person or tradesperson draw your attention to the energy label prior to the purchase?

1. Yes
2. No
3. Not sure

Q23. A new energy rating label for certain appliances was introduced in 2009. It included a second layer of "super efficiency" stars to further distinguish those appliances at the top of the energy efficiency range.

Have you noticed this label on new appliances being sold in stores?

1. Yes
2. No
3. Don't know/not sure

(If code 1 in Q23, continue. If code 2 or 3 in Q23, skip to Q25)

Q24. Which one of the following statements most closely corresponds to your understanding of what the extra stars mean on the energy rating label?

Extra stars mean the appliance…

1. consumes more energy
2. consumes less energy
3. is more energy efficient
4. is less energy efficient
5. is less expensive to use
6. is more expensive to use
7. don't know/not sure

Q25. Before today, did you know that the Energy Rating Label Scheme is based on a partnership between the Australian Government and industry?

1. Yes
2. No
3. Not sure

(If code 1 in Q25, continue; otherwise skip to Q27)

Q26. Knowing that the energy rating label is based on a partnership between the Australian Government and industry, how confident are you that the energy rating label provides information that is

	Not At All Confident 0	1	2	3	4	Moderately Confident 5	6	7	8	9	Extremely Confident 10	Don't know
Accurate												
Trustworthy												
Relevant												
Up-to-date												

Q27. Do you think the Energy Rating Label Scheme would be better…..

1. as an Australian Government only scheme
2. as an Industry only scheme
3. left as the existing partnership between the Australian Government and industry
4. don't know/not sure/don't care

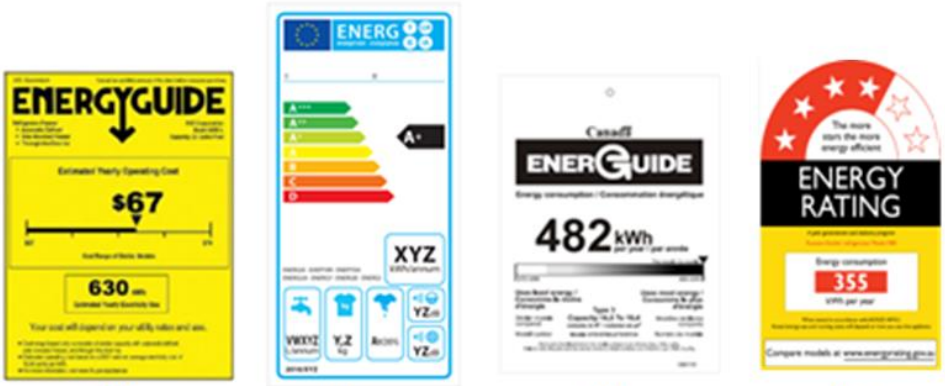
Q28. Indicate how helpful to you each item below would be when you purchase an appliance. Use the scale of 0-10 where 0 means "not at all helpful" and 10 means "extremely helpful."

	Not At All Helpful 0	1	2	3	4	Moderately Helpful 5	6	7	8	9	Extremely Helpful 10	Don't Know
Year of manufacture												
Model number												
Annual operating cost												
Links to additional information (e.g. a Quick Reference code or website address)												
Country of manufacture												
Annual greenhouse gas emissions												
Hazardous substances (e.g. chemical agents, refrigerants)												
Water consumption and other environmental information												
Star rating scale												
Operating noise												

Q29. Different countries present information on the energy use of appliances in different ways.

Consider the following four labels which are used by different countries to inform purchasers about the amount of energy used by an appliance.

Please indicate which label you think is the most effective in informing you about the following features of the appliance:



338 297 859 403

Feature (randomise order of attributes)	Most effective label (select the code below the label)
Operating cost	338 297 859 403
Energy consumption	338 297 859 403
Providing information for easily comparing similar models	338 297 859 403

Q30. Did you know that the energy labels for appliances are updated periodically to ensure that the reported energy use aligns with new developments in technology that might improve energy performance in newer products?

1. Yes
2. No
3. Not sure

Q31. In 2010, the star rating system on the label for refrigerators was changed. For example, a fridge rated 4-stars in 2009 (see "2009 label" on left) would rate only 2-stars today (see "2010 label" on right) even though the actual energy used by the fridge model is unchanged. The label change was made to permit more efficient refrigerators coming onto the market to have higher comparative star ratings.

Notice that the green stripe at the bottom of the 2009 label was removed in an effort to show the updating in the rating system that occurred in 2010. The two labels are shown below.

2009 Label 2010 Label

Do you think that the removal of the green stripe was an effective way of communicating the revised star rating system?

1. Yes
2. No
3. Not sure

Q32. Another way to distinguish between the labels is shown below. On the left again is the label used in 2009 showing the "energy star rating" assigned at that time. On the right is a later 2010 label showing the "energy star rating" was updated for the appliance. Do you think that showing the year is an effective way of communicating the change in the star rating system?

2009 Label

2010 Label with date

1. Yes
2. No
3. Not sure

Q32a. Do you have a preference between the two ways shown for how government should communicate a change in the star rating label?

1. Prefer the year-date on the label
2. Prefer removal of the green stripe
3. Have no preference
4. Prefer some other method for communicating the change (Please specify):

Q33. A smartphone is a mobile phone that works like a computer. It has a camera and can access the Internet.

Do you use a smartphone?

1. Yes
2. No

(If code 1 on Q33, continue; otherwise skip to Q36)

Q34. A Quick Response code, or QR code, is a type of barcode made up of black and white squares. Smartphone users can access website information about a product by scanning its QR code with their device's camera.

Would you use a QR code on an energy rating label to access additional information an appliance?

1. Yes
2. No
3. Not sure

Q35. Would you use a smartphone application or 'app' to access more information about the appliance if the app was available to download through a website link or QR code on an energy rating label?

1. Yes
2. No
3. Not sure

Q36. Would you use a website address on an energy rating label to access more information about the energy use of an appliance?

1. Yes
2. No
3. Not sure

F.3.2 Consumer survey 2

Q1. Are you involved in decisions in your household about the purchase of appliances?

1. Yes, I am the main decision maker
2. Yes, I make the decisions jointly with someone else
3. No, someone else makes the decisions
4. Don't know
5. Prefer not to say

(If code 1 or 2 continue; otherwise thank and close)

Q2. When you last bought a new appliance did you buy it online or in a physical store?

1. Online
2. In a physical store
3. I have never purchased a new appliance.

(If code 1 or 2, continue; otherwise thank and close)

Q3. When did you most recently buy a new appliance in a physical store (that is, not online)? .

1. In the last 6 months
2. 7 to 12 months ago
3. 13 to 24 months ago
4. more than 24 months ago

If code 1, 2 or 3 in Q3, continue

If code 4 in Q3, thank and close.

Q4. What is the one appliance you bought most recently?

1. Refrigerator

2. Freezer
3. Clothes washer
4. Clothes dryer
5. Dishwasher
6. Television
7. Air conditioner (cooling only)
8. Reverse cycle air conditioner (heating and cooling)

If you bought more than one of these appliances on your most recent shopping occasion, please select just one.

Q5. Have you noticed this type of energy rating label on new appliances being sold in stores?

1. Yes
2. No
3. Not sure

(If code 1 on Q5, continue. If code 2-3 on Q5, thank and close)

Q6. The energy rating label has a number in the red box which is the annual energy consumption for the appliance. Do you compare this number with the numbers for other similar appliances when making your purchasing decision?

1. Yes
2. No
3. Not sure

Q7. Have you used the number in the red box (the annual energy consumption) to estimate the annual operating costs for the appliance?

1. Yes
2. No
3. Not sure

Q8. Appliance operating cost varies depending on where you live and how your family uses the appliance. With this in mind, if an operating cost for an appliance were included on the label, that figure would only be an approximate amount.

Would you prefer to use Internet tools to better estimate the operating cost that takes account of your family location and circumstances rather than rely on approximate amount reported on the label?

1. Yes
2. No
3. Not sure

(If code 1 on Q8, continue to Q9, then skip to Q11. If code 2-3 on Q8, skip to Q10)

Q9. Past surveys show access to accurate operating cost is preferable. A website link or a Quick Response (QR) code on the label are two options to provide easy access to the Internet to calculate more accurate operating costs that take account of your family location and circumstances.

A QR code is a type of barcode made up of black and white squares. Smartphone and tablet users may access website information about a product by scanning a QR code on its label with their device's camera.

With this in mind, which option would you prefer to use to give you a more accurate yearly appliance operating cost for your family location and circumstances?

1. Prefer to include a website link on the label
2. Prefer to include a QR code on label
3. Prefer not to include a website or QR code on the label
4. Not sure

Q10. If the appliance label were to include an approximate operating cost, would you prefer to…?

1. Keep the existing number for energy consumption and add the operating cost. That is, both energy consumption and operating cost appear in the red box on the appliance label
2. Replace the number for energy consumption in the red box with the operating cost
3. No preference
4. Other: Please specify (open ended)

Q11. Currently there is some variation in how big or small the energy rating label is to suit the physical size of the appliance.

Which of the following options for energy rating label size do you prefer?

1. Keep the label size the same for all appliances
2. Allow for some variation in size of label to better suit the available space on individual appliance types
3. No preference
4. Not sure

Q12. Methods to award star ratings are updated periodically as appliance technology changes to ensure that the number of stars awarded is appropriate. The energy rating label is updated accordingly. For example, in 2010, the star rating method on the label for refrigerators was updated, meaning that a fridge that rated 4 stars in 2009 would only rate 2 stars today. This change allowed more efficient refrigerators coming onto the market to have higher comparative star ratings.

Do you think that periodic updating of the methods and label to reflect technology improvements is a good idea?

1. Yes
2. No
3. Don't know/don't care

(If code 1 or 2 on Q14, continue. If code 3 on Q14, skip to Q17)

Q13. In the past, when updates to the label have occurred, appliances for sale in showrooms and shops had fixed transition periods where both rating labels might appear for a time. So, for example, a refrigerator would be labelled for a while with both a two star rating and a four star rating. After the transition retailers and appliance suppliers were required by law to relabel any remaining older stock with the new label and remove the old label. Such label updates impose a cost on retailers to relabel the appliances that have been updated. The cost may be passed on to consumers.

Would you prefer a system where the cost of this transition of showroom floor stock could be minimised or avoided altogether?

1. Yes
2. No
3. Don't know

Q13a. Would you prefer a system where the need for relabelling of appliances could be minimised or avoided altogether?

1. Yes
2. No
3. Don't know

Q14. A smartphone is a mobile phone that works like a computer. It has a camera and can access the internet. A tablet is similar in what it can do. Do you use a smartphone or tablet?

1. Yes

2. No
3. Not sure

(If code 1 on Q16, continue. If code 2 or 3 on Q16, thank and close)

Q15. Did you use one or more application ("apps") on your tablet or smartphone to help you choose your most recently purchased appliance?

1. Yes, I used one or more apps
2. No
3. Not sure/don't remember

If code 1 on Q17, continue; otherwise skip to Q20

Q16. Do you remember the name of the app(s)?

1. yes
2. no
3. not sure

If code 1 continue, otherwise skip to Q20

Q17. Please enter the name of the app(s).

Q18. Did you use one or more websites on your tablet or smartphone to help you choose your most recently purchased appliance?

1. Yes, I used one or more websites
2. No
3. Not sure/don't remember

(If code 2, continue; otherwise skip to Q23)

Q19. Do you remember the name of the website(s)?

1. Yes
2. no
3. not sure

(If code 1 continue; otherwise skip to Q23)

Q20. Please enter the name of the website(s).

Q21. Did you use one or more apps on your tablet or smartphone to help you research the energy efficiency or power costs when choosing your most recently purchased appliance?

1. Yes, I used one or more apps
2. No
3. Not sure/don't remember

(If code 1 continue, otherwise skip to Q26)

Q22. Do you remember the name of the app(s)?

1. yes
2. no
3. not sure

(If code 1 continue, otherwise skip to Q26)

Q23. Please enter the name of the app(s).

Q24. Did you use one or more websites on your tablet or smartphone to help you research the energy efficiency or power costs when choosing your most recently purchased appliance?

1. Yes, I used one or more websites
2. No
3. Not sure/don't remember

(If code 2 continue, otherwise skip to Q29.)

Q25. Do you remember the name of the website(s)?

1. yes
2. no
3. not sure

(If code 1 continue; otherwise skip to Q29)

Q26. Please enter the name of the website(s).

Q27. Thinking about occasions when you were shopping in a store and making a decision to purchase an appliance, which statement below most closely describes you?

4. I have used my smartphone or tablet to access information about appliances
5. I have not used my smartphone or tablet to access information about appliances but I would be interested to try it
6. I have not used my smartphone or tablet to access information about appliances and I would not be interested to try it
7. Don't know/not sure

Q28. A QR code is a type of barcode made up of black and white squares. Smartphone and tablet users could access website information about an appliance by scanning a QR code on its label with their device's camera.

What would be your preferred method of accessing more information about an appliance using your smartphone or tablet when shopping in a store?

1. An app (once downloaded will work in a store without connection to the Internet)
2. Scanning a QR code printed on the label to link to a website tool (requires connection to the Internet)
3. Keying in a web address printed on the label to link to a website tool (requires connection to the Internet)
4. Any of the above
5. None of the above

Appendix G Advisory Forum Report

G.1 Introduction

ACIL Allen Consulting is currently undertaking an independent review of the Energy Rating Labelling Scheme for the Department of Industry (on behalf of the Equipment Energy Efficiency (E3) Committee).

An Advisory Forum was held with representatives from industry to discuss the findings of ACIL Allen's review, including the results of the first survey of Australian consumers conducted as part of this review.

This report summarises the discussion, outcomes and action items from the Energy Rating Label Review Advisory Forum.

G.2 Agenda and attendees

The Energy Rating Label Review Advisory Forum (the Forum) was held on 29 November 2013, 1pm – 4.15pm at the Mercure Canberra, Cnr Ainslie and Limestone Avenues, Braddon, ACT.

The Forum's agenda and leads are outlined in Table G1 and the attendees in Table G2.

Table G1 **Advisory Forum Agenda**

Time	Agenda Item	Lead
1:30–1:35pm	1. Welcome and introduction (5 mins)	David Walker (DoI)
1:35–1:50pm	2. Overview of the elements of current label projects (15 mins) ERL Review Climate Rating Label Energy Rating app Digital Labelling Energy Star (NZ)	David Pearson (DoI)
1:50–1:55pm	3. Terms of reference for the ERL Review (5 mins)	Renee Robinson (DoI)
1:55–2:10pm	4. Labelling principles (15 mins)	ACIL Allen Consulting
2:10–2:40pm	5. Key outcomes from the ERL Review first Consumer Survey (30 mins) 1200 statistically relevant views	ACIL Allen Consulting
2:40–3:10pm	6. Open discussion (30 mins) What consumers want and don't want included on the label When can this be done? What are the stumbling blocks?	Shane Holt (DoI) (facilitate discussion)
3:10–3:30pm	7. Labelling options – Image then debate, issue by issue (20 mins)	Shane Holt (facilitate discussion)
3:30–3:50pm	8. Open discussion (20 mins) How can the label interact with the internet? ERL Committee volunteers	Shane Holt (facilitate discussion)
3:50–4:00pm	9. ERL Advisory Committee (10 mins) Terms of reference and housekeeping	Shane Holt
4:00–4:05pm	10. April conference timeline (5 mins)	Renee Robinson
4:05–4:15pm	11. Other Business	Shane Holt

Source: Department of Industry.

Table G2 **Advisory Forum Attendees**

Organisation	Representative
Australian Information Industry Association (AIIA)	Sharon Kennard
Apple	Vicki Hawthorne
Air conditioning and Refrigeration Equipment Manufacturers Association of Australia (AREMA)	Steve Anderson
Australian Industry Group (AI Group)	David Crossley
CHOICE	Scott O'Keefe
Consumer Electronics Suppliers Association (CESA)	Ian McAlister
Consumer Electronics Suppliers Association (CESA)	Colin Doyle
Consumer Electronics Suppliers Association (CESA)	Phillip Robinson
Consumers' Federation of Australia	Polly Plowman
Electrolux	Ian Forte
George Wilkenfeld & Associates	George Wilkenfeld
LG	Stuart Parker
Mitsubishi Electric	Peter Wilkinson
New Zealand Government	Chris Forsman
New Zealand Government	Terry Collins
Rheem Australia Ltd	Gareth Jennings
Water Efficiency Labelling and Standards (WELS)	Josephine Townsend
Gas Appliance Manufacturers Association	Rod Brutlag
Department of Industry	David Pearson
Department of Industry	David Rochford
Department of Industry	Gemma Goodwin
Department of Industry	Sara Williams
Department of Industry	Tim Laris
Department of Industry	Shane Holt
Department of Industry	Renee Robinson
Department of Industry	Ross Hamilton
Department of Industry	Michael Golden
Department of Industry	Kingsley Sutton
Maia Consulting	Melissa Damnics
ACIL Allen Consulting (afternoon session only)	Mayela Garcia
ACIL Allen Consulting (afternoon session only)	Rowena Gregson

Source: Department of Industry.

G.3 Notes on agenda items

G.3.1 Agenda item 1: Welcome and introduction

The Department of Industry (the Department) welcomed industry guests and thanked them for their attendance and assistance with this review. The role that industry plays in this space was also highlighted by the Department. Industry and government need to work together to get a product that meets the consumer's needs.

G.3.2 Agenda item 2: overview of the current label projects

The Department noted that they would like to work with industry and other stakeholders to collect information and develop ideas for conveying energy efficiency information to consumers other than through the ERL.

The Department explained that it is currently conducting a comprehensive review of the energy rating labelling scheme and some of the issues underpinning this review, which include:

- consumers are changing the way they purchase products. There is a rise in online sales which means that consumers are researching and purchasing differently to, say, 10 years ago. For example they may not go into stores therefore they may not be able to see (or use) an ERL; and
- there are two international energy label reviews underway – the European Union Energy Rating Label and Ecodesign Directives, and the work by New Zealand (including ENERGY STAR®).

Several initiatives and issues are already being explored as part of this review, including:

- digital labelling (monitors are currently being trialled);
- climate labelling for climate sensitive products (e.g. air conditioners);
- the mandatory disclosure of labels in advertising;
- the new EU labels for air conditioners (implemented in 2013);
- the introduction of a climate label in the US; and
- a mobile app to run on smartphones (a prototype app is near completion).

The Department also noted that the main goals of this review are to:

- ensure the ERL provides information to consumers when and where they need it;
- work with industry to ensure the ERL is consistently displayed; and
- promote competition and consumer information.

The Department also reported on the scope for smartphone apps (and a QR Code on the label) to link the physical label to www.energyrating.com.au and other websites. This has the potential to address many of the limitations and shortcomings of the physical label, including:

- the provision of more information than what is able to fit on the label;
- the provision of information that changes by geography, by personal buyer circumstance and over time (e.g. the energy costs and greenhouse gas emissions associated with the specific energy use of a specific labelled model);
- comparing the labelled product with competing products that may not be in the same showroom (or on the same website);
- personalising the presentation of the data to suit individuals (e.g. generating an electronic image of a label where the kWh/year value is over-written by $/year); and
- possibly, the vintage of the label scale and the calculation of ratings under earlier/later label vintages.

A QR code on the label could act as a convenient portal to the energy rating website for portable devices. Consumers accessing the website this way for the first time could be offered an app for download (presumably the system would be able to detect whether to offer an IOS or Android version – it should not be necessary to have different QR codes).

G.3.3 Agenda item 3: Terms of reference for the ERL Review

The Department outlined the terms of reference of the independent review being conducted by ACIL Allen Consulting, which include:

- a review of the issues raised by stakeholders since the previous review in 2000;
- a review of international labelling developments; and
- a consumer survey to determine the effectiveness of the current label.

G.3.4 Agenda items 4 & 5: Labelling principles and key outcomes from the ERL Review consumer survey

ACIL Allen Consulting presented the preliminary findings from the independent review. The feedback received on ACIL Allen's presentation and comments raised about labelling options are presented in the next section.

G.3.5 Agenda items 6-8: Open discussion and labelling options

Industry comments on ACIL Allen's presentation

- George Wilkenfeld provided the following comments on ACIL Allen's presentation.
  - He was encouraged by the stability of the findings of ACIL Allen's research; recognition of the label has stayed consistent with almost every survey of energy label users undertaken in the past 20 years. This indicates that the program is both successful and stable.
  - Some results which could be considered disappointing are actually satisfactory, particularly the fact that 60 per cent of respondents had noticed the super-efficiency label (i.e. the coronet with four extra stars). Due to the low incidence of the super efficiency label on whitegoods, this result was unexpectedly high, although it is partly explained by the high ratio of TV purchasers, who would have seen many such labels on TVs in their showroom visits. As commented by one industry participant, if this was a program run by his marketing department he would tell them not to spend more money on it because there is nothing to fix.
  - 40 per cent of respondents to the survey had purchased a TV; this seemed rather high, until the Department pointed out that three million of the seven million labelled appliances sold last year were in fact TVs (i.e. over 40 per cent). Response from purchasers of whitegoods was more or less in proportion, but air conditioner purchases were grossly under-represented (i.e. 7 per cent of respondents, but about 13 per cent of label sales — the labelled air conditioner market is nearly 0.9 million per year).
  - Similarly, energy use featuring as the 3rd or 4th most important factor for purchasers is a satisfactory finding; it has never been higher in previous studies. Consumers always buy based on price and features; these factors will always trump energy use.
- ACIL Allen's research finding that energy use features 3rd or 4th in the most important factors for purchasers is also supported by research conducted in New Zealand.
- The respondent breakdown heavily weighted towards TVs possibly because of analogue phase-in.
- The large number of TV purchasers included in the sample population could have skewed the preference for including the year of manufacture on the ERL; TV is a technology that constantly changes and TV purchasers might have a greater desire for year of manufacture information to ensure they are getting the latest technology.

Industry comments on label design

- There is strong evidence that consumers like the look and feel of the ERL, but the impact of size has not been investigated; there is not always enough 'real estate' on an appliance to display a large label. In the past the size of the ERL applied to TVs has been reduced. This issue will be investigated in the second consumer survey conducted as part of this review.
- One of the strengths of the ERL (and WELS) label is that it is simple and has a simple message. This can also be seen as a weakness because the message is over simplified. When too much complexity is added, the message is lost. Consumers can be given information but maybe the label is not the best place for it.
- A complete revamp of the label or its components (such as the stars) could result in all the recognition (the 'brand') of the existing products (the stars) being lost. The seasonal air-conditioning label presented this problem in New Zealand.
- There is some international research looking at a consistent label for developing countries. However there are arguments for and against a global label. One test method for each product is sensible but there would be a lot of expended effort in different countries to understand the label and to ensure there are culturally specific issues in label design. That said, the testing could be the same and applied to a culturally appropriate label. This should not be expected for many years yet.
- Given the review's results clearly demonstrate the success of the label, industry believes there is not a lot of justification to spend a lot of money on improving an already very effective label. There might be an incremental benefit but industry representatives pointed out that the imposition should not be on industry to fund any changes to the label or to fund new support tools for the label(i.e. the online component). The app could just end up being an expensive addition to something that is already available to consumers.
- Any major change on the label should be subject to a cost-benefit analysis.
- Industry questioned whether the first survey (or other research) has explored the following issues:
  - whether people understood what kWh means; and
  - whether a picture of 5 stars is better than the words 'five stars'.

Industry comments on appliances' operating costs

- George Wilkenfeld pointed out that consumers have consistently wanted operating costs included on the label but the problems associated with its inclusion are widely documented and once these are explained to consumers, they accept why these are not included in the label. The smartphone app proposed by the Department may be the tool to address issues relating to including operating costs on the label (i.e. cost of electricity in different regions and over time).
- The current ERL is widely recognised, trusted and accepted, but not all consumers know how to interpret the information contained in the label, especially the kWh; consumers often find it hard to link kWh with stars and the overall running costs. Consumers get more traction from a monetised figure on an energy label.
- With respect to the WELS, operating cost will never be a selling point because water is relatively cheap. There is no plan to include operating cost on the WELS label.
- There was nothing in the research to directly show if consumers understood the meaning of kWh. Some consumers interpret the kWh, some interpret the star rating, some people interpret everything. If consumers were educated, they could convert kWh to operating costs.

- **There is the potential for a QR code/smartphone app to educate and/or convert information for consumers.**

Industry comments on smartphone app and QR code

- The survey may have been biased towards technically experienced customers, which makes the relatively small preference for a smartphone app quite interesting. It would be interesting to know how many consumers are actually using their smartphones when buying an appliance. This will be investigated as part of the second survey.
- The app will be important as a comparison tool. An app can bring together disparate data to a point where it is understood by the consumer.
- It was suggested that the app should not be built around the 'average' consumer. It is an opportunity to provide customised information to consumers depending on the alignment of the consumer (e.g. decisions based on energy efficiency, the hip pocket or what's good for the environment). For example it could provide greenhouse gas emission information to satisfy those who are aligned with the environment, but this same information could be ignored (or not brought to the fore) to those do not want it. **The app is an opportunity to customise information to a consumer's interest.**
- The research and work on the prototype app will need to consider the constantly changing face of technology: What comes after the QR code? What will be the next technology? How will this technology be supported over time?
- Industry is concerned about who will bear the cost of the app/QR code. The cost of labels is currently borne by manufacturers; they must place the labels on appliances and change the labels when there are updates. Industry is concerned about who will bear the cost of gathering, collecting and maintaining the data that underlies the app. Industry does not want to pay for it. Industry also believes that the data underlying the app should be data supplied under law, nothing more, and if consumers want to know more about an appliance they can be referred to the manufacturer's website.
- The Department noted that to limit any impost on the development of the app, the prototype currently uses information that already exists on the website and it wouldn't be expensive to put it into a more usable format. **The app will make existing information (contained on the energy rating website and other sources) more useable and accessible.**
- Overall, the industry participants in the meeting were generally supportive of the development of the app (as long as it did not involve costs for them). The feeling was that the information presented should be generated by government from the data submitted through registrations, and should not be linked to manufacturer- or retailer-provided data. This would protect the reputation and integrity of the program.

Industry comments on endorsement labels

- Locating the endorsement labels next to the ERL on low star appliances has a significant impact in New Zealand, more so than the placement of endorsement labels on a high star appliance.
- Government endorsement without a clear system for awarding endorsements could be a grey area — how do you endorse one product over another? This could present 'cherry picking' issues.
- The New Zealand representative suggested that an endorsement label (i.e. Energy Star) helped after label re-ratings, when the buyers who might have an idea that, say, 4+ stars indicates a reasonably efficient product could not find any models with a higher rating than, say, 3 stars.

— George Wilkenfeld pointed out that endorsement labels also age and lose their effectiveness until they are re-rated. In the USA there are several product categories where most models now carry Energy Star labels.

Industry comments on Government/industry partnership

— New Zealand research shows that highlighting the government/industry partnership gives the label much more credence. The strength of the label here is in the relationship between the two partners.

— Some of the changes to the WELS label will place more emphasis on the government/industry partnership at the expense of less important information. The black bar (that contains the words 'water rating') is to become narrower and a coloured bar will be added that contains the web address in bigger letters. For the WELS label, the government side of the partnership is more important than the industry side.

Industry comments on transitional arrangements

— From a manufacturer's perspective, transitional arrangements are disruptive. Consideration needs to be given to label changes that avoid transitional arrangements.

— Views were mixed on the best way to treat transitional issues related to the occasional re-scaling of the label.

  – CESA suggested that this was so infrequent it can be managed at the time.
  – One industry representative suggested an open scale (i.e. unlimited number of stars), or at least a scale where the maximum rating (say 10 stars) is determined by a technical limit (i.e. a product that uses no purchased energy to perform its function — this is only feasible for water heaters). It was noted by people in the room that a consumer is unlikely to be able to visually differentiate 7 stars and above.
  – Another industry representative indicated that any form of dating on labels would be a problem for slow-moving products such as water heaters, which may sit in warehouses for up to three years.
  – It is necessary to clarify whether a date refers to year of manufacture, year of registration or vintage of the rating scale.
  – George Wilkenfeld believes that all of the above issues have been canvassed over the years and that there is still no perfect solution to the problem of adjusting the label to rising product efficiency over time.

Industry comments on year of manufacture

— Industry is concerned that if a year of manufacture is placed on the label, there may be problems along the supply chain; the slow parts of the supply chain may experience low turnover of stock that is considered 'old' by consumers. This could introduce problems about who has responsibility for clearing the product from the floor – retailers, manufacturers or suppliers.

— It was noted by one industry representative that a transition date on the ERL was preferred to the year of manufacture.

— If there is a year (transition date or year of manufacture) on the label, there should be a period of stability in which the label will remain unchanged, i.e. the label should not change again for a specified number of years, preferably the estimated life of an appliance.

— An alternative option to including the year of manufacture on the ERL, for example changing the colour band from green, could result in a large cost for government because there will need to be an education campaign about the colour change.

Industry comments on other efficiency labels

— Any changes to the ERL will flow onto WELS. WELS administrators are concerned that ERL and WELS changes are happening in isolation even though people relate to WELS because it is similar to the ERL.

— The Ministerial Council on Energy MCE explored a combined energy/water label some years ago. There were positive and negative aspects to this and the combined label should be considered again. If there is real value in having energy and water information amalgamated and it is displayed in an appropriate way then it should be considered.

— WELS working in tandem with the ERL can present problems. The nature of water using appliances means that the label is much more bounded; the technological limits around the star rating are different between the ERL and WELS, however both labels are using the same kinds of algorithms. Having an appliance with a high energy rating and low water rating for example can create confusion.

— WELS administrators are in the process of reviewing the WELS standard and looking at how labels can be made cleaner and the rules made more flexible. This review will consider, among other things: size; position – it can be placed prominently rather than in a designated position; and content – consumers are not reading the fine print so it can be removed.

— With respect to the gas label, the government does not 'own' the gas label however future regulatory activities may consider this label. There is no schedule for this; it is currently a planning exercise, with a work plan expected in less than 6 months. When it starts will depend on how important the issue is.

G.3.6 Agenda items 9 &10: ERL Advisory Committee & April conference timeline

The Department invited industry to be part of the ERL Advisory Committee. All attendees expressed interest in being included in this Committee.

The Committee will be provided with regular updates and information about the E3 Label Review Project and will be asked to provide feedback along the way about various aspects of the Review.

The Department highlighted that the independent review report from ACIL Allen Consulting will be finalised by February 2014 and that the final findings will be presented at a major labelling forum planned for April/May 2014.

G.4 Action items

— ACIL Allen research:

- 〉 ACIL Allen to examine the proportion of buyers across each appliance type that have a preference for including the year of manufacture on the label (to check whether including this information was skewed due to a large number of TV purchasers in the sample).
- 〉 ACIL Allen to examine the proportion of consumers who thought GHG emissions were important and those who interpreted the label correctly.
- 〉 ACIL Allen to investigate New Zealand's experience with the Energy Star endorsement label.

- Electronic information:
  - Future research could investigate the proportion of consumers that are actually using their smartphones when purchasing an appliance.
  - The Department will explore whether additional information for consumers could be provided as an app or a QR code and consider how the app/QR code will be managed in the face of changing technology (a more detailed study about the use of different technologies).
  - The Department will consider whether the app should replace the kWh figure with a dollar figure.
- WELS:
  - Consideration will be given to a combined ERL/WELS for relevant appliances.
- Label design:
  - The Department will consider the physical size of the label and how this 'real estate' is used during focus groups to be held in the coming months.
- Transitional arrangements:
  - Industry to provide alternative ideas for the current transitional arrangements, in particular cheaper methods that satisfy all needs.