18 December 2009

Energy Efficiency in the National Electricity Market The Role of Electricity Retailers in Energy Service Provision



A report for Choice



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# **Executive Summary**

Policies that promote energy efficiency play an important role in addressing the market failures that might otherwise impede socially desirable energy efficient practices and products from being adopted. Improving energy efficiency is often in a consumer's direct interest because of the cost savings involved, while simultaneously lowering electricity supply costs in the future and reducing the carbon emissions from electricity generation.

In this report we examine the role of retailers in the promotion of energy efficiency. We set out the incentives and barriers to retailers promoting energy efficiency, describe the energy efficiency policies and programmes currently being implemented both in Australia and abroad by retailers, and make recommendations about the opportunities available to enhance the promotion of energy efficiency by retailers.

#### Energy retailers have an important role to play in promoting energy efficiency

It is sometimes argued that placing a price on carbon through the proposed Carbon Pollution Reduction Scheme (CPRS) will address many of the barriers to optimal investment in energy efficiency by consumers. However, while pricing carbon is important to the promotion of energy efficiency there is likely to remain information, financial and other market barriers to socially optimal investment in energy efficiency. This suggests that energy efficiency policies will remain important following the introduction of the CPRS.

Energy retailers can play an important role in the promotion of energy efficiency in light of the energy supply relationship with customers. This role can include the provision of information on energy efficiency such as conducting energy efficiency audits and providing advice on opportunities for customers' to save energy, and being engaged in programmes that directly lower consumer energy use, say through the installation of energy efficient light globes and other appliances.

That said the financial motivations for energy retailers to promote energy efficiency are limited in the absence of either commercial pressure to retain customers, or the implementation of direct obligations on energy retailers to promote or achieve energy efficiency outcomes.

# Retailer competition creates some incentive for retailers to differentiate products through the promotion of energy efficiency

Importantly, it is commonly believed that retailers have no incentive to promote energy efficiency amongst customers because they earn revenue from the sale of electricity. Indeed, if this statement was true then retailers would actively encourage energy use and not be engaged in the promotion of energy efficient practices at all. In practice all retailers provide some information on energy efficiency to customers, and retailers like AGL Energy, Origin Energy, and some smaller specialty retailers are actively engaged in promoting energy efficiency in excess of any obligations that they might otherwise have.

At present, the principal reason why energy retailers promote energy efficiency is in order to differentiate their retail offerings from that of their competitors, and to encourage customer loyalty within the competitive market. These competitive incentives create the same

motivations that other companies have to lower carbon emissions and so promote themselves as being environmentally aware in order to attract customers from rival firms.

Ultimately, retailers increase revenue by acquiring more customers from competitors and growing market share. As consumers become more aware of the merits of investment in energy efficiency and place greater value on improving energy efficiency outcomes, retailers will most likely become more engaged in energy efficiency activities as a means of attracting customers from rival retailers.

That said, while there is evidence of some effort by retailers to engage in the promotion of energy efficiency to customers, the effectiveness of these efforts at achieving energy efficiency outcomes are less than clear.

# Retailers currently provide information about government financial incentives, energy saving tips and take part in mandatory government schemes

Our review of energy efficiency programmes conducted by retailers highlights the range of activities currently being undertaken both within Australia and abroad. These activities can be categorised into market mechanisms, financial incentives, and information provision.

Victoria, South Australia and New South Wales have each implemented a market-based mechanism for energy efficiency in the form of respective State-based energy efficiency target schemes that require retailers to achieve state-wide energy saving targets. These schemes operate by allowing retailers to generate energy efficiency certificates by undertaking activities that improve energy efficiency outcomes. These certificates are then surrendered in line with each retailer's individual obligations. If insufficient certificates are created the retailer is required to pay a penalty. Retailer activity as a consequence of these schemes has been focused on the installation of low energy light globes and low flow shower heads.

Retailers also inform customers of the various government financial incentives and rebate programmes available to encourage the adoption of more energy efficient practices and products. These include solar hot water rebates, ceiling insulation funding, and the Australian government's green loans program.

Information provision is where retailers are currently actively engaged in the promotion of energy efficiency. These include energy saving tips and information on the cost of running common household appliances, and conducting in-home energy audits. Aurora (in Tasmania) is also developing a scheme to link suppliers of energy efficient products and/or services with customers to encourage their uptake.

While there is considerable activity by retailers providing information to promote energy efficiency, there has been little research on the effectiveness of these programmes to changing the behaviour of customers in their energy use. There is little incentive for retailers to seek to continuously improve energy efficiency information programmes in line with Australian or international best practice.

## Australia's energy efficiency policies are in line with international practices

Other developed countries have introduced a range of measures to promote energy efficiency. While many of the most effective measures correspond to similar programmes in Australia there are a number of innovative or different approaches that might be considered and examined in greater detail. There is therefore merit in:

- examining whether energy retailers should submit their plans to satisfy existing energy
  efficiency targets for review prior to implementation, and so facilitate information sharing
  amongst retailers and provide incentives for ongoing improvement similar to the
  approach adopted in California by the Californian Public Utilities Commission; and
- reviewing in detail the effectiveness of international energy efficiency information programmes, to determine whether there are lessons that can be learned to improve the effectiveness of existing programmes in Australia.

# Benchmarking the performance of energy efficiency retailer programmes will likely improve outcomes

In our opinion there is a need to review the effectiveness of retailer energy efficiency programmes and in so doing identify where opportunities exist to enhance existing programmes. Part of this should involve providing incentives for retailers to continuously improve programmes and adopt best practice approaches from within Australia and globally.

Such incentives could be provided by (but not be limited to):

- providing an annual award for the most innovative energy efficiency information programme;
- obliging retailers to publish the average energy efficiency of its customers and categories of customers (eg, a family of four living in a house); and/or
- obliging retailers to audit and publicly report on the effectiveness of current energy efficiency programmes.

Making information available on the performance of retailers in lowering customer energy use and the effectiveness of existing information programmes creates direct incentives for retailers to be innovative in energy efficiency programme design. Over time this should enhance the energy efficiency outcomes from retailer programmes.

# Government obligations will be needed to encourage more effort by retailers to promote energy efficiency

While commercial pressures will likely lead to retailers becoming more engaged in the promotion of energy efficiency in future years, and particularly following the introduction of the CPRS, these efforts are most likely to be at the margin and aimed at attracting and retaining customers rather than the achievement of specific energy efficiency outcomes. In these circumstances energy efficiency promotion will be limited to those programmes that are cost effective (ie, are expected to deliver returns that exceed the cost) to the individual retailer.

Encouraging greater effort by retailers to achieve a socially desirable level of investment in energy efficient practices and products (reflecting associated market failures) will therefore require direct intervention by the government in the market. This can take the form of specific programmes implemented directly to end use customers (eg, the current Australian government programme to encourage the installation of home insulation) or by placing incentives or obligations on retailers to achieve specific energy efficiency targets (eg, the Victorian Energy Efficiency Target scheme (VEET)). Other interventions include using retailers to promote financial incentive schemes, such as the solar hot water system rebate.

Before considering new government programmes to encourage retailers to engage in activities to promote energy efficiency and so address an identified market failure, there is merit in evaluating the materiality of the market failure, and then the associated costs and benefits of intervention in the market.

In our opinion, energy efficiency target schemes should be preferred to other policy interventions because they provide flexibility to retailers to engage in those activities that will cost effectively deliver desired energy efficiency outcomes.

# 1. Introduction

NERA Economic Consulting (NERA) has been asked by CHOICE to investigate the barriers and incentives for energy retailers to offer services that improve the end use energy efficiency of consumers (the project). Specifically, the two principal aims of the project are:

- to identify the barriers and enablers to energy service provision and energy efficiency in Australia by retailers, particularly in light of the introduction of the Carbon Pollution Reduction Scheme (CPRS); and
- to make recommendations as to how these barriers might be addressed (or enablers activated) to facilitate greater effort by retailers to improve the energy efficiency of their customers.

# 1.1. Background

Australia's reliance on emission intensive energy sources, particularly electricity generation from coal, means that Australia has one of the highest per capita greenhouse gas emissions in the world. Australia can therefore be characterised as being a significant contributor, at least in per capita terms, to the global climate change problem.

It is within this context that Australia is working towards the introduction of a number of policies designed to provide incentives to lower carbon emissions, including the CPRS. With the introduction of the CPRS, exploring all policy options to facilitate carbon reductions will be necessary to ensure that Australia can effectively and efficiently make the transition to a low carbon future. Energy efficiency is one area where significant carbon savings may be achievable. The promotion of energy efficiency is therefore an important part of the policy mix within which Australia will achieve its carbon emission reduction commitments. Energy retailers, as the interface between consumers and energy markets, can play an important role in improving end use energy efficiency.

Effective implementation of least cost energy efficiency measures is also likely to benefit consumers directly through lower energy bills and through reducing the need for investment in electricity generation.

Governments have devoted significant effort to the development of energy efficiency policies in recent years. In particular, the National Framework for Energy Efficiency (NFEE),<sup>1</sup> which is now in its second phase, is focused on the development and delivery of energy efficiency measures for buildings, appliances and equipment, commercial and industrial practices and the provision of information to the residential sector.

In addition, at its recent 2 July 2009 meeting the Council of Australian Governments (COAG) agreed to a comprehensive 10-year National Strategy on Energy Efficiency and signed the National Partnership Agreement on Energy Efficiency. The strategy is designed to accelerate energy efficiency improvements for households and businesses across all sectors

<sup>&</sup>lt;sup>1</sup> The NFEE was established in August 2004 by the Council of Australian Governments.

of the economy by incorporating and building on the measures delivered and being developed through the NFEE.

# 1.2. The project

The purpose of this project is to examine in detail the role that retailers currently (or potentially could) play in the promotion of energy efficiency amongst end users. In so doing we examine the incentives and barriers faced by retailers for the promotion of energy efficiency, set out the programmes retailers are currently engaged in to promote energy efficiency, and examine the programmes that have been implemented by retailers internationally. Importantly, we also consider the underlying motivations and drivers for retailers being engaged in the promotion of energy efficiency, as the basis for making recommendations about where opportunities may lie to enhance existing incentives and so encourage greater participation by retailers in the promotion of energy efficiency.

# **1.3. Structure of the report**

The remainder of this report is structured as follows:

- Section 2 describes the retail electricity market and trends in energy use in Australia;
- Section 3 identifies the incentives and barriers to the promotion of energy efficiency by retailers;
- Section 4 sets out the policy context within Australia to promote energy efficiency, and identifies the energy efficiency programmes that are currently undertaken by retailers;
- Section 5 provides an international review of energy efficiency policies and programmes by retailers; and
- Section 6 sets out our recommendations and concludes.

# 2. Overview of the National Electricity Market

This section briefly describes the National Electricity Market (NEM) with a particular focus on the retail sector of the NEM, and recent trends in Australia's energy use and carbon emissions. This provides the relevant context for subsequent consideration of energy efficiency policies and programmes in Australia, and the role of retailers in promoting energy efficiency.

# 2.1. Energy use in Australia

From 1999 to 2008/09, total sent out energy (GWh) in the NEM region increased by 24 per cent, to 191 149  $\text{GWh}^2$  – Figure 2.1.



Figure 2.1 Total sent out energy (GWh), NEM region, 1999-2008/09

Source: Australian Energy Market Operator (AEMO), Price and demand data sets, aggregated price and demand data – historical.

Although total primary energy consumption in Australian has grown steadily since the 1970s, Australia's *rate of growth* in energy consumption has tended to fall. For example, during the 1960s energy use increased at an average rate of 5 per cent per annum. This growth declined to 3.9 per cent a year during the 1970s (largely due to the two major oil price shocks) and fell further in the 1980's to average 2.3 per cent per annum.<sup>3</sup>

Over the last 15 years, energy consumption has grown between one and four per cent per annum, and by an average rate of 2.1 per cent over 2004-2008.<sup>4</sup> ABARE's most recent

<sup>&</sup>lt;sup>2</sup> Australian Energy Market Operator (AEMO), Price and demand data sets, aggregated price and demand data – historical.

<sup>&</sup>lt;sup>3</sup> ABARE Economics Energy Data.

<sup>&</sup>lt;sup>4</sup> ABARE Economics, Table F, Australian energy consumption, by industry and fuel type.

projections estimate that primary energy consumption will grow by 2.2 per cent per annum in the medium term (period to 2011-2012) and moderate to average growth of 1.6 per cent per annum for the period to 2029-2030.<sup>5</sup> These projections do *not* reflect the proposed introduction of the Carbon Pollution Reduction Scheme (CPRS), the national Renewable Energy Target, or the National Framework for Energy Efficiency (NFEE). Each of these policies is expected to put downward pressure on primary energy consumption.<sup>6</sup>

## 2.1.1. Energy use per capita

Although growth in Australia's total primary energy consumption can be partly attributed to the ongoing growth in Australia's population, *primary energy consumption per capita* has also grown significantly. In 2007, primary energy consumption per person in Australia was 257.4 GJ, well above the OECD average of 198.8 GJ per capita. This measure is projected to increase by 18 per cent over the period to 2030.<sup>7</sup>



Figure 2.2 Total Primary Energy supply per Capita, PJ, 1971-2007

Source: Total primary energy supply per capita, OECD Factbook 2009<sup>8</sup>

# 2.1.2. Energy use by Sector

Electricity generation, transport and manufacturing accounted for more than three-quarters (77 per cent) of Australia's total primary energy supply in 2007-08. The electricity generation sector is the most significant energy user in Australia, representing 29 per cent of total demand.

<sup>&</sup>lt;sup>5</sup> ABARE Economics Energy Data.

<sup>&</sup>lt;sup>6</sup> ABARE, Australian energy national and state projections to 2029-2030, December 2007, pg 1.

<sup>&</sup>lt;sup>7</sup> ABARE, Australian energy national and state projections to 2029-2030, December 2007, pg 2.

<sup>&</sup>lt;sup>8</sup> Swivel preview data; energy efficiency per capita; http://www.swivel.com/, March 2009.

Figure 2.3 illustrates total energy consumption by sector in 2007-08.<sup>9</sup> Examining this chart it can be observed that:

- the transport and manufacturing sectors each account for approximately 24 per cent of energy consumed; and
- energy consumption by the residential sector is relatively minor, accounting for just over 7 per cent of total energy consumption.



Figure 2.3 Energy Consumption in Australia by industry, 2007-2008

Source: ABARE economics, Table B Energy consumption in Australia, by Industry.

Over the past decade, the portion of total energy consumption accounted for by each sector of the economy has remained relatively stable with the exception of mining, which has increased significantly, growing by over 32 per cent between 2004 and 2008.

# 2.2. Energy intensity and carbon emissions

# 2.2.1. Energy intensity

Energy intensity (as measured by total primary energy consumption per dollar of gross domestic product (GDP))<sup>10</sup> has been declining in Australia, as it has in most developed countries. This means that energy consumption has grown at a slower rate than GDP. The

<sup>&</sup>lt;sup>9</sup> This is based on the consumption of primary fuels, such as coal and petroleum amongst others: ABARE, Table B Energy consumption in Australia, by Industry.

<sup>&</sup>lt;sup>10</sup> The EIA defines energy intensity as the total primary energy consumption per dollar of gross domestic product using purchasing power parities, and measures GDP in US\$ at 2000 prices. We have converted the EIA's information from British thermal unit (BTU) to MJ using 1 btu = 0.001055 MJ.

only exception to this trend is Western Australia, where energy intensity has increased due to growth in the resources sector.<sup>11</sup>



Figure 2.4 Energy Intensity in Australia 1980-2006

Source: EIA, Energy Intensity - Total Primary Energy Consumption per Dollar of Gross Domestic.

The trend illustrated in Figure 2.4 can be largely attributed to improvements in the energy efficiency of production processes and the rapid growth in less energy intensive sectors, such as the commercial and public services sectors, relative to more energy intensive sectors. Gains in the energy efficiency of production have been driven by technological developments and fuel switching – Australia has experienced a notable shift in its fuel mix away from liquid fuels (except in transport), and toward gas.

Australia exhibited a relatively high level of energy intensity in 2006 (9.46 MJ/\$) compared to the world average of 8.87 MJ/\$ and the US rate of 8.84 MJ/\$.<sup>12</sup> The high level of energy intensity in Australia can be attributed, to some extent, to the significant role that energy inputs have in the economy.

#### 2.2.2. Emissions

Australia emitted 553 million tonnes of carbon dioxide equivalent<sup>13</sup> (Mt  $CO_{2-e}$ ) in 2008. This means Australia's emissions were 107 per cent of 1990 levels as of 2008. Figure 2.5 shows the contribution of each sector of the economy to total net emissions.

<sup>&</sup>lt;sup>11</sup> ABARE, (2009), Energy in Australia 2009, pg 11.

<sup>&</sup>lt;sup>12</sup> Energy Information Administration Data.

<sup>&</sup>lt;sup>13</sup> Australian Government, (2009), Department of Climate Change, National Greenhouse Gas Inventory, May, pg 1. This amount does not take into account emissions coming from land use, land use change and forestry.



Figure 2.5 Australia's emissions by sector, 2007

Source: National Greenhouse Gas Inventory, May 2009.

The largest increase in emissions over the period 1990 to 2007 occurred in the stationary energy sector (49.5 per cent increase), followed by fugitive emissions (28.9 per cent increase) and the transport sector (26.9 per cent increase).<sup>14</sup> Offsetting growth in emissions from these sectors has been a strong decline in net emissions from the land use, use change and the forestry sector (57 per cent), which was driven by a reduction in the clearing of forest cover. Emissions from the waste sector also declined over the same period, by 22.5 per cent.

Although Australia has reduced its emissions per capita over the period 1990 to 2007 by 11.2 per cent to 28.6 tonnes  $CO_2$ -e per person,<sup>15</sup> Australia is currently one of the highest per capita emitters of greenhouse gases amongst developed economies. This reflects a number of factors, including:

- the dominance of the use of coal as a fuel in the electricity industry, which is significantly more emissions intensive compared to nuclear and hydro-electric power;
- positive emissions from the land use, land use change and forestry sector in Australia; and
- international trade patterns, which result in the production in Australia of many goods with high associated emission levels — that is, resources and agricultural products — that are destined for export and consumption in other countries.

<sup>&</sup>lt;sup>14</sup> Australian Government, (2009), Department of Climate Change, National Greenhouse Gas Inventory, May, pg 4. Stationary energy emissions include emissions from fuel consumption for electricity generation, fuels consumed in the manufacturing, construction and commercial sectors, and other sources such as domestic heating. Fugitive emissions include greenhouse gases that are released in the course of oil and gas extraction and processing, through leaks from gas pipelines, and as waste methane from black coal mining.

<sup>&</sup>lt;sup>15</sup> Australian Government, (2007), Department of Climate Change, National Inventory by Economic Sector, pg 4.

# 2.3. The National Electricity Market

The NEM was established in 1996 and is based on a pooled exchange between electricity producers and consumers where the output from all generators is aggregated and scheduled to meet current levels of demand. The NEM interconnects five regional market jurisdictions including Queensland, New South Wales, Victoria, South Australia and Tasmania.

The NEM power system is comprised of more than 5,000 kilometres of electricity network infrastructure. The power system supplies more than \$10 billion of electricity annually, and is responsible for meeting the demand of more than 8 million homes, offices and factories.<sup>16</sup> NEM infrastructure is comprised of both public and privately owned assets, and is managed by a variety of entities under the overall direction of the Australian Energy Market Operator (AEMO).

The NEM is administered by the AEMO<sup>17</sup> and operates as a gross pool, energy-only market.<sup>18</sup> An 'energy-only market' means that generators earn revenue only through the production and sale of electricity. Unlike some markets internationally, generators in the NEM are not paid for supplying generation capacity. In the absence of a separate capacity market or a capacity payment mechanism, generators must earn in excess of their fuel costs in order to make a return on the generator investment.

Generators are required to sell all of the electricity that they produce on the wholesale market and receive the spot price for each unit of electricity sold into the pool. AEMO's primary role is to balance electricity supply and demand on a least-cost basis through a centrally coordinated real time dispatch process. Spot prices are determined every half hour by averaging the six dispatch prices for each of the five minute intervals in that half hour period.

# 2.3.1. National Electricity Market participants

Electricity is no longer supplied in the NEM by single, vertically integrated entities. Rather, electricity is supplied within a decentralised decision making framework where generators submit offers to sell a given quantity of electricity at a particular price, with the price being determined by the least cost combination of bids to meet market demand. The electricity is then transported along high voltage transmission lines operated by transmission network service providers before being transferred to lower voltages and distributed to users by distribution network service providers. Retailers act as the intermediary between customers and the wholesale market, and in effect manage wholesale price risks on behalf of their customers. NEM market participants therefore include generators, transmission network service providers, distribution network service providers, retailers, large end-users and special participants. All market participants are required to be registered with the AEMO.

<sup>&</sup>lt;sup>16</sup> NEMMCO, (2004), An Introduction to Australia's National Electricity Market, July, pg 4.

<sup>&</sup>lt;sup>17</sup> AEMO was established in 2009 to act as the power system and market operator of the NEM. It carries out electricity functions previously undertaken by the National Electricity Market Management Company (NEMMCO) and of the Electricity Supply Industry Planning Council.

<sup>&</sup>lt;sup>18</sup> A gross pool market does not permit participants to contract directly with each other for the physical delivery of a good. In the NEM, the AEMO aggregates the entire production of electricity into a pool from which retailers and large market customers can purchase their electricity requirements.



# Figure 2.6 Structure of the National Electricity Market<sup>19</sup>

#### **Generators**

Generators own and operate electricity generation assets that convert various fuel sources such as coal, water, natural gas and wind into electricity. Generators can be classified as either 'baseload generators' that provide steady power flows into the electricity grid, and usually only stop generating electricity for the purpose of undertaking repairs and maintenance, or 'peak load' generators, which provide supply at times of increased demand. This is due to higher costs of operation and/or shorter start-up times than base load.

#### Network Service Providers

The electricity network consists of high voltage transmission lines that transport electricity from generators to consumers via a local distribution network.

Transmission network service providers (TNSPs) provide access to the high-voltage cables that move electricity from large generators to load centres. Transmission networks carry electricity long distances and operate at high voltages to allow for the movement of a greater amount of electricity for a given size, compared to local distribution networks.<sup>20</sup>

<sup>&</sup>lt;sup>19</sup> Source: AEMC Reliability Panel, (2007), Comprehensive Reliability Review, Final Report, December, pg 8.

<sup>&</sup>lt;sup>20</sup> ActewAGL, 'How electricity is Distributed in Australia', http://www.actewagl.com.au/education/Energy/Electricity/ElectricityDistribution/default.aspx, 17 August 2009.

Distribution network service providers (DNSPs) receive electricity from the transmission network, transform it to lower voltages and carry electricity to end users such as homes offices and factories. They are responsible for the operation and maintenance of their local distribution network. Both TNSPs and DNSPs are responsible for maintaining system security on their portion of the network and facilitating new connections.<sup>21</sup>

#### Retailers and large end use customers

Retailers are the interface between the energy market, and households and small business (except large commercial users). Electricity is purchased by retailers from the wholesale market pool and sold to customers at a price that reflects the generation, transmission, distribution and retail costs of electricity supply. Currently there are 42 licensed electricity retailers in the NEM. Large end users participate directly in the NEM by purchasing their own electricity requirements from the pool at the spot price. The retail segment of the NEM is described in more detail in section 2.4.

#### 2.3.2. Legislative framework

The legislative framework underpinning the NEM is contained in the National Electricity Law ('NEL'). The NEL sets out provisions for:

- the development and legal enforceability of the National Electricity Rules ('NER') which govern the general operation of a number of aspects of the NEM including:
  - the operation of the wholesale market and ancillary services market; <sup>22</sup>
  - the terms and conditions upon which access to transmission and distribution network services should be provided; and
  - the economic regulation of the services provided by transmission and distribution network service providers ('network service providers').
- the powers and functions of the Australian Energy Market Commission ('AEMC'), which in accordance with the NEL is responsible for making and amending the NER and providing policy advice to the Ministerial Council on Energy ('MCE');
- the powers and functions of the Australian Energy Regulator ('AER'), which in accordance with the NEL is responsible for:
  - acting as the national economic regulator of transmission and distribution network service providers;
  - monitoring the operation of the wholesale market; and
  - monitoring the compliance of NEM participants with the NEL and NER.

<sup>&</sup>lt;sup>21</sup> AEMO, (2009), An Introduction to Australia's National Electricity Market, July, pg 3.

<sup>&</sup>lt;sup>22</sup> The ancillary services market, which is also administered by the AEMO, refers to the market for frequency control services and long term contracts for network control ancillary services and system restart ancillary services. These services maintain the technical characteristics of the system, which include standards on voltage, frequency network loading and restart processes.

- the powers and functions of the AEMO, which in accordance with the NEL is responsible for:
  - operating the electricity market;
  - operating, maintaining and improving the security of the power system; and
  - facilitating the planning of generation capacity and transmission network augmentations.

#### 2.4. The retail electricity market

Since the 1980's a number of significant reforms have been undertaken in the Australian electricity sector. This has had a substantial impact on the electricity retail market and the incentives that retail businesses face. The introduction of retail competition has been particularly important.<sup>23</sup> Full Retail Contestability (FRC) gives all electricity customers the opportunity to choose their supplier. This encourages competition between retailers on the price and non-price terms of supply offered to customers. The behaviour of electricity retailers has almost certainly changed as a consequence of introducing retail competition. As at June 2009 approximately 6.3 million electricity customers had switched retailers.<sup>24</sup>

Figure 2.7 illustrates the market share of each retailer in each NEM jurisdiction in 2008.



Figure 2.7 Electricity customers by jurisdiction and retailer

Source: UBS, Australian utilities structure 2008 (numbers may not add due to rounding).

The relationship between the extent of retail competition and the incentive for retail businesses to invest in energy efficiency measures is discussed in more detail in Box 2.1.

<sup>&</sup>lt;sup>23</sup> Retail competition has been introduced progressively across Australia. The Ministerial Council on Energy (MCE) has agreed that once effective competition exists, these default regulated tariffs will be removed.

<sup>&</sup>lt;sup>24</sup> AEMO, (2009), An Introduction to Australia's National Electricity Market, July, pg 19.

# Box 2.1 Competition and energy efficiency

Competition at the retail level creates commercial pressures for retail businesses to differentiate themselves from competitors in order to retain existing customers and attract new customers.<sup>25</sup>

Retail businesses can differentiate themselves on the basis of:

- the type of products and services offered to customers;
- the price of products and services offered to customers;
- customer service;
- the achievement of environmental and/or sustainability ratings;
- discounts and 'freebies'; and
- other non-price terms and conditions of retail offerings such as the length of contracts, payment terms, etc.

By contrast, where businesses operate as geographic monopolies there is a much weaker incentive for product innovation. This limits the extent of product and service differentiation amongst retailers (on price and non price terms). In this circumstance retailers do not profit from attracting new customers because the relationship between retailers and customer is 'fixed' by virtue of geographic boundaries. As such, there is little commercial benefit for retailers from investing significant effort in product and service diversification and differentiation. Instead, monopoly retailer efforts are focused on increasing the amount of energy consumed per customer to increase revenue, or reducing the 'cost to serve' per customer.<sup>26</sup>

This discussion highlights that in general businesses operating in a competitive environment are more likely to invest in energy efficiency measures (where this represents one possible approach to business differentiation to grow market share), as compared to a monopoly retailer who faces no direct commercial incentives.

Where governments elect to directly intervene in the market to drive energy efficiency outcomes, the existence (or not) of retail competition is less relevant<sup>27</sup>. The intervention itself will ensure that the desired level of investment in energy efficiency is undertaken, irrespective of the extent of competition. Indeed, there is considerable evidence both within Australia and internationally to support direct government intervention as the principal driver for retailers engaging in energy efficiency promotion programmes – see section 5.

<sup>&</sup>lt;sup>25</sup> The specific importance of market share to retailers is discussed in more detail in section 3.3.1.

<sup>&</sup>lt;sup>26</sup> At least in the absence of government obligations to achieve energy efficiency targets or implement specific programmes.

<sup>&</sup>lt;sup>27</sup> However, the costs of benefits of government intervention are likely to differ depending on whether the retail market is operating competitively, or as monopoly franchises, when such intervention is imposed.

Figure 2.7 shows that incumbent retailers<sup>28</sup> remain dominant in all jurisdictions of the NEM. Specifically, the nine incumbent retailers across the NEM region account for over 90 per cent of the retail market.<sup>29</sup> Victoria, New South Wales, Queensland and South Australia have experienced some market entry, but there is no evidence of significant new entry in the Australian Capital Territory and Tasmania. Nationally, AGL and Origin are the largest electricity retailers and have the greatest geographic coverage.

Electricity companies that own both generation and retail assets are often referred to as 'gentailers'. Combining retail and generation assets is usually undertaken to assist retailers with managing price risks in the wholesale market. It reduces the businesses exposure to changing circumstances in the market at either end of the supply chain.

A number of the large Australian electricity retailers also own generation assets. For example, Origin Energy currently operates a number of generation plants including Quarantine, Ladbroke, Roma, Uranquinty and Mt Stuart with total combined capacity of 1,178 MW.<sup>30</sup> Origin also has an interest in a portfolio of three cogeneration plants (Osborne, Worsley, Bulwer Island).<sup>31</sup> TRUenergy owns Tallawarra, a 400MW combined-cycle gas-fired plant located near Wollongong in New South Wales<sup>32</sup>, and AGL currently has an interest in Loy Yang Power, a 2,120 MW coal fired plant in Torrens Island and Somerton gas fired power stations. AGL also owns 10 hydroelectric generating schemes including 16 power stations in Victoria and New South Wales.<sup>33</sup>

In addition, a number of Australian retailers have indicated that they are intending to invest in new generation assets in the near future. Examples include:

- Origin:
  - Spring Gully, a 1000 MW combined-cycle gas-fired plant to be located at the coal seam gas field of the same name;
  - In March 2009, Origin commenced the construction of a 550 MW gas-fired plant at Mortlake in western Victoria, the project is expected to be completed by 2010;<sup>34</sup>
  - Origin is also currently developing the Darling Downs project in Queensland. The 630 MW coal seam ethane fired plant has been scheduled for completion in early 2010;
- ERM Power:

<sup>32</sup> Rod Myer, (2005), "TRU to build \$250m plant", The Age, 8 December.

<sup>&</sup>lt;sup>28</sup> That is, retailers that provided electricity services prior to the introduction of retail competition.

<sup>&</sup>lt;sup>29</sup> UBS, (2008), Australian utilities structure.

<sup>&</sup>lt;sup>30</sup> Origin, Power Stations, http://www.originenergy.com.au/289/Power-stations, 21 August 2009.

<sup>&</sup>lt;sup>31</sup> Origin, Power Stations Generation Interest, http://www.originenergy.com.au/289/Power-stations, 23 July 2009.

<sup>&</sup>lt;sup>33</sup> AGL, (2009), Energy Sources, http://www.agl.com.au/about/EnergySources/Pages/EnergySources.aspx, 17 August.

<sup>&</sup>lt;sup>34</sup> Origin, (2009), Mortlake Power Station Newsletter, May 2009, pg 2. ABARE, (2009), Electricity Generation, major development projects, April. pg 7.

- Wellington, a 640MW open-cycle gas-fired plant to be located near Wellington in New South Wales. Construction is due to commence in 2009 for operation in 2011;
- AGL:
  - Bogong, a planned 140MW hydroelectric power plant to be constructed in the Kiewa Valley in Victoria;
  - AGL is also developing Hallett II, a 71 MW wind farm. Both projects are expected to be fully operational by the first half of 2009/2010 financial year;<sup>35</sup> and
- Aurora:
  - Tamar Valley, a 375 MW (200 MW combined-cycle and 175 open-cycle) natural gas fired plant located in Tasmania, is under constructions and its competition is expected in late 2009.<sup>36</sup>

This snapshot of the gentailer segment of the electricity market suggests there is a growing trend towards retailers investing in generation assets, and the incidence of gentailers in the NEM can be expected to continue growing. The consequences of this trend for investment in energy efficiency by electricity businesses are considered in more detail later in the report.

<sup>&</sup>lt;sup>35</sup> ASX announcements, (2009), AGL, Strong half-year results positions AGL for growth, 25 February.

<sup>&</sup>lt;sup>36</sup> ABARE, (2009), Electricity Generation, major development projects, April, pg 7.

# **3.** Incentives and barriers to the promotion of energy efficiency by retailers

This chapter sets out the incentives faced by energy retailers to engage in activities that improve the energy efficiency of end-use customers as well as the barriers faced by individuals to improve their own energy efficiency.

Our starting point is to define what is meant by the term 'energy efficiency'. This has important implications for the design of an energy efficiency policy and programme, particularly where a primary objective is carbon abatement. We then describe some of the incentives for, and impediments to, investment in energy efficiency by customers and by retailers. Finally, we identify the various policy approaches commonly used to address these market failures.

# 3.1. What is energy efficiency?

For the purposes of this paper we draw a distinction between the term 'energy conservation' and 'energy efficiency'. Energy conservation is simply an absolute reduction in energy use, while energy efficiency is a change in the ratio of productive output per unit of energy used. An improvement in energy efficiency therefore can occur when:

- for a given level of energy input, productive output (or benefits) increases; or
- for a given level of productive output (or benefits), energy input decreases.

This means that an improvement in energy efficiency does not necessarily imply that total energy consumption will fall and so greenhouse gas emissions will be reduced. The implication of this is that if greenhouse gas abatement is a policy priority then the emphasis should be placed on programmes that result in a reduction in energy inputs for a given level of productive output and overall energy conservation.

# 3.2. Benefits of energy efficiency

Energy efficiency programmes that promote a reduction in energy consumption for the same level of productive output<sup>37</sup> can potentially deliver a range of benefits to both individuals and society more generally. The primary benefit accruing to private individuals is lower energy bills, whereas the broader community benefits from energy efficiency programmes via improved environmental outcomes, ie, greenhouse gas abatement. It is in the context (and combination) of these private and public benefits, (ie, low cost abatement opportunities) that energy efficiency programmes are becoming an increasing focus of government policy, both in Australia and internationally.

<sup>&</sup>lt;sup>37</sup> In contrast to energy efficiency programmes that increase productive output for the same energy input, or energy conservation programmes that are focused on reducing the overall level of energy consumption.

#### 3.2.1. Low cost abatement

Improving energy efficiency is widely regarded as one of the most cost effective approaches to achieving greenhouse gas abatement. In particular, many energy efficiency options are able to be implemented at a 'negative' cost to the individual – that is to say, the dollar value associated with energy savings over a period of time exceeds the cost of implementing the energy efficiency initiative. Accordingly, an investment in energy efficiency could potentially result in a reduction in greenhouse gas emissions and at the same time, lower customer energy bills.<sup>38</sup> For this reason, energy efficiency initiatives are becoming an increasing focus of climate change policies.

In a recent McKinsey & Company report, *An Australian Cost Curve for Greenhouse Gas Reduction*<sup>39</sup>, it is estimated that Australia could reduce greenhouse gas emissions in 2020 to 20 per cent below 1990 levels at no net cost to the economy. In particular, McKinsey & Company consider that a significant number of existing abatement options are characterised by private benefits exceeding the total costs associated with implementing the option. By implementing such negative-cost abatement options, the subsequent benefit to the economy would be sufficient to pay for other abatement measures up to a marginal cost of \$62 per tonne  $CO_2.e.^{40}$ 

Most of the 'cheap' abatement options identified by McKinsey and Company are energy efficiency measures, such as improvements in the energy efficiency of buildings and appliances.<sup>41</sup> The McKinsey and Company report notes that many of these abatement opportunities 'can be categorised as market failures from misaligned incentives, for example, those between builders and tenants.'<sup>42</sup>

#### 3.2.2. Estimating the quantum of benefits

Notwithstanding the conclusions of McKinsey and Company, it is virtually impossible to identify the extent that negative-cost greenhouse gas abatement opportunities exist in Australia and therefore, the precise potential of increased investment in energy efficiency. Indeed, the McKinsey and Company report notes 'the full extent of available untapped energy efficiency opportunities has not been robustly quantified for Australia and indeed, this would be extremely difficult to do.'<sup>43</sup>

The Productivity Commission (the Commission) has previously argued that the true extent of the energy efficiency gap (ie, negative-cost abatement opportunities) in Australia, or any other country, is largely immeasurable. However, in undertaking its 2005 review of energy efficiency the Commission considered that given a number of preliminary analyses and case

<sup>&</sup>lt;sup>38</sup> This raises the question why net beneficial energy efficiency investments are not already being undertaken? The answer is the likely presence of market failures, which we discuss in further depth in section 3.4.

<sup>&</sup>lt;sup>39</sup> McKinsey & Company, (2008), An Australian Cost Curve for Greenhouse Gas Reduction, February.

<sup>&</sup>lt;sup>40</sup> Ibid, pg 15.

<sup>&</sup>lt;sup>41</sup> Ibid, pg 6.

<sup>&</sup>lt;sup>42</sup> For further discussion on barriers to investment in energy efficiency, refer to Section 4.4.

<sup>&</sup>lt;sup>43</sup> McKinsey & Company, (2008), An Australian Cost Curve for Greenhouse Gas Reduction, February, pg 8.

studies have consistently reported the existence of an efficiency gap, it is likely that a gap of some size does exist. Accordingly, rather than debate the size of these gaps, the Commission determined that it was more productive to accept that an efficiency gap exists and proceed with their review on this basis.<sup>44</sup> For the purposes of this report we have a similar view.

In summary, it appears that there is evidence to support the conclusion that in the absence of energy efficiency policies, sub-optimal investment in energy efficiency would occur – the so called 'energy efficiency gap'. That said it is then relevant to consider what incentive retailers face within the current market framework to pursue investment in energy efficiency.

# 3.3. Incentives for retailers to promote energy efficiency

Commercial electricity retailers respond daily to a complex series of incentives in order to maximise the value of the retailer to its shareholders (irrespective of whether those shareholders are government or private individuals). The incentives are created by the need to manage its financial risks in the wholesale electricity spot market (particularly the potential for prices to rise to \$10,000 MWh), and the risks associated with losing customers to rival retailers. To manage these risks, retailers take out long-term contracts for the supply of electricity by generators at predetermined prices, set tariffs to both manage financial exposure in the contract market and to win new customers, and engage in marketing, including the development of new product offerings and incentives to attract new customers.

This section describes the implications of these retailer incentives for retailers pursuing energy efficiency.

# 3.3.1. Commercial incentives

There are two aspects of the commercial incentives facing electricity retailers that are relevant to understanding why retailers may choose to invest in energy efficiency measures (or alternatively, to avoid investing in energy efficiency initiatives). In particular, it is important to consider the opportunities retail businesses have to increase their profitability, and the extent to which the promotion of energy efficiency would increase, or reduce, retailer profits.

# Retailer revenue linked to consumption

Electricity retailers sell energy to customers on a unit (\$/kWh) basis. This means that revenue is based on the number of units of electricity sold, and revenue will increase in direct proportion to growth in electricity demand, all else being equal. In this context, electricity retailers generally have little independent incentive to enhance energy conservation or promote energy efficiency in such a way that reduces demand for energy, as less energy use corresponds to less revenue for the business.

McLennan, Magasanik and Associates (MMA) has recently indicated that under the current framework 'generators and retailers want to sell as much as possible, in theory limited only

<sup>&</sup>lt;sup>44</sup> Productivity Commission (2005): The Private Cost Effectiveness of Improving Energy Efficiency, pg xxv.

by their marginal cost<sup>45</sup>, and alternative incentives may therefore need to be developed to encourage retailers to sell less electricity. MMA argue that retailers should be reconfigured as energy service providers, rather than electricity sellers. That said, MMA acknowledge that retailers can already profit from providing a range of services beyond selling units of electricity including offering hot water, cogeneration and other appliances and engaging in energy efficiency and demand management.

MMA conclude that the problem of retailer revenue being directly linked to electricity consumption could be addressed by 'encouraging retailers to transform themselves into energy service providers able to profit from providing services rather than just selling units of electricity. Another way would be to enhance the status of energy service providers so they could compete effectively with retailers'.<sup>46</sup>

Given the low probability of retailers investing in energy efficiency of their own volition, much of the emphasis of energy efficiency policy is on how best to use energy retailers as effective implementers of programmes designed to address the barriers faced by end-use customers, given the close relationship retailers have with end-use customers. This necessarily involves careful consideration of the relative costs and benefits of using market-based mechanisms as compared to direct regulatory obligations, to achieve desired energy efficiency outcomes. Indeed, choosing between these policy options is an important part of any policy development process.

This fairly simple summation of retailer incentives to encourage energy efficiency belies the commercial realities created by emerging retail competition. Energy use per customer is not the only driver of retailer revenue. Customer numbers (or market share) is just as, if not more valuable from a revenue generation perspective to retailers.

#### Incentive to grow market share

As retail market competition strengthens in Australia, customers will continue to 'switch' suppliers based on the price and non-price terms of retailer offerings.<sup>47</sup> Businesses therefore face a sharp commercial incentive to gain and retain customers in order to increase market share and therefore become more profitable.

Growing market share is financially lucrative for two reasons. First, the more customers a retailer has translates to the sale of more electricity and so higher revenue. Indeed, given the large economies of scale in retailing the addition of every new customer will most likely increase overall profits.<sup>48</sup> Second, a larger customer base increases the financial benefits from a retailer diversifying into other lines of business, (eg appliance retailing, electrical or gas repairs or energy service provision more broadly).

<sup>&</sup>lt;sup>45</sup> McLennan, Magasanik and Associates, (2009), Role of the NEM in responding to climate change policies, Report to Total Environment Centre, June, pg 68.

<sup>&</sup>lt;sup>46</sup> McLennan, Magasanik and Associates, (2009), Role of the NEM in responding to climate change policies, Report to Total Environment Centre, June, pg 89.

<sup>&</sup>lt;sup>47</sup> It should be acknowledged that there remain some barriers to switching, including the high search costs involved with comparing retailer offerings.

<sup>&</sup>lt;sup>48</sup> This assumes that the cost of acquiring a customer does not exceed the additional profits expected to be earned.

It is the prospect of capturing these profits through business diversification and innovation that is of particular interest to retail businesses. In addition, given the relatively small profits associated with supplying electricity, growing market share within a competitive retail market in order to maximise the return from future business diversification is expected to become an increasing focus of retailers.

There are two principal ways that a retailer can attract new customers. First, by competing on the price of electricity, which can include providing cash incentives to change to a retailer. Second, by competing on the non-price terms and conditions, which can include the length of a contract, and potentially accessing free (or subsidised) energy efficient products, ie, energy saving bulbs, or in-home energy assessments. In short, retailers can choose to promote energy efficient appliances, services and practices as a means of attracting (and retaining) customers and growing its revenue base from its customers as a natural extension of supplying electricity. Indeed, AGL Energy currently promotes the sale of energy efficient appliances from it energy shops to its retail customers. In addition, AGL offers to provide electrician and gas fitter services through its 'energy assist' business. Both of these are examples of a retail business engaging in product and service diversification. Whether retail businesses also transform themselves into 'energy service', is yet to be seen – see Box 3.1.

# Box 3.1 Retail businesses as 'Energy Service Providers'

At present, the core business of retailers is selling units of electricity to customers. Although a number of retailers offer various additional services, (eg, the conduct of in-home energy efficiency assessments), these services are pursued on a limited scale and generally only to comply with obligations imposed on the retailer by the government.

Energy service providers build on the traditional retailer-model of only selling energy products, by diversifying into energy-related services that can be purchased by its customers. The precise type and range of energy services offered by these providers will depend on the commercial incentives the businesses face, and in particular, the *return* the business expects to realise from undertaking such diversification. In turn, the extent to which there is a viable market for these types of services will depend on consumer needs and preferences, and the value they place on consumption of such energy services.

Examples of the types of energy services that could be offered by energy service providers include:

- in-home energy efficiency audits / assessments;
- the provision (at no cost, or for sale or lease) and/or replacement of energy efficient products and appliances, ie, hot water systems; air conditioning systems, shower heads, ceiling insulation etc;
- the provision (at no cost, or for sale or lease) of renewable generation units such as solar panels, wind turbines etc;
- providing targeted and tailored energy information to consumers; and
- linking consumers with providers of other energy products or services; and so on.

AGL Energy provides a good example of a retailer engaged in product and service diversification. AGL energy operates a number of 'AGL Energy Shops' that fulfil many of the functions of what we have termed an energy service provider. AGL Energy Shops sell gas and electric appliances for cooking, hot water, heating and cooling, as well as solar products. The AGL franchises provide customers with information on the energy efficiency and cost-efficiency of the various appliances on offer. Customers are also offered assistance with installation of appliances and have access to the 'AGL Today' interest-free financing option.

The introduction of a Carbon Pollution Reduction Scheme may well enhance the business case for a retailer transforming into an energy service provider. If consumers face stronger and sharper incentives to seek out ways to reduce their consumption of energy, various energy products and services that promote energy conservation and/or energy efficiency are likely to become more attractive to consumers. As a consequence, investment in these services by retailers may well become financially viable. Where retail businesses determine that it is cost-effective to invest in such services, we can expect to see retailers slowly reposition themselves in the market as energy service providers.

Commercial incentives to grow market share, and the price signals created by the Carbon Pollution Reduction Scheme, are not the only means of encouraging retailers to develop innovative energy services. Government intervention in the form of regulatory requirements or financial incentives could also create the necessary level of demand for energy services, and so drive investment in the provision of these services by retail businesses.

Our review of energy efficiency programmes<sup>49</sup> suggests that retailers may be beginning to differentiate themselves on the basis of energy efficiency products and services, (eg the Aurora green scheme), but only to a very limited extent. On the whole, retailers do not appear to be extending the energy efficiency products and services they offer beyond those required by government policy.

# 3.4. Barriers to investment in energy efficiency

This section identifies the potential *barriers* or *impediments* to the adoption of energy efficient practices and products by residential households and commercial energy users, as the basis for considering how policies can be developed so that retailers promote energy efficiency by customers. Our focus has been on:

- explaining the role of energy prices to promote energy efficiency amongst retailer customers;
- identifying the market barriers to investment in energy efficiency that prevent or impede cost-effective investment in energy efficient products, practices or services; and
- setting out the evidence of market barriers.

<sup>&</sup>lt;sup>49</sup> As set out in section 4.2.3.

# 3.4.1. The role of energy prices to promote energy efficiency

Energy is used in the economy to produce goods and services that are valued. The use of energy will therefore be efficient when the value associated with its use is maximised, given the cost of its provision. For energy use to be efficient, a customer should pay an energy price equal to the marginal cost of providing energy including any production, delivery and environmental costs involved.

Consumer retail electricity tariffs are based on the average cost of supply with no allowance made for environmental costs. This means that electricity use has exceeded that which would result if the associated environmental costs were specifically included in prices. As a consequence energy prices have not provided the correct signals to customers to drive efficient energy use. The introduction of the CPRS will explicitly include carbon costs into the price of electricity. This will in turn create an incentive for consumers, businesses and industry to invest in energy efficiency practices where the cost of doing so is less than the cost of energy, including the cost of the associated carbon emissions. In light of the relatively low demand responsiveness of consumers to energy prices, the price may need to increase significantly to encourage consumers to engage in significant energy conservation or energy efficiency behaviour.

For example, assume that the average household electricity bill in Australia is 1,000/year with no CPRS in place, or 1,200/year with a CPRS. This represents a 20 per cent increase in the cost of electricity for that household, assuming no associated change in consumption behaviour. To the extent that consumers will prefer to offset some (or all) of this 200 increase, the incentive for consumers to adopt energy conservation and/or energy efficiency practices will increase. If a consumer's own price elasticity of demand is -0.05, then for every one per cent increase in the cost of energy, energy demand will fall by 0.05 per cent. This would mean that a consumer would seek to reduce energy consumption by 1 per cent (ie,  $20 \times 0.05$ ), when facing the prospect of a 20 per cent increase in the price of electricity.

This reduction in energy consumption may be achieved by energy conservation measures, energy efficiency measures or a combination of the two. In the absence of other market failures, and assuming that cost effective energy efficient options are available, it is reasonable to assume that consumers would prefer to implement cost-effective energy efficiency measures to reduce their bills to the desired level (ie, maintain the same amount of productive output for lower energy inputs (and therefore lower energy costs) rather than energy conservation measures that would result in a similar reduction in energy inputs (and energy costs) for the individual, but would also be associated with a reduction in the benefits received.

The Commonwealth Government has committed to introducing the Carbon Pollution Reduction Scheme (CPRS) in Australia from 1 July 2011. Investment in energy efficiency is therefore expected to become more attractive for consumers. However, the extent to which investment in energy efficiency is increased will depend on two factors in particular:

- the responsiveness of energy demand to the change in price; and
- the extent that market barriers prevent consumers from making decisions about the optimal combination of energy conservation and/or energy efficiency measures.

To the extent that individuals exhibit a low responsiveness to price changes (ie, energy demand is relatively price inelastic), consumers are unlikely to invest in energy efficiency (or indeed energy conservation options) rigorously. For example, in the above example a 20 per cent increase in energy prices only leads to a small reduction (one per cent) in consumer energy demand. This suggests energy prices would need to increase significantly to encourage a large reduction in energy use (and by consequence, increased investment in energy conservation or energy efficiency initiatives by the individual).

The responsiveness of consumers to energy price changes does not create any opportunities for policy intervention to enhance energy efficiency outcomes. If consumers are relatively unresponsive to changes in the price of energy, this presumably reflects the value of, and preferences for, energy by those individuals and does not imply that a 'market failure' exists (although market failures can also affect the value of energy to consumers).

In contrast, if there are real and material market impediments to investment in energy efficiency, consumers may not respond to an increase in energy prices (as a result of the CPRS) by investing in energy efficiency even though such investment might be cost-effective. To be precise, including carbon costs in energy prices will not be sufficient to achieve optimal investment in energy efficiency where there are also genuine market failures that result in consumers under-investing in energy efficient practices and technologies. As such, following the introduction of the CPRS it is likely that energy efficiency policy will increasingly focus on addressing material impediments to the uptake of energy efficient practices.

Finally, while a CPRS will in principle incorporate carbon costs into wholesale electricity prices, for this to drive energy efficiency investment it is necessary but not sufficient that the 'price signals' are also passed through the supply chain 'intact' and so are faced directly by end-use consumers.

Under the current market framework, customer retail tariffs are generally set to recover the average cost of wholesale electricity, network and retailing services. However, in practice the cost to provide electricity to an individual customer varies according to the time of day of electricity use and the geographic location of that customer. By not charging on the basis of the 'true' cost of supplying electricity to an individual customer that customer does not receive a price signal against which optimal energy use decisions can be made. This approach to retail pricing means that 'low cost to serve' energy customers (ie, customers that consume electricity at non-peak times), effectively cross subsidise the costs imposed by 'high cost to serve' customers that consume electricity during peak periods. The lack of time of day price signalling means that households that contribute the most to wholesale and network costs (ie, those that consume mostly during peak periods) are likely to under invest in energy efficiency because the 'true' cost of energy supply is not borne by them.

The current arrangements therefore represent a breakdown in price signals between the cost of supplying electricity and the cost to the end consumer for the use of electricity. Where price signals are lost or distorted, consumers do not face the true costs of their consumption decisions, and by consequence, do not face appropriate incentives to seek out opportunities to change their consumption behaviour where this might include investment in energy efficiency.

# 3.4.2. Potential impediments to investment in energy efficiency

Incorporating carbon costs in energy prices will be insufficient alone to drive optimal investment in energy efficiency practices, where there are also genuine market failures preventing consumers from investing appropriately in energy efficiency. These barriers may result from:

- Basic financial barriers: including potentially higher upfront costs of energy efficient products compared with non energy efficient products;
- Hidden costs: including the transaction costs associated with finding information on energy efficiency;
- Lack of information: which leads to a lack of awareness of the scope for personal improvements in energy efficiency without compromising the benefits from electricity use;
- Risks and uncertainty: including uncertainty as to energy prices, length of stay at a
  particular premises and the likely energy savings associated with energy efficiency
  measures;
- Poorly aligned incentives: including the split between landlords and tenants, whereby a landlord under invests in energy efficiency because tenants pay energy bills. Similar misalignments occur in the building industry and among property developers.
- Pricing impediments: associated with the lack of pricing at the marginal cost of energy use, including greenhouse emission costs, leading to potential under or over investment in energy efficiency by households and businesses.

Many of these impediments have the potential to be addressed through some form of policy intervention. This might take the form of an obligation on energy retailers to engage in activities designed to explicitly address a particular impediment. Alternatively, retailers could be provided with an outcome oriented energy efficiency target, such as the Victorian Energy Efficiency Target (VEET), with the details on how to achieve the target being left to the discretion of the retailer.

In addition to the barriers identified above, the Productivity Commission has also acknowledged that there are likely to be behavioural and organisational barriers.<sup>50</sup>

These barriers arise because of limits on the decision-making abilities of individuals and organisations to make optimal decisions about energy efficiency investments. This can be the result of individual's deciding that 'near enough is good enough', particularly when energy use is a small input cost, or cost in the household budget. It is worth noting that the Productivity Commission found that barriers of this form were unlikely to justify government intervention.

<sup>&</sup>lt;sup>50</sup> Productivity Commission, *The Private Cost Effectiveness of Improving Energy Efficiency*, 21 October 2005, Chapter 4.

# 3.4.3. Evidence of market barriers to consumers and retailers

Having identified the high-level impediments to investment in energy efficiency, the next step is to consider the barriers that are most relevant for energy consumers and retailers for the adoption and promotion of energy efficiency respectively.

#### Barriers to consumers adopting energy efficient products and practices

A lack of awareness and information on energy efficient products and services is a key impediment to customers investing in energy efficiency. Information-based market impediments may include barriers to the effective:

- provision of information on energy efficient products and services,
- receipt and understanding of information on energy efficient products and services by consumers; and/or
- behavioural response or consumer action(s), in response to this information.

Information deficiencies that prevent energy consumers from understanding the full costs and benefits of investment in energy efficiency are, in turn, likely to limit:

- the uptake of energy efficient appliances and equipment;
- investment in energy efficient buildings;
- residential energy efficiency savings; and
- the adoption of energy efficiency practices in the industrial, commercial and services sectors.

A lack of information on the potential benefits (and costs) of energy efficiency is likely to lead to a failure by individuals to properly trade-off up front costs against the benefits from lower energy costs in the future. In particular, information is critical to allow consumers to choose between appliances and equipment on the basis of differences in their relative energy consumption, and equally, for potential purchasers or tenants to make informed choices when purchasing or leasing a building. Similarly, in order to encourage residential, commercial and industrial energy users to adopt energy efficient practices and services, it is critical that they are aware of and understand the practices and technologies that are available and can be used to manage energy efficiency.

*Split incentives* are also common in the Australia context, particularly in the residential and building sectors. The split incentives between landlords and tenants, or developers and purchasers, means those responsible for the purchase or construction of buildings may not appropriately consider energy efficiency practices. Energy efficiency improvements do not often increase the associated property value, or rental income earned, from the building. This means that there is often no commercial reason for undertaking these investments, particularly for existing properties.

A related issue is the ability of developers to access finance to fund energy efficiency upgrades to existing buildings given the risks and uncertainties involved, or equally, constraints on the ability of certain households to obtain the capital required to invest in energy efficiency improvements. This is particularly important where the initial costs of investing in energy efficient products are high. Low-income residential households or small businesses may trade off lower capital costs now for higher ongoing operating costs due to the relatively large opportunity costs these groups may face in accessing funds.

Finally, under the current policy and regulatory settings it is unlikely that there are sufficient *incentives* on market participants to be concerned about the energy efficiency of the products and services consumed. In particular, manufacturers of appliances are unlikely to be concerned about the energy efficiency of the products they produce if consumers do not place a value on energy efficiency. However, if consumers value energy efficiency, and had access to the right information in order to exercise this preference, manufacturers may face sufficient competitive pressure to improve the energy efficiency of the products they produce.

#### Impediments to retailers investing in energy efficiency

Our review of energy efficiency service provision by Australian retailers suggests retailers only invest in energy efficiency where they are obligated to do so. Indeed, although a number of retailers have begun positioning themselves as energy efficiency service providers, this is not reflected in the products and services they provide. Retailer efforts are primarily focused on making customers aware of programmes and rebates available through government initiatives, and providing information to customers on energy saving techniques and the benefits of renewable energy and green power more generally.

This suggests that retailers do not expect to realise a net gain from investment in energy efficient products and services. Reasons for this may include:

- the prohibitively high setup costs for retailers to establish this function;
- the potentially inadequate benefits to retailers of investing in energy efficiency because:
  - customers do not readily 'switch' retailers, ie, the market is 'sticky';
  - customers do not sufficiently value the non-price elements of retailer offerings, ie, the price elements of retail offers dominate customer switching decisions; or more specifically
  - customers do not sufficiently value energy efficient products and services, where this may be because of:
    - <sup>D</sup> information failures because customers do not understand the value of energy efficiency products and services; and/or
    - the high information gathering costs associated with understanding energy efficiency so that customers do not make informed decisions when it comes to switching retailers or consuming energy efficient products more generally.

It is difficult to determine how important each of these potential market barriers are in the Australian context, and the extent that investment in energy efficiency by retailers is impeded

as a consequence of any or all of these factors. However, CHOICE has recently found<sup>51</sup> that consumers who are given an opportunity to switch retailers have done so more than five million times since retail competition was introduced in 2002, and that discounts, offers and promotions have been remarkably effective in enticing customers to switch electricity retailers.<sup>52</sup>

As noted above, investment in energy efficiency may also be unattractive to retailers if customers do not sufficiently value the non-price elements of retailer offerings. Although an analysis of the precise value customers place on the non-price elements of retailer offerings is not part of this project, there is evidence to suggest that customers do delineate between price and non-price elements, and that they attach some value to the non-price elements. For example, the results of the CHOICE power survey show that despite consumers being relatively dissatisfied with the price components of service offered by the NSW electricity retailers for example (Country Energy, Integral Energy and Energy Australia have satisfaction ratings of 47, 48 and 46 per cent respectively), satisfaction with customer service provided by these retailers, and the ease of understanding bills, was much higher, ie, between 65 and 69 per cent.

In addition, GreenPower – a government accredited program for renewable energy – now has close to 1 million customers<sup>53</sup>, suggesting that electricity consumers do place some value on the non-price element of retail offerings and are willing to pay extra to support renewable energy generation.

This section has considered the *market barriers* to investment in energy efficiency by retailers. As discussed earlier, retailers may be discouraged from promoting energy efficiency because of the link between retailer revenue and units of electricity sold. Although this is not a 'market barrier', it does represent a further challenge for encouraging retailers to promote energy efficiency to consumers within the current market framework. However, as noted earlier, there is also significant potential for retailers to be motivated to invest in energy efficiency as a means of growing market share, particularly as retail competition strengthens and businesses look beyond unit electricity sales to generate revenue, ie, retailers transform themselves into energy service providers into order to benefit from business diversification.

A further and final issue commonly identified as obstructing investment in energy efficiency by retailers relates to the commercial incentives and behaviours of 'gentailers'. 'Gentailers' refer to those electricity retail businesses that also own electricity generation assets. The impact of gentailers on investment in energy efficiency in the Australian context is discussed further in Box 3.2.

<sup>&</sup>lt;sup>51</sup> CHOICE, (2009) Power switching Survey, http://www.choice.com.au/printFriendly.aspx?ID=106751. July.

<sup>&</sup>lt;sup>52</sup> There are also concerns that some customers may switch as a consequence of aggressive or misleading marketing, but the extent of this problem is unknown.

<sup>&</sup>lt;sup>53</sup> GreenPower Newsletter, (2009) GreenPower continues to shine, Issue 29, May.

# Box 3.2 Gentailers and energy efficiency

Many Australian electricity retailers own electricity generation assets. This 'gentailer' structure has become more common within the electricity industry as a means of managing financial risks within the wholesale market. By owning generation assets a retailer can directly reduce its exposure to price volatility in the wholesale market without needing to enter into wholesale supply contracts with other generators. To the extent that this reduces or eliminates the need for a retailer to negotiate wholesale electricity contracts, or swap agreements, with other NEM generators, a gentailer may also incur lower transaction costs compared to a regular retailer.

Given the growth of the gentailer sector of the Australian electricity market it is important to consider whether these businesses face *different* incentives to invest in energy efficiency, as compared to a retailer without generation assets.

When a gentailer sells a MW of electricity in the wholesale market it earns revenue for that quantity of electricity, as determined by the prevailing wholesale price. Equally, when the gentailer sells 1 MW of electricity to an end-use customer it earns revenue on that sale, as determined by the prevailing retail price. The difference between wholesale prices and retail prices once other retail costs have been taken into account is the profit earned by the retailer. In this context, the decision to promote energy efficiency will be based on an examination of the implications for the revenue and costs of the gentailer.

If a gentailer were to invest in energy efficiency measures, such that retail customers choose to consume less energy, the **retail** revenue accruing to that gentailer would decline, all else being equal. This is a consequence of the direct relationship between unit electricity consumption and retailer revenue under the current market framework, and is the same for all retailers regardless of whether they also have generation interests. This suggests retailers (in general) have a disincentive to promote energy efficiency. However, as discussed earlier, this may be offset to some extent by the incentive on retailers (including gentailers) to grow market share in order to maximise the return from business diversification and differentiation, where this may be achieved by offering customers energy efficient products and services.

The implications of promoting energy efficiency for a gentailer's generation revenue are less clear. Where a gentailer promotes energy efficiency and this results in a decrease in electricity consumption by retail customers, then a gentailer's generation revenue will only be impacted if the wholesale electricity price is also affected. In other words, generation revenue will only be affected if the decrease in electricity demand changes the marginal generator and so lowers the wholesale price for that period. Given the depth and competitiveness of the wholesale electricity market, it is extremely unlikely that a small change in demand for electricity at the retail end will have any noticeable impact on demand for electricity (and therefore the price of electricity) in the wholesale market.

In summary, there are two possible implications for gentailer generation revenue of the promotion of energy efficiency, namely:

 generation revenue does not change because the decrease in electricity demand is insufficient to change the marginal wholesale market generator, such that the wholesale price is unaffected; or  generation revenue falls because the decrease in electricity demand is sufficient to lower the wholesale electricity price.

The first implication means that gentailers will likely have the same commercial incentives (or disincentives) to promote energy efficiency as regular retailers, as they incur the same costs and benefits of a decrease in retail demand as a consequence of energy efficiency being promoted.

The second implication means that gentailers stand to incur a 'loss' at both the retail and generation end as a consequence of the decrease in electricity demand. In this case, the gentailer can be regarded as having an even stronger disincentive (or weaker incentive) to promote energy efficiency compared to a retailer without generation assets.

There are credible reasons why the second outcome can be regarded as highly unlikely. In particular, the NEM operates as a *competitive* wholesale energy market, meaning that no one buyer or seller has the capacity to influence the market price that emerges, ie, there is no evidence of market power. However, the second outcome assumes that the gentailer accounts for such a large portion of the retail market that a reduction in customer demand (brought about by energy efficiency measures) will have a material impact on the demand for electricity at the wholesale level (and therefore impact the wholesale price). If this were true, such that the behaviour of one market participant is able to influence the prevailing wholesale market price, this would cast serious doubts over the true competitiveness of the wholesale market. Such competition concerns would raise concerns by the competition regulator.

In summary, there are a number of potentially real and tangible barriers to retailers promoting energy efficiency, in addition to various circumstances that may provide a disincentive for retailers (including gentailers) to promote energy efficiency. Although there may be a growing commercial incentive for retailers to promote energy efficiency as competition strengthens and businesses seek to diversify their product offerings, many of the same barriers that are thought to limit the uptake of energy efficiency by end-use customers may also be serving to distort the commercial incentive for retailers to promote energy efficiency as a means of growing market share.

The identification of these impediments suggests that the market is currently failing to support an optimal level of investment in energy efficiency, and society would benefit if greater levels of investment were undertaken. Consequently, there is likely to be an ongoing role for government to address market based barriers to investment in energy efficiency, even following the introduction of the CPRS.

# 3.5. Basis for policy intervention

There is considerable debate amongst economists about the economic justification for government intervention to promote energy efficiency. It is sometimes argued that simply setting energy prices equal to the opportunity cost of energy provision, including any environmental costs will lead to optimal effort to improve energy efficiency. This view would suggest that simply focusing on mechanisms that provide carbon price signals to customers would be sufficient to promote energy efficiency.

The introduction of the CPRS in Australia will internalise the cost of greenhouse gas emissions associated with the production and use of energy. This implies that energy consumption decisions – including the adoption (or not) of energy efficient practices – will take account of the true cost of energy use, ie, the environmental costs of associated greenhouse gas emissions.

However, providing carbon price signals may not be sufficient of itself to achieve optimal energy efficiency outcomes where there are real and material barriers and impediments to the take-up of energy efficiency practices. It is in this context that energy efficiency policy becomes critical.

The primary economic rationale for energy efficiency policy is to address genuine market failures, ie, information deficiencies, lack of access to finance, or misaligned or split incentives, that inhibit optimal investment in energy efficiency. Examples of the types of programmes that may be used to address impediments to energy efficiency investment include:

- pricing impediments these may be addressed through programmes that incorporate the environmental costs within the overall energy price and seek to pass those prices directly through to customers. Examples of the types of programmes include an emissions trading scheme, fuel levies, and the introduction of smart metering technologies;
- information barriers these can be addressed through programmes that are designed to increase and enhance the provision of information on energy efficient practices, ie, labelling and energy use audits, or investment in research into more energy efficient technologies;
- capital barriers these barriers may be overcome by identifying those segments of society that have particular problems accessing capital to fund more energy efficient appliances or engage in more energy efficient practices, and providing financial assistance to these groups, ie low interest loans for energy efficiency investments; and
- incentive barriers to address the split benefits problem, specific incentives can be created either through obligations to achieve energy efficiency targets, or through financial incentive programmes.

In reality there is a wide range of policy options available to increase energy efficiency for end users. These are likely to be within a spectrum of prescriptive to less prescriptive approaches including:

- obligations to provide information and/or undertake specific energy efficiency programmes, ie, energy audits; and
- specification of a cap and trade energy efficiency target, with scope for retailers to trade energy efficiency certificates to meet obligations.

While there are a range of programmes that may be implemented, it is important to recognise that the mere presence of an impediment to energy efficiency is not sufficient to justify government intervention. The best policy approach within this range will depend on the materiality of the perceived market failure(s), and then the associated costs and benefits of intervention in the market.

Government intervention itself creates costs and distortions that should be considered prior to the implementation of any programme that is designed to encourage energy efficiency. Indeed, the Productivity Commission considered this issue in its 2005 energy efficiency review and concluded the following:<sup>54</sup>

Energy efficiency improvements that are privately cost effective are true 'no regrets' measures — the individual producer or consumer concerned saves costs and the (global) community benefits from reduced pollution, including greenhouse gas abatement. There is no doubt that such opportunities exist. But the potential for making such improvements, and the scope for governments to efficiently intervene to address barriers and impediments preventing their uptake, appears to be modest. In many cases, the improvements are not as cost effective for individual producers and consumers as they might seem, once all of the costs (including the opportunity cost of using those funds elsewhere) are considered. And few of the many perceived barriers and impediments are areas where government intervention is justified.

In contrast the more recent McKinsey & Company report highlights the size of the possible no net cost opportunities that might be available to lower greenhouse gas emissions, many of which are improvements in energy efficiency.<sup>55</sup>

Choices on the mix of programmes to promote energy efficiency and the extent of intervention by government should therefore:

- reflect an assessment of the materiality of the barriers to energy efficiency; and
- provide a framework for least cost achievement of energy efficiency objectives.

The following section sets out a high-level summary of the various policy approaches that have been implemented to address market failures in relation to energy efficiency in Australia. This includes identification of the various policies and programmes that have been used to promote investment by retailers in energy efficiency.

<sup>&</sup>lt;sup>54</sup> Productivity Commission, (2005), The Private Cost Effectiveness of Improving Energy Efficiency, pg XLIII.

<sup>&</sup>lt;sup>55</sup> McKinsey & Company, (2008), An Australian Cost Curve for Greenhouse Gas Reduction, February.

# 4. Retailer energy efficiency programmes

This chapter provides an overview of the role retailers currently have in promoting the adoption of energy efficient products and practices. Specifically, this chapter:

- sets out the policy context within Australia to promote energy efficiency; and
- identifies the energy efficiency programmes that are currently undertaken by retailers.

This overview establishes the 'base case' against which an assessment of the need for additional market intervention can be assessed. It also provides the basis for subsequent analysis of any programme gaps, drawing upon the information provided through the subsequent international review of energy efficiency policies and programmes.

# 4.1. Energy efficiency policy in Australia

Energy efficiency has the potential to play a key role in reducing Australia's energy use and carbon emissions. The promotion of energy efficiency is therefore an important part of the policy mix within which Australia will achieve its carbon emission reduction commitments. Increasing investment in end use energy efficiency can both reduce greenhouse gas emissions at low (or negative) cost and help consumers keep power bills down even while prices rise. In this context, governments have devoted significant effort to the development of energy efficiency policies in recent years. In addition, the promotion of energy efficiency provides a means for addressing carbon emissions while transitioning to the introduction of the CPRS.

This section sets out current policy context, ahead of describing the key energy efficiency programmes in place.

# 4.1.1. The National Framework for Energy Efficiency

In 2002 the Ministerial Council on Energy (MCE) endorsed the development of a nationally co-ordinated approach to energy efficiency policy. In August 2004, the MCE released details of the policies that would underpin the first stage of the National Framework for Energy Efficiency (NFEE) and apply between January 2005 and June 2008 – Box 4.1.

# Box 4.1 National Framework for Energy Efficiency Stage 1 initiatives

NFEE Stage one measures included:<sup>56</sup>

- Buildings: nationally consistent minimum energy efficiency standards for new residential and commercial buildings and major renovations/refurbishments, mandatory disclosure of energy performance of residential and commercial properties at the time of sale or lease, and training;
- Appliances and equipment: minimum energy performance standards (MEPS) and appliance and equipment labelling;

<sup>&</sup>lt;sup>56</sup> MCE Communiqué, 27 August 2004.

- Industrial and commercial sectors: the Australian Government's Energy Efficiency Opportunities (EEO) scheme, energy efficiency research and development, energy efficiency best practice networks; and
- Residential sector: information provision and benchmark billing on energy bills.

Implementation committees were set up to deliver the NFEE. The implementation committees cover energy efficiency measures relating to Buildings; Commercial and Industrial; Appliances and Equipment; Government; Trade and Professional Training and Accreditation; Consumer Information; Green Leases; Hot Water; Inefficient Lighting; Heating Ventilation and Air-Conditioning (HVAC); and Data Gathering.

On 13 December 2007 the MCE agreed to a package of new energy efficiency measures for delivery under NFEE Stage two, to be effective from 1 July 2008. These measures complement a number of the Stage one measures. Specifically, NFEE Stage two includes:

- the EEO scheme;
- an energy efficiency exchange website;
- mandatory disclosure of building energy performance;
- an expanded and enhanced MEPS programme;
- a heating, ventilation and air-conditioning high efficiency systems strategy;
- the phase out of inefficient incandescent lighting; and
- government (state and federal) leadership through green leases.

# 4.1.2. National Strategy on Energy Efficiency

At its 2 July 2009 meeting, COAG agreed to a comprehensive 10-year National Strategy on Energy Efficiency and signed the National Partnership Agreement on Energy Efficiency. The strategy is designed to accelerate energy efficiency improvements for households and businesses across all sectors of the economy by incorporating and building on the measures delivered and being developed through the NFEE.

The strategy's scope will encompass all areas in the economy where substantial costeffective energy efficiency opportunities exist, ie, commercial buildings, residential buildings, appliances and equipment, industry and business, government, transport, skills, innovation, advice and education. Specifically, the strategy encompasses the following measures:

- assistance to households to reduce energy use by providing information and advice, financial assistance and demonstration programmes;
- assistance to business and industry to obtain the knowledge, skills and capacity to pursue cost-effective energy efficiency opportunities and therefore meet the challenges of a low carbon economy;
- higher energy efficiency standards to deliver substantial growth in the number of highly energy efficient homes and buildings, and provide a clear road map to assist Australia's residential and commercial building sector to adapt;

- nationally-consistent energy efficiency standards for appliances and equipment and a process to enable industry to adjust to increasingly stringent standards over time;
- new standards for the energy performance of air conditioners to be introduced in 2010 and increasing the standard by a further 10 per cent from 1 October 2011;
- addressing potential regulatory impediments to the take up of innovative demand side initiatives and smart grid technologies;
- governments working in partnership to improve the energy efficiency of their own buildings and operations; and
- a detailed assessment of possible vehicle efficiency measures, such as CO2emission standards, which international studies suggest have the potential to reduce fuel consumption by 30 per cent over the medium term and so significantly contribute to emissions reductions.

COAG has indicated that all regulatory measures will be subject to normal regulatory impact assessment to ensure that the benefits of any scheme outweigh its cost.

The Commonwealth government recently committed to the establishment of the Australian Carbon Trust to support households and businesses to engage on climate change, particularly through cutting energy use - Box 4.2. This highlights that governments are looking to provide information on energy efficiency through a number of mechanisms.

# Box 4.2 Australian Carbon Trust<sup>57</sup>

The Australian Carbon Trust will provide information and tools for households and businesses to effectively participate in Australia's climate change response. The Government has committed \$75.8 million from 2009–10 over 5 years to establish the Australian Carbon Trust.

The Australian Carbon Trust has two core components: the Energy Efficiency Savings Pledge Fund, and the Energy Efficiency Trust.

Energy Efficiency Savings Pledge Fund

The government has allocated \$25.8 million over 5 years to establish the Energy Efficiency Savings Pledge Fund. These funds are to be used to help households and small businesses understand the emission reductions and dollar savings to be gained from cutting energy use.

Web based tools will enable households and small businesses to calculate their energy use and the dollar savings that can be made through actions to reduce energy use, such as installing energy efficient appliances. Individuals can then pledge the resulting savings, or any other amount, to the Energy Efficiency Savings Pledge Fund. The fund will buy and cancel carbon pollution permits to create additional emission reductions. Individuals could

<sup>&</sup>lt;sup>57</sup> Department of Climate Change, (2009), Fact Sheet: Supporting Individual Action, June, http://www.climatechange.gov.au/emissionstrading/index.html.

also choose to purchase and cancel offset credits complying with the Government's forthcoming National Carbon Offset Standard.

Pledges will be tax deductible. Because the fund will pool pledges, even small amounts can combine to make a big difference to the environment.

# Energy Efficiency Trust

The government has provided \$50 million in seed funding to an Energy Efficiency Trust to provide a best practice model that will motivate and inform private sector engagement in energy efficiency. To do this, the Trust will bring together public seed funding, private sector skills and business culture, and the necessary technical knowledge to leverage investment in energy efficiency activities in commercial buildings and other business operations.

Upfront investment will be repaid through energy savings, creating a revolving fund for further investment. Examples of investments include retrofits of commercial buildings to deliver more efficient lighting, ventilation, heat and air conditioning, more efficient computer systems and other office machines and transport logistics. Entities receiving support through Trust activities will include small and medium manufacturing businesses as well as private and community residential care facilities. The activities of the Trust will give priority to demonstrating savings with the largest potential flow-on effects.

On July 21 2009 the government announced that Professor Robert Hill will be appointed chair of the Board to be established for the Australian Carbon Trust.<sup>58</sup>

The following section sets out the specific activities retailers are pursuing in this policy environment to promote and support energy efficiency.

# 4.2. Energy efficiency programmes by retailers

This section provides a high level overview of the most significant, **retailer-led** energy efficiency programmes in place in Australia. This includes energy efficiency programmes that are driven by government policy but implemented at the retail level, such as financial incentives for households to take up energy efficient practices mandatory residential energy efficiency targets.

Specifically, this review includes:

- the identification and a brief description of the energy efficiency programmes offered by retailers; and
- a brief outline of the drivers for implementation of the programme, including the related policy context, ie, the underlying motivations for particular programmes.

In addition to retailer-led programmes, there are also a large number of federal and state government led programmes in place to improve the energy efficiency of households, businesses and industry. These programmes have not been considered as part of this review.

<sup>&</sup>lt;sup>58</sup> Australian Labor Party, (2009), 'Chair for \$75.8m Australian Carbon Trust', Media Statement, 21 July.

Energy efficiency programmes can be usefully categorised as one of:

- *a market mechanism*:
  - Market mechanisms can provide incentives for suppliers or consumers of energy to minimise energy use or maximise energy savings / carbon abatement, by modifying for example prices and/or tariff structures. These mechanisms provide significant flexibility with respect to how the relevant target or objective is achieved.
- *a financial incentive*; or
  - The provision of rebates and subsidies can create incentives for retailers and/or their customers to invest in energy efficiency, ie providing rebates for the adoption of more energy efficient appliances; assisting with the substitution of alternative fuel sources such as gas hot water systems as an alternative to electric hot water systems; funding other household actions, such as insulation, to improve energy efficiency.
  - Direct financial assistance also can be an effective way of encouraging the adoption
    of practices to improve energy efficiency, particularly where there are constraints
    associated with particular households or businesses accessing funds to finance the
    initial cost outlay for more efficient appliances or retrofitting a building to enhance its
    energy efficiency.
- *information provision:* 
  - Actions such as providing information to customers on opportunities to reduce energy use, conducting energy efficiency audits to identify possible household cost savings and providing better energy bill information can all create incentives for customers to invest in energy efficiency.

The following sections consider the most significant energy efficiency programmes currently in place in Australia.

#### 4.2.1. Market mechanisms

Energy efficiency targets impose an obligation on individual retailers to achieve a certain level of energy savings. These targets do not prescribe how retailers are to achieve these energy savings. This means individual businesses can pursue whichever combination of energy savings measures they prefer, subject to complying with the requirements of the scheme.

Energy efficiency targets are currently in place in Victoria and South Australia, and the New South Wales Energy Savings Scheme commenced on 1 July 2009.

#### Victorian Energy Efficiency Target

In line with the Victorian government's 2006 election policy statement, Victoria has committed to a reduction in household greenhouse gas emissions of 10 per cent by 2010 and an overall reduction in the State's greenhouse gas emissions of 60 per cent by 2050. To achieve this commitment, the Victorian government introduced the Victorian Energy

Efficiency Target (VEET) scheme. The scheme, administered by the Essential Services Commission (ESC), commenced on 1 January 2009 and will run until 2029.

Under the VEET scheme a State-wide target for energy savings is set every three years. For the first three years of the scheme (2009, 2010 and 2011), the scheme target is set at 2.7 million tonnes (Mt) per annum. Individual Victorian electricity and gas retailers are required to meet annual greenhouse gas emissions liabilities that ensure total State-wide greenhouse gas emission reductions meet the annual scheme target. These amounts are determined on the basis of each retailer's share of a defined customer market. Retailers must acquire and surrender a certain number of Victorian Energy Efficiency Certificates (VEECs) each year, in line with their individual liability.

A VEEC can be created in respect of prescribed activities undertaken by the retailer. An activity is prescribed if it results in a reduction in greenhouse gas emissions that would not otherwise have occurred if the activity was not undertaken. Examples of energy saving activities include:

- the modification of an appliance, structure or equipment that leads to a reduction of greenhouse gas emissions;
- replacement of a system or equipment that will lead to a reduction of greenhouse gas emissions such as the installation of a high efficient water heating system;
- purchase and installation of an appliance or equipment that has a lower greenhouse gas intensity than a comparable product such as the installation of low energy lamps; and
- installation of an appliance or any equipment that will result in reduced greenhouse gas emissions such as insulation.

Specifically, six categories of activities are specified as prescribed activities in the VEET Regulations:<sup>59</sup>

- Water heating decommissioning of low efficiency water heating products and the installation of high efficiency water heating products. This category also includes the installation of solar pre-heaters or solar retrofit kits;
- Space heating decommissioning of low efficiency ducted heating products and the installation of high efficiency ducted heating products, and the installation of high efficiency space heating products;
- Building / Space conditioning installation of insulation, thermally efficient windows and weather sealing products;
- Lighting installation of low energy lamps;
- Shower rose decommissioning of non-low flow shower rose and the installation of low flow shower rose; and

<sup>&</sup>lt;sup>59</sup> Essential Services Commission, (2009), 'Victorian Energy Efficiency Target, June, http://www.esc.vic.gov.au/public/VEET/Prescribed+Activities.htm.

 Refrigerators/freezers – purchase of high efficiency refrigerators or freezers (refrigerator purchase) and destruction of pre-1996 refrigerator or freezer (refrigerator destruction).

To create a VEEC, retailers encourage households to take up eligible energy efficiency activities ie, through discounts on energy efficient appliances or the free replacement of incandescent lamps with more energy efficient compact fluorescent lamps and free replacement of high flow shower heads to three star rated shower devices. Households that choose to implement energy efficiency initiatives through the VEET scheme are expected to realise a net decrease in energy costs, due to avoided energy use.

Any retailer that fails to satisfy its greenhouse gas emissions liability in full by surrendering valid VEECs will have a VEEC shortfall for the relevant year and must pay a shortfall penalty.

#### South Australian Residential Energy Efficiency Scheme

On 18 February 2008, the South Australia government announced a new energy efficiency incentive scheme for households.<sup>60</sup> The Residential Energy Efficiency Scheme (REES) has been in place since January 2009 and it is administered by the Essential Services Commission of South Australia (ESCOSA).

The REES requires electricity and gas retailers<sup>61</sup> in South Australia to achieve two targets; an energy efficiency target and an energy services target, as described below:<sup>62</sup>

- energy efficiency target requires retailers to achieve a reduction of 155,000 tonnes of CO<sub>2</sub>-e in 2009, 235,000 tonnes of CO<sub>2</sub>-e in 2010 and 255,000 tonnes of CO<sub>2</sub>-e in 2012. Savings are expected to be achieved by implementing energy efficiency measures; and
- energy services target requires energy audits to be undertaken in a set number of low income households. The energy audits target is 3,000 households in 2009 and 5,000 households in 2010 and 2011.

Retailers are able to choose from a number of energy efficiency measures to achieve their respective targets, and are encouraged to be innovative in designing new measures that lead to energy savings. The Minister for Energy sets the annual State-wide REES target. ESCOSA, as scheme administrator, then allocates these targets to individual retailers based on greenhouse gas emissions associated with energy sales and residential customer numbers.

#### New South Wales Energy Savings Scheme

The NSW Greenhouse Gas Reduction Scheme (GGAS) currently provides incentives for a range of emissions reduction activities, including energy efficiency. However, the GGAS

<sup>&</sup>lt;sup>60</sup> Department for Transport, Energy and Infrastructure, (2009), 'Residential Energy Efficiency Scheme', June, http://www.dtei.sa.gov.au/energy/government\_programs/rees.

<sup>&</sup>lt;sup>61</sup> Retailers whose customer number exceeds 5,000.

<sup>&</sup>lt;sup>62</sup> Essential Services Commission of South Australia, (2009), 'Residential Energy Efficiency Scheme (REES) Targets, June, http://www.escosa.sa.gov.au/site/page.cfm?u=296.

will cease to operate once the CPRS commences. It is in this context that the NSW Government committed to the introduction of the Energy Savings Scheme.

The Energy Savings Scheme (ESS) is a NSW based mandatory energy efficiency scheme for electricity retailers and other liable parties, and will operate in much the same way as the VEET and the REES. The ESS establishes legislated annual energy savings targets that must be met through the creation and surrender of Energy Savings Certificates (ESCs). The ESS is administered by the Independent Pricing and Regulatory Tribunal (IPART), and includes an energy efficiency target of a 0.4 per cent reduction in total electricity sales, which will increase to 4 per cent in 2014. The ESS commenced on 1 July 2009.<sup>63</sup>

# 4.2.2. Financial incentives

Financial incentives associated with the promotion of energy efficiency include rebates, subsidies and direct financial assistance. There are a number of energy efficiency related rebates and subsidies in place in Australia. Although the uptake of these incentives may be facilitated by retailers, these programmes are funded by way of specific Commonwealth and State government policies and initiatives. The most common and significant programmes include:

#### Solar Hot Water rebate

The Australian Government current provides a rebate of \$1,600 to help eligible homeowners, landlords or tenants replace their electric storage hot water systems with solar or heat pump hot water systems. This offer is part of the Government's \$4 billion Energy Efficient Homes Package. A number of jurisdictions also offer state specific solar hot water rebates in addition to the Federal Government rebate.

#### **Ceiling insulation**

The Energy Efficient Homes Package will install ceiling insulation in up to 2.9 million homes. This scheme came into effect on 1 July 2009 and will run until 30 June 2011 for renters and landlords, and 31 December 2011 for owner-occupiers.

#### Green Loans

Green Loans is an Australian Government initiative to help Australians tackle climate change. The Green Loans Program supports the installation of solar, water saving, and energy efficient products. The Green Loans Program commended on 1 July 2009 and provides:

- detailed, quality Home Sustainability Assessments; and
- access to interest free Green Loans of up to \$10,000 each to make the changes recommended in the assessment.

To be eligible for a Home Sustainability Assessment of a Green Loan, households must meet certain conditions. Home Sustainability Assessment applicants must have an income below

<sup>&</sup>lt;sup>63</sup> Energy Savings Scheme, 'About', http://www.ess.nsw.gov.au/about/about.asp, June 2009.

\$250,000 and be the dwelling owner, a trustee or renter listed on the lease. In addition, the house must have been completed and occupied for at least 12 months. To be eligible for a Green Loan, the applicant must have undertaken a home sustainability assessment and satisfy the lending criteria of a participating Green Loans program financial provider. The Green Loan must be for actions recommended in the home sustainability assessment report, as provided by an accredited assessor. The Green Loans program is administered by the Department of the Environment, Water, Heritage and the Arts.

#### Solar Feed-in tariffs

State-based solar feed-in tariff programmes were described in section **Error! Reference source not found.**. These schemes provide an incentive for households to produce electricity from solar energy and return it to the electricity network.

#### Appliance replacement

A number of retailers provide customers with free replacement of, or subsidised access to, a number of home appliances including energy efficient light globes and water saving showerheads. In most instances, these programmes are driven by the retailer obligations under VEET and REES.

#### 4.2.3. Information provision

The majority of retailers provide energy efficiency information to customers via their websites. This information typically covers:

- energy saving tips, including how to measure and reduce household energy use and the cost of running household appliances;
- energy rating labelling;
- relevant federal and state government rebates and programmes; and
- the various 'green products' available for purchase including energy efficient appliances, hot water systems and the like.

In addition, a number of retailers offer free in-home energy audits or assessments of energy use, to identify where potential energy savings could be made. Retailers are required to undertake a certain number of these audits each year as part of their VEET and/or REES obligations.

One retailer, Aurora (in Tasmania) is developing a scheme that will link suppliers of energy efficient products and/or services with customers, to encourage their uptake (called the Aurora green scheme). A number of retailers also provide customers with information on their strategy for managing climate change, or energy efficiency information targeted at specific groups, ie, school children, businesses, and so on.

The following table provides a summary of the various energy efficiency programmes in place in Australia, including the primary driver(s) of these initiatives.

<b>Program / Initiative</b>	Jurisdiction	Driver
Market mechanisms		
VEET	Victoria	State-based legislative requirement on retailers
REES	South Australia	State-based legislative requirement on retailers
EE Scheme	NSW	State-based legislative requirement on retailers
Rebate / subsidy		
Solar Hot Water rebate	National	Federal and State government funding
Ceiling insulation	National	Federal Government funding
Green Loans	National	Federal Government funding
Solar Feed-in tariffs	Victoria, South Australia, Australian Capital Territory, Tasmania, Queensland	State government funding
Appliance replacement	Various	Compliance with VEET and REES requirements
Information provision		
In home energy audits / assessments	Various	Compliance with VEET and REES requirements.
		Additional audits above VEET/REES requirements may be being undertaken at the discretion of retailers.
Other information, ie, via websites.	Various	Compliance with relevant policy and regulatory requirements, and well as voluntary standards for provision of energy efficiency information to consumers.
		Additional information may be provided to customers at the discretion of retailers.

# Table 4.1 Summary of energy efficiency programmes in Australia

This review highlights that the majority of energy efficiency activity that is currently being undertaken by retailers is a consequence of government intervention and does not reflect the commercial incentives of retail businesses.

# 5. International review of energy efficiency programmes

This section provides a high-level overview of international experiences with energy efficiency programmes for the purpose of informing our subsequent recommendations for enhancing investment in energy efficiency by Australian retailers.

Critical to this task has been to identify those international energy efficiency programmes that have been most effective, and that could be readily modified for application in Australia. Ultimately, Australia's energy efficiency policy needs to ensure that the combination of incentives created does not result in detrimental and unintended outcomes for greenhouse emission reductions and consumers more generally.

# 5.1. Approach to the review

There are two aspects of international experience that we have focused on, namely:

- the nature of the incentives provided for retailers to engage in energy efficiency programmes; and
- the types of energy efficiency programmes that have been implemented in response to the incentives provided.

From a policy perspective, the first aspect provides potential guidance on how to design an incentive regime to achieve desired energy efficiency outcomes. The experience from international programmes can be used as a basis for considering the approach that might be more widely applied in Australia.

Our focus is to consider the energy efficiency experience in the United States, Canada, the European Union, France, Italy, the United Kingdom, Japan and New Zealand, and to highlight the range of programmes that are in place. These programmes are considered according to the same three categories set out earlier in the report, ie, market-based mechanisms, financial incentives (eg, rebates, subsidies and direct financial assistance) and the provision of information on energy efficiency. In the case of information provision, we have also considered the approach to energy efficiency labelling in international jurisdictions.

# 5.2. Market-based mechanisms

# 5.2.1. Overview

There has been a trend towards greater use of market-based mechanisms in the European Union, and particularly in the United Kingdom. These schemes are increasingly favoured by policy-makers because of:

- the flexibility they provide with respect to the achievement of relevant energy efficiency objectives;
- the incentives that are created to minimise the cost of compliance with energy efficiency obligations; and
- the certainty surrounding the expected energy efficiency outcomes that will be achieved.

These schemes also provide strong incentives for participants to provide information to individuals and businesses about methods of improving energy efficiency, as they seek to deliver programmes to meet their obligations.

# 5.2.2. California

California is widely regarded as a world leader in energy efficiency policy. California has achieved significant reductions in energy use as a consequence of implementing a number of energy efficiency measures. According to the California Public Utilities Commission (CPUC)<sup>64</sup>, energy efficiency savings<sup>65</sup> across all CPUC energy efficiency programmes has lead to a reduction in peak demand of 1,776 MW to December 2008<sup>66</sup>, which corresponds to net annual energy savings of 10,341 GWh and net annual gas savings of 138 million therms (Mth).

The CPUC regulates investor-owned (electric and natural gas) utilities (IOUs) operating in California.<sup>67</sup> The IOUs play a key role as administrators of ratepayer-funded energy efficiency programmes overseen by the CPUC. Specifically, the utilities oversee a set of programmes to decrease energy use in the following areas: lighting and appliances; heating, ventilation and air-conditioning (HVAC) systems, and motors. The IOUs also administer programmes that target customers when investment decisions are made, for example, during retrofits and renovations and during the new construction of buildings and homes. Many of the policies and programmes that have been implemented in California have been subsequently introduced in other jurisdictions in various forms.

The driver of IOU investment in energy efficiency measures stems from the CPUC mandated energy saving goals imposed on utilities.<sup>68</sup> These targets specify individual energy savings that must be achieved by each of the four utilities over the period to 2020.<sup>69</sup> Utilities must submit plans for meeting these targets to the CPUC, who then authorises each IOU energy efficiency portfolio plan and associated funding level for each assessment period. The CPUC authorised around US\$2 billion in funding to be used by the four IOUs to implement energy efficiency programmes over the 2006-08 cycle.<sup>70</sup>

<sup>&</sup>lt;sup>64</sup> Energy Efficiency Groupware Application (EEGA), 02/09/09, http://eega2006.cpuc.ca.gov/.

<sup>&</sup>lt;sup>65</sup> Installed and committed savings do not include low income energy efficiency (LIEE) programs.

<sup>&</sup>lt;sup>66</sup> This measure includes energy efficiency that has been installed up to December 2008.

<sup>&</sup>lt;sup>67</sup> Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), San Diego Gas and Electric Company (SDG&E), and Southern California Gas Company (SCG). Each of the IOUs serve customers located in their respective geographic areas, with PG&E and SDG&E providing electric and natural gas services, SCE providing electric service, and SCG providing natural gas services.

<sup>&</sup>lt;sup>68</sup> The Californian energy efficiency goals operate in a similar manner to the energy efficiency target schemes operating in Victoria, South Australia and New South Wales. The difference between the Californian and Australian schemes relate to the size of the energy efficiency target. In California the target has been based on an assessment of the opportunities for overall net beneficial energy efficiency actions, while the targets in Australia are more modest.

<sup>&</sup>lt;sup>69</sup> California Public Utilities Commission, (2009), Energy Efficiency and Conservation Programs – Progress Report to the Legislature, July, pg. 10.

<sup>&</sup>lt;sup>70</sup> California Public Utilities Commission, (2009), Energy Efficiency and Conservation Programs – Progress Report to the Legislature, July, pg. 16

California has also introduced a 'decoupling policy' for setting the regulated revenue requirement of IOUs. Under the decoupling policy, the disincentive for utilities to encourage energy conservation is removed as utility revenues are not tied to the amount of energy sold. Instead, utilities submit their revenue requirements and estimated electricity sales to regulators. These revenue requirements include the cost of implementing the necessary energy efficiency programmes to achieve the CPUC mandated energy saving targets. The CPUC then sets tariffs so as to ensure that utilities collect no more (or less) than required to run the business, plus a fair return to investors. Any excess revenue gets credited back to customers. The decoupling policy is designed to provide an incentive for utilities to focus on effective energy efficiency programmes and invest in activities that reduce energy demand.<sup>71</sup>

The CPUC's energy efficiency programmes are funded by the electric Public Goods Charge (PGC) and natural gas Demand Side Management (DSM) charge. These charges are established in legislation and are applied to each customer's bill within each utility's service territory. These surcharges comprise approximately 1.0 per cent and 0.7 per cent, respectively, of each customer's bill and provide the CPUC and the California Energy Commission with a total of approximately US\$540 million to fund public purpose programmes.<sup>72</sup>

The CPUC mandated energy saving targets program is only one of many examples of large scale, interventionist energy efficiency policies in place in California. The California loading order policy is a further example - Box 5.1.

#### Box 5.1 Loading order in California

In 2003 California introduced a "loading order" that consists of decreasing electricity consumption by increasing energy efficiency and conservation, reducing demand during peak periods through demand response and meeting new generation needs first with renewable and distributed generation resources and then with clean fossil-fuelled generation.

This priority list, or "loading order," is meant to guide individual and joint energy decisions made by the government agencies. The goal of the loading order is to develop and operate California's electricity system in the best long-term interests of consumers, ratepayers, and taxpayers.

#### 5.2.3. Other international evidence

This section identifies some of the more notable energy efficiency policies and programmes in place internationally. In particular, we have considered the UK, US, Europe, New Zealand, Canada and Japan. The retail market arrangements, including the extent of competition amongst retailers, are different across these jurisdictions – Table 5.1.

<sup>&</sup>lt;sup>71</sup> The decoupling policy is equivalent to the adoption of a revenue cap form of regulation, whereby a retailer is guaranteed to recover its total revenue requirements with any over or under recovery being returned to customers during a subsequent price period. In Australia all regulated retail tariffs are based on a price cap form of regulation, whereby a retailer faces the risks associated with electricity demand forecasts exceeding or being less than expectations.

<sup>&</sup>lt;sup>72</sup> California Public Utilities Commission, Program Funding, 03/09/09, http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/EE+General+Info/ee\_funding.htm

Jurisdiction	Market arrangements
Great Britain	Full retail competition was introduced in Great Britain from 1999.
European Union	EU Directives required the European gas and electricity markets to open to full retail competition by 1 July 2007. However, the extent to which retail market competition has been established varies significantly across the EU. Competition is well developed in Britain, Norway and Sweden.
United States	The extent of retail competition varies across the US. States with strong levels of retail competition include Illinois, Maryland, Massachusetts, New Jersey, New York, Pennsylvania, and Texas.
New Zealand	Full retail competition.
Canada	Extent of retail competition varies across the Canadian provinces – competition is well established in Alberta and Ontario.
Japan	The retail energy market opened up to competition in 2000.

#### Table 5.1 International electricity retail market structures

Understanding the market arrangements that are in place internationally is useful in terms of identifying those retail energy markets most comparable to Australia. Where investment in energy efficiency is undertaken by retailers in response to direct government intervention, the structure of the retail market, including the extent of competition among retailers, is less relevant. However, where energy efficiency investment by retailers is *not* driven by government policy, it will be important to consider the retail market structure, and in particular, whether the actions of these retailers can be regarded as some form of profit maximisation strategy, or response to commercial pressure.

#### Residential energy use reduction targets

Both the *White Certificate* schemes in France and Italy, and the *Carbon Emission Reduction Target* in the UK, are well established programmes that place obligations on energy retailers/distributors to achieve specified energy use reduction targets. While these schemes specify an energy reduction target they provide the retailer/distributor with some flexibility on the choice of energy efficiency measures that will be implemented. Since their inception these programmes have been instrumental in delivering the targeted energy usage savings across the residential sector and have provided a strong incentive for the ongoing pursuit of energy efficiency improvements across the residential sector.

These schemes have been introduced alongside the EU emissions trading scheme, reflecting the view that carbon pricing alone is inadequate in addressing all of the potential market impediments to optimal investment in energy efficiency. This highlights that there are important interactions between the incentives created through an energy efficiency incentive scheme and an emissions trading scheme.

#### Commercial energy use reduction targets

The only country with a policy directly targeting the commercial and services sector is the Carbon Reduction Commitment (CRC) programme in the UK. The CRC programme has

been designed to address the identified managerial impediment to economically beneficial energy efficiency actions and investments by large commercial businesses where energy costs represent only a small proportion of total input costs.

The basic format of the CRC is a cap-and-trade scheme although it differs in motivation and design from a traditional emissions trading scheme. One notable difference between the programmes is that participants will be required to pay for emissions first and then receive money back depending on the trend of their own consumption and their performance relative to other participants. Another feature of this proposed scheme is that it will seek to raise the awareness of the issue in the minds of senior managers by requiring companies to report their energy use. This programme is expected to raise awareness of a business' energy use and act as an incentive to reduce energy use over time.

Qualification for the scheme is based solely on half hourly metered electricity usage. The qualification process was undertaken throughout 2008. Organisations qualified for the programme if they:

- had at least one half hourly electricity meter (HHM) settled on the half hourly market in the 2008 calendar year; and
- had a total half hourly electricity consumption of at least 6,000 megawatt-hours (MWh) in the 2008 calendar year.

The CRC scheme commences in April 2010.

#### Energy saving targets for appliances

One of the most innovative international programmes to promote energy saving is Japan's 'Top Runner' programme, which provides energy performance standard targets for appliances and obliges manufacturers to satisfy those standards within specified timeframes.

The Top Runner programme is designed to provide an incentive for continuous improvement to the energy efficiency of appliances. This is achieved by the specification of an energy saving target, for an identified basket of appliances that must be achieved by a future target year. The target can therefore be satisfied by larger energy efficiency improvements in some appliances to offset smaller improvements in the energy efficiency of other appliances, so long as the overall energy efficiency improvement satisfies the target.

The mechanism for enforcing compliance with the programme involves an independent assessment in the target year, to determine whether a manufacturer has complied with the target. Initially confidential advice is provided to the manufacturer and an opportunity is provided for the manufacturer to satisfy the standard. Where non-compliance is ongoing the company is publicly named.

By setting stretch energy efficiency targets in combination with a compliance and enforcement mechanism the Top Runner programme differs from other minimum appliance energy performance approaches. While the Top Runner programme provides incentives for ongoing efficiency improvement, the minimum appliance energy performance standards approach provides no ongoing incentive for efficiency improvement, until the minimum standard is revised.

# 5.3. Financial incentives

## 5.3.1. Overview

Financial incentives for investment in energy efficiency can include rebates, subsidies and direct financial assistance. There are a vast range of rebates and subsidies on offer internationally to promote the adoption of specific energy efficiency products and practices. These incentives typically relate to promoting the uptake of energy efficient appliances and machinery, and driving more energy efficient transport outcomes.

# 5.3.2. International evidence

#### Appliance replacement

Under the New Zealand product retirement scheme consumers are provided with a financial incentive to replace an existing inefficient appliance with a newer appliance. This scheme is designed to accelerate the uptake of more energy efficient newer appliances such as refrigerators and washing machines.

#### Financial assistance

A number of countries have provided financial assistance to overcome the constraints on households obtaining the capital required to retrofit their houses and to enhance the overall energy efficiency of their property. In France, Japan and Canada the financial assistance has been made available to all home owners, while in the UK and the US the provision of financial assistance has been limited to low income households. In New Zealand financial assistance is available to both low and middle income households although the magnitude of assistance provided to low income earners is substantially greater than that provided to middle income earners.

The programmes targeting low income households in New Zealand, the UK and the US in effect seek to overcome the access to finance barrier. For example, energy efficient investments might be net beneficial, but the householder is unable to finance the investment themselves. It also acknowledges a fundamental problem with typical rebate based low-income energy bill assistance programmes, which can encourage these households to use more electricity because it lowers the average cost of energy to them.

Funding is also available in many international jurisdictions for the provision of energy use audits. These audits are designed to assist households in the identification of potential energy efficiency improvements.

Finally, a number of countries including Canada, the US, Japan, France and New Zealand provide direct financial assistance for specific residential actions to improve energy efficiency. Some of these are administered through electricity retailers.

# 5.4. Provision of information and energy efficiency labelling

# 5.4.1. Overview

Information provision to households on energy efficient practices occurs in a number of ways. Some of the methods that we identified from our study included:

- via dedicated web sites;<sup>73</sup>
- through the media;
- through training programmes; and
- through the establishment of dedicated information centres.

Mandatory labelling programmes are also commonly used to provide consumers with information on the energy efficiency of a product, relative to its peer products. In addition to mandatory programmes, there are also voluntary programmes such as the international Energy Star rating scheme. These schemes operate in most developed countries including the United States, Canada, Japan, the European Union, and New Zealand. These schemes are designed to provide incentives to manufacturers to improve the energy efficiency of their appliances through competitive pressure being exerted by the choices of consumers.

The differences in these labelling programmes between countries relate to the appliances that are required to have mandatory labels and the information required to be included in the labels. For example, most label information is independently verified, and includes an estimate of energy use for the appliance, and its performance relative to similar products. In the US however, the labels are also required to provide monetary values of ongoing energy costs to allow a purchaser to easily understand the total cost of the appliance (ie, both the initial cost and ongoing energy cost) associated with its operation. This information is designed to directly address the problem of consumers not properly taking into account differences in ongoing energy costs between appliances.

# 5.4.2. International evidence

#### Information provision

In the UK the role of disseminating information to the residential sector on energy efficiency and raising their overall awareness of energy efficiency issues has been accorded to the Energy Saving Trust. Similar roles have been accorded to the Energy Conservation Centre in Japan, the Office of Energy Efficiency in Canada and the Energy Efficiency Conservation Authority in New Zealand. In France information is provided at a local level through Local Information Centres that are scattered throughout France. All of these organisations work at both a local and national level to promote energy efficiency. These approaches can be characterised as comprehensive and involving ready access to information at the local level.

<sup>&</sup>lt;sup>73</sup> See for example, http://www.energysave.energyaustralia.com.au/.

#### Building performance standards

One of the most unique approaches to addressing impediments to energy efficiency in the building sector is the EU based Energy Performance Certificate (EPC) scheme. The scheme is designed to create incentives to improve the energy use performance of buildings, by providing the information base to allow purchasers and tenants to differentiate between buildings with different energy performance characteristics. By providing this information, it is hoped that incentives will be created to improve a building's energy performance as purchasers and tenants modify the value they place on a building in response to its energy performance rating.

This scheme provides flexibility in the approach to achieving minimum building energy performance standards and provides a common framework for measuring a building's energy performance, which is recorded in an EPC. The certificate provides consumers with information about the energy performance of the building. All new buildings are required to comply with the EPC Scheme providing information to prospective purchasers or developers on their energy performance. In addition, in some countries existing buildings are also required to have an EPC when they are sold, leased or undergo major modification.

The main features of the EU EPC scheme are:

- an EPC must be obtained whenever a building is sold or rented;
- all public buildings are required to display an EPC;
- it provides an energy efficiency performance rating from 1 to 100 with the rating based on a common methodology for measuring energy performance across buildings; and
- it includes an assessment of what could be done to improve a properties energy performance rating.

The approach in the EU differs from all other countries because it mandates a minimum performance standard, a rating scheme and the frequency with which a certificate must be obtained.

While other countries such as Canada, Japan and New Zealand have also implemented mandatory energy efficiency performance standards within their building codes they have not to date mandated a comprehensive energy efficiency certification and labelling process. Instead within Canada owners and builders can voluntarily have their buildings certified and obtain an Energy Star label if they meet certain requirements. In Japan builders must also comply with building standards but there is no certification or labelling process. Owners of large energy using buildings in Japan do, however, have an ongoing obligation to report their energy saving measures. Energy efficiency labelling for residential buildings is currently being trialled in New Zealand, but remains voluntary for both residential and non-residential buildings.

Another interesting development being considered in New Zealand is the establishment of a minimum energy performance standard for existing rental properties and commercial buildings. The combination of these policies in New Zealand would result in the adoption of a scheme that is similar in coverage to the EU's EPC scheme.

In the US the principal certification scheme in place is the voluntary scheme operated by the Green Building Council. One unique feature of the Green Building Council scheme is that recertification requires the provision of data on energy performance since the previous certification. This means that it provides an ongoing incentive for energy efficiency for the building.

#### Appliance labelling

The United States EnergyGuide Programme labels consumer products with the results of appliance tests, providing informational content to consumers interested in energy efficient appliances. Through the EnergyGuide Programme, the Department of Energy (DOE) has also provided a standardised label to disseminate this information to the public. Many categories of appliances in the US now have a distinctive yellow sticker providing information about the energy efficiency of the appliance that the consumer can use while evaluating potential purchases.

The label is mandatory for product classes to which it applies. It is designed to be eyecatching and to convey two pieces of information:

- First, it graphically compares the unit to others in its class to provide the consumer with a sense of what alternative units are available; and
- Second, the label explicitly monetises the estimated annual energy consumption of the unit, on the theory that consumers are more likely to choose energy efficient appliances if they are able to compare units on the price or total costs (including energy costs) than on purchase price alone.<sup>74</sup>

A meta-study by Gillingham, Newall, and Palmer found that little analysis has been done in the literature to determine whether consumer behaviour is significantly influenced by the EnergyGuide Labelling Programme.<sup>75</sup> Gillingham, Newall, and Palmer note that 'anecdotal evidence presented in Weil and McMahon (2003) suggests that labeling programmes such as EnergyGuide can successfully induce energy savings'.<sup>76</sup> This paper acknowledges that 'some of the literature on utility DSM informational programmes also mentions labeling programmes in general as a fairly ineffective policy tool', but considers that this could be attributed in part to a lack of compliance at the retail level with the EnergyGuide labeling requirements.<sup>77</sup>

While EnergyGuide is a mandatory labelling programme, a 2001 Federal Trade Commission inspection revealed that 70 of 144 inspected showrooms were not in compliance with the

<sup>&</sup>lt;sup>74</sup> US Department of Energy, Office of Energy Efficiency and Renewable Energy, How to Read the EnergyGuide Label, 2006.

<sup>&</sup>lt;sup>75</sup> Resources for the Future, Retrospective Examination of Demand-Side Energy Efficiency Policies, Washington, DC: RFF, September 2004.

<sup>&</sup>lt;sup>76</sup> Resources for the Future, (2004), Retrospective Examination of Demand-Side Energy Efficiency Policies, Washington, DC: RFF, September, pg. 49.

<sup>&</sup>lt;sup>77</sup> Resources for the Future, (2004), Retrospective Examination of Demand-Side Energy Efficiency Policies, Washington, DC: RFF, September, pg. 49.

mandated EnergyGuide labelling requirement.<sup>78</sup> However they noted one study that found energy price increases are more effective than product-labelling requirements to encourage manufacturers to offer more energy efficient products.<sup>79</sup>

One of the most widely recognised aspects of DOE's appliance labelling programmes has been the Energy Star label, a joint DOE-EPA Programme that determines and labels the most energy efficient appliances and equipment in a given product class. The labelling is then used by manufacturers to promote their products. The Programme was initiated by the 1992 Energy Policy Act, and is run by EPA and DOE. The Energy Star voluntary labeling programme essentially has a similar informational purpose to the mandatory EnergyGuide Programme.

The Energy Star labels have been applied to a growing list of over 50 product categories, now including major appliances, consumer electronics, office equipment, and lighting (EPA 2008c). As noted above, the Programme also includes standards for new homes and commercial and industrial buildings. Each product category has different standards, and different shares of the market made up by Energy Star-certified products. In most cases the label is applied only to the most efficient products available, but for some products (e.g. personal computers) the great majority of sales are of Energy Star-certified products.<sup>80</sup>

In 2007 Americans purchased 500 million Energy Star products, pushing the cumulative total since 1992 above 2.5 billion Energy Star products.<sup>81</sup> According to an EPA estimate, the benefits of this Programme (including minor auxiliary Energy Star programmes) include more than 80 billion kilowatt hours saved.<sup>82</sup> However, it is difficult to be sure of the degree to which these energy savings would not have occurred in the absence of the Programme. A study by Howarth et al. suggests that "rebound" effects<sup>83</sup> are not very significant in their modelling of the Energy Star Programme.

In recent years, EPA has spent around \$50 million on administering all Energy Star programmes. A metastudy by Gillingham, Newell, and Palmer found no estimates for the cost to consumers of taking part in Energy Star programmes and estimated the energy savings to be "at most" 0.93 quadrillion British thermal unit (Btu)<sup>84</sup> per year. Not counting costs other than direct administrative costs, and assuming that the apparent benefits of the Programme were in fact fully due to Energy Star, the cost-effectiveness of the Energy Star

<sup>&</sup>lt;sup>78</sup> US Federal Trade Commission, (2001), FTC Sends Warning Letters to Appliance Retailers: Aims to Increase Compliance with EnergyGuide Labelling Requirements.

<sup>&</sup>lt;sup>79</sup> N, R., et al., (1999), The Induced Innovation Hypothesis and Energy-Saving Technological Change. Quarterly Journal of Economics 114 (3), pg, 941-975.

<sup>&</sup>lt;sup>80</sup> Resources for the Future, (2004), Retrospective Examination of Demand-Side Energy Efficiency Policies, Washington, DC: RFF, September.

<sup>&</sup>lt;sup>81</sup> US Environmental Protection Agency, (2008), Energy Star Overview of 2007 Achievements.

<sup>&</sup>lt;sup>82</sup> US Environmental Protection Agency, (2002), ENERGY STAR and Other Voluntary Programs: 2001 Annual Report.

<sup>&</sup>lt;sup>83</sup> A rebound effect in the context of energy efficiency occurs when the expected reduction in energy consumption following an energy efficiency improvement is less than anticipated. For example a household could use part of the anticipated energy savings to purchase other goods or services that use energy.

<sup>&</sup>lt;sup>84</sup> The Btu is the measure of thermal energy used most frequently in the United States. British thermal units can be converted to MJ using 1 btu = 0.001055 MJ.

Programme would come to approximately \$0.054 billion per quadrillion Btu.<sup>85</sup> Although this estimate is only an upper bound, it would constitute significantly greater cost-effectiveness than the authors find for some other measures (e.g. the same authors estimate the cost of appliance standards at \$3.28 billion per quadrillion Btu), so it seems very possible that the Energy Star Programme may be reasonably cost-effective compared to other energy efficiency programmes.

# 5.5. Summary

This section has set out a range of noteworthy energy efficiency programmes being implemented internationally. These initiatives are summarised in Table 5.2, which also identifies the comparable programmes or policies in place in Australia, where relevant.

<sup>&</sup>lt;sup>85</sup> Resources for the Future, (2004), Retrospective Examination of Demand-Side Energy Efficiency Policies, Washington, DC: RFF, September.

Energy efficiency programme	International examples	Australian equivalent
Building energy performance standards	EU based Energy Performance Certificate scheme	Building standards set out in the Building Code of Australia
	United States Green Building Council scheme (voluntary)	
	Canada, Japan and New Zealand have also implemented mandatory energy efficiency performance standards within their building codes.	
Appliance energy	Japan's Top Runner programme	ENERGY STAR Programme
performance standards		Minimum Energy Performance Standards
Appliance labelling	United States EnergyGuide and Energy Star Programmes	Energy Rating Label scheme
Financial assistance	Various countries provide financial	Solar incentives
	assistance to overcome the constraints on households obtaining the capital required to retrofit their houses and to enhance the overall energy efficiency of their property (France, Japan, Canada, UK, NZ and the US)	Green Loans
	Climate Change Levy programme in the UK	
	Climate Change Agreements programme in the UK	
Residential energy efficiency targets	White Certificate schemes in France and Italy	Residential energy efficiency targets operate in Victoria, South Australia and New South Wales
	The Carbon Emission Reduction Target in the UK	New South Wales
	Energy efficiency goals in California with an associated compliance monitoring regime	
Commercial energy efficiency targets	Carbon Reduction Commitment programme in the UK	None
Information provision	UK Energy Saving Trust	Australian Carbon Trust
	Energy Conservation Centre in Japan,	Various retailer based information programmes
	Office of Energy Efficiency in Canada	
	Energy Efficiency Conservation Authority in New Zealand.	
	Local Information Centres in France	

# Table 5.2 International approaches to energy efficiency

This brief review of international energy efficiency policies and programmes highlights that Australia's energy efficiency policy efforts to encourage retailers to engage in energy efficiency promotion is consistent with international efforts. That said there may be opportunities to enhance the Australian programmes by examining which international programmes are most effective.

International best practice retailer information provision could be translated to the Australian market by the creation of an incentive scheme that encourages retailers to continuously seek improvements in existing information provision programmes. We set out in the following chapter a number of approaches that could be adopted to provide such an incentive to retailers.

Finally, in our opinion there is merit in:

- examining whether energy retailers should submit their plans to satisfy existing energy
  efficiency targets for review prior to implementation, and so facilitate information sharing
  amongst retailers and provide incentives for ongoing improvement similar to the
  approach adopted in California by the Californian Public Utilities Commission; and
- reviewing in detail the effectiveness of international energy efficiency information programmes, to determine whether there are lessons that can be learned to improve the effectiveness of existing programmes in Australia.

# 6. Conclusions and recommendations

Policies to promote energy efficiency have the potential to play a key role in reducing Australia's energy use. Increasing investment in end use energy efficiency can reduce greenhouse gas emissions at low (or negative) cost and help consumers keep power bills down even while prices rise. In this context, governments have devoted significant effort to the development of energy efficiency policies in recent years.

Despite the potential significance of energy efficiency as a cost-effective emissions abatement option, investment in energy efficiency initiatives has not grown strongly. In particular, retailers and end-use customers have demonstrated very little interest in investing in energy efficiency measures as a means of reducing energy use without any loss of productive output.

This paper has considered the incentives and barriers to investment in energy efficiency by retailers and end-use customers. In so doing, we have also set out the energy efficiency programmes being currently undertaken both in Australia and internationally by retailers. Table 6.1 summarises the principal barriers to investment in energy efficiency by retailers and end-users and the associated policies and programmes that have been adopted both in Australia and internationally to overcome these barriers. Generally Australia currently has policies and programmes that target the principal barriers to improvements in energy efficiency.

Barrier	Australian programmes	International programmes
Financial barriers	Various subsidy and rebate schemes administered by governments to promote adoption of energy efficient products (eg, green loans scheme)	Various subside and rebate schemes, in some instances targeting low-income households to encourage adoption of energy efficient products.
Information barriers	Information provision programmes conducted by retailers and the Australian Carbon Trust.	Mandatory product labelling schemes and information provision programmes conducted by retailers. Some countries have created dedicated energy efficiency information agencies (eg, Energy Saving Trust in the UK, Energy Conservation Centre in Japan).
Incentive barriers	Energy efficiency target schemes creating obligations on retailers to achieve energy efficiency outcomes.	Obligations placed on retailers and/or energy users to achieve energy efficiency improvements, (eg, White Certificates schemes in France and Italy, energy efficiency goals in California)
Pricing barriers	Introduction of the CPRS to include the price of carbon emissions in energy prices, and so encourage greater adoption of energy efficient products and practices.	European Union Emissions Trading Scheme.

# Table 6.1Summary of barriers and programmes designed to overcome the barrier

Retailers act as the interface between the wholesale electricity market and consumers. For this reason retailers are commonly regarded as the appropriate entity to promote energy efficiency by end-use customers. However, it is not clear that retailers face sufficiently strong incentives to undertake investment in energy efficiency under the current market arrangements. Specifically, in deciding whether to invest in energy efficiency measures a retailer will consider the various costs and benefits that are likely to result as a consequence of that investment, including:

- the upfront costs of the energy efficiency initiative to the retail business;
- any loss of revenue associated with a downturn in demand for energy; and
- the implications for a retailer's market share, because as market share increases, the scope for a retailer to increase revenue by way of product and/or service diversification also increases.<sup>86</sup>

It is extremely difficult to predict the net impact of these various incentives for retailer behaviour. Given the limited evidence of retailers promoting energy efficiency in the current market, it appears that retailers do not regard the promotion of energy efficiency to be currently financially beneficial.

Although the CPRS is expected to provide stronger incentives for investment in energy efficiency by revealing the true environmental cost of carbon-intensive energy use (and in doing so, revealing the benefits of reducing energy use) it is not clear whether this scheme will be sufficient to achieve an optimal level of investment in energy efficiency. Rather, to the extent that other (non price related) market failures to investment in energy efficiency persist, a suboptimal level of investment is also likely to persist. In addition, the CPRS is not yet operational and is not expected to be in place before July 2011. In this context, there is a stronger case for taking action on energy efficiency that is *in addition* to the incentives provided by the CPRS, and for such action to take place in the more immediate term.

In our opinion, the existing market based energy efficiency target schemes are preferred to alternative approaches to obliging retailers to achieve energy efficiency outcomes. Such schemes provide a concrete incentive to retailers about the amount of energy efficiency to be achieved by the specification of an obligatory target, but provide flexibility to retailers about how the target is to be achieved. This allows retailers to innovate and find cost effective ways of meeting the specified energy efficiency target outcomes.

Indeed the incentives created through energy efficiency target schemes are similar to those applied in California, as electricity businesses are obliged to develop plans setting out how it intends to achieve the specified energy efficiency goals set out by policy makers. The cost of implementing the plans, once approved, are included in the revenue allowances recovered from customers. The primary distinction between the Californian approach and the current energy efficiency target schemes in Australia are the size of the targets. In California they are based on estimates of the likely size of negative cost (or in other words net beneficial) energy efficiency actions. In contrast the Australian energy efficiency targets are more modest. For example the Victorian energy efficiency target is a reduction of 2.7 million

<sup>&</sup>lt;sup>86</sup> To the extent that investment in energy efficiency serves as an effective means of attracting customers and growing market share.

tonnes of  $CO_2e$ , which represents a reduction in electricity use of approximately 3 TWh (which represents 6 per cent of total energy use in Victoria).

While the energy efficiency target schemes provide a direct incentive to retailers to engage in energy efficiency activities, we believe there could also be improvements in the incentives retailers have to innovate in the provision of information to improve the awareness of customers about the energy efficiency opportunities that are available. While all retailers are currently engaged in providing customers with information to promote energy efficiency, there is little evidence about the effectiveness of these programmes for achieve energy efficiency outcomes.

The starting point should therefore be a review of the effectiveness of current retailer energy efficiency programmes to the achievement of energy efficiency outcomes. Such a review should identify where opportunities exist to enhance existing programmes, and the practices that appear to be the most effective at changing customer energy use behaviour.

Following a review, there is a need to design an incentive scheme so that retailers become actively engaged in continuously improving their information provision programmes through innovation or the adoption of best practice approaches observed from within Australia and abroad. Such incentives could be provided by (but not be limited to):

- providing an annual award to a retailer undertaking the most innovative energy efficiency information programme;
- obliging retailers to publish the average energy efficiency of their customers, including for specific categories of customers (eg, family of four living in a house); and
- obliging retailers to audit and publicly report on the effectiveness of current residential energy efficiency programmes.

By making information on current average customer energy use of a retailer publicly available, comparisons can be drawn both between retailers (particularly retailers operating in a similar area) and also over time for a specific retailer. This will allow public scrutiny of the performance of retailers in promoting energy efficiency.

In summary, the promotion of energy efficiency by retailers is driven by a combination of commercial incentives to attract and retain customers, and government obligations to achieve energy efficiency outcomes or implement specific programmes. While the former is important to improving the efficiency of energy use within the existing market framework it is unlikely to drive the promotion of energy efficiency beyond the level that is financially beneficial to the retailer. This suggests that specific government obligations to require retailers to achieve energy efficiency outcomes may be warranted in circumstances where genuine market failures exist. Improving existing energy efficiency programmes by creating incentives for retailers to continuously improve will be an important step towards enhancing the effectiveness of retailers promoting energy efficiency.



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