Minister for Energy and Resources

Our Ref: ME006100

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Dear Mrs Sullivan,

SUBMISSION TO INQUIRY INTO ENERGY EFFICIENCY IMPROVEMENTS

It is widely recognised that energy efficiency is one of the quickest and most cost effective ways to reduce energy use and greenhouse gas emissions.

Extensive independent analysis has been undertaken at a national level on the role of energy efficiency in addressing the greenhouse challenge facing the energy sector. In particular, the Council of Australian Government's Ministerial Council on Energy (MCE), has demonstrated the potential for cost effective energy efficiency through the National Framework for Energy Efficiency (NFEE). The recently signed National Partnership Agreement on Energy Efficiency will take NFEE measures forward and examine ways to maximise other cost effective energy efficiency gains across the economy.

At a state level, the Victorian Government has analysed a number of barriers to the uptake of energy efficiency measures in the Victorian residential sector, including poor information, split incentives for tenants and landlords, behavioural and institutional inertia and the perceived risks of energy efficiency investment. It has been shown that energy is not a high proportion of household expenditure and therefore energy efficiency is not a "top-of-mind" issue for most households.

Victoria's *Energy Saver Incentive* - the public name of the *Victorian Energy Efficiency Target Act 2007* - provides an incentive for entrepreneurial energy service providers to enter the market and provide a service which makes it easy for residential customers to reduce greenhouse gas emissions.

Since the establishment of the Victorian Energy Efficiency Target, the South Australian and New South Wales Governments have introduced their own energy efficiency schemes. To harmonise and enhance the respective schemes, the jurisdictions have established a Retailer Energy Efficiency Working Group.

I am pleased to present the following submission regarding the objectives and operation of the Victorian Energy Efficiency Target. I trust that this information will inform the work of your committee on its inquiry into energy efficiency and I recommend you contact the Department of Primary Industries if you require any further information. Please refer enquiries to Mr Anthony Williamson, Energy Sector Development Division, telephone (03) 9658 4187 or email Anthony.Williamson@dpi.vic.gov.au.

Yours sincerely,

Peter Batchelor MP
Minister for Energy and Resources

29/10/2009

Encl.

SUBMISSION REGARDING THE VICTORIAN ENERGY EFFICIENCY TARGET TO THE QUEENSLAND PARLIAMENT'S INQUIRY INTO ENERGY EFFICIENCY IMPROVEMENTS

Introduction

The Victorian Government has a four pillar portfolio approach to tackling climate change in the energy sector. This approach was described in the December 2004 *Greenhouse Challenge for Energy Position Paper*, and includes support for a national Emissions Trading Scheme (or ETS - now in the form of the proposed CPRS) complemented by policies to accelerate market uptake of low emissions technologies, renewable energy and energy efficiency.

The Victorian Government has identified energy efficiency– particularly in the residential sector – as an important complementary measure to the proposed CPRS and launched its *Energy Saver Incentive* on 1 January 2009. Energy Saver Incentive is the public name for a mandatory energy efficiency target that it introduced through the Victorian Energy Efficiency Target Act 2007.

VEET Establishment

The Victorian Energy Efficiency Target (VEET) was the first energy efficiency target scheme to be introduced in Australia. At the time of VEET development, several countries in the European Union had introduced, or were developing, similar schemes that set mandatory energy efficiency targets.

Improving energy efficiency is an important part of the Victorian Government's integrated policy approach to tackling climate change. The Government has been implementing a range of policy measures to reduce greenhouse gas emissions from the energy sector while continuing to ensure that Victorians have access to a secure, efficient and affordable supply of energy. VEET realises the significant potential that exists for households to undertake cost-effective measures to reduce their energy use and their greenhouse gas emissions, and ease the impacts from the introduction of carbon pricing.

The VEET Act states that the following objectives:

- Reduce greenhouse gas emissions;
- Encourage the efficient use of electricity and gas; and
- Encourage investment, employment and technology development in industries that supply goods and services which reduce the use of electricity and gas by consumers.

The scheme commenced on 1 January 2009 and is administered by the Essential Services Commission (ESC). The first phase of the scheme will save 8.1 million tonnes of greenhouse gas.

Operation of VEET

The VEET is a market-based mechanism that operates similarly to the proposed CPRS. The scheme sets a target for reductions in energy use, and requires energy retailers to meet those targets by achieving energy efficiency improvements in households. Each electricity and gas retailer is subject to an individual target, set in relation to each retailer's imputed greenhouse gas emissions.

Certificates are created for each tonne of greenhouse gas abatement energy saved. These certificates are tradable and offer flexibility – retailers can comply by creating their own certificates through energy efficiency, or purchasing certificates from others where that was more cost-effective. For those able to create and sell certificates, they offer an additional revenue stream, which is independent of their other business activities. Certificates are then surrendered to the scheme administrator to achieve compliance.

An annual target is set by legislation for the first VEET scheme phase (2.7 million tonnes of CO2-e per year, from 2009 to 2011). For subsequent 3-year scheme phases, annual targets will be set in regulations.

The scheme is set up to allow flexibility in the types of measures that are implemented in households. There are currently more than twenty activities prescribed in the VEET Regulations, ranging from installation of compact fluorescent light globes, purchasing high efficient appliances or the installation of renewable energy sources. The value of activities – that is, the number of certificates awarded - is calculated based on actions undertaken in residential premises that result in a reduction of greenhouse gas emissions that would not have otherwise occurred.

The VEET scheme operates in parallel with other energy efficiency-related policy measures that Victoria is engaged in at a national level, such as Minimum Equipment Performance Standards (MEPS), appliance and equipment labelling and building standards.

Complementarity to the proposed Carbon Pollution Reductions Scheme (CPRS)

The Commonwealth Government's proposed CPRS will be the main economic driver for the development and adoption of new technology and innovative, least cost ways of reducing greenhouse gas emissions.

However, even in the presence of the CPRS, there will remain some residual market failures to the uptake of energy efficiency measures. To ensure that the CPRS does not compromise other energy policy objectives, for example, energy affordability, other complementary policies are required to address those market failures that could prevent the uptake of energy efficiency practices and technologies.

One sector where residual market failures are present is the residential sector. The aim of VEET is to facilitate a range of low-cost abatement opportunities that may not otherwise be incentivised by the CPRS.

The National Emissions Trading Taskforce (NETT) undertook modelling to estimate the relative merits of coupling an ETS with complementary measures – in particular, enhanced energy efficiency. The results of the modelling indicated that complementary measures minimise the negative economic impacts of an ETS. Other sources have corroborated the conclusions drawn from the NETT modelling, including the Garnaut Review's ETS discussion paper.

A full description on the rationale underpinning the VEET Regulations - including complementary measures and market failures - can be found in the Regulatory Impact Statement (RIS) that was released with the Regulations (see Attachment 1).

Collaboration with other jurisdictions

The Victorian, South Australian and NSW Governments have introduced separate market based instruments to promote energy efficiency measures. There are key similarities between these instruments and the three jurisdictions have committed to work together to achieve a greater level of harmonisation.

The South Australian *Residential Energy Efficiency Scheme*, and the *NSW GGAS Energy Efficiency targets*, and VEET, share a number of fundamental objectives and design features, and have a significant overlap in liable parties and participants. They also have some important differences in objectives, scope and design. But on balance, there is potential and a case for working to ensuring these schemes are harmonised as much as possible.

The three governments have established a Retailer Energy Efficiency Working Group to pursue the following objectives:

- reduce regulatory and administrative costs for liable parties and scheme participants;
- reduce the costs of energy efficiency under the schemes by facilitating economies of scale in service delivery across jurisdictions;
- reduce the costs to government and improve scheme performance for each jurisdiction.

These objectives will be pursued to the extent that they are complementary to the key objectives of each individual scheme. In progressing harmonisation, the working group will take into account government commitments to ensure these schemes are complementary to the CPRS and aligned with other national energy efficiency programs.

Further information

The following documents can be viewed for more detailed study of VEET:

- the *Victorian Energy Efficiency Target Act 2007*
- the *Victorian Energy Efficiency Target Regulations 2008*
- the *Victorian Energy Efficiency Scheme Guidelines December 2008*

The VEET RIS can be downloaded from the DPI website at www.dpi.vic.gov.au/energysaverincentive.

DEPARTMENT OF
PRIMARY INDUSTRIES

The thinking behind
our everyday essentials

Proposed Victorian Energy Efficiency Target Regulations

Regulatory Impact Statement

September 2008

Victoria
The Place To Be

Proposed Victorian Energy Efficiency Target Regulations 2008

Regulatory Impact Statement

September 2008

This Regulatory Impact Statement has been prepared in accordance with the *Subordinate Legislation Act 1994* and the April 2007 edition of the Victorian Guide to Regulation to facilitate public consultation on the proposed *Victorian Energy Efficiency Target Regulations 2008*.

The Regulatory Impact Statement provides the rationale for, and an analysis of, the proposed *Victorian Energy Efficiency Target Regulations 2008*.

Public submissions are now invited on the proposed Regulations. All submissions, unless expressly stated otherwise, will be treated as public documents.

In compliance with the statutory obligations stated in the *Subordinate Legislation Act 1994*, the Department of Primary Industries will consult with stakeholders for 30 calendar days on the proposed Regulations. Written comments and submissions must be received no later than **5.00pm on Friday 3 October 2008**. Comments and submissions can be sent by:

Email:
veet.submissions@dpi.vic.gov.au

Post:
VEET Submissions
Energy and Earth Resources Policy Division
Department of Primary Industries
PO Box 4440
MELBOURNE VIC 3001

In addition to stakeholders and sources cited in the Regulatory Impact Statement, the Department of Primary Industries would like to thank the following organisations for their substantive contributions during the development of this document:

- KPMG;
- Saturn Corporate Resources;
- Carbon Market Economics;
- Sustainability Victoria;
- Essential Services Commission;
- Victorian Department of Sustainability and Environment;
- Deacons;
- McLennan Magasanik and Associates; and
- Deborah Hollingworth Consulting.

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Executive Summary

Climate change is expected to be one of the most critical issues facing the global community in the 21st Century. While the causes and implications of climate change are global, solutions will ultimately rely on the actions taken by individual jurisdictions.

The Australian Government's chief response to climate change will be the establishment of a national emissions trading scheme (ETS), known as the Carbon Pollution Reduction Scheme. The ETS will put a cap on the amount of carbon that may be produced by entities in the domestic economy – with the effect of establishing a price for carbon emissions. One of the effects of the ETS is expected to be an escalation in household energy prices.

In a perfect market, entities respond to price signals and adjust their consumption accordingly. Available data, however, suggests that households do not respond to energy price signals in an economically efficient fashion. This sub-economic response by households is believed to stem from a number of market failures, including bounded rationality, information failures, split incentives and a lack of access to electronic information regarding energy efficient products. While a direct causal relationship could not be established between these market failures and historically low demand elasticities for the Victorian household sector, it is the opinion of DPI that these market failures are the underlying cause.

The Victorian Energy Efficiency Target (VEET) scheme attempts to address these market failures in order to deliver an economically optimal degree of investment in energy efficiency. It seeks to do this by introducing a third party – certificate creators – that will incentivise households to improve their energy efficiency. This is reflected in the VEET scheme's objectives of reducing greenhouse gas (GHG) emissions, encouraging more efficient use of gas and electricity, and encouraging the development of an industry specialising in improving household energy efficiency.

In December 2007, the Victorian Parliament passed the *Victorian Energy Efficiency Target Act* (the Act). The Act sets an annual target of avoided GHG emissions, to be achieved by major energy retail businesses, through improvements to household energy efficiency. Analysis undertaken as part of the consideration of the Act indicated that, based on the first three years of operation, the scheme would result in 8.1 million tonnes of GHG avoided, and result in an average annual household energy savings of $45. This initial analysis was subsequently re-tested in mid-2008 to evaluate its ongoing relevance and robustness. It is the opinion of the Department of Primary Industries (DPI) that the costs and benefits identified in the initial analysis remain fundamentally sound.

The Act indicates that regulations will specify which energy efficiency activities will be counted towards this target, and how much avoided emissions can be attributed to each activity. There are a number of possible options for how these regulations will work in practice. These include the accreditation of large, energy efficiency projects put forward by proponents; the use of a list of prescribed activities with default abatement values determined by the Victorian Government, and the use of such a list of prescribed activities, limited to those which meet additional criteria of administrative costs, and confidence in accuracy of abatement and energy savings claims.

The assessment criteria to which these options were subject to in this Regulatory Impact Statement (RIS) are consistent with the objectives of the VEET scheme. They include the achievement of GHG abatement, the encouragement of energy efficiency, the development of an energy efficiency industry and the minimisation of administrative costs.

The table below indicates that Option 3 leads to the lowest administrative costs.

Description of administrative cost ($m)	Option 1	Option 2	Option 3
Government start-up (once off)	$2.5	$5.3	$5.0
Government scheme administration (annual)	$3.7	$4	$2.8
Scheme participants (non-Government)			
Certificate creators (annual)	$4.2	$4.2	$3.5
Energy retailers (annual)	$2.8	$1.2	$1.2
Households (annual)	$1.2	$1.2	$1.0
Total scheme participants (annual)	**$8.2**	**$6.5**	**$5.6**
Total annual administration costs	**$11.9**	**$10.5**	**$8.5**
NPV	**- $35.8**	**- $34.5**	**-$28.6**

The second table indicates that Option 3 is also preferred when assessed against the other criteria above.

Criteria	Weighting	Option 1		Option 2		Option 3	
		Rating	Score	Rating	Score	Rating	Score
Achievement of GHG abatement	25%	0.8	0.2	0.8	0.2	0.9	0.225
Encouragement of energy efficiency	35%	0.8	0.28	0.8	0.28	0.9	0.315
Encouragement of the development of an energy efficiency industry	15%	0.7	0.105	0.9	0.135	0.9	0.135
Minimisation of administrative costs	25%	0.6	0.15	0.7	0.175	**0.9**	0.225
Total	**100%**	**2.9**	**0.735**	**3.2**	**0.79**	**3.6**	**0.9**

The Act indicates that the scheme must be evaluated prior to 31 December 2011. Prior to this date, DPI will undertake an evaluation of the scheme against key performance indicators (KPIs). These KPIs are detailed in the attached RIS, and reflect the objectives of the scheme. In addition, DPI will seek to obtain further baseline information, where the Department was unable to identify data to support claims made in the course of this analysis. The evaluation will examine the VEET scheme's performance against variables that currently have a high degree of uncertainty – such as final structure of the proposed ETS.

Consultation to date on the VEET scheme has included four stakeholder fora, as well as numerous individual meetings with affected stakeholders. This consultation found some

energy retailers believed that the scheme would not be the optimal means to promote enhanced energy efficiency, and also indicated a preference for national consistency. However overall, the majority of stakeholders – including businesses specialising in energy efficiency, social and environmental advocacy groups, and local government – were strongly supportive of the scheme.

Stakeholders will now have a further opportunity to comment on the content of this document, and the proposed Regulations which will enable the scheme to operate. This consultation will extend for 30 calendar days (until 3 October 2008). The Victorian Government intends to enact the proposed Regulations to enable the scheme to commence by the legislated start date of 1 January 2009.

1. Glossary of acronyms

ABARE – Australian Bureau of Agriculture and Resource Economics

ABS – Australian Bureau of Statistics

BAU – Business as usual

COAG – Council of Australian Governments

DPI – Department of Primary Industries

DSE – Department of Sustainability and Environment

DSR – Demand-side response

DTF – Victorian Department of Treasury and Finance

E2WG – Energy Efficiency Working Group of the Ministerial Council on Energy

EEC – Energy Efficiency Commitment (United Kingdom scheme)

ESC – Essential Services Commission

ERAA – Energy Retailers Association of Australia

ESAA – Energy Supply Association of Australia Limited

ETS – Emissions Trading Scheme

FTE – Full-time equivalent

GGAS – New South Wales Greenhouse Gas Abatement Scheme

GHG – Greenhouse gas

GJ – Gigajoule of energy (this measurement is most commonly used for natural gas)

IEA – International Energy Agency

KPI – Key performance indicator

MCE – Ministerial Council on Energy

MEPS – Mandatory Energy Performance Standards

MJ – Megajoule of energy (this measurement is most commonly used for natural gas)

MMA – McLennan Magasanik and Associates

MRET – Mandatory Renewable Energy Target (Commonwealth)

MWh – Megawatt-hour of electricity

NIEIR – National Institute of Economic and Industry Research

NEET – National Energy Efficiency Target

NEM – National Electricity Market

NEMMCo – National Electricity Market Management Company

NETT – National Emissions Trading Taskforce

NFEE – National Framework for Energy Efficiency

PJ – Petajoule of energy (this measurement is most commonly used for natural gas)

REES – Residential Energy Efficiency Scheme (South Australia)

RIS – Regulatory Impact Statement

SV – Sustainability Victoria

VEEC – VEET scheme certificate (each certificate equals one tonne of CO_2-equivalent avoided through energy efficiency or fuel-switching activities)

VEET – Victorian Energy Efficiency Target

VRET – Victorian Renewable Energy Target

2. List of illustrations

3. Introduction

3.1. The VEET Scheme

In November 2006, the Victorian Government was elected on a platform of energy and greenhouse policies which included, among other things, a commitment to introduce:

> *'… a [VEET] scheme that will require energy retailers to help families cut their power bills through measures such as providing energy efficient light globes, insulation and efficient shower roses…VEET will be a market based scheme and … will place an obligation on energy retailers to meet specific energy conservation targets.'*[1]

Following detailed consultation and analysis, the Government introduced a VEET Bill into Parliament on 31 October 2007. Following brief debate in both houses, the bill was supported by all parties. The Act received the Royal Assent on 11 December 2007.

The Act states that the scheme will commence on 1 January 2009 consisting of three-year phases (with targets for each phase set by Regulations) and ending on 31 December 2029. The objects of the Act, as stated in Section 4, are to:

- reduce GHG emissions;
- encourage the efficient use of electricity and gas; and
- encourage investment, employment and technology development in industries that supply goods and services which reduce the use of electricity and gas by consumers.

The Act also specifies, in section 75, that the Governor in Council may make Regulations addressing a range of issues essential to enable the VEET scheme to operate. These relate primarily to:

- prescribing which activities can be the basis of creating a tradeable energy efficiency certificate, and how many certificates can be attributed to those activities;
- prescribing a penalty rate to apply to parties who do not meet their liabilities under the Act; and
- determining annual targets and other details of subsequent three-yearly scheme phases.

In the absence of Regulations detailing the above matters, the VEET scheme as prescribed in the Act would not be able to operate.

3.2. The RIS process

Primary legislation, such as the Act, is subject to Parliamentary processes of debate and scrutiny. This ensures that legislation is enacted in accordance with the best interests and wishes of the public through its elected representatives.

[1] ALP Policy for the 2006 Victorian Election, *Tackling Climate Change – Helping Families Play Their Part*, 2006, p 6

Subordinate legislation is made by Ministers under powers established through primary legislation. Consequently, subordinate legislation may not be subject to the same degree of Parliamentary scrutiny as primary legislation.

The *Subordinate Legislation Act 1994* was enacted, among other reasons, to ensure that Parliament, and the general public, were empowered to influence the development of subordinate legislation. Subordinate legislation includes instruments such as the Regulations now being contemplated under the Act.

The *Subordinate Legislation Act 1994* requires the responsible Minister to prepare a RIS with respect to the regulations being made. These must explain the objectives of the regulations, its implications and an examination of alternatives.

3.3. The VEET RIS

This RIS provides an overview of the analysis and consultation which informed the Government's, and ultimately the Parliament's, decision to enact the Act.

It then discusses the relative merits of several different options for the VEET Regulations – in particular, the extent to which these regulatory options accord with the express objectives of the VEET scheme as detailed in the parent Act. The RIS concludes that these objectives are best fulfilled by the proposed Regulations, which prescribe a list of energy efficiency activities limited in number to those assessed as most likely to generate maximum GHG abatement at least cost in the VEET scheme.

4. Problem

4.1. Policies to reduce GHG emissions

The Victorian and Commonwealth Governments recognise the significant social, economic and environmental challenges presented by climate change, and have adopted a range of policies to reduce national GHG emissions as part of a coordinated global response to climate change.

The Victorian Government believes that a portfolio policy approach is necessary to address this challenge. Such an approach allows all sectors—government, business and household—to contribute to the reductions in GHG emissions necessary to mitigate climate change and sufficiently adapt to a carbon constrained future.

The Government recognises that there are clear connections between GHG emissions and climate impacts, and that the earlier and more strongly emissions are restricted worldwide, the more manageable the impacts of climate change will be.[2] The Victorian and Commonwealth Governments have committed to reduce GHG emissions by 60 per cent of 2000 levels by 2050.[3]

The proposed ETS, which internalises the price of carbon, will be the main economic driver for the development and adoption of new technology and innovative, least cost ways of reducing GHG emissions. Australia has now ratified the Kyoto Protocol and will introduce a national ETS by 2010.

4.1.1. Emissions trading

The Victorian Government has a four pillar portfolio approach to tackling climate change in the energy sector. This approach was described in the December 2004 *Greenhouse Challenge for Energy* Position Paper,[4] and includes support for a national ETS, complemented by policies to accelerate market uptake of low emissions technologies, renewable energy and energy efficiency.

The central pillar of this policy is a national ETS to drive climate change mitigation and meet current and future emission reduction targets. Through an ETS, a price will be placed on GHG emissions, thus providing emitters with an incentive to reduce their emissions where this is cheapest, while allowing the continuation of emissions where they are most costly to reduce.

The Commonwealth Government has outlined design principles for an Australian ETS which is expected to be introduced in 2010.[5] The ETS will:

- be based on the cap and trade model, which sets a limit on the amount of emissions permitted and then allows companies to trade permits if they are above or below the limit;
- place Australia on a low emissions path in a way that best manages the economic impacts of transition, while ensuring our ongoing economic prosperity;

[2] Victorian Government, *A Climate of Opportunity - Summit Paper*, 2008, p 24
[3] Commonwealth of Australia, *Carbon Pollution Reduction Scheme Green Paper*, July 2008, p v. See also *Victorian Labor Party, Tackling Climate Change - Helping Victoria Play its Pa*rt, 2006, p 1
[4] Victorian Government, *Greenhouse Challenge for Energy*, 2004 – available at www.climatechange.vic.gov.au
[5] Commonwealth of Australia, *Carbon Pollution Reduction Scheme Green Paper*, 2008

- include maximum coverage of sectors of the economy to the extent this is practical;
- enable international linkages to other emissions trading schemes;
- address the competitive challenges facing emissions-intensive, trade-exposed industries and the impacts on strongly affected industries; and
- develop measures to assist households adjust to a carbon price.[6]

The emissions cap under the ETS is expected to be high in its early years (i.e. close to current emissions levels) and gradually reduce to achieve a 60 per cent reduction in 2000-level emissions by 2050. Consequently, all else being equal, it is expected that carbon prices will start off comparatively modest, and become higher over time.

A countervailing price pressure is expected in the form of reductions in demand for emissions permits. This reduction in demand may result from a range of factors, including improved technologies, and reduced demand for particular goods and services – such as energy. The extent to which such a reduction in energy demand will result through natural demand elasticity, or through government intervention, is discussed below.

4.2. Residual market failures in the presence of an ETS

Market failures occur when market systems are unable to truly reflect the social and environmental costs or benefits associated with transactions. An ETS addresses some of the key market failures relating to climate change by imposing a price on GHG emissions, thus forcing emissions to become a consideration in any transaction decision. The extent to which the ETS will address these market failures will depend on the extent to which the carbon price resulting from the ETS target levels matches the true environmental cost of energy production, transmission, and use, and how effectively this price information is communicated to relevant parties (such as energy end-users).

However, even in the presence of an ETS, there will remain some residual market failures and other barriers which result in a sub-optimal allocation of resources (in this case, atmospheric capacity to absorb GHG).

These market failures already exist, and the introduction of an ETS will not, in itself, resolve them. To ensure that an ETS does not compromise Government's other energy policy objectives (e.g. energy affordability) it must similarly address these market failures or other barriers that could prevent the uptake of technologies and practices that reduce GHG emissions at low cost.

One sector where these residual market failures are present is the residential sector. A full description on the residential sector and its contribution to GHG emissions is found below. A discussion on the specific residual market failures relating to the residential sector in the presence of an ETS is found in section 4.5.

4.3. Residential energy use and GHG emissions

The Victorian residential sector is energy-intensive. This means that Victorian homes are:

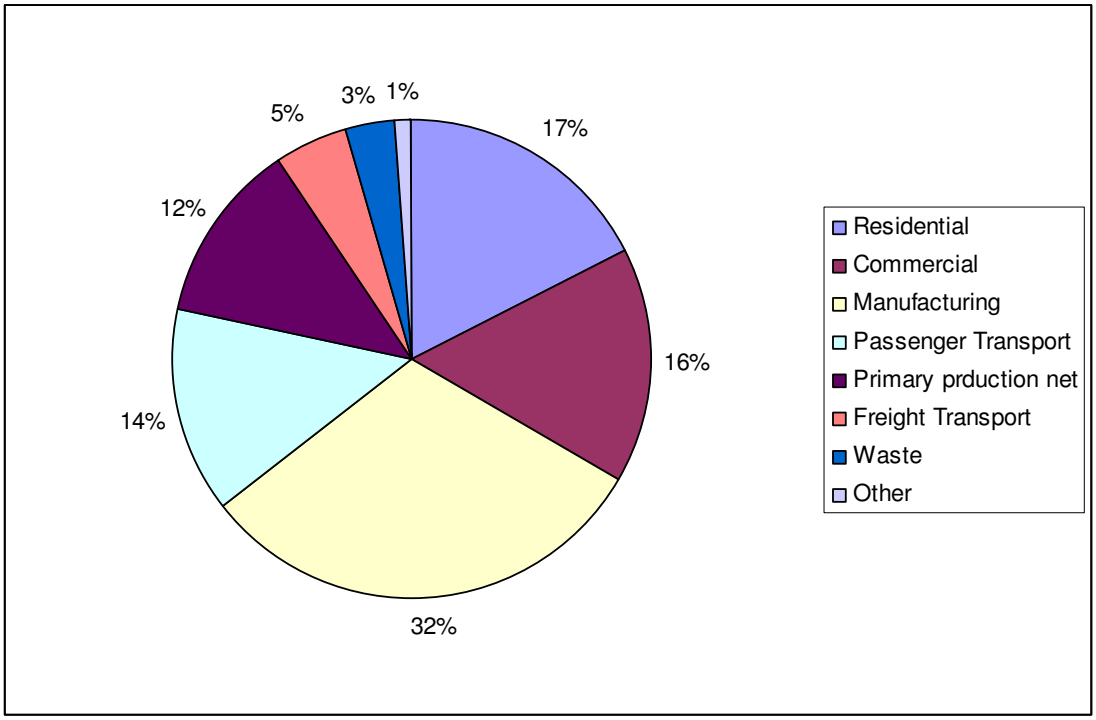
- highly dependent on the delivery of reliable, low-cost energy in order to maintain our lifestyle;

[6] Victorian Government, *A Climate of Opportunity – Summit Paper*, 2008, page 9

- a major contributor to GHG emissions; and
- potentially at risk of a range of adverse impacts from future carbon prices.

Figure 4.1 illustrates the composition of Victoria's GHG emissions by economic sector in 2005. It shows the large contribution that the residential sector makes to Victoria's emissions profile.

Figure 4.1 Emissions in Victoria in 2005 by economic sector



Source: George Wilkenfield and Associates – Victoria's GHG Emissions (End Use Allocation of Emissions) report to the Department of Sustainability and Environment 2008

The average Victorian household spends around $1,700 each year on energy. Population growth, rising incomes, increased comfort levels and increased use of electrical appliances and equipment in households and offices is imposing additional demand on generators and increasing GHG emissions. This is likely to impose an increased cost burden on households and other consumers once a price is placed on carbon.

Table 4.2 shows Victoria's current and forecasted future final energy use by sector.

Of Victoria's total energy consumption of 851 petajoules (PJ), some 151 PJ (18 per cent) is used by the residential (household) sector. Household energy use is therefore a significant component of total energy use and the residential sector is the third largest energy user in the State.

Table 4.2: Total final energy use in Victoria

Sector	Energy use PJ (% of total) 2005-06	Energy use PJ (% of total) 2029-30	Annual growth to 2029-30 (%)	Total growth to 2029/30 (%)
Agriculture	15.4 (1.8)	17.7 (1.5)	0.93	14.94
Mining	6.4 (0.8)	13.9 (1.2)	5.31	117.19
Manufacturing and construction	255.7 (30.0)	347.3 (29.9)	2.06	35.82
Transport	341.5 (40.1)	438.1 (37.8)	1.67	28.29
Commercial services	66.7 (7.8)	116.2 (10.0)	3.77	74.21
Residential	**150.9 (17.7)**	**210.3 (18.1)**	**2.24**	**39.36**
Other	14.7 (1.7)	16.8 (1.5)	0.89	14.29
Total	**851.3**	1,160.3	**2.09**	**36.30**

Source: Australian Bureau of Agriculture and Resource Economics, Energy in Australia, 2006

Table 4.2 shows household energy use forecasts on a status quo policy setting assumption.[7] Total energy use is forecast to rise by 36 per cent (309 PJ) by the end of 2029-30, and household energy use by 39 per cent (59.4 PJ). The national ETS will reduce these forecasts although the precise impact will depend on the final design and scope of the scheme. Nevertheless, households will remain a major contributor to Victoria's total energy consumption in the future. Population growth and rising household energy demand (e.g. due to larger houses and more appliances) are expected to drive increased energy demands.

Almost 55 per cent of household energy demand is met from electricity generation[8] which, in Victoria, is principally generated by brown coal-fired power stations (estimated 90 per cent).[9] Brown coal is recognised as a cheap, but highly GHG intensive form of electricity generation.

4.3.1. The sources of residential energy use and greenhouse emissions

The average Victorian household is responsible for 12 tonnes of GHG emissions each year.[10] Table 4.3 illustrates the breakdown of energy consumption and GHG emissions by household activity in a typical home. Energy consumed by appliances is responsible for around 40 per

[7] Australian Bureau of Agriculture and Resource Economics, *Energy in Australia*, 2006
[8] Australian Bureau of Agriculture and Resource Economics, *Energy in Australia*, 2006
[9] http://www.dpi.vic.gov.au/DPI/dpinenergy.nsf/childdocs/-384C1AC0F3D5716CCA25729D00102547-AFE5D9442E22210ACA2572BB00096717-02C73866B10B9510CA2572BB000D73CA?open
[10] In 2006, the ABS estimated there were 2.1 million Victorian households.

cent of the GHG emissions attributable to the household sector, with water heaters responsible for one-fifth. Heating and cooling, lighting and cooking are responsible for the remainder.[11]

Table 4.3: Household energy use and GHG emissions contribution

Household activity	Energy use as a percentage of household total	GHG emissions as a percentage of household total
Lighting	3%	9%
Appliance (cooking)	3%	4%
Appliance (fridge and freezer)	4%	12%
Appliance (other)	10%	29%
Water heater	21%	20%
Space heating and cooling	59%	26%

Source: Victorian Energy Efficiency Action Plan, Department of Sustainability and Environment, 2006 (using average emissions coefficient)

4.4. Energy efficiency complementary measures under an ETS

As discussed previously, to complement the introduction of an ETS, there will be a role for governments to address ongoing market failures and support households. The Garnaut Review's ETS Discussion Paper stated that *'effective policies [to correct residual market failures] can reduce the price of permits, the price of emissions-intensive products, and pressures for structural change in production and expenditure.'* [12]

The National Emissions Trading Taskforce (NETT) undertook modelling to estimate the relative merits of coupling an ETS with complementary measures – in particular, enhanced energy efficiency. Scenario 1 impacts are based on an ETS achieving a 175 MT CO_2-e cap by 2030; Scenario 2 is the same but with complementary measures – predominantly energy efficiency measures. The results of this modelling indicate that complementary measures minimise negative economic impacts of an ETS, as detailed below:

Table 4.4: NETT modelling results

Indicator (% deviation from base case) at 2020	Scenario 1 (without complementary measures)	Scenario 2 (with complementary measures)
Gross Domestic Product	- 0.4	- 0.3
Private consumption	- 0.6	- 0.4
Labour market	- 0.1	0.1
Real wages	- 1.0	- 0.5

[11] Department of Sustainability and Environment, *Victorian Energy Efficiency Action Plan*, 2006 (using average emissions coefficient)
[12] Garnaut Climate Change Review, *Emissions Trading Scheme Discussions Paper*, 2008, p 6

Indicator (% deviation from base case) at 2020	Scenario 1 (without complementary measures)	Scenario 2 (with complementary measures)
Time in months to recover, base case GDP	1.9	1.3

Source: The Economic Impacts of a National Emissions Trading Scheme. Allen Consulting Group for the National Emissions Trading Taskforce, final report, June 2006, p. vii. Modelling done by Centre of Policy Studies (COPS) at Monash University using MMRF- Green.

Other sources have corroborated the NETT modelling. For example, a 2007 study by the Centre for International Economics found that policies to enhance building energy efficiency would reduce the costs of an ETS for all sectors by nearly 14 per cent by 2050.[13] The Stern Review and the Intergovernmental Panel on Climate Change also cited the merits of complementary measures, particularly in the early years of an ETS where the cap's coverage may be limited.[14]

The Victorian Government has identified energy efficiency– particularly in the residential sector – as an important complementary measure to the proposed ETS. Garnaut has also indicated that assisting households in adjusting to greater efficiency in energy use is one of the ways to provide assistance to households under an ETS.[15] These positions are consistent with long-standing Victorian Government policy.[16]

Energy efficiency policies aim to facilitate a range of low-cost abatement opportunities that may not be incentivised by an ETS. These opportunities are the focus of the VEET scheme. As a result, the VEET scheme aims to assists in achieving GHG abatement earlier and at lower costs. While the Act extends until 31 December 2029, it is the intention of DPI to continue the VEET scheme only so long as it delivers low-cost GHG abatement in the residential sector that is not incentivised under an ETS. In this sense, the VEET scheme is a transitional measure.

It should also be noted that in the absence of an ETS (i.e. prior to 2010), the VEET scheme will accelerate GHG abatement, by reducing the demand for energy (the production and use of which generates GHG emissions). Following the introduction of an ETS, the VEET scheme will be a complementary measure that delivers low-cost abatement – which the ETS will not incentivise – in the residential sector.

Figure 4.5 demonstrates the ability of effective complementary measures, such as the VEET scheme, to pick up the "low hanging fruit" that the ETS will not capture, especially in the early years, when the carbon price signal will have little, if any, impact on the level of energy consumption on the demand side.

[13] Centre for International Economics, *Capitalising on the Building Sector's Capacity to Lessen the Costs of a Broad Based GHG Emissions Cut*, 2007, p 4

[14] Stern, N, *Stern Review on the Economics of Climate Change*, commissioned by the United Kingdom Department of Treasury, 2006. See also Intergovernmental Panel on Climate Change, *Fourth Assessment Report - Working Group III Report – Mitigation of Climate Change*, 2007

[15] Garnaut Climate Change Review, *Emissions Trading Scheme Discussions Paper*, 2008, p 18 and *Draft Garnaut Climate Change Review Report*, July 2008, p 11

[16] Victorian Government Response to the Productivity Commission's Draft Report on Energy Efficiency, 2005, p 3

Figure 4.5: Role of complementary measures under an ETS

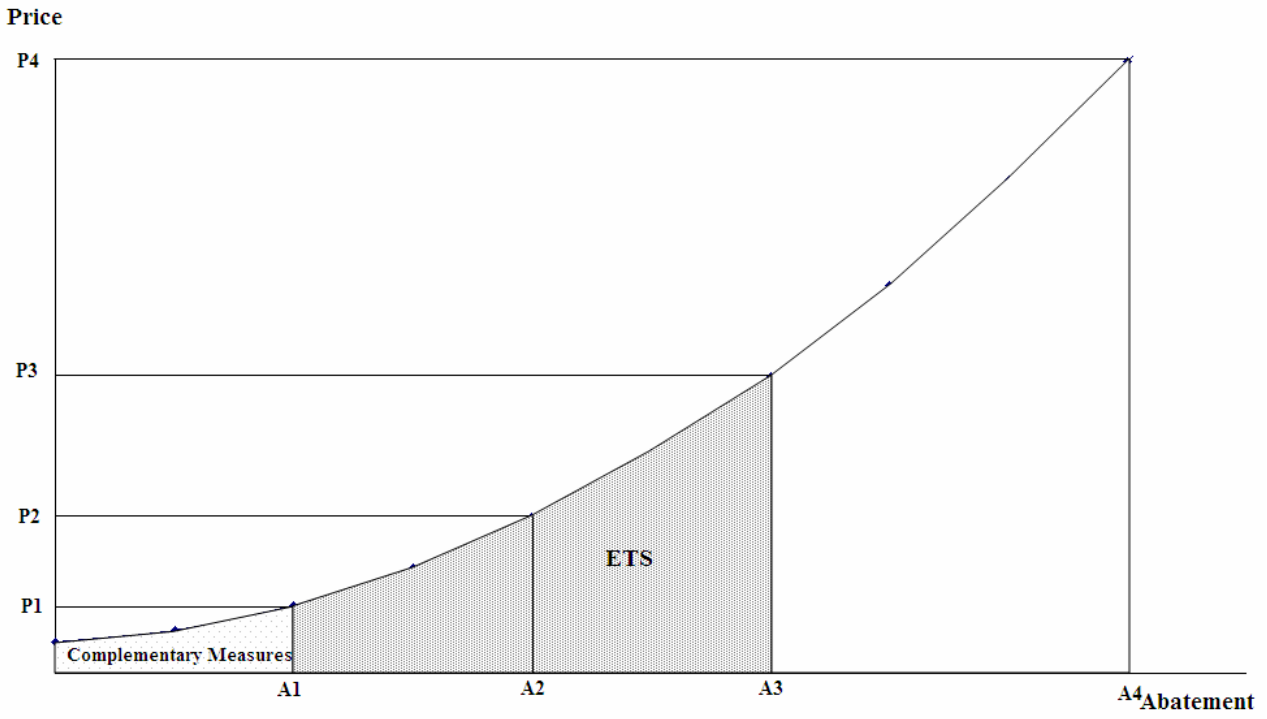


Figure 4.5 illustrates the ability of complementary measures to drive the cost of GHG abatement under an ETS down the cost curve. The graph shows that without complementary measures, total GHG abatement equals A3 – A1 due to the inability of an ETS to capture low cost abatement, such as improving residential energy efficiency. The price of carbon under an ETS without complementary measures is shown at P3.

The inclusion of complementary measures captures GHG abatement between 0 and A1 and has no net impact on total abatement. That is, the region A2 – 0 is the same as A3 – A1. The key difference is the lower price of abatement (P2) with complementary measures due to the cost-effectiveness of complementary measures demonstrated by P1.

Energy efficiency complementary measures under an ETS in practice

There is also practical evidence that complementary measures deliver benefits in addition to an ETS. In 2002, the United Kingdom (UK) established the world's first economy-wide ETS. The scheme was superseded by the mandatory European Union ETS, which commenced in 2005.

In the same year, the UK also implemented an energy efficiency market based scheme, similar to the VEET scheme, called the Energy Efficiency Commitment (EEC). The first phase of the EEC (2002-05) stimulated approximately £850m ($1.77b) worth of investment in energy efficiency and delivered net present value benefits to householders of £3.1b ($6.46b).[17] It is expected to save 1.1 Mt CO_2-e annually by 2010, with costs to suppliers of around £3.20

[17] Eoin Lees Energy, *Evaluation of the Energy Efficiency Commitment 2002-05* commissioned by the United Kingdom Department of Environment, Food and Rural Affairs, 2006, p 26

($6.67) per customer per fuel per year.[18] Around 10 million households have benefited from EEC 2002-05. EEC 2005-08 requires broadly double the level of activity of EEC 2002-05 and is expected to deliver greater abatement than its predecessor.[19]

4.5. Market failures applying to energy efficiency

As noted above, there are a range of market failures and barriers which prevent optimal uptake of energy efficiency. These were noted by the Commonwealth Government, in its Carbon Pollution Reduction Scheme Green Paper, as a rationale for energy efficiency policies to complement an ETS.[20] These market failures are discussed below.

4.5.1. Bounded rationality

The concept of bounded rationality states that perfectly rational decisions are often not feasible in practice due to the finite computational resources available for making them. That is, individuals have a limited ability to process and analyse information and hence make decisions that can satisfy but may not necessarily maximise their utility, leading to sub-optimal outcomes.

Bounded rationality impacts the uptake of energy efficient products due to the complexity associated with measuring the relative benefits of purchasing an energy efficient product in terms of lower operating costs against the upfront capital costs. In this environment, it is difficult for householders to come to a well-informed and rational decision on the purchase of an energy efficient product.

DPI was unable to identify conclusive empirical evidence demonstrating that bounded rationality impacts on the uptake of energy efficient products. If this data was collected, it would be expected to show that householders do not purchase energy efficient products when it is rational to do so due to the complexity and time involved in making a well-informed purchase decision. However, there are some mechanisms that help to reduce/mitigate this problem (e.g. advertising).

Two symptoms of bounded rationality concerning the uptake of energy efficient products are high price inelasticity of demand for energy and consumers' beliefs on discount rates for energy efficient products.

Discount rates

Bounded rationality often manifests as high discount rates, with consumers placing more emphasis on the upfront purchase cost than whole-of-life costs. This is particularly relevant to energy efficiency measures in households. The potential savings on energy bills made over the life of an energy efficient appliance may be discounted more than the upfront savings of selecting a less energy efficient appliance, even though over the life of the product, the energy efficient appliance may be the cost-effective choice.[21]

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[18] United Kingdom Department for Environment, Food and Rural Affairs, *Explanatory Memorandum to the Electricity and Gas (Carbon Emissions Reduction) Order 2008*, 2008, p 8 (available at http://www.eeph.org.uk) For a discussion on the EEC, see also HM Government, *Climate Change – the UK Programme 2006*, Presented to Parliament by the Secretary of State for the Environment, Food and Rural Affairs, 2006, p 78

[19] United Kingdom Department for Environment, Food and Rural Affairs, Explanatory Memorandum to the Electricity and Gas (Carbon Emissions Reduction) Order 2008, 2008, p 8 (available at http://www.eeph.org.uk)

[20] Carbon Pollution Reduction Scheme Green Paper. Commonwealth of Australia, July 2008, p. 285

[21] From the Department of the Environment and Water Resources, http://www.environment.gov.au/about/publications/economics/consumption/effectiv.html

Compounding this issue is the fact that, for most households, energy is a lesser order budget consideration. In 2005-06, the average annual Victorian household electricity bill was $993;[22] for gas the figure was $700.[23] Average Victorian household weekly disposable income in 2005-06, however, was $1,055.[24] Consequently an average Victorian household spends only 3 per cent of its disposable income on energy. While low-cost energy does not constitute a market failure, it offers some explanation for the application of high discount rates to energy efficiency products.

Discount Rates and Energy Efficiency

Discount rates reflect the time value of money. As the discount rate is increased, the present value of a future stream of costs over benefits is going to become smaller. High discount rates favour projects with short-term payoffs over projects with long-term benefits.

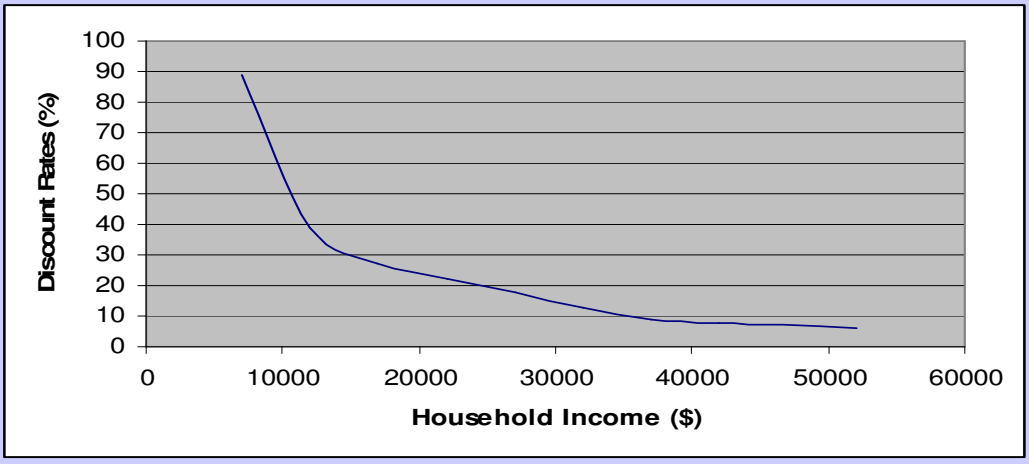
Some academics have argued that consumers place more emphasis on the upfront capital costs rather than ongoing operational costs. Estimated implicit discount rates for energy efficiency investments presented in several studies range from 25 per cent to 300 per cent across a range of measures.[25]

There are also a number of studies that highlight lower levels of energy efficiency due to higher implicit discount rates in households occupied by renters compared to those occupied by owners in the United States.[26]

One study of consumer purchases of air conditioners found that consumers could achieve considerable present-value savings by switching from models actually purchased to more energy-efficient alternatives. Figure 4.6 demonstrates the studies findings that implicit discount rates fell sharply in high income households, whilst low-income households behaved in a fashion consistent with discount rates of up to 89 per cent.[27]

Figure 4.6: An Example of Implicit Discount Rates in Energy Efficiency Purchases as a Function of Household Income in the United States[28]

[22] Essential Services Commission, *Energy Retail Businesses Comparative Performance Report for the 2006-07 Financial Year*, 2008, p 65
[23] Department of Human Services, *Victorian Utility Consumption Survey 2007*, 2008, p iv-vi
[24] Australian Bureau of Statistics, A*BS 6523.0.55.001 - Household Income and Income Distribution, Australia - Detailed tables, 2005-06*, 2007
[25] Sanstad, A, Hanemann W, and Auffhammer M, *End-Use Energy Efficiency in a "Post-Carbon" California Economy*, 2006. See also the following articles for a discussion on discount rates used by households purchasing energy efficiency products: Ruderman, H, Levine, M.D, and McMahon J.E, *The Behaviour of the Market for Energy Efficiency in Residential Appliances including Heating and Cooling Equipment*, Energy Journal, 8(1), 1987, p 101-124; and Koomey, J.G, Levine, M. D, McMahon, J.E., Sanstad, A.H, *Energy Efficiency Policy and Market Failures,* Annual Reviews in Energy and the Environment, 1995
[26] Train, K, *Discount Rates in Consumers' Energy-Related Decisions: A Review of the Literature*, Energy 10 (12), 1985, p 53
[27] Hausman, J.A, *Individual Discount Rates and the Purchase and Utilisation of Energy-Using Durables*. Bell Journal of Economics, 1979, p10
[28] Ibid, p 10



The academic literature indicates that households use inordinately high implicit discount rates, which results in an underinvestment in energy efficiency products.[29]

Price inelasticity of demand

Bounded rationality also manifests itself in the form of low price elasticity of demand. Using historical data from Victoria and other Australian jurisdictions, the National Institute of Economic and Industry Research (NIEIR) has established household electricity demand of 0.25.[30]

This finding indicates that changes in the price of electricity – including those induced by carbon pricing under an ETS – will have an extremely limited impact on energy consumption – particularly by low-income households.

In addition, many energy-consuming appliances provide consumers with an essential service (hot water, heating, refrigeration, etc). Consumers generally do not replace such items until they fail. Once they do fail, DPI assumes that a consumer's first priority is replacing the item in question as quickly as possible and other considerations, no matter how economically rational, are secondary. As a result, the essential service characteristic of many appliances significantly constrains consumer's capacity to weigh up other information regarding an appliance. This also infers that consumers will have a highly inelastic demand for essential energy-consuming appliances.

Related studies

Recently, Professor Joshua Gans conducted a study on retailer churn in the energy market which found that consumers perceived low benefit from switching energy retailers and high search costs in evaluating the relative prices of different energy retailers.[31] As a result, there was little churn in the market and consumers were content to pay more on energy and remain with their existing supplier.

[29] DPI acknowledges that the majority of the academic literature cited in relation to discount rates is historically. It is also acknowledges that consumer awareness may have evolved due to greater social awareness of, among other things, the impact of energy consumption on climate change. However, DPI is of the view that this data remains relevant.

[30] National Institute of Economic and Industry Research, *The Own Price Elasticity of Demand for Electricity in NEM Regions: A report for the National Electricity Market Management Company (NEMMCo),* 2007

[31] Gans J, *The Road to Confusopoly*, 2008, available at: http://www.mbs.edu/home/jgans/papers/The%20Road%20to%20Confusopoly.ppt

If the same considerations are relevant to the uptake of energy efficient products, householders may perceive that there is no, or limited, difference in energy consumption between different products. Therefore, householders may be less likely to search information on or to purchase energy efficient products. This problem is compounded by the short term focus of householders, which DPI considers is demonstrated by the use of inordinately high discount rates by householders as discussed above.

Conclusion

DPI is of the opinion that bounded rationality is one of the root causes of the high discount rates and low price elasticity of demand for energy in households. As discussed, DPI is of the view that this is primarily due to high search costs, an inability and/or a lack of desire to assimilate information. Consequently, householders do not make rational purchase decisions concerning energy efficient products.

DPI considers that even if complete information is available to all individuals, householders may not always encourage the efficient use of electricity and gas.

4.5.2. Information failures

In its submission to the Garnaut Review, the Productivity Commission indicated that one of the main justifications for a supplementary policy to an ETS is to correct an information failure.[32] The Victorian Government has found that householders' understanding of the benefits of energy efficiency remains rudimentary.[33] This situation appears to exist in spite of considerable investment by government and other parties, such as private companies and consumer groups, explaining the benefits of energy efficiency in general, and in relation to specific products and activities.

In this instance information is only as useful as its capacity to inform consumers and influence their behaviours (i.e. decision making). There is a considerable amount of information available to the general public on energy efficiency. Much of this information is sponsored, in some form or another, by government (as noted in section 6.3.5 below). There are a range of reasons why this information does not necessarily enable informed decision-making. These include:

- time lags;
- aggregated energy pricing; and
- transaction/search costs.

4.5.2.1. Linkage between consumer decision and actual energy consumption

Time lag between energy consumption and receipt and payment of energy bills

Electricity and gas price information is divorced from the time at which these resources are used. This time lag problem may affect the efficacy of price information in influencing consumer awareness and behaviour in regard to household energy use.

Electricity consumers receive gas bills every two months and electricity bills every quarter. DPI believes that these bills are probably the most obvious point for informing a consumer of

[32] Productivity Commission Submission to the Garnaut Climate Change Review, *What Role for Policies to Supplement an Emissions Trading Scheme?*, 2008, p 14
[33] NWC Research, *Black Balloons Campaign Evaluation – A Research Report*, commissioned by the Department of Sustainability and Environment, 2007, p 31

their individual energy use. Bills provide a consumer the ability to benchmark their energy consumption, and energy prices, against previous quarters or years. However, some consumers may not make such a comparison. Further, such benchmarking, even where it is done, is removed from the point in time at which the decision to use energy was actually made (for example, the hot day when the decision was made to put on the air conditioner). Actual, time-of-use information on energy use may be gathered directly from the meter – but very few householders would be expected to have the motivation, or expertise, to interpret such information. For these reasons, gas and electricity billing information may have a limited ability to inform decisions.

This situation forms a contrast with petrol use. For most motorists, petrol is purchased on a weekly or twice weekly frequency (i.e. sufficiently frequent for consumers to recall previous prices and how the product was utilised since the previous purchase). It is also easier for consumers to directly assess the fuel-use implications of a decision (a trip) by monitoring the fuel gauge.

The above analysis does not, in itself, constitute conclusive empirical evidence that the time lag between energy consumption and bill payment leads to irrational energy usage behaviour by householders. DPI expects, however, that if such data existed, it would show that householders are more responsive to energy bill information when it is presented closer in time to actual decision-making which affects use, and less so when the time lag is larger.

Pending the availability of such detailed information, DPI believes that the time lag should be regarded as a significant barrier to the rational and efficient use of energy in the household sector. This argument is strengthened by the Productivity Commission's report, *The Private Cost Effectiveness of Improving Energy Efficiency*, which included a quote that stated that "most consumers act as if they have no control over their electricity bill, [and the limited feedback they receive] is often too late for them to respond."[34]

Aggregated energy prices

There may be limited understanding between a householder's understanding of specific/individual appliance use and its impact on energy bills. For example, while some consumers may be aware that certain appliances such as air conditioners are energy intensive, it is difficult for a householder to measure the billing impact.

Electricity and gas bills reflect the cost of operating a diverse range of appliances and equipment over a period of time. Consumers are not necessarily aware of which particular appliance or equipment is contributing to the total price they ultimately pay for a given fuel for a given period. This also militates against an informed demand response. Once again, the contrast with petrol is stark. Petrol is used exclusively by the vehicle into which the consumer places it. The fact that a consumer physically places the fuel in the vehicle themselves only heightens their awareness of price.

Electricity tariffs may not communicate price information in a way conducive to behavioural response, for example. In this competitive market, arrangements are best suited to meet the needs of both parties, the end result may not optimally communicate price information in a way conducive to behavioural response. For example, some householders may have chosen a fixed tariff to smooth/average their energy usage across the year. This may enable both the household and the energy retailer to best manage cash flow, but would provide little direct incentive to efficiently consume energy.

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[34] Productivity Commission, *The Private Cost Effectiveness of Improving Energy Efficiency*, 2005, p 105. In particular, see submission 64 from Jeff Beal (p 12).

The above analysis does not, in itself, constitute conclusive empirical evidence between the lack of understanding between usage of specific/individual product and energy bills. If such information did exist, DPI expects it would show that householders would be more responsive to energy price signals where these were directly linked to specific energy use decisions (appliances), and less so when a larger number of energy-using appliances were bundled together for billing purposes.

Pending such detailed information being available, DPI believes that the lack of understanding between product use and energy bills by householders is a significant barrier to the efficient use of electricity within households. DPI considers that even if householders had full information on the relative costs of all household appliances, the efficient use of electricity and gas may not always be encouraged.

4.5.2.2. Transaction/search costs

Community wide transaction/search costs

Even where information is accurate, available, current and complimentary, a consumer must invest time to identify and assimilate it. There is an opportunity cost associated with the use of one's time for such a task. Reviewing literature on energy efficiency, undertaking web searches, visiting different shops, making phone calls, measuring the existing energy usage of the household or assessing its energy performance characteristics are all time-consuming.

One study indicated that if consumers were aware that compact fluorescent lamps could save money, they may need to spend 45 minutes to accurately assess potential savings and locate a shop that sold these lamps.[35] If individuals valued their time at $20 per hour, this would more than double the 'price' for the first purchase of this type of lamp. However, if individuals could pass the initial cost barrier, over their lifetimes it is likely they would benefit significantly from savings on their lighting costs.

Another recent study of energy efficiency investments estimated that transaction costs relating to information gathering and decisions accounted for 3 to 8 per cent of the costs of the investment.[36]

Individuals also have difficulties in processing, retaining and using information, and therefore may not attempt to weigh up the costs and savings of low emissions options. Even where savings are known, households may give them inadequate attention due to their perceptions of upfront costs, effort involved in the behavioural change, and social norms (see the discussion on discount rates and energy efficiency in section 4.6.2).[37]

Individual transaction/search costs

Even if undertaking an energy efficient activity delivers a net benefit in the majority of circumstances, an individual needs to evaluate the economic benefit of that activity in their own specific situation. That is, a householder should not assume that a particular energy efficient product will be economically beneficial in all cases. A householder should

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[35] Sathaye, J. & Murtishaw S*, Market Failures, Consumer Preferences and Transaction Costs in Energy Efficiency Purchase Decisions*, California Energy Commission, Berkeley, 2004. This example is also used in the *Draft Garnaut Climate Change Review Report*, 2008, p 447

[36] Hein, L.G. & Blok, K. *Transaction costs of energy efficiency improvements*, in Proceedings of the 1995 Summer Study: Sustainability and the reinvention of the government—a challenge for energy efficiency, The European Council for an Energy Efficient Economy, 1995

[37] Komor, P & Wiggins, L, *Predicting conservation choice: beyond the cost-minimisation assumption, Energy* 13(8), 1988, p 633-44

individually assess their individual situation to determine if it is economically rational to undertake a particular activity eligible under the VEET scheme.

For example, insulating ceilings is generally regarded as a cost-effective energy efficiency measure. This may not be the case, however, where a dwelling has a flat roof with inadequate space to accommodate insulation. In the former case, extensive and expensive works would be necessary to the dwelling to accommodate insulation.

Installing insulation may also not be a cost-effective energy efficient measure where a dwelling is only occupied seasonally (i.e. a beach house). In this case, the low or negligible fuel use in the dwelling means that there is little abatement to avoid through building fabric improvement.

These examples reinforce the point that individual circumstances will determine if any given activity is economically efficient or not. A technology or initiative that may be cost-effective on average across a population of potential investors, may, in fact, be uneconomic for a subset of that population.[38]

Consequently, consumers (householders) must assimilate information provided for a general audience and apply it to their own circumstances. The transaction costs of doing so may prove a deciding factor for that consumer. Similarly, governments attempting to deliver energy efficiency policies may end up incurring sub-optimal abatement costs by mandating a particular activity (e.g. insulation in all homes) where it may not, in some cases, deliver cost-effective abatement. Optimal policy interventions would engender flexible uptake of only those instances of an energy efficiency activity which were genuinely cost-effective for all parties.

Conclusion

DPI was unable to identify conclusive empirical evidence demonstrating the extent of transaction/search costs however several studies have noted its extent including those referenced in this document. If this data was collected, it would be expected to show that householders view transaction/search costs as a barrier to the efficient uptake of energy efficient products.

DPI is of the view that transaction/search costs are a material barrier to the efficient uptake energy efficient products.

4.5.3. Misplaced / split incentives

Misplaced, or split, incentives refer to the potential difficulties that arise when two parties engaged in a contract have different goals and different levels of information.[39] This problem is often present in the rental market where the primary incentives of the landlord are to make a strong return on investment by maximising the rental price of the property and having constant occupation of the property whilst the tenant primarily aims to receive cheap rent and low household operating costs. As a result of tight market conditions, the current Victorian rental market may be described as a landlord's market.[40]

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[38] Golove, W. & Eto, J., *Market Barriers to Energy Efficiency: A Critical Reappraisal of the Rationale for Public Policies to Promote Energy Efficiency*, 1996, p 6

[39] International Energy Agency, *Mind the Gap – Quantifying Principal-Agent Problems in Energy Efficiency*, 2007, p. 11

[40] Real Estate Institute of Victoria - http://www.reiv.com.au/news/details.asp?NewsID=654

In relation to energy efficiency, misplaced, or split, incentives arise when there are transactions or exchanges where the economic benefits of energy conservation do not accrue to the person who is trying to conserve. Landlords typically provide fixed household appliances (e.g. water and space heating), which are generally both the most expensive types of appliances and the most energy-intensive (with the exception of refrigerators and freezers), while tenants provide non-fixed appliances (e.g. refrigerator, kettle, microwave). The fixed appliances are selected by a builder or landlord who is primarily concerned about the upfront capital cost and not by the tenants who have long-term concerns about the whole-of-life costs which include the running costs.

As a result, DPI considers that there is little incentive for landlords to purchase energy efficient products as the tenant gains by enjoying lower operating costs. Furthermore, DPI considers that there is little incentive for landlords in the current rental market to purchase energy efficient products as there is, irrespective of the energy performance of households, strong demand and competition for leased properties within Victoria.

The nature of the misplaced, or split, incentives problem is compounded by the following factors.

Price differential between energy efficient and standard products

The price differential between highly energy efficient products and standard products vary. For eligible lighting activities under the VEET scheme, the average market price differential is approximately $3.[41] This represents a market price for energy efficiency lighting that is approximately 29 per cent more expensive than standard lighting. Eligible refrigerators under the scheme are approximately 27 per cent more expensive than standard refrigerators.[42]

Therefore, there is little or no incentive – in the absence of the VEET scheme – for a landlord to increase their upfront expenditure for an energy efficient product as a landlord does not pay the operating costs and will not reap the benefits of reducing those costs.[43]

Low vacancy rates

Given the current tight rental market (1 per cent vacancy in Melbourne in April 2008, up from a record low 0.9 per cent in March 2008)[44] it is plausible that renters are less likely to be able to pick and choose rental properties that have energy efficient appliances that could lead to cost savings. It is also plausible that renters are less likely to seek leasing contract renegotiations based on energy efficiency due to the increasing rental prices in Melbourne. For example, renegotiating a rental arrangement based on the landlord installing appliances with a greater energy efficiency than those currently installed would also take into account the increased market rental prices since the previous rent negotiation (from April 2007 to April 2008, median weekly rent for a house in Melbourne increased by 22.9 per cent, while for apartments the typical weekly rent rose by 18.5 per cent)[45] and thereby offset the potential

[41] Quotes obtained from http://www.bunnings.com.au
[42] Ibid
[43] Note: While there has been limited empirical research into the split incentives of landlords in appliance selection, a US study of energy efficiency in rental accommodation found that households where the landlord pays the heating bills are more energy efficient than households where the tenant pays the heating bills. This indicates capital investment in more energy efficient appliances when landlords bear the operating costs of the appliances. Levinson, A. & Niemann, S., *'Working Paper: Energy Use by Apartment Tenants when Landlords Pay for Utilities',* Georgetown University, 2003.
[44] Real Estate Institute of Victoria - http://www.reiv.com.au/news/details.asp?NewsID=654
[45] The Age, *'Tenants Angst on the Rise'*, 7 June 2008 http://www.theage.com.au/national/tenants-angst-on-the-rise-20080606-2mys.html

saving on energy bills due to increased energy efficiency. Therefore, it is the opinion of DPI that there is a disincentive for tenants to renegotiate rental agreements in this situation.

There is little Victorian data and information on the break-down of household appliances by tenants or owner occupiers to establish the extent of the split incentives problem. However, a recent survey by the Australian Bureau of Statistics of South Australian householders demonstrated non-trivial differences in the appliances used by tenants and owner occupiers.[46] For example, the survey found that tenants were more likely to use an electric heater (38 per cent of renters with a government housing authority and 27 per cent of other renters)[47] than owner occupiers (15 per cent of owners without a mortgage and 12 per cent of other owners).[48] Conversely this data also shows that 73 per cent of other renters compared to 85 per cent of owners without a mortgage and 88 per cent of other owners use non electric heating. Electric heaters are less energy efficient and cheaper than energy efficient alternative heaters, such as gas or solar. However, DPI considers that the South Australia survey provides an insight into the practical impacts of the split incentives problem.

Bundled nature of decision making

Energy efficiency is only one consideration for consumers when evaluating purchase options. In the property market, purchasers and renters are choosing a property based on a combination of many factors - most notably location, size, and price. Similarly purchasers of appliances must consider size, functionality, appearance, warranty, availability and energy efficiency.[49] There is little empirical evidence that examines the impact of the bundled nature of decision making for energy efficient products in mitigating the importance of energy conservation in the decision making process. However, DPI considers that bundling is a significant barrier to the uptake of energy efficient household appliances.[50]

The high discount rates for energy efficient appliances discussed in section 4.5.1 indicates that households often place a high value on upfront capital costs against ongoing operating costs. This mitigates the relative importance of energy efficiency in the decision making process which predominately benefits households through lower GHG emissions and operating costs.

Short average tenancies relative to payback periods

The average length of occupancy in a rental property is 18 months, based on unpublished data previously sourced from the Residential Tenancies Bond Authority. This period is less than the average payback period of four years for current commercially available technologies.[51] This indicates that renters will not reap the rewards of the cost savings from energy efficient appliances. For example, there is no incentive for tenants to purchase and have installed ducted heating as it cannot be removed when the tenant moves out of the property and the average pay back period is greater than the average tenancy duration.

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[46] Australian Bureau of Statistics, *Domestic Use of Water and Energy: South Australia*, Catalogue Number 4618.4, 2005

[47] This indicates that a large proportion (73 per cent) of South Australian rental properties used relatively more efficient non-electric heaters.

[48] Ibid

[49] The availability of an appliance is particularly important for consumers. Many energy-intensive appliances provide an essential service (refrigeration, heating, water heating). Consumers generally do not replace these items until they fail. Once an essential service is no longer available, replacing it is a time-sensitive priority, and delays in availability or installation are not acceptable for most consumers.

[50] The issue of bundling is also discussed in sections 4.5.2.1 and 6.3.5.2.

[51] National Framework for Energy Efficiency, *Towards a National Framework for Energy Efficiency—Issues and Challenges: Discussion paper*, 2004

As a result, there is a significant disincentive for tenants to invest in energy efficient appliances. There is also little incentive for landlords to incur the additional cost of putting energy efficient appliances into their investment properties as the tenant receives the savings through lower energy bills.

Conclusion

DPI considers that the misplaced, or split, incentives problem identified is of high significance given that approximately 30 per cent of Australian households are renters (22 per cent in private arrangements).[52] This figure is possibly even higher in Victoria, with approximately 440,000 Victorian households (24 per cent) being renters, 370,000 of which (21 per cent of all households) are in private arrangements.[53]

While study has not been able to quantify the extent of the misplaced, or split, incentives problem in Victoria, there are several studies that have noted its existence including the *Interim Report to the Commonwealth, State and Territory Governments of Australia* as part of the Garnaut Climate Change Review.[54] DPI considers the misplaced, or split, incentives problem a significant barrier to the uptake of energy efficient products within households that are leased.

4.5.4. Lack of access to electronic information regarding energy efficient products

DPI research indicates that much of the information available to consumers on energy efficient products that is detailed – such as energy use calculators and product reviews – is electronic. However, certain householders either may not have access or have experienced difficulties in accessing this particular type of electronic information. In 2006, the Australian Bureau of Statistics conducted a survey which found that 37 per cent of Victorian households do not have access to the internet.[55] The survey also revealed noticeably lower access rates for regional and rural areas, in comparison with major cities of Australia, especially for broadband access.

DPI is of the opinion that there is a very high penetration of internet usage throughout Victoria but relatively low affordable broadband available in rural and regional Victoria.

In this environment, DPI expects to observe that rural and regional Victorians would incur greater search costs due to their inability to access certain types of detailed materials on energy efficient products electronically. It should be noted that general information on energy efficiency may be accessible via print, radio, television or other technical publications.

DPI was unable to identify conclusive empirical evidence demonstrating the impact of the lack of access to electronic information regarding energy efficient products. If such data existed, it would be expected to show that regional and rural Victorians have less awareness of the benefits of energy efficiency in households including lower relative consideration of energy efficiency during purchase decisions and lower general awareness of the impact of climate change.

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[52] Australian Bureau of Statistics, *Housing and Occupancy Costs (Finding No. 4130.0.55.001),* 2007,
[53] Advice received from the Tenants Union of Victoria.
[54] Garnaut Climate Change Review, *Interim Report to the Commonwealth, State and Territory Governments of Australia*, 2008, p 455 (See also International Energy Agency, *Mind the Gap – Quantifying Principal-Agent Problems in Energy Efficiency*, 2007, p 12)
[55] Australian Bureau of Statistics, *Patterns of internet access in Australia*, Cat. no. 8146.0.55.001, 2006

It is the expert opinion of DPI that the lack of access to electronic information regarding energy efficient products is a significant barrier to their uptake, especially in rural and regional Victoria.

Consequently, DPI believes word-of-mouth remains a critically important means of disseminating information – with skilled tradespersons playing a vital role. While this does not impede all consumers from accessing information, DPI believes it does indicate that there are practical and cost difficulties for some Victorians.

4.5.5.Summary

Least cost GHG abatement is not expected to result purely from the introduction of an ETS, due to the presence of a number of market failures. Specifically, bounded rationality, information failures and split incentives are expected to prevent the realisation of a significant quantum of cost-effective GHG mitigation. Consequently, in the absence of further policy intervention, households are expected to experience greater increases in energy expenditure, and the costs of abatement under an ETS are expected to be marginally greater, than they otherwise would be. An optimal policy intervention would be one which addresses the identified market failures by incentivising a third party – certificate creators – to improve household energy efficiency.

5. Objectives of the VEET scheme

Section 4 of the Act states that objectives of the scheme are to:

(a) reduce GHG emissions;

(b) encourage the efficient use of electricity and gas; and

(c) encourage investment, employment and technology development in industries that supply goods and services which reduce the use of electricity and gas by consumers.

The extent to which the proposed VEET design achieves these objectives will depend on how successfully the proposed design addresses the market failures identified in Chapter 4 above.

5.1. Reduce GHG emissions

GHG emissions reductions in Australia will be delivered by an ETS, once it is fully operational. Pending the full operation of the ETS, the VEET scheme will accelerate GHG emissions reductions, by reducing the demand for energy (the production and use of which generates GHG emissions).

A start date for the ETS has not been established. DPI believes transitional arrangements, such as price caps, may compromise the extent to which the scheme actually achieves emissions reductions. Consequently it is expected to be several years before an ETS delivers its stated emissions benefits, hence the transitional nature of the VEET scheme.

Once an ETS is fully operational, additional measures (including the VEET scheme) will not actually yield additional abatement. Therefore, post full operationalisation of the ETS, the only justification for additional or complementary measures is that they lower the cost of achieving the emissions task.

Given the existence of the market failures identified in Chapter 4, DPI is of the view that a quantum of cost-effective GHG abatement will not be realised based purely on the price signals induced by the operation of the ETS. The VEET scheme will address these market failures, thereby allowing this cost-effective GHG abatement to be realised.

GHG emissions are reduced by lower energy consumption (itself the result of more efficient use of energy), and by switching to less carbon-intensive fuels.

5.2. Encourage the efficient use of electricity and gas

DPI believes the introduction of an ETS will effectively increase the cost of energy.[56] While some endogenous demand response will result from this price increase, DPI expects the behavioural response by small end-users – in particular, households – to be modest (sub-economic). Once again, this is expected to be the case due to the market failures identified in section 4.

Rather than relying on energy price signals, the VEET scheme seeks to induce greater efficiency in the use of electricity and natural gas by specifically incentivising parties to install products or undertake activities in Victorian homes which improve the efficiency of

[56] As the ETS design is not yet finalised, the extent and timing of this cost increase is not firmly established. Further, actual energy price increases will be influenced by a range of factors – not just carbon prices.

electricity and natural gas use. These products range from building fabric improvements (air sealing, insulation etc) to more efficient appliances (5-star refrigerators, ducted gas heating etc). As households are relatively homogenous with respect to their energy consumption patterns, it is possible to make accurate predictions as to the full lifetime energy savings benefits of these activities across the entire household sector.

The benefits of more efficient energy use include the reduction of associated GHG emissions (as discussed above); the reduction in household energy costs; and improvements to supply security for all energy consumers. This is of particular relevance with respect to natural gas.

While electricity can be produced by a wide range of fuels, natural gas is a scarce, non-renewable and valuable natural resource. Natural gas can, and is, traded internationally – and Victoria will be able to import natural gas at such point as its own local supplies are depleted. However, reliance on imported natural gas will expose Victorian consumers to international pricing parity pressures, and heightened risks of supply disruption. Victoria's household sector accounts for approximately one-third of the state's natural gas consumption.[57] Consequently enhanced household energy efficiency will effectively conserve our natural gas resource, and make households more resilient in the face of any future price increases or supply disruptions.

5.3. Encourage investment, employment and technology development in energy efficiency industries

Enhanced energy efficiency is expected to result when there is a robust industry dedicated specifically to improving the efficiency of energy use. This industry already exists in Victoria, but is modest in its scope and extent. Energy prices in Victoria have historically been sufficiently low that energy efficiency expertise has not attracted the same demand as it has in other jurisdictions, such as Europe. Energy price increases (from both the introduction of an ETS and other causes) may, by itself, increase the size of the energy efficiency industry. Stakeholders consulted in the course of this RIS have indicated that existing government programs to drive enhanced energy efficiency have had a mixed result, largely due to the uncertainty created by the precipitous change or withdrawal of government program expenditure.

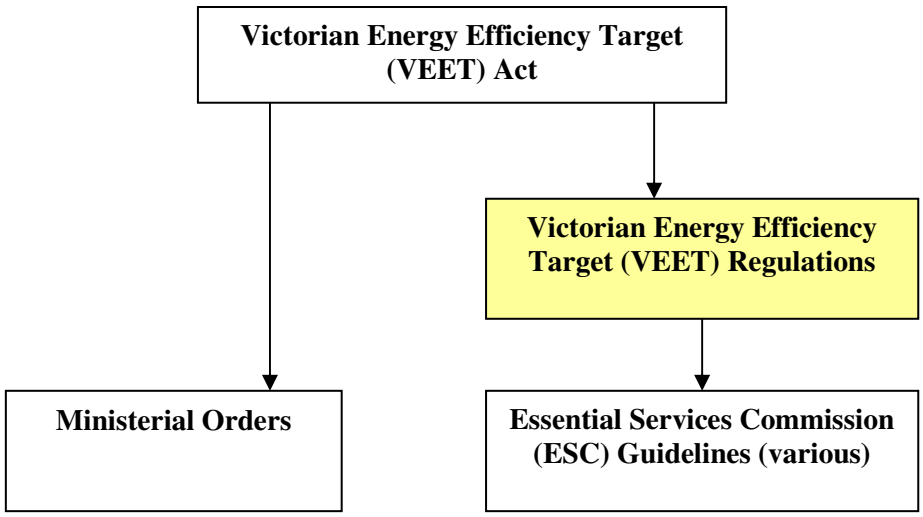
By enacting a legislated target for enhanced energy efficiency, the VEET scheme is expected to create the certainty needed to foster a robust and enduring energy efficiency industry in Victoria. This includes both the expansion of existing businesses specialising in this area, and the encouragement of new entrants to this market.

5.4. Legal structure of the VEET scheme

The above objectives, and the approach to achieving them, are reflected in the legal structure of the VEET scheme. This structure is illustrated below.

[57] National Institute for Economic and Industry Research, July 2008

Figure 5.1: Legal structure of the VEET scheme



5.4.1. The Act

The Act establishes the VEET scheme, and contains the following objectives:

(a) reduce GHG emissions;

(b) encourage the efficient use of electricity and gas; and

(c) encourage investment, employment and technology development in industries that supply goods and services which reduce the use of electricity and gas by consumers.

The Act also establishes most of the salient design elements of the scheme:

- Establishes the commencement of the scheme (1 January 2009) and its conclusion date (31 December 2029).
- Establishes an annual target, in tonnes of CO_2-e.
- Creates a legal liability for energy retailers (both electricity and gas) with more than 5,000 Victorian customers, to meet a share of this annual target, based on their proportional share of the electricity and gas markets (see ministerial orders below).
- Specifies that certificates will be the means for determining whether a party has acquitted their liability.
- Specifies that certificates will be produced by businesses accredited by the scheme administrator (the Essential Services Commission, or ESC) to produce certificates.
- Indicates (section 75) that remaining details will be determined through Regulations to be made under the heads of power established by the Act.

- Indicates that these Regulations will be limited to a three-year duration, thereby establishing three-yearly scheme phases.

5.4.2. Objectives of VEET Regulations

As dictated by the Act, the *Victorian Energy Efficiency Target Regulations* will have the following objectives:

(a) to prescribe activities carried out in residential premises that result in reduction of GHG emissions that would not otherwise have occurred if the activities were not undertaken;

(b) to prescribe the shortfall penalty rate; and

(c) to prescribe the method and variables to calculate the carbon dioxide equivalent of greenhouse gases to be reduced by a prescribed activity.

These regulations are the subject of this RIS. Section 12 outlines the evaluation strategy DPI will undertake to evaluate the impacts of the proposed Regulations in 2011.

5.4.3. Additional instruments

The *Essential Services Commission Guidelines* will specify the form and nature of information disclosure. These guidelines address, among other things, information required to:

- achieve accreditation as a certificate creator;
- seek registration of certificates; and
- comply with audits.

The ESC is a statutory authority and is bound by its own consultation processes. Consequently the ESC will undertake consultation on the various VEET-related guidelines separately to, but in parallel with, consultation on the RIS and draft regulations.

Ministerial Orders are instruments made by the Minister, and published in the Victorian Government Gazette, to address:

- the GHG reduction rate; and
- the application of discount abatement factors.

The *GHG reduction* rate determines the liability for relevant entities (energy retailers). The rate works in much the same fashion as the renewable power percentage used in the Commonwealth Mandatory Renewable Energy Target (MRET) scheme. In brief, the liability at any point in time for a relevant electricity or gas retailer will be a function of their wholesale acquisition of energy, in MWh or GJ, multiplied by the greenhouse reduction rate. The GHG reduction rate must be published by no later than 31 May of the year to which it applies.

Discount abatement factors are determinations by the Minister that the abatement value (in certificates) attributed to a given activity in the regulations should be discounted, in some or all instances, to take account of circumstances unforseen at the time the regulations were made. These could include a shorter operating life for a given product, or evidence of

consumer behaviour which compromises performance of a product (for example, de-installation of air sealing). Discount abatement factors will be published as required.

While the above detail is useful in understanding how the VEET scheme will work in practice, it must be stressed that this RIS examines only the merits of different approaches to the Regulations – not the other instruments described above.

6. Options to achieve objectives

6.1. How the options were chosen

The task of a RIS is, among other things, to identify the least cost regulatory option for achieving a policy outcome. This necessitates identifying regulatory options for examination which are sufficiently different from each other as to lead to material differences in cost-effectiveness. In the case of the VEET scheme, this requires:

- an understanding of what details of the scheme are determined by the Regulations (as opposed to the Act); and
- an examination of those scheme details that are likely to impact on the costs of the scheme.

Section 75 of the Act allows the Regulations to prescribe:

- which activities may serve as the basis for certificate creation;
- abatement methodologies for determining how many certificates may be created with respect to those activities; and
- the shortfall penalty rate applying to liable energy retailers that do not acquit their annual liability.

Consequently different options for the Regulations involve different approaches to determining the above details. Regulatory options should be considered against the base case, which is one in which there are no regulations. This would give no effect to the Act and forgo the anticipated benefits attributed to the parent Act.

6.2. The options

As the scheme is being designed to minimise non-compliance so no party needs to pay a shortfall penalty, this element of the Regulations is not expected to provide a useful variable to perturb in order to determine different levels of cost for scheme participants.

Rather, the different options are structured around different approaches to determining which activities are "in", and how many certificates they may generate in each instance. This resulted in the identification of the following options:

1. *Option 1: project-based assessment* – this approach would essentially leave it to the market to determine which activities were cost-effective to pursue, and to identify defensible abatement claims to make with regard to those activities. The Government would then review these projects to determine if the activities and attributed abatement claims were valid.

2. *Option 2: prescribed list approach* – employ a prescribed list of activities and their abatement values, with an objective of maximising certificate creation potential. This would entail Government identifying activities which were suitable for inclusion in the scheme, and determining their abatement value. This would then be prescribed for all scheme participants. No effort would be made to determine how cost-effective these measures would be, however – leaving that up to the market (certificate creators and their household clients).

3. *Option 3: minimise scheme costs* – employ a prescribed list of activities and their abatement values, with an objective of minimising administrative costs. This would entail employing a shorter list of prescribed activities, on the assumption that the additional administrative costs associated with including some activities was not warranted, in light of the marginal increase in potential certificate volume likely to result by virtue of their inclusion.

These approaches were developed following extensive consultation and analysis by DPI with industry stakeholders and other Victorian Government Departments.

6.3. Base case: no VEET regulations

As noted previously, there are a number of policies currently in place, or soon to be enacted, at both a state and federal level that have been designed to address the market failures that lead to high levels of GHG emissions in Australia (See table 3.3). Such initiatives include:

- the *Black Balloons* information campaigns (currently underway and ongoing);
- Minimum Energy Performance Standards (MEPS) (currently in operation, and scheduled to expand in the scope of products covered);
- Smart Meters (scheduled for mandatory roll-out to all remaining Victorian electricity customers between 2009 and 2012);
- the national ETS (scheduled for commencement in 2010, with some transition period or "soft start" likely in the initial years); and
- rebates for particular energy efficiency activities/products (there are a number of rebates currently available).

The VEET scheme is designed to operate alongside these other initiatives. As the Act was passed by Parliament in December 2007, it too could be considered part of the base case. However, in the absence of supporting Regulations, the VEET scheme cannot operate. Consequently this base case assumes no VEET scheme is in operation. It should also be noted that in the base case, the benefits of the VEET scheme – such as delivering low-cost GHG abatement that an ETS is not expected to incentivise – will not be captured.

6.3.1. The effects of existing and committed measures

The Victorian Government believes that the most effective and least cost means of GHG-abatement is by adopting a range of complementary policy mechanisms that improve the effectiveness of one another – a position supported by, among others, the International Energy Agency.[58] The following table summarises which policy instruments are being employed, or considered, by the Victorian Government to address specific market failures and barriers to energy efficiency.

[58] International Energy Agency, *Promoting Energy Efficiency Investments – Case Studies in the Residential Sector,* 2008.

Table 6.1: Policy instruments matched against market failures

Policy	Bounded rationality	Information failure	Split incentive	Lack of access to electronic information regarding energy efficient products	Negative externality
ETS	Does not address	Partially addresses	Does not address	Partially addresses	Strongly addresses (once introduced)
Rebates	Partially addresses	Partially addresses	Partially addresses	Partially addresses	Partially addresses
MEPS	Does not address	Partially addresses	Does not address	Partially addresses	Partially addresses
Information campaigns	Does not address	Partially addresses	Does not address	Partially addresses	Does not address
Smart meters	Does not address	Partially addresses	Does not address	Partially addresses	Does not address

It should be noted that the fact that a policy addresses a particular market failure does not mean that the market failure has been addressed optimally. This issue is discussed below.

6.3.2.ETS

An ETS is primarily aimed at addressing the unpriced negative externality market failure (i.e. GHG emissions) that currently exists. It focuses on incentivising emissions-intensive industries (particularly the energy supply industry) to invest in new, low-emissions technologies. The costs of doing so are expected to translate into higher prices for a range of goods and services – in particular, energy.

Wholesale electricity prices, however (the point of incidence for future carbon prices) represent less than half of a householder's final electricity bill. The majority of the cost of electricity – retail margin and network costs – will remain largely unaffected by an ETS. By way of example, in 2006 Victoria experienced a 68 per cent increase in wholesale prices due to the removal of hydro generation capacity in the wake of prolonged drought.[59] The net effect of this increase, however, was a 17.5 per cent increase in residential prices.[60]

Carbon permits will simply be an additional operating cost for electricity generators, and will effectively increase their short run marginal costs. The net effect on electricity markets will be an increase in wholesale prices which, from a householder's point of view, will be indistinguishable from energy price fluctuations more generally. Further, in line with the cap trajectory, an ETS-induced carbon price is expected to commence at low levels, and only rise to significant levels gradually over a period of time (i.e. 2030 and beyond). It is the opinion of DPI that this gradual price increase will have less of an impact on householders' energy consumption than a sudden price increase.

A RIS recently prepared for the Council of Australian Governments (COAG) considered the impact of carbon prices on energy demand. The analysis assumed a carbon price commencing in 2012 at $15 and reaching $40 in 2030, with 50 per cent of a consumer's bill

[59] Energy Supply Association of Australia, *Electricity Gas Australia 2007*, 2008, p. 7
[60] Victorian Government, Press Release from the Minister for Energy and Resources, *Drought to Impact on Power Prices*, 30 November 2007

comprising wholesale costs and demand elasticity of 0.2. The RIS concluded that energy demand reductions were expected to be 0.01 per cent in 2015, 0.65 per cent in 2025 and 2.06 per cent in 2030.[61] This corroborates the expectation that carbon prices induced through an ETS are not expected to result in significant energy demand reductions until at least 2030 – the year in which the VEET scheme is due to sunset. Consequently the behavioural response from small-scale end users (e.g. households) to a carbon price signal induced by the ETS is expected to be modest over the time period examined by this RIS.

6.3.3. Rebates

The Victorian Government offers a number of rebates for energy efficiency improvements. While these are numerous and change over time, some of the more relevant rebates at the moment are:

- Solar hot water - $30 million was allocated in the 2008-09 Victorian Government budget to subsidise the cost of solar hot water to customers in regional Victoria.
- Insulation – Sustainability Victoria provides rebates of up to $1,000 for insulation installed in homes which have not previously installed insulation.
- Energy and Water Taskforce – this program targets geographical areas of socioeconomic disadvantage, with a view to lowering energy costs and improving amenity through the provision of energy-saving devices such as low-flow shower roses.

Rebates may provide governments with the means to overcome a range of market failures, such as the split incentives problem, to institute energy efficiency for a range of objectives (not just GHG abatement). Rebates can provide a strong economic incentive to purchase energy efficiency products by offsetting the purchase cost and lowering the pay-back period.[62] Rebates may also minimise economic distortions which may result from alternative policy tools (e.g. regulation or cross-subsidy).

The chief limitation of a rebate policy is that it provides minimal certainty to investors to stimulate the development of an energy efficiency industry – one of the objects of the Act. A case in point is provided by the photovoltaic industry, which has suffered a boom-bust pattern of growth in Australia due to sudden and unexpected contractions in government spending.

For rebate programs to be effective they generally involve high costs. Hence, government rebate programs tend to be relatively short-term in their approach. Further, rebate programs can prove surprisingly difficult to administer. A recent example is the Victorian Government's High Efficiency Gas Heater Rebate. This program, which incentivises the installation of high efficiency gas appliances, was taken up by only 5 per cent of eligible consumers – despite the fact that the program provided an average of 21 per cent of the installed cost of the equipment in question.[63]

6.3.4. MEPS

MEPS seek to improve energy efficiency by eliminating the worst performing products from the market. There are two forms of MEPS:

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[61] Cost Benefit Analysis of Options for a National Smart Meter Roll-Out: Consultation Regulatory Impact Statement, April 2008, p 28

[62] NSW Department of Environment and Climate Change, *NSW State of the Environment 2006*, 2006

[63] High Efficiency Gas Heater Rebate program, administered by Sustainability Victoria, reviewed by DPI in July 2007. While the program was generally considered successful (it met its targeted uptake rate of 5 per cent by eligible households) it illustrates the expense involved in even well-run rebate programs.

- Appliances and equipment – these are regulated through the national Equipment Energy Efficiency program, and address specific types of major energy-using devices in the residential, commercial and industrial sector. This program expands to include new appliances over time as identified.

- Buildings – since 1 July 2006 all class 1 and 2 buildings (houses and flats) constructed in Victoria have needed to meet energy performance standards, commonly described as "5-star."

Regulations to mandate energy efficiency through product standards, assuming they are enforced, are among the most cost effective policy tools for reducing energy use and GHG emissions. The evidence supplied by national RIS's prepared for MEPS and building standards indicates that significant savings can be achieved from these policies at net benefit to consumers. In 2004, the Ministerial Council for Energy's submission paper, *Towards a National Framework for Energy Efficiency—Issues and challenges,*[64] indicated that "the MEPS equipment and appliance program will, between 2003 and 2018, deliver 560 PJ in energy savings with net benefits of over $4.2 billion."[65]

There are, however, three limitations to MEPS (for both appliances and buildings):

- Prescriptive approach – consumers are not afforded the discretion to determine (according to their own circumstances) whether avoided energy costs warrant potentially negative impacts on up-front costs, or loss of other amenity.

- Eliminates only worst performers – MEPS cannot exceed the energy performance of what is commercially available at the time they are enacted. Consequently, MEPS need to limit themselves to eliminating poor outliers in terms of performance.

- Limited applicability – MEPS are only capable of affecting energy efficiency outcomes in line with normal consumer decision-making processes (i.e. point of purchase and, by extension, point of manufacture). MEPS are not capable of incentivising owners of existing, operational equipment or buildings to retire or modify their assets to enhance energy performance. This leads to a significant lag or delay in the transformation of existing stock towards better energy performance.

6.3.5. Education and information strategies

Information failures can be addressed via information and education campaigns. Overall, the evidence suggests that information campaigns can be an important adjunct to other measures.

While there are numerous avenues for consumers to gain access to energy use information, there are currently three primary tools which take the form of Victorian Government policy:

- the *Black Balloons* campaign;

- appliance and equipment energy labelling; and

- smart electricity meters.

These are discussed below.

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[64] Energy Efficiency and Greenhouse Working Group, *Towards a National Framework for Energy Efficiency—Issues and challenges*, 2003, available at http://www.nfee.gov.au/about_nfee.jsp?xcid=64

[65] Ibid, p 7

6.3.5.1. Black Balloons campaign

The objective of the Victorian Government's *Black Balloons* information campaign is to increase energy conservation awareness. In this regard, the campaign has been successful. A recent evaluation of the campaign indicated that 61 per cent of Victorian households had been exposed to the campaign, and that 57 per cent of those who had seen the campaign had been motivated to implement energy saving behaviour. The most common behaviours affected were turning off appliances at the switch, turning off lights and using energy efficient light globes.[66]

Studies have shown, however, that information campaigns alone are not effective at changing behaviour. There exist other barriers which are often activity specific. Some of these barriers include:

- Forgetfulness – individuals are motivated to adopt energy efficient behaviours such as closing blinds and turning off appliances at the switch, but often overlook to do so if not prompted at the right time.

- Lack of previous commitment – studies have shown that individuals who agreed to a small initial request—such as wearing a pin to promote a particular cause—were far more likely to agree to a subsequent larger request like making a donation.[67]

- Desire to maintain normative behaviour – in the 1930's the United States Government provided information, in the form of brochures, to farmers on the loss of top soil and suggesting actions to prevent this problem from continuing. This information campaign failed and farmers were not motivated to change their agriculture practices by simply being more informed about the problem. The Government therefore tried a new approach to address the problem. It instead provided direct assistance to a small number of farmers. This approach was much more successful. As neighbouring farmers observed the changes and had the opportunity to observe them in practice, see the results and discuss them they were far more motivated to adopt similar practices and new agricultural practices spread more quickly.

- External barriers – often the desirable behaviours are inconvenient, unpleasant, costly or time-consuming and simply providing more information to consumers will not overcome these barriers.[68]

Lastly, a distinction needs to be drawn between behaviour change (which can readily cease in the absence of reinforcement by an ongoing campaign) and the purchase of long-lived appliances or building fabric improvements (which will deliver benefits for years, in the absence of conscious decision-making by householders). The *Black Balloons* evaluation revealed that only 4 per cent of those who had altered their behaviour had been motivated to purchase energy efficient appliances.[69] Consequently there is little expectation that an information campaign, by itself, will yield the degree of energy efficiency savings comparable to that sought under the VEET scheme. The existence of a *Black Balloons* campaign does, however, potentially augment the VEET scheme, as a household which is aware of the merits

[66] NWC Research, *Black Balloons campaign evaluation – a research report*, Commissioned by the Department of Sustainability and Environment, 2008
[67] Brock T, Green M, *Persuasion psychological insights and perspectives: Psychological Insights and Perspectives*, 2005, p 153
[68] McKenzie-Mohr D, Smith W, *Fostering Sustainable Behaviour – An Introduction to Community-Based Social Marketing*, 1999, p 10-11
[69] NWC Research, *Black Balloons campaign evaluation – a research report*, Commissioned by the Department of Sustainability and Environment, 2008

of energy efficiency is expected to be more receptive to an offer for eligible products provided through the VEET scheme.

It should be noted that, as of May 2008, the Victorian Government had a further $5 million over one year to extend the *Black Balloons* campaign. No commitment has been made to extend the campaign beyond this point.

6.3.5.2. Appliance and equipment energy labelling

Informing consumers of the energy use implications of appliances prior to purchasing is an important component of broader educational efforts. DPI is of the opinion that consumers may alter their purchasing behaviour in the presence of such information. However, in the case of appliances consumers are confronted with bundled goods, and the relative merits of energy performance over other elements of the appliance (functionality, size, appearance, price, availability) may take precedence. This may compromise the impact of energy labelling.

More importantly, energy labelling information is only capable of influencing the decisions of consumers that are already in the market for new appliances. This tool is not capable of motivating users of existing (but poorly performing) appliances to replace them or to motivate householders to improve the building fabric of properties they currently occupy.

6.3.5.3. Smart meters

Another way of addressing information failures is to provide electricity consumers with time-sensitive price information to enable more reactive behaviour change.

Smart meters refer to technologies capable of recording time of use, with a view to matching this information to time of use pricing information. Smart meters may include a range of additional functionalities including direct, central control of major load (such as air conditioners), automated transmission of data off-site, as well as in-home displays of information. Smart meters aim to improve the efficiency of energy use by allowing for cost-reflective pricing to end-use consumers.

In 2006, COAG committed to the progressive national roll-out of smart meters. The Victorian Government subsequently mandated the use of smart meters for all electricity customers using less than 160MWh per year (large electricity users have had smart meters in place for some time already). In 2006, amendments were made to the *Electricity Industry Act 2000 (Vic)* to require distributors to install these meters commencing in 2009 and concluding by 2012.

The costs and benefits of smart meters were examined in a national RIS completed for the Ministerial Council for Energy in April 2008. The RIS notes that the rate of response is critical in determining energy and GHG savings, and is dependent on both:

- the form of tariff energy retailers offer customers once smart meter data is available to them; and
- consumer responses to this information.

The RIS found that:

- Smart meters would induce a "conservation effect" close to 0 per cent under a low response scenario, and between 3 and 7 per cent in a high response scenario, depending on the functionality deployed.[70]

- Much of this conservation effect was expected to come from behavioural responses. Investment in long-lived energy efficiency improvements was expected to contribute less to this effect.

- The largest benefits by far of smart meters are on network and retail business efficiency (peak demand management), rather than energy conservation.[71]

Consequently, while smart meters are expected to provide some marginal assistance in delivering GHG abatement, their primary justification is in reducing price volatility, and in efficient use of electricity network assets, through load-shifting.

The *Electricity Industry Act 2000 (Vic)* only requires distributors to install interval meters. Electricity retailers are not obligated to use the data supplied by these meters. As the rollout of interval meters is not to be completed until 2012, and electricity retailers will take some time to accommodate this data and develop associated tariff offers, minimal consumer behavioural response is expected during 2009-2011 (the period of operation of the Regulations being examined in this RIS).

6.3.6. Base case summary

In the absence of the VEET scheme, a range of policies will be in place in the short term to deliver GHG abatement and energy savings. However, collectively these policies are not expected to capture the low-cost GHG abatement potential available from the household sector. In the longer term, once an ETS is in place, these existing energy efficiency policies will help to offset cost increases to households, but not to the extent possible with a VEET-style measure.

The base case also forgoes the benefits of the Act. Prior to the introduction of an ETS, the VEET scheme is expected to deliver GHG abatement that would not have otherwise occurred. Following the introduction of an ETS, the base case does not allow the VEET scheme to lower the costs of GHG abetment.

6.4. Overview of the VEET scheme

In contrast to the situation as described above in the base case, the VEET scheme will establish a market for energy efficiency improvements, designed with the expectation that this will deliver accelerated GHG abatement (prior to the introduction of the proposed ETS), lower the cost of abatement following the introduction of the proposed ETS, encourage the efficient use of electricity and gas, and encourage investment, employment and technology development in energy efficiency industries.

[70] CRA International, *Cost Benefit Analysis of Options for a National Smart Meter Roll-Out: Consultation Regulatory Impact Statement*, 2008. See also *Appendix - Cost Benefit Analysis of Smart Metering and Direct Load Control*, 2008, p 9

[71] CRA International, *Cost Benefit Analysis of Options for a National Smart Meter Roll-Out: Consultation Regulatory Impact Statement*, 2008. See also *Appendix - Cost Benefit Analysis of Smart Metering and Direct Load Control*, 2008, p 102

6.4.1. The case for a market-based instrument to pursue energy efficiency

As noted under the market failure discussion above, the relative merits of any given energy efficiency activity is highly situation-dependant. Many approaches taken by governments in the past to encourage energy efficiency have assumed that a particular solution or approach will be cost-effective in all situations. In practice, however, this may not be the case.

One means of overcoming this problem is by establishing a market-based instrument to drive energy efficiency. Markets derive their inherent efficiencies from the flexibility they grant to decision-makers. Rather than prescribing a solution for all agents, a market in energy efficiency – or a white certificate scheme, as they are known – allow two agents (in this case, a household and a certificate creator) to undertake bilateral negotiations in order to establish which energy efficiency activities are desirable in a given situation, and how the costs of undertaking that activity will be shared between the two parties.

The concept of white certificate schemes precedes the VEET scheme. Table 6.2 below summarises the evolution of these schemes internationally and in Australia which led to the Victorian Government commitment to a VEET scheme.

Table 6.2: Summary of international white certificate scheme

April 2002	UK EEC scheme commences, with energy retailers given a collective target of 62TWh of energy reductions from the household sector from 2002-2005.
January 2003	NSW commences the Greenhouse Gas Abatement Scheme – with tradeable certificates able to be produced for energy efficiency (demand side abatement rule).
April 2004	Report by the Allen Consulting Group / Monash COPS for the National Framework for Energy Efficiency (NFEE) examines the macroenonomic impact of a National Energy Efficiency Target (NEET) proposing a 1 per cent increase per annum in energy efficiency. Report finds NEET would lead to an increase in GDP over a 20-year period of NPV $11.1 billion.
January 2005	The Italian White Certificate Scheme commences with electricity and gas distributors given a collective target of 2.9 million tonnes of oil equivalent reductions from all sectors from 2005-09.
April 2005	UK EEC phase 2 commences, with a target of 130TWh of avoided energy to be achieved by retailers from the household sector from 2005-2008.
June 2006	Environment and Natural Resources Committee of the Victorian Parliament recommended “that the Victorian Government establishes an Energy Efficiency Commitment for energy retailers in Victoria, following the model employed in the United Kingdom.”
July 2006	The French White Certificate Scheme commences, with all energy providers given a collective target of 54 TWh of energy reductions from all sectors from 2006-2008.
November 2006	Victorian Labor Party makes an election commitment to develop a VEET scheme.

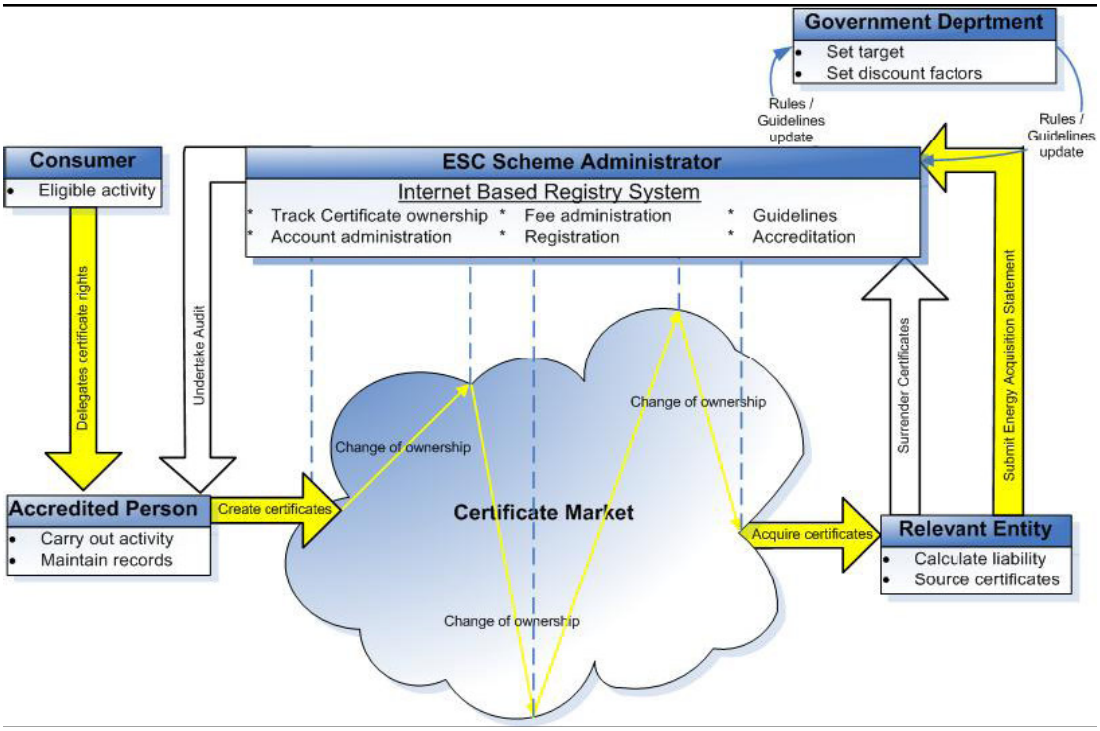
6.4.2.A typical VEET scheme transaction

Consistent with the general model of white certificate schemes internationally, the VEET scheme creates a market in energy efficiency improvements. This overcomes the market failures applying to household decision-makers by creating incentives for third parties (certificate creators) to make these improvements more readily accessible to households. From a householder's point of view, certificate creators will offer them energy efficiency products. The householder, if they chose to accept the offer, will sign a form assigning to the certificate creator the right to produce a certificate based on an eligible activity having taken place in their premises.

The certificate creator then inputs the data from this form into a web-based registry, administered by the scheme administrator. The registry calculates the number of certificates attributable to that activity, and registers those with the certificate creator. The certificate creator is then free to sell these certificates to any party. All transactions must take place on the web-based registry (price information, however, is not disclosed on the registry – this is a matter for private, bilateral negotiation). Ultimately, energy retailers will purchase these certificates to acquit their annual liability, as noted above.

The transactions involved in the VEET scheme are summarised in the diagram below.

Figure 6.3: Summary of VEET transactions



The way in which the scheme will look to different parties can be described as follows:

VEET transactions from the perspectives of different parties

The householder

Household Y is approached by certificate creator X. Certificate creator X offers to provide an energy efficiency assessment of household Y at no charge. Household Y agrees. Certificate creator X identifies a list of potential activities which they can implement in the household.

Some of these are free to household Y; others would require some contribution by household Y. Household Y agrees to all those items offered for free, and to a small number of items which require some contribution from themselves. This contribution may take the form of cash; it could also take the form of a contractual commitment (i.e. to switch to a new retailer for example).

Certificate creator X installs the products in question. Household Y signs an assignment form, and gives it to certificate creator X. Household Y's energy use, and therefore their energy bill, is reduced.

The certificate creator

Certificate creator X identifies household Y as a potential source of certificate creation. Upon installing items in Household Y's premises, and obtaining their signature on assignment forms, they return to their office, log on to a web-based registry with their own ID and password. They input data from the assignment form. The registry calculates the number of certificates which can be created by the transactions at household Y. Certificate creator X hits the "send" button, sending the scheme administrator a request to register that number of certificates. The scheme administrator issues certificate creator X an invoice to register the certificates. Certificate creator X provides banking details and actions payment. The scheme administrator sends certificate creator X a list of registered certificates, each with a unique identifier.

At some point in the future, certificate creator X sells the certificates to energy retailer Z. Certificate creator X transfers the certificates, online, to energy retailer Z.

Also at some point in the future, the scheme administrator would audit certificate creator X's operations. In doing so, the scheme administrator may gain access to certificate creator X's premises, and demand to see the original assignment forms provided by household Y, as well as any associated documents (e.g. receipts for the purchase of the products installed).

The energy retailer

Energy retailer Z makes a wholesale acquisition of electricity totalling Q megawatt hours (MWh) in 2009. Energy retailer Z multiplies this wholesale acquisition by the VEET scheme GHG reduction rate, to identify their year 2009 liability under the scheme. Energy retailer Z is also an accredited certificate creator and purchases and creates sufficient certificates to meet their liability – including purchasing some from certificate creator X. Energy retailer Z provides a wholesale acquisition statement, together with the required quantity of certificates, to the scheme administrator before 30 April 2010, in order to acquit their liability.

The scheme administrator

Certificate creator X seeks, and receives, accreditation under the VEET scheme. Certificate creator X is issued a user ID, and password, which gives them access to the administrator's web-based registry.

At regular intervals, certificate creator X sends a notification to the administrator, seeking registration of a number of certificates, relating to a specific activity in a specific time and place. The administrator, upon receiving payment for the registration of those certificates, issues a unique identifier to all the certificates, and transfers title to certificate creator X.

By 30 April following any given calendar year, energy retailer Z submits a scheme acquisition statement, detailing how much energy they acquired, and surrendering a corresponding amount of VEET certificates. The scheme administrator extinguishes these.

At regular intervals, the scheme administrator undertakes an audit of certificate creator X, to determine that they can prove the claims they made with respect to the certificates they have created.

In the event of non-compliance by either certificate creator X or energy retailer Z, the scheme administrator can apply penalties.

The scheme administrator does not have access to price information – i.e. the form, nature and extent of any inducement or discount provided by the certificate creator to the household. This is a private contractual matter between the householder and the certificate creator.

The Victorian Government

The performance of the VEET scheme is monitored and evaluated, based on data captured through the web-based registry – together with other information, including consumer surveys, and market surveys (to identify price information). This information, together with stakeholder consultation and broader policy considerations, informs the setting of future scheme phase design parameters – including target levels, abatement factors and eligible activities.

A variation on the above example can take the form of a householder who happens to be in the market for an appliance. Once in the shop, the appliance retailer (who is an accredited certificate creator) persuades the householder to purchase a high efficiency version of the appliance in question, by offering them a cash discount based on the number of VEECs that can be created and the market price of VEECs. Householder Y signs the assignment form as per the example above. The remaining transactions are identical; the sole difference is that the transaction costs to the certificate creator are lower, because the householder has effectively approached them.

6.4.3. How the VEET scheme will address residual market failures

The VEET scheme allows that market to decide, through bilateral negotiations between accredited certificate creators and householders, which activities are appropriate. The key residual benefit of this approach over and above existing measures lies in its ability to drive flexible low-cost GHG abatement in the residential sector. This may result in a householder in Swan Hill deciding to install insulation whilst a householder in Ballarat installing a gas/ LPG space heater.

The VEET scheme will meet its primary objectives – as stated in the Act and Regulations – by addressing information failures, bounded rationality, split incentives and a lack of access to electronic information regarding energy efficiency products.

It is the opinion of DPI that the VEET scheme addresses these residual market failures by incentivising a dedicated tranche of businesses – certificate creators – to do so. DPI expects that these incentives could operate as described below.

Search costs are minimised by lessening the number of parties who must meet these costs. Rather than having millions of individual household information searches, Government does much of this itself, centrally, determining average energy savings benefits of a limited number of activities. Certificate creators then perform the role of providing that information to households. The net benefit of this innovation is detailed in section 7 below. The VEET scheme may also shift to a more advanced stage the starting point for householders seeking information on energy efficiency products. In this environment, householders will experience search/transaction costs DPI expects that they will be less than the base case.

Issues associated with individual search/transaction costs are overcome, as a series of bilateral negotiations occurs between household and certificate creator, to determine in which circumstances an activity does in fact constitute a cost-effective initiative. Both parties – householder and certificate creator – are incentivised to avoid the installation of a product in a sub-optimal setting (a setting in which cost-effective energy and greenhouse savings will be unlikely to eventuate).

Certificate creators may structure information around specific activities (e.g. the installation of particular products) allowing householders to directly link energy savings to specific decisions (i.e. whether or not to install a particular product). This overcomes one of the chief deficiencies inherent in energy billing information.

The bounded rationality of consumers is overcome, as certificate creators are capable of offering households inducements to purchase, or have installed, energy saving devices. This could include items which the householder was not in the market for, or a more energy efficient version of a product which the householder would otherwise have purchased. While the extent and nature of these inducements are determined by a combination of a regulatory framework (i.e. the VEET market structure) and decisions by scheme participants, these inducements on the part of certificate creators are expected – in the opinion of DPI – to address the high discount rates generally applied by consumers to energy efficient products.

Split incentives can be partially overcome by the VEET scheme, as the energy retailers and installers of common household products have an incentive to sell the most efficient varieties of these respective products. These retailers and installers can earn VEECs for the sale of such products – thus providing them with an inducement to attract customers towards this "high end" of the market. DPI considers that there may also be an incentive under the VEET scheme for landlords to improve their property's energy efficiency by undertaking eligible activities that are free of charge. Air sealing is one eligible activity that is expected to fit in this category. A landlord that undertakes this action may experience greater tenancy occupancy certainty due to the associated goodwill by the tenants and their reduced energy bills.

In addition to meeting the objectives of the parent Act, residual benefits of the scheme may include behavioural change within the residential sector. For example, the VEET scheme may encourage the widespread uptake of eligible activities such as installing low-flow shower roses, energy efficient lighting and air sealing.

For example, the VEET scheme may induce behaviour change by facilitating the following. Assume a given product, standard product X, costs $100. Their substitute product, product Y, is energy efficient and retails at $140. Under the VEET scheme, product Y delivers two tonnes of lifetime CO_2-e abatement. Given a market price of $26 per VEEC, a certificate creator is able to sell product Y on the market for $95 including administrative costs. In this example, a householder in the market for this particular type of product is expected to purchase product Y.

The example above sends a strong signal to householders on the relative energy efficiency of product Y. DPI expects this signal occurring on a large scale may address, among other things, one of the two primary symptoms of bounded rationality identified in this RIS – high discount rates for energy efficiency products.

Existing energy efficiency measures have not been as effective in meeting the above market failures as the VEET scheme may prove. These issues are further discussed in section 6.5 below.

6.4.4.A transitional measure

The VEET scheme is not intended to last indefinitely. The Victorian Government expects that, over the course of the next two decades, Australia will be on track to achieve its emissions reductions objectives, and Victorian householders will be sufficiently resilient and prepared to adapt to consequent changes in our energy markets. The VEET scheme is being implemented largely to assist a particularly vulnerable sector to overcome this transitional period.

As noted above, the Act specifies that the scheme will end on 31 December 2029. In addition, the scheme will comprise of three year phases, with key scheme design elements (such as annual targets, eligible activities and abatement methodologies) to be potentially reset, through new regulations, at every phase change. In addition, the Minister must undertake a review of the Act by 31 December 2011 to ensure it has achieved its objectives. It is envisaged that future regulations will also be subject to a RIS process.

The reasons for these time bounds relate to the uncertainty regarding the policy problems being addressed. Government's expectations regarding the impact of other greenhouse measures (such as an ETS) as well as the VEET scheme may prove to be incorrect. If this is the case, the chosen scheme design will allow the Victorian Government to correct for unanticipated negative consequences.

6.4.5. National energy efficiency targets

Where it is in the interests of Victoria's economy or community to pursue actions that do not require national uniformity (e.g. Victorian specific schemes due to unique local circumstances) , the Victorian Government will develop climate change measures that deliver benefits to the State, and which demonstrate a continued commitment to responding to climate change.[72]

While the VEET scheme is currently a Victorian-specific initiative, there is considerable interest from other jurisdictions in similar schemes.

For example, South Australia has committed to a Residential Energy Efficiency Scheme (REES) to commence on 1 January 2009. The REES resembles the VEET scheme, although there are some differences in terms of legal structure.

In June 2008, New South Wales also announced its intention to reform the demand side abatement component of the New South Wales Greenhouse Gas Abatement Scheme (GGAS) to effectively create a VEET-style white certificate scheme – also commencing 1 January 2009. DPI has been working with these jurisdictions in an attempt to harmonise, to the extent possible, these schemes.

In addition, COAG is currently considering a range of energy efficiency measures which are suitable for national implementation. Market based energy efficiency schemes may be identified as a suitable policy instrument for national roll-out.

Consequently, a consideration in developing the VEET scheme has been how to structure a scheme which best lends itself to national application. While it is not possible to anticipate exactly what form a national market based energy efficiency scheme would take, some likely principles for consistency are:

- liabilities should reside with energy retailers (both electricity and gas);

[72] Victorian Government, *A Climate of Opportunity - Summit Paper*, 2008, p 7

- targets should be expressed annually, in units of GHG avoided;
- abatement should be attributed to energy efficiency and fuel switching activities, based on the estimated lifetime abatement benefit of activities;
- periodic scheme reviews should be held to determine if activities, abatement methodologies or targets require revision;
- uniform methodologies should be employed to determine the greenhouse intensity of energy, as well as avoided energy from, and expected lifetime of, individual energy efficiency activities; and
- data disclosure and reporting requirements should be uniform for scheme participants.

It is also expected that future national market based energy efficiency schemes may need to allow individual jurisdictions flexibility in determining some matters, including:

- which activities are locally appropriate for inclusion in the scheme; and
- specific abatement factors – noting that these will be determined by local circumstances.

6.5. Compatibility with an ETS

One concern raised by some stakeholders is the potential for confusion, or double-counting, between the VEET scheme (or any other white certificate scheme) and the forthcoming national ETS. There is little reason to suspect that this will be a material issue, however, as discussed below.

Firstly, different parties are directly involved in each scheme. The ETS is likely to place a legal obligation on major emitters of CO_2-e (i.e. those exceeding a threshold size) to acquire, and surrender, permits. The preferred position of the Commonwealth Government – consistent with existing reporting requirements under the *National Greenhouse and Energy Reporting Act 2007* – is that this threshold be 25,000 tonnes of CO_2-e per annum on a facility basis.[73] The VEET scheme, however, is aimed at small end users of energy. The VEET scheme incentivises energy efficiency in households, where annual greenhouse emissions average approximately 12 tonnes per annum. Even at such time as the VEET scheme might expand to other sectors – such as small and medium-sized industrial and commercial businesses – the coverage of the scheme, in terms of facilities hosting energy efficiency improvements, would not overlap with the coverage by an ETS. To the extent that gas retailers are considered "facilities" with respect to the combustion emissions of their end-use customers, the existence of two completely different currencies will help prevent confusion.

Secondly, the VEET scheme and the ETS are two separate markets. There is no fungibility between the two schemes. A certificate under the VEET scheme has no standing under the ETS; similarly, an emissions permit under the ETS will have no status under VEET. A liable party under a given scheme will not be able to acquit that liability with a currency from the other scheme.

Lastly, as noted earlier, the UK, France and Italy have effectively operated white certificate schemes in parallel with a European-wide ETS, with no identified adverse impacts on either scheme.

[73] Commonwealth of Australia, *Carbon Pollution Reduction Scheme Green Paper*, 2008, p 98

The three specific options for operationalising the VEET scheme are now examined.

6.6. Option 1: Project-based assessment

This option would require energy retailers or the relevant certificate creator to approach the Victorian Government with their own projects and proposed activities for improving energy efficiency in Victorian homes and thereby generate VEECs. Under this approach, VEEC-creating activities could include any activity identified by the proponent, using the abatement methodology of their choice. In essence, the considerations outlined in "scheme details impacting on cost" would be internalised by certificate creators on a project-by-project basis.

To support their project ideas, energy retailers and certificate creators would need to provide supporting data and information to prove the actual GHG abatement that would occur. The Victorian Government (that is, the Victorian Government agency charged with responsibility for evaluating activities) would then review proposals and the supporting evidence on a case-by-case basis and either approve, amend or reject the proposals.

The case study presented below outlines how Option 1 could conceivably operate.

Case Study – Project Assessment Method

Certificate creator X undertakes research to establish the optimal way for it to make a claim for VEET certificate creation at least cost to itself. First, certificate creator X researches what the abatement benefit of avoided electricity and gas use is, and what the expected lifetime of various products is, to determine relative GHG abatement benefits of products.

Next, certificate creator X determines what the total costs to itself would be to purchase and install the products above (capital costs, labour costs, and associated on-costs such as transport). Then certificate creator X estimates the potential market uptake (number of households) for the various products.

Based on this analysis, certificate creator X determines that there is a potentially lucrative project based on the roll-out, over 12 months, to 30,000 middle-income households in a particular geographical area, of two products - low energy lighting and air sealing.

Certificate creator X details all these assumptions in a project plan. Each product is assumed to generate 2 tonnes of abatement per year, per household, and last for 5 years. This yields a total of 10 tonnes per house per product, or 20 tonnes for each house. Over 30,000 houses this results in a claim that the project is worth 600,000 certificates. The project is submitted to the scheme administrator for assessment.

The scheme administrator employs a dedicated officer to review the project plan and check its claims. The scheme administrator determines that the abatement benefit of the activities is overstated, and – after a period of negotiation with the project proponent- decides that the project is actually worth 500,000 certificates.

Based on this figure, certificate creator X is accredited to create, and sell, 500,000 certificates. The revenue from this sale provides certificate creator X with the cash required to transact the installation of the activities in the project plan.

From point of project inception to the point of sale of certificates, 5 months have elapsed. The actual delivery of the products now commences, and extends for the proposed 12 months.

Once the 12 month project is completed, the scheme administrator audits certificate creator X to ensure that there is sufficient documentation (assignment forms, purchase receipts etc) to demonstrate, to a level of confidence, that the activities have in fact taken place.

Before the completion of the above project, certificate creator X will commence research on the next project, with a view to securing ongoing revenue from certificate sales.

6.7. Option 2 - Prescribed list approach

A different approach to Option 1 above is for Government to determine, to the greatest extent possible:

- those activities which could take place in the household sector; and
- their abatement value.

The chief benefit of this approach is that it further reduces transaction costs, by performing a single set of calculations for all scheme participants, rather than requiring individual businesses to undertake these themselves. For this reason, this general approach is considered to address the residual market failure of information failure (and, specifically, transaction costs) more fully than Option 1.

6.7.1. Identifying activities for Option 2

Option 2 prescribes activities that would be eligible to create VEECs. This requires Government to centrally determine which activities may potentially occur in the household sector.

DPI and its associated Victorian Government agencies (Sustainability Victoria, Department of Sustainability and Environment and the ESC), in conjunction with independent consultants (Saturn Corporate Resources P/L, Carbon Market Economics) identified the following activities as technically possible in Victorian households. That is, the relevant technology is commercially available in Victoria, and Victorian households have the physical characteristics necessary to host these technologies:

Table 6.4: Technically potential activities in the Victorian household sector

Activities			
1	Undertake home energy audit	22	Gas/LPG boosted solar hot water replaces gas/LPG water heater
2	Improve quality of existing insulation	23	Solar pre-heater for an existing gas/ LPG water heater
3	Apply reflective paint or coatings to roof or walls	24	Installation of high efficiency ducted gas heater to replace existing gas ducted heater
4	Undertake voluntary energy conservation	25	Installation of high efficiency ducted gas heater to replace existing central electric resistance heater
5	Apply reflective/emissive films to windows to avoid summer heat gain	26	Installation of ducted air-to-air heat pump to replace existing ducted air-to-air heat pump

6	Install insulation blanket on electric resistance storage water heater	27	Installation of ducted air-to-air heat pump to replace existing central electric resistance heater
7	Plant shade trees/vegetation to prevent solar heat gain in summer	28	Installation of gas/ LPG space heater
8	Purchase power board or similar device to avoid standby power losses	29	Install high efficiency space air-to-air heat pump
9	Install solar-powered air heater	30	Installation of ceiling insulation in existing home with uninsulated ceilings
10	Purchase high efficiency dishwasher	31	Installation of under floor insulation in existing home with uninsulated floors
11	Purchase high efficiency clothes washer	32	Installation of a thermally efficient window
12	Install geothermal heat pump	33	Retrofit of existing single glazed window with a fixed attachment which raises thermal efficiency of existing window
13	Install gas clothes dryer	34	Air sealing
14	Purchase high efficiency entertainment equipment	35	Installation of low energy GLS lamp
15	Purchase high efficiency computer, IT equipment	36	Installation of low energy small decorative lamp
16	Purchase high efficiency pool pump	37	Installation of low energy reflector light lamp
17	Purchase high efficiency electric clothes dryer	38	Installation of low energy downlight
18	Gas/LPG water heater replaces an electric resistance water heater	39	Installation of low flow shower rose replacing conventional shower rose
19	Electric boosted solar or heat pump hot water heater replaces an electric resistance water heater	40	Destruction of refrigerator purchased before 1996
20	Solar retrofit kit fitted to an existing electric resistance water heater	41	Purchase of high efficiency refrigerator
21	Gas/LPG boosted solar hot water heater replaces electric resistance water heater	42	Purchase of high efficiency freezer

6.7.2. Abatement methodologies

Having identified, as best as possible, the extent of activities capable of occurring in the household sector at this point in time, the Government then estimates the abatement benefit of the above activities based on the following factors:

- the annual net energy saving;
- the expected life of the energy saving, in years; and
- the GHG intensity of the energy affected by the activity.

Annual net energy saving

Annual net energy saving requires a defensible methodology whereby the net energy impact of an activity can be defensibly assessed. Annual energy savings of an activity is potentially a function of the following sub-factors:

- the relative energy efficiency of the product on which the activity is based;
- the size of the energy efficient product;
- the efficiency of any existing equipment being replaced;
- the climate zone in which the house is located;
- the orientation of the house;
- the condition of the house (size, materials, age, quality of construction);
- the number of occupants of a house, and their patterns of occupancy;
- the location within the house in which the energy efficient product is installed;
- the type of fuel used in the house;
- the level of electricity network loss at the house;
- whether or not the product was correctly installed;
- whether or not the product is correctly used; and
- whether or not any additional consumer behaviour is induced through the activity (either negative in the form of "rebound" effects, or positive in the form of enhanced energy conservation).

The rebound effect

Rebound refers to the fact that savings in energy expenditures from enhanced energy efficiency – that relatively lowers the price of energy – can cause an increase in consumption.[74]

Table 6.5: Estimates of the substitution rebound effect by end use for the US residential sector

[74] ACIL Tasman, *Policies for Energy Efficiency in the Household Sector: an Evaluation of Potential Options* commissioned by the Victorian Department of Treasury and Finance, 2007, p 46

End Use	Rebound Effect (%)	Number of Studies
Space heating	10-30	26
Space cooling	0-50	9
Water heating	<10-40	5
Lighting	5-12	4

Data source: Greening, L., Greene, D., Difiglio, C, *Energy efficiency and consumption – the rebound effect – a survey, Energy Policy (28)*, 2000, p 398

Computable general equilibrium modelling undertaken for the NFEE indicated that economy wide rates of rebound on the NFEE savings estimates was approximately 25 per cent.[75] This is consistent with the results of other studies.

There is some academic literature stating that low income households that are constrained in their use of energy services – such as heating – consume a significant portion of the savings on additional energy services, resulting in rebound.[76]

The VEET scheme is a market based instrument that drives greater energy efficiency. Under the scheme, a householder is free to spend the additional disposable income gained from energy savings wherever their marginal utility is maximised.[77] It should also be noted that even in the presence of rebound a household, whilst using more energy, may emit less GHG given their greater energy efficiency.

Most households do not face this financial constraint, as energy is a small proportion of the total household budget, and energy is viewed as a necessity. Overall, the impact of rebound is likely to be moderate other than in low income households.[78]

Determining each of the annual net energy saving sub-factors outlined above requires a different degree of data intensity – and data intensity drives administrative cost. Where data can be determined by a scheme administrator centrally, it reduces costs. Where data capture is required at an individual household level, costs are increased. This is summarised in the table below.

Table 6.6: Energy saving sub-factors and their cost impacts

Energy saving factors	Centrally determinable	Household specific
relative energy efficiency of product	Yes – existing Australian standards, labelling regulations	n/a
size of product	Yes – purchase receipts	n/a
efficiency of equipment being replaced	No	Requires assessment by certificate creator
climate zone	Partial – climate zones and	Requires disclosure of

[75] Adams P. and Begley R. 2004, *Modelling opportunities for improved energy efficiency*, Presentation to NFEE workshop, (available at www.nfee.gov.au), 2004

[76] Hong, S, Oreszczyn, T, Ridley, I, *The impact of energy efficient refurbishment on the space heating fuel consumption in English dwellings, Energy and Buildings 38 (10)*, 2006 and Herring H. and Roy R., *Technological innovation, energy efficient design and the rebound effect, Technovation* 27, 2006

[77] As discussed, modelling by McLennan Magasanik and Associates has indicated that each Victorian household will save an average of $45 per annum under the VEET scheme.

[78] ACIL Tasman, *Policies for Energy Efficiency in the Household Sector: an Evaluation of Potential Options,* commissioned by the Victorian Department of Treasury and Finance, 2007, p 46

Energy saving factors	Centrally determinable	Household specific
	their attributes can be centrally determined	postcode and match of postcode to zone
orientation of the house	No	Requires assessment by certificate creator
condition of the house	No	Requires assessment by certificate creator
number of occupants	No	Requires ongoing monitoring
location within house	No	Requires assessment by certificate creator
type of fuel used	Partial – fuel use zones can be centrally determined	Requires disclosure of postcode and match of postcode to zone
level of electricity network loss	Partial – network loss zones can be centrally determined	Requires disclosure of postcode and match of postcode to zone
correct installation	No	Requires assessment by certificate creator
correctly use	No	Requires ongoing monitoring
rebound	Partial – some discounting can be applied to certificate values based on best estimates of expected rebound	Requires ongoing monitoring

The most administratively costly sub-factors are those which require ongoing monitoring. Those requiring assessment by a certificate creator are less so; those which can be partially or fully determined centrally will yield the lowest administrative costs.

Conversely, if Government were to ignore all of the above sub-factors and simply assume a single average abatement figure for each activity, across all households, it would reduce administrative costs, but at the expense of:

- masking significant variation in actual greenhouse benefits;
- under incentivising some households;
- over incentivising other households; and
- not directing the efforts of the VEET scheme towards genuinely least-cost abatement.

Expected life of the energy saving

Estimating the expected life of the energy saving requires an estimate of the longevity of the product in question. For many products, market information is available on the average life of a product. Where this information is available, estimations of life expectancy are not costly.

Where this information is not available, an estimate of the life expectancy must be made based on stakeholder input. Obtaining such information from stakeholders has proven to be time-intensive rather than costly.

For some products, it may safely be inferred that the product will last for the life of a building in which it is installed (examples include glazing, air sealing and insulation products). Consequently very long product life (40 years) could be safely inferred.

Attributing future benefits to the present normally requires the use of a suitable discount rate. This approach is common when benefits are expressed in financial terms. Where benefits are described in environmental terms, however (avoided GHG emissions), this approach is somewhat less straight forward. While the benefit of energy efficiency can also be thought of in terms of avoided energy use – which does have a financial value – consideration also needs to be given to the likelihood that future energy costs will increase, potentially negating the application of conventional discount rates. This issue is discussed further below.

Greenhouse intensity of fuel

There are two fuels relevant to the VEET scheme – electricity and gas. The greenhouse intensity of gas is not particularly dynamic – i.e. the emissions associated with the production of a useful unit of energy do not change significantly from year to year. This is principally because these coefficients are a function of:

- where the natural gas comes from (the well); and
- how it is used by the end-user.

While different gas wells would also produce different lifecycle estimations of CO_2 equivalents, the development of new gas supply is sufficiently gradual as to make large changes in greenhouse coefficients of small users relatively unlikely. Similarly, natural gas used in the home is essentially used in the same way (combusted for its heat value) and is not likely to change dramatically in the course of the three years covered by these regulations.

Lifecycle GHG intensities for small users are estimated by the Commonwealth Government (Factors and Methods Workbook). Consequently this information is available at essentially no cost to the VEET scheme administrator.

The GHG intensity of electricity is somewhat more complex. There are two methods whereby this can be estimated:

- average GHG intensity; and
- marginal GHG intensity.

Average versus marginal GHG intensities

The GHG intensity of electricity is a product of the particular generation units making electricity in the National Electricity Market (NEM) at a point in time. Different generation units have different GHG intensities, based on the fuel they use and the technology they employ. Different generation units also have different costs of production. The NEM is designed to dispatch generation units in response to demand at a point in time. The lowest cost generation units are dispatched first, if demand is high the NEM dispatches generation units further up the "merit order" (the relative order of cost).

Brown coal generators in Victoria, using conventional technologies, are currently the lowest cost generators in the NEM. They are also the most GHG intensive. Black coal generators in New South Wales and Queensland are less greenhouse intensive, but somewhat more expensive. Gas turbines are even less greenhouse intensive, but are also more expensive (open cycle gas turbines are the most expensive principal power stations in the NEM). The most expensive generation unit dispatched by the NEM, at a point in time, is known as the marginal unit.

The *average* greenhouse intensity of an end-user of electricity is calculated by simply averaging the GHG intensity of all electricity sold in the market, in a year, and multiplying that by the number of units of electricity consumed by the end user. Basically, this method assumes that a household's electricity is supplied by a representative sample of all the electricity generators who are dispatching electricity into the grid. It is a useful way of attributing responsibility for greenhouse emissions upstream, to end-users downstream. For this reason this methodology has been employed in communicating to householders on their contribution to greenhouse (e.g. the *Black Balloons* campaign).

The *marginal* greenhouse intensity serves a different purpose. Rather than attributing responsibility for emissions to an end user, the marginal GHG intensity estimates the actual impact on GHG emissions from avoiding a specified quantum of energy use (as driven by a particular policy, such as VEET). Using a computerised model of the electricity market (in this case, MMA's Strategist model), a quantum of end-use energy demand is removed. When electricity demand is decreased, the market responds by removing the marginal unit of generation at a point in time. The greenhouse impacts of the policy are therefore a function of the greenhouse intensity of the (removed) marginal generation units. As explained above, these marginal generation units are (currently) less GHG intensive than the average GHG intensity.

To estimate the GHG savings of the VEET scheme, the Victorian Government has decided to employ a marginal emissions coefficient. This was regarded as essential for Victoria, given the considerable discrepancy between our average emissions coefficient (approximately 1.35 tonnes/MWh) and the estimated marginal greenhouse coefficient resulting from the removal of the quantum of energy assumed for the VEET scheme in its first phase (0.9 tonnes/MWh, resulting from the removal of 218 GWh in 2009, rising to 1,168 GWh in 2016).

The GHG intensity of fuels (electricity in particular) is expected to decrease with time, however. This is primarily expected to be driven by the operation of an ETS (this change in intensity will affect both average and marginal GHG coefficients). This change in emissions intensity will be addressed in the VEET scheme through the scheduled 3-yearly scheme phase reviews.

How to approach discounting of future benefits?

Scheme phase reviews will allow for recalibrations in certificate quanta for future certificate creation. Such reviews do not, however, resolve the problem of how to reward upfront the full lifetime abatement benefit of an activity within a given scheme phase, without overstating those benefits. Four potential ways to address this problem are:

- apply an annual discount rate to financial savings from avoided energy attributable to an activity;
- apply an annual discount rate to the energy saved from an activity;

- apply an annual discount rate to future greenhouse intensities when determining lifetime abatement benefits; or

- truncate the expected lifetime of a product to a period sufficiently short (20 years) so as to avoid significant risk of overstating abatement benefits.

Applying annual discount rates to financial savings would require some estimate to be made of those benefits in any given year. While nominating a defensible financial discount rate is straight-forward (e.g. 6.5 per cent annually), accuracy would dictate that this should be counterbalanced by some prediction of future energy price trends. This is difficult in the current economic and policy environment. It is expected that, with the advent of carbon pricing through an ETS, plus complementary policies, retail energy prices will increase. Global pricing parity pressures on traded stationary energy fuels (natural gas, steaming coal) is expected to have a further upward impact on Australian domestic energy prices. Taken together, these energy price increases, if annualised, could negate commonly used discount rates. Consequently it is very difficult to make an accurate determination of what the net present value of future energy savings will be over the period of time in question. Lastly, the value of a VEEC is expressed in terms of tonnes CO_2-e avoided, rather than financial savings – making the application of this approach problematic in principle.

Applying annual discount rates to units of saved energy would not reflect the actual energy benefits of activities (which, for the most part, provide continuous, rather than declining, energy savings benefits). Further, as above, VEET certificate values are stated in terms of avoided units of CO_2-e avoided – not units of energy avoided.

Applying annual discount rates to future greenhouse intensities is difficult due to fundamental uncertainties in future energy market evolution. As noted above, this will be a function of investor behaviour, and market operation, in a context of carbon pricing, coupled with complementary policies, and global energy market evolution. While this approach is possible, it is inherently speculative.

Truncating product lifetimes to a sufficient short period is, in some respects, artificial, as many products will last longer than this (see discussion of ceiling insulation below). This approach does have the virtue, however, of being simple, and avoiding the need for multiple, highly speculative (and administratively intensive) assumptions as detailed above. Consequently this option has been structured to employ this truncating product lifetimes approach.

6.7.3. Applying abatement methodologies to activities

The example of how these abatement methodologies apply to an activity is detailed below.

Abatement methodologies applied to an activity: ceiling insulation

The certificate value of a unit of ceiling insulation can be given as:

Annual avoided energy x GHG intensity of avoided energy x expected life of insulation

Avoided energy and GHG intensity of avoided energy consists of the following factors:

Relative energy efficiency of product

The r-value of ceiling insulation was prescribed for purposes of the regulations as being a minimum of 3.5. This is based on consultation with industry stakeholders and experts who indicated that this standard was both high enough to generate appreciable energy savings, but

still cost-effective and physically capable of being accommodated in most houses. By effectively demanding a single-value for r-value, this component of subsequent energy savings calculations was made easier.

Size of product

The energy savings benefit was attributed directly the number of square meters of insulation installed in a ceiling. A minimum size of 20m^2 was indicated in the regulations, to prevent frivolous claims for certificate creation (any installation less than 20m^2 would have at best a minimal effect on building thermal performance).

Spatial considerations - climate zone

Consistent with the climate zones established for the purposes of the Victorian Building Regulations, 3 climate zones were established, reflecting the characteristics of different parts of the state: hot, mild and cold. Consequently, all else being equal, a meter of ceiling insulation in cold Victoria (e.g. Ballarat) accomplishes more greenhouse abatement than a meter in hot Victoria (Mildura). It should be noted that the vast majority of space conditioning energy use is for heating, not cooling, across all Victorian climate zones.

Spatial considerations - type of fuel

Natural gas has a lower greenhouse emissions coefficient (0.0573 kg/MJ)[79] than electricity (0.2675kg/MJ).[80] Victoria was disaggregated into two regions for purposes of fuel mix: metro and regional. Metro region fuel use is predominantly natural gas; regional Victoria is predominantly electric, with a significant portion of firewood. Consequently, all else being equal, a meter of ceiling insulation in regional Victoria accomplishes more greenhouse abatement than a meter in metro Victoria.

Spatial considerations – network losses

Electricity is lost when it is transmitted and distributed. In general, the losses are greater where greater distances are involved. Consequently electricity use by regional electricity consumers involves greater losses than metro users – on average, total network losses are 5 per cent for metro users, and 11 per cent for regional users[81]. Consequently, where ceiling insulation is installed in regional locations, it provides an additional abatement benefit.

Sustainability Victoria, in conjunction with Tony Isaacs Consulting P/L, has developed a model of the Victorian household sector. The model allows for the calculation of the energy use impacts of alterations to household characteristics, disaggregated according to factors such as size, orientation, location, age and general characteristics of the house. This model allows for the calculation of average values within identified parameters. These identified parameters are those which are centrally determinable as noted in table 6.1 above.

Life of insulation

It was assumed that ceiling insulation installed in a home would remain in place for the remainder of the building's life. The life of building in question was estimated by reference to data on Victorian homes. Ceiling insulation under VEET can only be installed in existing dwellings without ceiling insulation. These are all pre-1990 dwellings, with an estimated

[79] Australian Greenhouse Office, *Factors and Methods Workbook*, 2007, Table 2
[80] McLennan Magasanik and Associates for DPI, 2007 – based on marginal coefficients reflecting impact of VEET scheme (see below)
[81] DPI calculation, based on NEMMCo transmission loss factors, 2007-08 and distribution losses from the ESC Distribution Price Review, 2006-2010

average remaining life expectancy of 40 years. As per the discussion above, however, the inability to accurately estimate the greenhouse abatement benefit of an activity over an extensive time period dictated that this greenhouse benefit should be truncated to 20 years.

Results

The considerations above were taken together, and inputted to the Victorian housing model, to produce different regional values for determining the benefits of ceiling insulation – 1.06 in Melbourne; 0.86 in mild regional Victoria; 1.23 in cold regional Victoria and 0.79 in hot regional Victoria. These regional values get multiplied by the underlying abatement factor per (in this case, 0.205 certificates/ m^2) to produce the certificate value relevant to a particular installation or instance of that activity.

By way of illustration, a 100m^2 insulation job in Melbourne would earn 22 certificates.

The above approach, or variants, would be applied to all of the 42 activities in the list of technically possible activities under Option 2.

6.8. Option 3 – minimise scheme costs

Option 3 takes the same approach as Option 2, but attempts to reduce the costs of the scheme by examining all the above activities with a view to applying a *prima facie* cost/benefit test to them. In other words, does the benefit of having an activity potentially available for certificate creation warrant the increase in the costs associated with including that activity?

The chief costs associated with including an activity are:

- extra data capture and interrogation; and
- risks to scheme integrity (accuracy of calculating greenhouse emissions).

The chief benefits of including an activity are a marginally larger market for certificate creation.

These are examined below.

Costs

The difficulty in calculating abatement benefits varies by activity. For some activities this is a straight-forward task; for others it is inherently more difficult, due to risks relating to the performance of the product in question, human behaviour or whether the activity in question would have happened in the absence of the scheme (additionality). Risks of error with regard to greenhouse savings estimation can be met, to a degree, by increasing data capture and monitoring requirements (as noted above). This, however, merely has the effect of translating risk into financial cost. Some of the factors informing this risk-cost equation are:

Product performance

The greenhouse benefit of an activity hinge on the energy savings benefit of a particular product, and an estimate of its longevity. Where a product was likely to require extensive data collection to confirm its performance or longevity, this was assessed as adding to administrative costs. On the other hand, where a product is covered by an Australian standard for energy performance, or where extensive market data is available to indicate longevity, the associated activity is likely to contribute only marginally to administrative costs.

Human behaviour

The greenhouse benefit of an activity also hinges on whether the associated product is properly installed, and is not subsequently de-installed, or improperly used, by a consumer. Where there is a strong likelihood of such improper installation, de-installation or improper use, this will necessitate greater data collection to verify performance – with implications for administrative cost.

Additionality

Additionality is a consideration of whether an activity would have taken place (either generally or in some instances) in the absence of the scheme. Examples include financial additionality (a party is paid money to undertake the activity), regulatory additionality (a party is required to undertake the activity) or environmental additionality (the environmental outcome would have resulted from natural consumer/market behaviour). Where an activity is highly likely to require detailed assessment of whether it would have eventuated or not, is likely to add significantly to administrative costs. Conversely, where an activity is unlikely to require such an assessment, it is likely to contribute only marginally to administrative costs.

Benefit

Any costs from an activity need to be justified by the potential of that activity to generate a significant addition to certificate volume. If an activity is likely to generate only modest levels of abatement (and modest levels of certificate creation), its inclusion will be only marginal beneficial. This may be due to the highly specialised nature of a product, or prohibitively high costs.

6.8.1. Applying a cost-benefit test

To understand how the application of the above approach resulted in a shorter list of activities, an example is provided of two activities: one of which satisfied a test of minimising administrative cost; another of which did not.

Applying administrative cost criteria to activities

Example 1: ceiling insulation

Costs

Product performance

Ceiling insulation is rated according to an established methodology determined in accordance with Australian Standards (AS4859.1). The resulting "R" or resistance value applied to insulation is commonly understood by product installers and associated tradespersons as indicating its relative value as an insulating material. Consequently the estimation of product performance was not a significant addition to administrative cost.

Human behaviour

Product installation for ceiling insulation can be a critical factor in determining its success. Australian standards exist which specify correct methods of insulation (AS 3999). In addition, training modules for correct installation are available from Sustainability Victoria. Consequently the estimation of production installation was not a significant addition to administrative cost.

The risks of subsequent human behaviour (end-users) compromising the performance of ceiling insulation are low. This is because ceiling insulation is installed in locations where risk of disturbance is minimal; the product degrades at a very slow or negligible rate; and is operation is not dependent on active consumer behaviour (i.e. it works regardless of the action of the house occupant). Consequently the estimation of production installation was not a significant addition to administrative cost.

Additionality

Regulatory additionality is readily addressed for ceiling insulation. As ceiling insulation is required of all newly constructed buildings in Victoria under the Victorian Building Regulations, and the Building Commission retains a database of building permits, cross-checking an address against relevant regulatory requirements is straight-forward. With regard to financial additionality, there are some rebate programs available for consumers to install insulation. It is, however, easier to avoid double-counting through the administration of a rebate program rather than through the VEET scheme. With regard to environmental additionality (natural market evolution), a discount rate has been applied to those activities where available data provided a basis for estimating natural take-up rates of insulation in existing dwellings.[82] In the case of insulation, this was estimated to be worth -5% of the abatement value over a 20-year time period.

Benefits

The benefits of installing ceiling insulation are considered strong. This was due both to the average abatement benefit per house likely to result (approximately 40 certificates, assuming an average size of installation of 200m^2), and the number of houses in Victoria which are estimated to be capable of hosting ceiling insulation (i.e. those which currently do not have ceiling insulation). ABS estimates that 9.2 per cent of Victorian households do not have ceiling insulation.[83] If only 5 per cent of these uninsulated houses are contacted by a certificate creator, and only 75 per cent accept an offer for free installation of the product, this activity could contribute over 320,000 certificates to the VEET market per year.

Ceiling insulation was included in the Option 3 list based on these considerations.

Example 2: energy efficiency audit

Costs

Product performance

Energy audits do not, in themselves, relate to the use of a product. However, much of the abatement benefit that could theoretically be attributed to this activity would result from an assumption that a new product was installed, and used. This is creates the double difficulty of estimating product benefits (where the product choice is not known) with underlying consumer behaviour uncertainties.

Human behaviour

Any abatement benefit from an audit relies on strong and ongoing behavioural change (some of it related to installation of a product). While some reference might be made to the

[82] According to the Australian Bureau of Statistics (ABS4602) – March 2005, table 2.12, the percentage of Victorian houses with insulation increased from 69.5 per cent in 1994 to 72.3 per cent in 2005 – an annual rate of installation of 0.25 per cent.

[83] Australian Bureau of Statistics, *ABS4602*, *Environmental Issues: People's Views and Practices*, 2006, Table 2.11, p 19

historical behaviour of households post receiving an energy audit, in practice there is little sound data available on this subject. What data is available is questionable due to small sample sizes, and the tendency for such survey data to be based on voluntary response – which can lead to a problem of self-selection (i.e. only a highly motivated minority respond, skewing the data towards artificially high reported rates of behaviour change). *Ex post* assessments of actual abatement benefits would require follow-up monitoring of the household, for a sufficiently long period of time. This would add considerably to administrative costs of including the activity in the scheme.

Additionality

There is no regulatory requirement for a home to undertake an energy efficiency audit. With regard to financial and environmental additionality, there is some uptake of home energy audits, based on a range of federal, state and local initiatives. But, as with the example above, it would be easier to account for this through the administration of such programs than through VEET regulations. Therefore additionality was not a significant addition to administrative cost.

Benefits

Virtually any of Victoria's estimated 2.1 million households could theoretically host an energy audit. However, given the issues above, it would be difficult to attribute a quantum of abatement to a given audit and therefore difficult to estimate what potential contribution to market volume this activity could provide.

Energy audits were not included in the Option 3 list based on the above considerations.

Based on this approach, a short list of activities was developed for use under Option 3.

Table 6.7: Activities against regulatory option

No.	Activity	Option		Item Number in proposed Regulations
		2	3	
1	Undertake home energy audit	✓		
2	Improve quality of existing insulation	✓		
3	Apply reflective paint or coatings to roof or walls	✓		
4	Undertake voluntary energy conservation	✓		
5	Apply reflective/emissive films to windows to avoid summer heat gain	✓		
6	Install insulation blanket on electric resistance storage water heater	✓		
7	Plant shade trees/vegetation to prevent solar heat gain in summer	✓		
8	Purchase power board or similar device to avoid standby power losses	✓		
9	Install solar-powered air heater	✓		
10	Purchase high efficiency dishwasher	✓		
11	Purchase high efficiency clothes washer	✓		
12	Install geothermal heat pump	✓		
13	Install gas clothes dryer	✓		
14	Purchase high efficiency entertainment equipment	✓		
15	Purchase high efficiency computer, IT equipment	✓		
16	Purchase high efficiency pool pump	✓		

No.	Activity	Option		Item Number in proposed Regulations
		2	3	
17	Purchase high efficiency electric clothes dryer	✓		
18a	Gas/LPG storage water heater replaces an electric resistance water heater	✓	✓	1A
18b	Gas/LPG instantaneous water heater replaces an electric resistance water heater	✓	✓	1B
19	Electric boosted solar or heat pump hot water heater replaces an electric resistance water heater	✓	✓	1C
20	Solar retrofit kit fitted to an existing electric resistance water heater	✓	✓	2A
21	Gas/LPG boosted solar hot water heater replaces electric resistance water heater	✓	✓	1D
22	Gas/LPG boosted solar hot water replaces gas/LPG water heater	✓	✓	3A
23	Solar pre-heater for an existing gas/LPG water heater	✓	✓	4A
24	Installation of high efficiency ducted gas heater to replace existing gas ducted heater	✓	✓	5A
25	Installation of high efficiency ducted gas heater to replace existing central electric resistance heater	✓	✓	6A
26	Installation of ducted air-to-air heat pump to replace existing ducted air-to-air heat pump (non gas reticulated areas only)	✓	✓	7A
27	Installation of ducted air-to-air heat pump to replace existing central electric resistance heater	✓	✓	8A
28	Installation of gas/LPG space heater	✓	✓	9A
29	Install high efficiency space air-to-air heat pump (non gas reticulated areas only)	✓	✓	10A
30	Installation of ceiling insulation in existing home with uninsulated ceilings	✓	✓	11A
31	Installation of under floor insulation in existing home with uninsulated floors	✓	✓	12A
32	Installation of a thermally efficient window	✓	✓	13A
33	Retrofit of existing single glazed window with a fixed attachment which raises thermal efficiency of existing window	✓	✓	14A
34	Air sealing	✓	✓	15A-15F
35	Installation of low energy GLS lamp	✓	✓	16A
36	Installation of low energy small decorative lamp	✓	✓	16B
37	Installation of low energy reflector lamp	✓	✓	16C
38	Installation of low energy downlight	✓	✓	16D
39	Installation of low flow shower rose replacing conventional shower rose	✓	✓	17A
40	Destruction of refrigerator purchased before 1996	✓	✓	19A
41	Purchase of high efficiency refrigerator	✓	✓	18A, 18B
42	Purchase of high efficiency freezer	✓	✓	18C, 18D

It should be noted that the lists of activities for both Options 2 and 3 would not be permanently fixed. The emergence of new and better information on the performance of products, or of consumer behaviour, would influence the consideration of including new

activities in the scheme. This issue is discussed further under the evaluation strategy section below (see section 12).

6.9. Other options

It has been suggested that a further Option might be a combination of the project assessment and prescriptive list approaches. However, this Option is not considered viable due to the prescriptive list removing the incentive for retailers to conduct research and development into new 'projects'. Furthermore, given the Department would consider new activities to be added to the prescriptive lists under Options 2 and 3 in the event of technology improvements, research and development efforts may be directed towards technology improvement projects and not projects with the sole aim of certificate generation.

6.10. Assessment of options against the objectives

6.10.1. Achieve GHG abatement to a given level

There are three aspects of achieving the stated GHG abatement target:

- the amount of abatement (quantity);
- the timing of the abatement (timeliness); and
- the confidence in abatement claims (quality).

Issues of cost associated with each option are examined separately in Chapter 7.

Quantity

In theory any of the options above would be designed to achieve the scheme target of 2.7 million certificates surrendered per annum, with each certificate representing one tonne of GHG abatement.

Timeliness

As noted in the case study above, one of the consequences of Option 1 is substantial time lags between the conception of a project, and its actual delivery. Given that the VEET scheme commences from 1 January 2009, it would be difficult for project proponents to have a model capable of delivering certificates to market by this date. This could delay the implementation of the VEET scheme. It is possible that the delay could also prevent the VEET scheme from achieving its annual target of 2.7 million VEECs surrendered.

Both Option 2 and 3 are not believed to create this degree of risk.

Quality

The options differ with regard to the confidence with which this abatement is achieved. Both Option 1 and Option 2 introduce a greater degree of risk of misstating abatement benefits than Option 3. This risk can be partially overcome through heightened monitoring and data collection, but with implications for the overall costs of the scheme.

Option 3 is considered to be superior with regard to this policy objective on grounds of quality and timeliness.

6.10.2. Encourage more efficient energy use/energy cost savings

As above, any of the options would in theory achieve the scheme target – and thereby induce more efficient use of energy and lower consumer costs. The chief difference is the degree of confidence in the estimates of this benefit (quality) and timeliness. Both Option 1 and Option 2 introduce a heightened element of risk with regard to quality which could only be countered by increased monitoring and data collection. Option 1 also introduces a risk of delay.

Option 3 is considered to be superior with regard to this policy objective.

6.10.3. Encourage the growth of an energy efficiency industry

All of the identified options would help to support the growth of an industry sector specialising in the provision of products and services designed to enhance energy efficiency. They differ, however, in regard to the extent to which they foster:

- business certainty;
- new market entrants; and
- innovation.

Business certainty

The capacity to provide business certainty and a stable certificate market is likely to be greater under Options 2 and 3, as both these provide for a regular, stable growth in certificate supply. Option 1, by contrast, could lead to uneven supply of certificates to the market. This is because projects will be the basis for certificate creation, and will consequently involve extensive lead-times for certificate creation, followed by the sudden introduction to the market of a large volume of certificates.

New market entrants

Option 1 imposes significant up-front costs on a certificate creator in the form of R&D costs. In practice, it is expected that these costs will serve to inhibit participation in the scheme by small, start-up businesses.

Both Options 2 and 3 effectively shift these R&D costs on to Government. Therefore both these options are assessed as being superior in encouraging new entrants to the certificate creation market.

Innovation

Option 1 is believed to offer the greatest scope for innovation (referring to both technological innovation or to innovative business models. Option 2 constrains this capacity for innovation; Option 3 is believed to offer the least scope for innovation. However, the narrower scope for innovation under Options 2 and 3 is mitigated by the following considerations:

- Activities in a prescribed list can be worded to be technology neutral within the bounds of that activity. For example, rather than prescribing a compact fluorescent light globe to replace an incandescent light globe, the list can prescribe the installation of a light of greater than x lumens/watt to replace an existing light of less than x lumens/watt. This approach may encourage technology innovation across all activities.

- The use of a prescribed list of activities does not limit what products a business may sell to a willing buyer. Rather, a prescribed list merely determines that VEET certificates will only be provided for a subset of those products.

- The VEET scheme is comprised of three-year phases. The exclusion of an activity from a prescribed list in the first phase of the scheme does not preclude its inclusion in subsequent phases, once an assessment of the energy and greenhouse savings of that activity are better established. Furthermore, an activity can be included within a particular phase if that activity meets certain requirements (see section 12). Should applications be received, reviews would be conducted every six months and, if successful, the activity would be included in the prescribed list within 30 days of the review.

Given the above analysis, it is believed that Options 2 and 3 are superior to Option 1 in meeting this policy objective.

7. Cost benefit assessment

This chapter assesses the costs and benefits associated with the VEET scheme. It does this by:

- identifying which stakeholders are expected to be affected by the scheme;
- identifying what types of household behaviour change are expected as a result of the VEET scheme;
- identifying how these behaviour changes will result in different costs and benefits for identified stakeholders;
- establishing methodologies to estimate the nature and extent of these costs and benefits; and
- determining these costs and benefits.

This chapter also indicates where a cost or benefit is influenced by the choice of regulatory option being examined by this RIS, rather than being determined by the VEET parent Act.

7.1. Stakeholders expected to be affected by the scheme

The VEET scheme is expected to have a material impact on the following groups of stakeholders:

- electricity generators;
- energy retailers;
- householders;
- energy service providers (certificate creators); and
- Victorian Government.

7.2. Household behaviour change sought through the VEET scheme

As noted in Chapter 5 above, the VEET scheme seeks to fulfil its objectives by overcoming a number of market failures. This effectively means the scheme will attempt to induce behaviour change amongst households. These include:

(a) less intensive use of existing equipment;

(b) purchase and installation of new energy saving products, which would not have been purchased in the absence of the scheme;

(c) purchase and installation of new equipment which is marginally superior to what would have been purchased in the absence of the scheme;

(d) early retirement of existing equipment and its replacement with a more energy efficient variety; and

(e) retirement of existing equipment which is not replaced.

An additional behaviour change which is not specifically sought from the VEET scheme – but which may nevertheless result – is driven by the income effect. That is, households may take capital freed up from avoided energy consumption and direct it towards expenditure on goods and services which in themselves consume energy. This would effectively counter the benefits of the VEET scheme. This is discussed separately below.

With the exception of the income effect, each of the above behaviour changes is expected to yield the benefits of GHG abatement, and avoided energy expenditure. The costs of each of these behaviour changes differ, however. The following discussion quantifies the extent to which each of these behaviour changes may ensure, by attributing each of them to specific activities in the scheme.

7.2.1. Less intensive use of existing equipment

This behaviour change is expected to result from activities including:

- air sealing;
- installation of insulation;
- replacement of an inefficient shower rose;
- retrofit of a secondary insulation material to an existing window or door; and
- retrofit of a solar pre-heater to an existing heater.

These activities effectively allow an existing piece of equipment to deliver the same amenity or output, but with lower (energy) inputs. For example, air sealing will allow an existing room heater to heat the room to the desired temperature, but with lower fuel consumption. The heater will not need to work as hard to heat a volume of air which is being exchanged with outside air less often.

For these activities, the consumer is not expected to be in the market for such goods in the absence of the scheme.

7.2.2. Purchase energy saving equipment

This category includes most of the activities above, with the exception of more efficient shower roses. For these activities, the consumer is not expected to be in the market for such goods in the absence of the scheme. Neither is an existing product being replaced in the course of such activities. Consequently costs are restricted to the full purchase and installation costs of the new item.

7.2.3. Purchase high efficiency equipment

This category includes activities based on the purchase and installation of high efficiency appliances (space heating, refrigerator/freezers).

For these activities, the consumer is assumed to already be in the market for the product in question. The scheme merely incentivises them towards the purchase of a more efficient version of that product. Consequently costs constitute any marginal increase in the purchase and installation costs over and above what the consumer was prepared to spend anyway.

Some households may, in the absence of the scheme, purchase a high efficiency product. In this sense, these households may be regarded as free-riders with respect to the VEET scheme.

The VEET methodology takes account of such free riders by basing the certificate calculation on the marginal benefit of a high efficiency product versus the market weighted average for energy performance for that product. These market weighted averages of energy efficiency were based on available data for a range of appliances.[84] In effect, this method, while ensuring scheme-wide accuracy, under-incentivises those who would have purchased under the sales weighted average, but over-incentivises those who would have purchased above it. It was not regarded as feasible to disaggregate household purchasers to eliminate for this problem.

7.2.4. Replace existing equipment with energy efficient variety

This category includes activities which incentivise consumers to retire equipment before the end of its useful life, and replace it with a more energy (or GHG) efficient version. These activities include the replacement of:

- space heaters;
- water heaters;
- windows and doors; and
- shower roses.

Costs for these activities include:

- marginal increases in purchase and installation costs over and above what the consumer was prepared to spend anyway at time of replacement;
- foregone useful life of the replaced items; and
- disposal.

7.2.5. Retirement of existing equipment which is not replaced

This category consists exclusively of the destruction of a refrigerator or freezer which was built prior to 1996. Costs for this activity include:

- foregone useful life of discarded items; and
- disposal.

7.2.6. Expenditure of money saved through energy efficiency (income effect)

One of the desired effects of the VEET scheme will be to reduce household expenditure on energy. What households do with the extra discretionary capital they are left with is difficult to determine.

There are two possibilities as to how that extra income would be expended:

- extra energy consumption; or
- general goods and services.

[84] Energy Efficient Strategies for the Equipment Energy Efficiency Committee, *Greening Whitegoods: A Report into the Energy Efficiency Trends of Major Household Appliances in Australia from 1993 to 2005*, 2006

The former is expected to be the case for households who have to date endured substandard comfort with respect to energy use, due to poor building and appliance quality. This is the "rebound effect" discussed earlier in the RIS, and is principally expected to occur with respect to space heating by low-income households. For this reason, the extent of expected rebound effects has been netted out of the purported energy savings attributed to building fabric improvements, as those activities are expected to impact on space heating load (i.e. ceiling and floor insulation, air sealing, glazing improvements).

The latter is expected to be the case for households which are already content with building and appliance amenity (i.e. they are not enduring substandard heating, lighting etc). As this extra disposable income would only be available to households which undertook some form of energy efficiency improvement through the scheme, they would be expected to be more aware of the importance of energy efficiency than non-participating households. This being the case, this RIS assumes that general goods and services purchased with additional disposable income by these households will not be energy-intensive in nature, and will consequently make only modest inroads on economy-wide energy efficiency gains brought about by the VEET scheme.

7.3. Identifying types of costs and benefits

As noted above, costs associated with the various activities include:

(1) upfront purchase, installation;

(2) foregone useful life of discarded items;

(3) disposal of retired equipment;

(4) scheme participant administrative costs (certificate creators and retailers);

(5) Victorian Government (scheme administration) costs; and

(6) Victorian Government (scheme start-up) costs.

The benefits associated with the various activities include:

(1) avoided energy expenditure;

(2) avoided GHG emissions, associated with energy consumption – that is accelerated prior to an ETS or is induced at a lower cost than would otherwise be the case under and ETS; and

(3) additional (non-energy and greenhouse) consumer amenity obtained from the building and equipment improvements in question.

7.4. Methodologies for determining costs and benefits

There were two basic approaches used to determine the above cost and benefits:

- attribute costs and benefits to specific activities, and assume a particular mix of activities is taken up, at a point in time; and

- input the effect of this uptake of activities into a model of the National Energy Market (NEM).

These approaches are explained below.

7.4.1. Attribute costs and benefits to specific activities

With respect to the benefits of the scheme, the manner in which benefits (greenhouse and energy savings) were attributed to individual activities is discussed in Chapter 6.

With respect to the costs above, all bar start up costs were attributed to individual activities in the form of total costs per certificate generated. The means by which this was done is described below.

7.4.2. Upfront purchase and installation costs

The upfront cost of purchase and installation of equipment varies according to activity, and is based on:

- The current retail price for these items, based on available data.[85]
- Whether the consumer would or would not have been in the market for a product of that nature anyway – albeit a less energy efficient one (marginal versus full costs). These are based on estimates of normal consumer purchasing cycles for appliances, based on available data.[86]
- Any rebates likely to be available from Government. These are based on the rebates currently available from the Commonwealth and Victorian Governments as of this writing, and include rebates for solar hot water, and insulation.[87]
- Cost reductions expected due to the capacity of certificate creators to engineer bulk purchase reductions in item unit costs. This analysis assumes certificate creators will be able to obtain a 50 per cent off the normal retail cost for mass-market, bulk items (shower roses, energy efficient light globes), and a modest reduction (15 per cent) with respect to larger consumer items (heaters, refrigerators etc). These figures were based on interviews with businesses that operated as certificate creators in the NSW GGAS scheme.
- DPI estimates of the length of time required to undertake the activity in question.
- Whether the labour required to the install the item was skilled or unskilled. Skilled labour was charged at $86/hour, and semi-skilled labour at $61/hour. These figures

[85] GWA, *Options to reduce GHG emissions from new homes in Victoria through the building approval process*, commissioned by the Victorian Department of Sustainability and Environment, 2007, table 20, p 61. Costs of items not included in the GWA analysis were obtained in June 2008 from a range of product suppliers including Bunnings (air sealing, lighting), Magnetite (window products), Clear Comfort (window products), Robinsons (chimney dampers), Sunflower (shower roses), Fisher & Paykel, Haier, Westinghouse and Vest Frost (refrigerators) and ecoMaster (air sealing).

[86] Energy Efficient Strategies, *Energy Use in the Australian Residential Sector 1986 - 2020*, commissioned by the Commonwealth Department of Environment, Water Heritage & the Arts, 2008. Also BIS Shrapnel, *The Household Appliance Market in Australia 2006: Vol 3 – Climate Control,* 2006, and BIS Shrapnel, *The Household Appliance Market in Australia 2006: Vol 4 - Hot Water Systems*, 2006.

[87] Rebates known at the time of this analysis included Commonwealth and Victorian Government rebates for insulation, Victorian Government rebates for solar hot water units and Commonwealth MRET RECs for solar hot water units. It should be noted that these rebates/assistance measures have multiple conditions which apply (such as limited eligibility based on location or other circumstances) and are subject to changes over time based on Government program decisions. Consequently rebate values were assumed for an average Victorian household for these activities.

were derived from ABS and Plumbers Trades Employees Union of Australia figures.[88]

Of the above costs, it is expected that the average household would be willing to pay a share if the item were a premium item. That is, if the installed cost of the item were too large to be absorbed by the certificate creator, based on certificate revenue, and if the item provided the consumer with high amenity value (beyond energy savings), it was assumed that the household would contribute a portion of this upfront cost. Examples would include double glazed windows, or solar hot water heaters. For lower-end items (energy efficient light globes; air sealing) it is assumed that the householder's contribution would be zero, as it is expected that certificate creators could absorb these costs and still clear a profit based on the value of certificates these would create.

It should be noted that the portion of consumer willingness to pay is only an assumption made to inform modelling and analysis of VEET scheme impacts. In practice, it is expected that myriad bilateral negotiations will take place between certificate creators and individual households. The apportionment of costs, and the timing and nature of payment, is expected to vary considerably, and to be driven by a range of factors beyond the purview of the VEET scheme (such as energy retailer's individual product offerings).

DPI considers that the aggregate costs for each of the specific regulatory options presented in the RIS is consistent with the modelling undertaken in May - July 2007 that was used to establish the $26 price point and hence the target of 2.7 million certificates that is fixed in the parent Act. The extent to which each of the options is consistent with the $26 price point is based on a series of assumptions described in this section. To the extent that actual behaviour differs from these assumptions (e.g. different take-up rates for different appliances) then the actual costs for each option could be higher or lower than the $26 price point used in the modelling.

7.4.3. Foregone life of products

Where an appliance was being replaced with a more energy efficient version, there is a portion of that appliances useful life which is foregone. Estimating the cost of this foregone appliance life is difficult. One method is to determine a purchase cost (in 2008 dollars), estimate the lifespan of the appliance, depreciate the appliance's purchase cost over its full lifespan, estimate the average age of an appliance being replaced due to the VEET scheme, and calculate the value of the remaining years of the appliance's life.

However, for the purposes of the modelling undertaken to inform consideration of the VEET legislation, it was assumed that householders would make their own assessment as to whether an offer by a certificate creator warranted the early retirement of an existing asset. Therefore, it is assumed that the certificate cost embodies the level of compensation necessary to induce consumers to retire goods early.

As above, DPI considers that the aggregate costs each of the specific regulatory options presented in the RIS is consistent with the modelling undertaken in May - July 2007. Actual costs for each option could be higher or lower than the $26 price point used in the modelling if consumer behaviour varies strongly from underlying assumptions.

[88] Australian Bureau of Statistics, *Australian Bureau of Statistics Year Book Australia, 2008 (Earnings); Plumbers Trades Employees Union of Australia*, 2008

7.4.4. Disposal

The proposed Regulations made limited reference to how products must be disposed of. Only the destruction of old refrigerators requires a particular form of product destruction – that being removal and destruction of refrigerants in compliance with HB 40.1 – 2001 of the Australian Refrigeration and Air-Conditioning Code of Good Practice (*which includes provisions for reduction of emissions of fluorocarbon refrigerants*).

For the other products above, the proposed Regulations confine themselves to dictating that they must be rendered incapable of operation (to prevent re-use of an inefficient product). This will generally apply to electric storage hot water systems, electric resistance space heating systems and incandescent light globes. In the case of many (but not all) electric resistance space heating, physical removal from site will be impossible (in the case of in-slab heating, which relies on electric wiring embedded in the concrete slab foundation of the dwelling).

For the remaining electric resistance space heating, electric hot water systems and refrigerator/freezer units, a significant portion of the weight consists of recoverable metals (principally copper, steal and aluminium). The value of these metals has been increasing in recent years, making recovery a worthwhile enterprise for a business which is obtaining these items in bulk. Indeed, it is expected that recycling of content is more likely to occur when these post-consumer items are obtained in bulk by a certificate creator (or their sub-contractor) than when households retire such items themselves, due to transaction costs for individual consumers. Table 7.1 is a representative breakdown of the total weight of a year 2000-vintage, 400 litre refrigerator serves to illustrate this.[89]

Table 7.1: Representative breakdown of the total weight of the 2000-vintage 400 litre refrigerator

Typical composition	Weight (kg)	Weight (%)	Value ($/kg)	Value (total)
Steel & zincanneal	70	61%	$0.20	$14.00
copper	2	2%	$5.50	$11.00
Aluminium	5	4%	$1.20	$6.00
Plastics	10	9%	$0.0	$0.00
Compressor	10	9%	$0.15	$1.50
Motor	2	2%	$0.15	$0.30
Refrigerants	0	0%	$0.0	$0.00
Foam	5	4%	$0.0	$0.00
other	10	9%	$0.1	$1.00
subtotal	114	100%	$0.15	$17.10

[89] Environment Australia, *Major Appliances Materials Project*, 2001, Appendix A. Figures for steel, aluminium and copper updated to reflect current commodities prices, as based on July 2008 purchase quotes from a Melbourne-based recycler. Landfill levy of $9/tonne based on Environment Protection Authority Victoria Publication 332.1 - Calculating the landfill levy and recycling rebates. Based on urban municipal waste rate, 2008-09.

Less landfill levy				
Total weight destined for landfill	15		- $0.009	- $0.135
Net value of item				$16.97

Based on the above information, it is assumed that only 13 per cent of the weight of a retired item would be destined for landfill, with 87 per cent of the weight recycled. If the above materials composition is considered to be indicative of that of other consumer durables disposed of in the course of the VEET scheme's operations, and if one assumes that activities which result in equipment disposal would make up approximately half of the certificate volume in a given year, it would account for approximately 1.4 million tonnes a year of post-consumer waste destined for landfill, with $8.8 million worth of recycled goods being recovered.

DPI considers it is unlikely that this volume of material would be recycled if it were the responsibility of the individual householder. Indeed, some recyclers require a minimum volume of material which would place recovery out of reach of a normal household. Given the values above, the presence of a dedicated industry dealing with the replacement of these items is likely to increase materials recovery. Consequently, this analysis assumes that certificate creators will be the recipients of any materials recovery benefit accruing from the scheme, and that the effect for other scheme participants will be nil. In this manner, the certificate cost was assumed to account for any disposal costs or recycling benefits.

DPI considers that the aggregate costs each of the specific regulatory options presented in the RIS is consistent with the modelling undertaken in May - July 2007 that was used to establish the $26 price point and hence the target of 2.7 million certificates that is fixed in the parent Act. The extent to which each of the options is consistent with the $26 price point is based on a series of assumptions described in this section. To the extent that actual behaviour differs from these assumptions then the actual costs for each option could be higher or lower than the $26 price point used in the modelling.

7.4.5. Scheme participant administration costs

Scheme participants include certificate creators and energy retailers. Their costs include all those which must be incurred in order to operate within the requirements of the scheme, over and above those costs described elsewhere (i.e. purchase of equipment for installation in households; scheme administrator fees). These would be expected to include marketing, advertising, research and business administration costs.

Households will also incur costs associated with assessing the services offered by certificate creators and providing information to certificate creators to facilitate the auditing process. As with foregone life of products, however, it is assumed that the certificate cost embodies the level of compensation necessary to induce consumers to incur these administrative costs.

At the time when the initial development of the VEET scheme was undertaken, the details of how the scheme would be implemented were not known. It was recognised, however, that scheme participants would face some administration costs, and that these would impact on the stated costs and benefits of the scheme. Pending better information as to what these costs were likely to be, the initial VEET modelling assumed that administrative costs would be reflected in the certificate costs at a rate of $2 per certificate. This modelling is discussed further below.

The analysis of different regulatory options undertaken through this RIS has tested these initial administrative cost assumptions. These are discussed further below.

7.4.6. Government (scheme start-up) costs

There are costs associated with developing, and implementing, the VEET scheme. These costs comprise staff hours for policy officers, technical experts and consultants, stakeholder consultation, and associated media. These costs are borne, in the first instance, by Government. Ultimately they are borne by taxpayers. As noted above, these costs are not attributed to the final certificate costs of the scheme.

In its May 2008 budget, the Victorian Government allocated $10 million to the establishment of the scheme administration of the VRET and VEET schemes. For purposes of this analysis, it is assumed that half this sum ($5 million) is allocated to the start-up of the VEET scheme.

The choice of regulatory option to enable the VEET scheme would be expected, in principle, to affect these costs.

7.4.7. Government (scheme administrator) costs

The scheme administrator's costs of doing business will be recovered in the form of fees charged to certificate creators. These fees will be charged on each certificate registered with the scheme administrator. For the purposes of initial VEET impact analysis, the scheme administrator's fees were assumed to be $1 per certificate registered.

The choice of regulatory option to enable the VEET scheme is expected to affect these costs.

7.4.8. Summary of activity costs and benefits

All the above costs, except for Government scheme start-up costs, were attributed to the certificate cost for individual activities. Consequently the certificate costs used for modelling purposes were assumed to incorporate all the costs identified above. This attribution of costs, together with the attribution of benefits discussed in Chapter 6, was then matched with an estimate of the volume of uptake for each activity in question in any given year.

The uptake assessment was based on:

- A technical assessment of what portion of the Victorian household sector (2.1 million households) was physically capable of hosting the activity in question. For example, only that subset of houses which have electric resistance heating would be capable of hosting an activity based on the replacement of such a system.

- An assessment of what percentage of the above cohort would be capable of being contacted by a certificate creator in a given year. For those activities where the consumer was in the market for a product anyway, this was assumed to be higher (50 per cent) than if the consumer were not (< 10 per cent).

- A further assessment was made as to what percentage of the cohort contacted by a certificate creator would, in the end, accept an offer. This was assumed to be driven by the extent to which the householder was expected to make an up-front cash contribution to the activity. Where an activity was expected to be offered free of charge, household acceptance was assumed to be high (75 per cent); where a contribution was expected, this was expected to result in much more modest acceptance levels (5 - 0.1 per cent, depending on the quantum of the cash contribution).

Where multiple activities were effectively in competition for a particular cohort (i.e. split system electric space heating replacing electric resistant heating, versus high efficiency gas ducted space heating replacing electric resistance heating), a further assessment was required as to what share of that cohort would opt for one activity versus another.

The above assumptions yielded a curve describing the quantum of certificate creation expected at a given price point. This cost curve was then intercepted at a price point of $26. This price point was chosen based on the assumption that abatement achieved under VEET should not be any more expensive than that capable of being provided by an ETS. At the time the modelling was done (May-July 2007) it was believed that an ETS would induce a cost of carbon approximating this price point during its first decade of operation (the principal period in which the VEET activities would yield a benefit)[90].

This exercise yielded two variables which were used to input into a model of the National Energy Market:

- a certificate cost which retailers would need to recover through their margins ($26); and

- a quantum of energy, corresponding to the annual energy savings attributed to the activities captured under the cost curve intercept point of $26.

The initial cost curve reflected a longer list of potential activities as described in Chapter 6. After the 2007 energy market modelling was completed, the list of activities and their abatement factors was further refined to develop the preferred VEET regulatory option. Consequentially the cost curve was revisited with this new information. The net effect on the inputs to the energy market modelling was, however, virtually nil. This is largely due to the fact that, based on a revised cost curve reflecting the current activities and abatement factors, there is expected to be a sufficient volume of certificates available at a $26 price point to meet the 2.7 million per year scheme target.

This cost curve data is provided at Appendix B.

7.4.9. Energy market modelling

DPI employed the MMA Strategist model of the NEM to assess the potential energy market impacts of the VEET scheme. Strategist comprises the following features:

- The future electricity pool price is essentially driven by the supply and demand balance. Consequently, assumptions on the fuel costs, unit efficiencies and capital cost of a new plant will have a significant impact on the long-term average price forecasts.

- The market price forecast takes into account regional and temporal forecasts, generating plant performance, timing of new generation, existing interconnection limits and potential for interconnection development.

[90] The result of intercepting this cost curve at a $26 price point is that a number of activities included in option 3 are not dispatched. This is a modelling assumption only, and is not intended to provide a prediction of what activities the market will eventually dispatch. The cost curve is driven by a range of assumptions – including consumer willingness to pay. While the average household's willingness (as reflected in the assumptions) may dictate than an individual activity is not, for VEET certificate creation purposes, cost effective, the view of DPI was that many of these "premium" items should be included in the list of eligible activities, reflecting the fact that a significant portion of households may reveal a higher willingness to pay than the assumed average.

- All major thermal, hydro and pumped storage resources as well as the interconnections between the NEM regions are considered in the modelling.

A business as usual (BAU) case was fashioned which consisted of the following assumptions:

- The wholesale market price includes all policies which were formally in place as of November 2006 (the date of the Government's commitment to a VEET). This includes:
    - the Queensland 13% Gas Scheme;
    - NSW Greenhouse Gas Abatement Scheme;
    - Commonwealth MRET Scheme;
    - 5-star building requirements; and
    - MEPS for relevant appliances.
- The BAU scenario did not include:
    - the NSW Renewable Energy Target Scheme;
    - the Clean Energy Target (CET) announced by the Commonwealth in September 2007 (or a possible expansion of MRET, as announced by the Federal ALP in October 2007); and
    - a carbon price induced through a national ETS.

The BAU also assumed that normal rainfall patterns resume (i.e. drought impact on wholesale prices ends). National Electricity Market Management Company's (NEMMCO's) median forecasts of electricity demand growth have been used in the modelling. This electricity demand forecast for NEMMCO developed by the National Institute of Economic and Industry Research (NIEIR) assumes embedded generation projected by NIEIR. NEMMCO's demand forecast has been adjusted by McLennan Magasanik and Associates (MMA) according to its own database of embedded renewable energy generators. The projected total electricity demand in Victoria for 2010 used in the MMA model is 37,137 GWh.

Other assumptions include the marginal costs of thermal generators. These consist of the variable costs of fuel supply including fuel transport plus the variable component of operations and maintenance costs. The indicative variable costs for various types of existing thermal plants are shown in table 7.2.

Table 7.2: Indicative average variable costs for existing thermal plant ($ June 2006)

Technology	Variable Cost $/MWh	Technology	Variable Cost $/MWh
Brown Coal – Victoria	$6 - $10	Brown Coal – South Australia	$17 - $23
Gas – Victoria	$36 - $54	Black Coal – New South Wales	$17 - $20
Gas – South Australia	$30 - $90	Black Coal - Queensland	$12 - $20

Oil – South Australia	$175 - $220	Gas - Queensland	$21 - $57
Gas Peak – South Australia	$80 - $115	Oil – Queensland	$200

Coal plants have available capacity factors between 86 per cent and 95 per cent and gas fired plants have available capacity factors between 87 per cent and 95 per cent.

With respect to gas, the assumption is that the marginal price rises from 2013 but remains under $4.50 per GJ on a volume weighted basis.

In terms of residential assumptions, it is assumed that there are around 2.1 million households in Victoria; the average Victorian household consumes an average of 6.5 MWh of electricity and 58 GJ of natural gas. Average retail price of electricity is 14.92 c/kWh and 13.45 $/GJ for gas. The total GHG emission from the residential sector in year 2010 is around 27 Mt of CO_2-e.

7.5. Results of modelling

Table 7.3 summarises overall impacts of VEET over the first scheme phase (2009 to 2011).

Table 7.3: Summary of impacts[91]

Impact	Amount
Average wholesale price impact (electricity)	- 2.2 %
Average retail price impact (electricity)	- 0.02 cents per kWh
Average retail price impact (electricity)	-0.16 %
Average retail price impact (gas)	+ 0.07 cents per MJ
Average retail price impact (gas)	+ 0.05 %
Average annual net impact on household energy costs	- $44.60
Average annual net impact on generator revenue	-$85.35 m
Average annual GHG abatement	0.78 mt

These impacts are explained below.

7.5.1. Wholesale prices

The scheme is expected to decrease wholesale electricity prices on average by around 2.2 per cent below business as usual, annually, over the period 2009 to 2011. This wholesale price impact is driven by the reduction in electricity demand.

For gas, the scheme is not expected to materially impact on wholesale prices. This is due to both the relatively small volume reduction in gas demand expected against BAU (1 per cent) and the fact that the gas market experiences less price volatility in response to sudden changes

[91] McLennan Magasanik and Associates, *Report to Department of Primary Industries: Electricity Market Impacts of the Victorian Energy Efficiency Target*, commissioned by the Victorian Department of Primary Industries, 2007. Modelling period extended from 2009 to 2030.

in the demand-supply balance (i.e. gas can be stored). The reduction in gas demand is modest because the reduction in gas demand induced through increased heating efficiencies is partially offset by the active switching of customers from electricity to gas (the VEET scheme rewards fuel substitution where it yields a greenhouse benefit).

7.5.2. Retail prices

Average retail prices for electricity are expected to decrease by 0.02 cents per kWh over the modelling period compared to business as usual. This reflects both the net decrease in wholesale prices, as well as the retailers' recovery of VEET certificate costs (equal to $26/certificate, x 8.1 million certificates = $210 million).

For gas, retail prices are expected to increase by 0.07 cents per MJ over the modelling period compared to business as usual. As the gas wholesale market prices remain unaffected by the VEET scheme, this increase is driven by gas retailers' recovery of VEET certificate prices through their retail margin.

It is assumed that retailers are able to fully realise any benefits of reduced wholesale market prices, and to pass-through any costs associated with certificate acquisition. Consequently there is no net impact on energy retailers.

7.5.3. Household energy costs

Due to reduced energy consumption, and (to a lesser extent) a slight decrease in energy prices over BAU, the average Victorian household is expected to be approximately $45 per annum better off under the VEET scheme. This equates to $94.5 million per year for the entire household sector ($45 x 2.1 million households).

7.5.4. Electricity Generators

As a direct consequence of reduced electricity consumption, electricity generators will experience an estimated 4.1 per cent reduction in revenue due to lower wholesale electricity prices ($85.35 million per year). Not all this revenue reduction will represent loss of profit, however, as these generators would also be expected to have marginally lower operating expenses (i.e. fuel consumption). These were not detailed in the modelling, however.

7.5.5. Penalty rates

The MMA Strategist model also informed the determination of penalty rates under the VEET scheme. As previously mentioned, the VEET scheme will impose a penalty rate on energy retailers that do not achieve their liability target. The equation to determine the liability of energy retailers is:

liability = penalty rate x tonnes of CO_2-e abatement short of liability target

The proposed Regulations have prescribed a penalty rate of $40 per tonne of CO_2-e shortfall. This penalty rate will apply to all liable energy retailers that do not meet their liabilities under the scheme.

The modelling indicated that the VEEC market price will be approximately $26. This will ensure the VEET scheme delivers low-cost GHG abatement and is cost-effective under an ETS, especially during its first decade.

Rationale for penalty rate

A penalty rate meaningfully higher than the expected market price encourages compliance by energy retailers.

Other penalty rate options

Other potential penalty rates were considered during development of the proposed Regulations. Key considerations included:

- A penalty rate less than $40 per VEEC shortfall of a liable parties annual target offers a relatively disincentive for liable energy retailers to engage in the scheme. That is, the closer the penalty rate is to the anticipated market price, the greater the incentive to disengage with the scheme and pay the penalty rate rather than obtaining VEECs.

- A penalty rate greater than $40 may not provide a meaningfully greater incentive for energy retailers to engage in the scheme. It also offers punitive punishment to liable energy retailers that do not achieve their annual liability.

Conclusion

Ultimately, the proposed penalty rate in the draft Regulations was a decision by DPI based on the extensive modelling undertaken by MMA on the anticipated VEEC market price in the first phase and in consultation with other Victorian Government departments.

Overall, the VEET scheme has been designed to ensure liable parties will have access to sufficient and adequately priced VEECs. Consequently the Government's expectation is that liable parties will not, in practice, pay shortfall penalties.

7.6. Testing the regulatory options

As described above, the costs and benefits of the VEET scheme have been established through a combination of activity-specific analysis, and energy market modelling. This was done as part of the Government's, and Parliament's, broader consideration of the VEET scheme.

Government is now intending on enacting the proposed Regulations which will give effect to the VEET scheme. Consequently, the test of the desirability of the proposed Regulations rests on the extent to which they:

- do not contribute to the costs of the scheme; and

- do not detract from the benefits of the scheme.

What follows is an assessment of the extent to which the different regulatory options perform against this test.

7.6.1. Impact of regulatory options on costs

As noted above, the choice of regulatory option is expected to potentially impose administrative costs on the following:

- government;

- certificate creators;
- energy retailers; and
- households.

Detailed estimates of these costs, including the relevant assumptions are set out in Appendix C.

Government

With regard to start-up costs, these would be expected to be lower for the first option ($2.5 million), and roughly the same for options 2 and 3 ($5.25 and 5.0 million respectively). The higher start-up costs for options 2 and 3 reflect the substantial investment in IT infrastructure required to maintain a web-based registry, as well as the staff time invested in determining abatement factors / certificate values for activities. Option 2 is slightly higher cost than Option 3 due to the need to assimilate further detailed information on activities on the longer list described in Chapter 6.

With respect to ongoing administration costs, these are expected to be highest for Option 1 (3.7 million), and lowest for Option 3 (2.8 million). As these fees are to be cost-recovered by the scheme administrator from a market of 8.1 million certificates, options 1 and 2 add roughly 40 per cent to the scheme fee costs assumed in the above modelling ($1/certificate). Option 3, however, adds only 3 per cent to the assumed costs. Consequently, Option 3 is preferred with respect to scheme administrator costs.

Certificate creators

These are expected to be larger for Options 1 and 2 ($4.2 million per annum for all certificate creators combined) than for Option 3 ($3.5 million) due to the increased quantity of record keeping involved with these options. Consequently, Option 3 is expected to best conform with the cost assumptions contained in the modelling above.

Energy retailers

These costs are expected to be considerably higher for Option 1 ($2.8 million per year for all 13 liable retailers combined) than for Options 2 and 3 ($1.2 million per year). This is due to the substantial research and development costs associated with projects under Option 1.

Households

Some further administrative costs are likely to be imposed on households based on the choice of regulatory option.

Simply by virtue of participating in the scheme, it is estimated that approximately $980,000 per annum will be incurred by households in the form of a time commitment. Both Options 1 and 2 are estimated to impose additional administrative costs on households in the form of extra time required for data gathering ($240,000 per annum across all households). While some administrative costs would be incurred under option 3 (due to the time commitment involved in allowing a certificate creator into the house, and to supervise them), this time commitment was expected to be a lower imposition than for the other two options.

It should be noted that the modelling simply assumed a $2/certificate cost for administration – it did not disaggregate this according to affected party. Consequently the summary comparison below simply presents the administrative costs for the modelling as a single figure.

The above analysis is summarised below.

Table 7.4: Administrative costs of options

Description of administrative cost ($m)	Modelling Assumption	Option 1	Option 2	Option 3
Government start-up (once off)	n/a	$2.5	$5.3	$5.0
Government scheme administration (annual)	$2.7	$3.7	$4	$2.8
Scheme participants				
Certificate creators (annual)	n/a	$4.2	$4.2	$3.5
Energy retailers (annual)	n/a	$2.8	$1.2	$1.2
Households (annual)	n/a	$1.2	$1.2	$1.0
Total scheme participants (annual)[92]	**$5.4**	**$8.2**	**$6.5**	**$5.6**
Total annual administration costs[93]	**$8.1**	**$11.9**	**$10.5**	**$8.5**
NPV[94]	**n/a**	**- $35.8**	**- $34.5**	**-$28.6**

As demonstrated above, the estimated administrative costs used in the original VEET modelling were $2/certificate for retailers (a total annual administrative costs of $5.4 million) and $1/certificate for government administrative costs (a total annual cost of $2.7 million), for a total of $8.1 million per annum. This compares to estimated bottom-up annual costs of $11.9m for Option 1, $10.5m for Option 2 and $8.5m for Option 3.

Where the estimated costs are higher to those used in the original VEET modelling, this would be expected to diminish the benefits indicated by the modelling (i.e. higher certificate prices, an increased margin recovered by energy retailers and, ultimately, lower energy savings per household). However, the estimated bottom-up costs for Option 3 are broadly consistent with those used in the original modelling and, all other things being equal, would not affect the results of the modelling presented in the RIS.

[92] Totals may vary from data above due to rounding.
[93] Includes Government administrative costs, but excludes Government start-up costs, as these do not occur annually.
[94] Includes Government start-up costs and annual costs, as well as costs borne by scheme participants. These costs are expressed as a net present value over 3 years at a 3.5% discount rate. Not applicable to the modelling assumptions, which did not take into account Government start-up costs. Figures shown are all negative, as only administrative costs are examined (not the benefits of the scheme).

7.6.2. Impact of regulatory options on benefits

As noted above, the benefits of the VEET scheme are a reduction in energy expenditure by households, a reduction in GHG emissions prior to the ETS and, once an ETS is in place, a reduction in GHG emissions at lower cost than would otherwise be the case. Both of these benefits are associated with avoided energy consumption, and both are driven by the VEET target. This target is, for the first VEET phase, established in the parent Act.

It is assumed that any of the regulatory options would be capable of meeting the legislated VEET target. Consequently, the extent to which the benefits are delivered or compromised by the choice of regulatory option is assessed against:

- the degree of confidence in claims of abatement/energy saved;
- the timing of that energy savings (the likelihood that targets are met on time); and
- the extent to which the scheme drives the creation of a robust energy efficiency industry.

These criteria match the objectives of the VEET scheme as described in Chapter 5.

Confidence in abatement claims

Option 1 is least expected to provide confidence in claims of abatement made. Option 2 is considerably better in this regard, but still not as likely to provide the degree of confidence afforded by Option 3.

Timing

Option 1 is least expected to allow for the legislated targets to be met at the dates specified in the legislation. This is a result of the need for considerable up-front R&D by parties before they can commence certificate creation. Both Option 2 and 3 perform equally well in this regard, as they are based on the use of a pre-existing electronic registry with default abatement factors. This is discussed in greater detail in Chapter 6.

Encourage the development of an energy efficiency industry

Option 1 is expected to favour large, established certificate creation businesses, but to have some advantage in promoting innovation. Options 2 and 3 are expected to better facilitate new market entrants, and provide for greater business certainty.

7.7. Evaluation of options

DPI has chosen a multi-criteria analysis to assess the relative merits of each of the regulatory options examined in this RIS. A multi-criteria analysis assigns scores based on numerical rankings of options against criteria, multiplied by weightings which reflect the relative importance of each criterion. This form of evaluation has been chosen because not all of the costs and benefits of the scheme are believed to be accurately captured through strict cost measurement.

The criteria chosen for use in this multi-criteria analysis reflect the objectives of the Act described in Chapter 5, and consist of:

- achievement of GHG abatement;

- encouragement of energy efficiency;
- encouragement of the development of an energy efficiency industry; and
- minimisation of administrative costs.

Each regulatory option was ranked on a scale of 0.0 – 1.0 in terms of how fully it meets each criterion. To each criterion, a percentage weighting has been applied, with the total value of all criteria summing to 100 per cent. This weighting reflects DPI's view of the relative importance of each of these criteria in assessing the VEET scheme.

These are discussed below.

7.7.1. Achievement of GHG abatement

One of the three objectives of the Act is to achieve GHG abatement. As noted above, prior to the introduction of an ETS, VEET will deliver GHG abatement. Upon commencement of the national ETS, the effect of the VEET will not be to provide any abatement in addition to what would have occurred otherwise. Rather, the effect of VEET will be to lower costs of meeting the ETS cap. Consequently this criterion considers:

- how soon abatement is likely to be delivered; and
- the extent to which it will achieve abatement at lower costs than BAU.

As climate change is a global problem, which has taken centuries to manifest itself, the extent to which the VEET scheme accelerates GHG abatement by 1-2 years ahead of the introduction of an ETS is considered a relatively minor benefit. DPI believes the potential of the scheme to lower the price of achieving emissions under an ETS is ultimately of greater importance. To the extent that VEET certificate prices are lower than the prices of carbon which ultimately prevail under an ETS, it is assumed that the VEET has made a contribution to lowering these carbon prices across the economy.

For this reason DPI has assigned a weighting of **25 per cent** to this criterion.

7.7.2. Encouraging energy efficiency

Another of the three objectives of the Act is to encourage the efficient use of gas and electricity. This is expected to have the effect of lowering household expenditure on energy in the face of future price increases – many of them expected to be directly linked to carbon pricing induced by an ETS. To the extent that energy price increases may be driven by other causes (such as drought and international fuel pricing parities) enhanced household energy efficiency is a social policy benefit that extends beyond carbon abatement. It is also by no means certain that the scope of energy efficiency benefits expected from the VEET scheme would occur in the absence of the VEET scheme.

For this reason DPI has assigned a weighting of **35 per cent** to this criterion.

7.7.3. Encouraging the development of an energy efficiency industry

The last of the three objectives of the Act is to encourage investment, employment and technology development in industries that supply goods and services which reduce the use of electricity and gas by consumers. The primary reason for encouraging the development of this industry is to encourage energy efficiency (objective number two above). Consequently DPI believes this objective expresses a preferred means, as much as it expresses an ends in

itself. Therefore the relative importance of this criterion is believed to be less than 1 or 2 above.

For this reason DPI has assigned a weighting of **15 per cent** to this criterion.

7.7.4. Minimisation of administrative costs

Consistent with the above discussions, one of the major expected benefits of the VEET scheme will be a reduction in household expenditure on energy in the face of expected future energy price increases. Consequently, for the VEET scheme to fully deliver on its potential benefits, it is crucial that the overall costs of the scheme do not erode the expected cost-saving benefits.

As noted in the discussion in 7.6.1 above, the choice of regulatory option is expected to significantly impact on administrative costs.

For this reason DPI has assigned a weighting of **25 per cent** to this criterion.

7.7.5. Multi-criteria analysis

Table 7.5 below summarises the discussion above and in previous chapters. Option 3 scores highest against the criteria and would be expected to deliver the highest overall net benefits if implemented.

Table 7.5: Multi-criteria analysis

Criteria	Weighting	Option 1		Option 2		Option 3	
		Rating	Score	Rating	Score	Rating	Score
Achievement of GHG abatement	25%	0.8	0.2	0.8	0.2	0.9	0.225
Encouragement of energy efficiency	35%	0.8	0.28	0.8	0.28	0.9	0.315
Encouragement of the development of an energy efficiency industry	15%	0.7	0.105	0.9	0.135	0.9	0.135
Minimisation of administrative costs	25%	0.6	0.15	0.7	0.175	**0.9**	0.225
Total	**100%**	**2.9**	**0.735**	**3.2**	**0.79**	**3.6**	**0.9**

Options 1 and 2 rank slightly below Option 3 in terms of achieving GHG abatement, largely due to the greater risks of abatement claims being misstated or, at the very least, not verifiable with the same degree of confidence. Options 1 and 2 rank slightly below Option 3 for encouraging energy efficiency for essentially the same reason. For industry development, both Options 2 and 3 were regarded as superior due to their capacity to encourage a larger number of new market entrants, and to militate against boom-bust cycles in the certificate market. Lastly, Option 3 was a clear best choice for minimising administrative costs, with Option 2 performing less well in this regard and Option 1 the least cost-effective option.

8. Impact on small business

The proposed VEET Regulations are likely to impact on smaller retailers in three ways:

- the emergence/growth of certificate creators as a new type of business entity;
- the purchase of energy efficient products; and
- the installation of energy efficient products.

Certificate creators as a new type of business entity

The Act specifies that certificates can only be made by parties which have been accredited to do so by the scheme administrator. This effectively creates a new category of businesses.

A certificate creator can be any party which obtains accreditation. The ESC has proposed a small, nominal application fee but no other costs will incur to businesses simply by virtue of being accredited. In exchange, these accredited certificate creators have access to a market which is potentially worth hundreds of millions in equity.

Certificate creators are a new category of business, and it is expected that new enterprises will emerge to operate in this capacity. It should be noted that the NSW GGAS scheme (of which the VEET scheme shares some similarities) has had robust participation from small start up businesses that generated certificates. At the end of the 2004/05 financial year, the NSW GGAS had almost 150 accredited abatement certificate providers.

It is also expected that many existing businesses will simply attain VEET accreditation and expand their business model to certificate creation. For example, there are already a number of small businesses operating in Victoria which specialise in home sustainability retrofits. There are also roughly 1,000 parties who are accredited home energy efficiency assessors, who effectively enable the operation of the Government's 5-star requirements for new residential buildings. Tradespersons and appliance retailers are logical candidates to seek accreditation or to work in partnership with parties who are. Lastly, energy retailers themselves might seek accreditation, enabling them to create certificates to acquit their own legal liabilities under the VEET scheme.

While any of the regulatory options examined in this RIS would yield some of the above benefits, it is expected that the preferred option (Option 3) will yield the greatest benefits, as it is most conducive to the entry to market of small, start-up operations and should impose the least costs on certificate creators generally.

As discussed in section 6, Option 3 will minimise R&D costs to certificate creators. These costs could be prohibitively high under a project based approach. As a result, Option 1 would adversely impact on small certificate creators that generally have less relatively capital in which to invest in R&D. A project based approach also lends itself to large scale energy efficiency programs, such as installing shower roses in thousands of metropolitan households. It is unlikely that small certificate creators will be able to complete with larger organisations that have the significant economies of scale.

Purchase of energy efficient products

The VEET scheme specifically encourages the uptake of energy efficient products by households through discounts and encouragement provided by retailers and certificate creators. These products consist of appliances (refrigerators, hot water systems, air conditioning and space heating systems), light globes and building fabric improvements (more efficient glazing, insulation and air sealing).

The incentive provided by the discounts offered is likely to lead to an increase in the purchase of energy efficient equipment by households upon the commencement of the VEET scheme. This could benefit small product retailers in the form of an increase in the volume of business.

The installation of energy efficient products

The VEET scheme requires professional installation of most energy efficient products before VEECs can be generated (the sole exception being the purchase or destruction of refrigerators). The increase in the installation of such products is expected to benefit tradespeople – including electricians, plumbers and builders. These industries are categorised by large numbers of small businesses.

Conclusion

The VEET scheme is unlikely to adversely impact small businesses. In fact, the scheme is likely to be beneficial to small businesses. The main benefits include providing opportunities for small businesses to participate directly in creating VEECs; the increase in the sale of energy efficient products, and the increase in the installation of such products.

9. Assessment of competition impacts

9.1. The competition test

The *Victorian Guide to Regulation 2007* establishes the fundamental principle that any new regulations in Victoria cannot restrict competition unless it can be demonstrated that:

- the benefits of the restriction, as a whole, outweigh the costs; and
- the objectives of the legislation can only be achieved by restricted competition.

DPI acknowledges that the proposed VEET scheme regulations may have an impact on competition with respect to two issues:

- products not incentivised by the list of activities; and
- new entrants to the energy retail market.

These are discussed below.

9.2. Products not incentivised by the list of activities

The preferred regulatory option (Option 3) consists of a prescribed list of 25 eligible activities. This imposes a potential barrier to entry for activities that are not eligible under the scheme.

As noted in the discussion in section 6 above, a number of activities were excluded from the preferred option due to their inability to contribute to measurable and low cost GHG abatement. If either of these two main exclusion rationales were overcome, there may be a case for an activity to be included within the scheme during a particular phase. The VEET scheme will include an Eligible Activities Review Panel that will actively encourage innovation and enhanced competition.

The list of eligible activities will be re-examined during the evaluation process at the end of each phase, with a view to reviewing the merits of removing activities, adding activities or modifying abatement factors applying to those activities. Subsequent scheme phases will require new Regulations. This will require a new RIS, and substantial stakeholder consultation, with a view to possibly removing activities, adding activities or modifying abatement factors applying to those activities. This process allows the VEET scheme to be flexible over time.

The structure of the VEET scheme also allows for the potential to include new activities during a particular phase, based on a stakeholder proposal. To be considered for inclusion in the scheme within a particular phase, proposals for a new activity must:

- be made in writing to DPI (Veet.Submissions@dpi.vic.gov.au);
- provide independent assessment of both the amount of energy to be saved, and the expected lifetime of the activity. This should be based on data which best approximates product performance under Australian conditions, for a period of not less than 12 months, and based on a statistically significant number of sites or observations;
- indicate the expected uptake of the activity (number of households per annum);
- indicate the expected upfront, installed capital cost of the activity; and
- indicate any other benefits or disbenefits associated with the activity.

An Eligible Activities Review Panel will be established to review applications. The Panel will not charge an application fee. It will consist, at a minimum, of at least one representative from

DPI, ESC and Sustainability Victoria. Membership may be extended to other agencies based on relevant expertise or interest.

The Panel will publish a statement of the expected benefits and disbenefits associated with the proposal on the DPI website, and seek stakeholder comment for a period of not less than 30 calendar days. Based on stakeholder comment and its own analysis, the Panel will make a recommendation to the Minister for Energy and Resources with respect to the inclusion of a new activity in mid-scheme phase. The Minister's decision will subsequently be published on the DPI website.

The first review of applications will be conducted after six months of the scheme commencing or, if no applications have been made, 28 days after receipt of the first application. Reviews will then occur every six months from the first meeting with applications received in the final twelve months of each phase considered at the beginning of the subsequent phase. In an extreme case, a product may gain certification under the VEET scheme in early January, for example, and be required to wait until 30 June to be eligible for VEECs.

Given the above process, DPI expects that adverse impacts on competition arising from the preferred approach will be significantly mitigated, and that any residual adverse impacts are warranted due to the benefits of the preferred approach.

DPI believes that the proposed Regulations are the most appropriate manner in which to achieve the objectives of the Act. It is the opinion of DPI that the benefits of this regulatory approach outweigh the costs.

9.3. New entrants to the energy retail market

The VEET scheme may place a competitive restriction on businesses by favouring incumbent energy retailers. As incumbent energy retailers will commence operation within the VEET scheme first, it would be expected that they would secure the lowest-cost certificates in the scheme. This may effectively force new entrants to confront higher VEET compliance costs than their competition.

The VEET scheme attempts to mitigate this risk by:

- establishing a minimum size threshold for liability under the scheme; and
- imposing the liability in a way which is expected to be proportional to the organisation's capacity to meet it.

Threshold

The Act places the mandatory obligation for the surrender of VEECs on energy retailers with more than 5,000 Victorian customers. This threshold was specifically placed in the parent Act so as to prevent inhibiting entry to market of new, small energy retailers.

Proportional liabilities

At such time as a retailer exceeds the 5,000 Victorian customer threshold, it will gain a liability. This liability is proportional the share of the retail market they command. More specifically, a retailer's liability is a function of their wholesale acquisition of electricity or gas, multiplied by the GHG rate for that fuel. This is detailed in Section 32 of the Act. The use of a GHG reduction rate allows any given liable entity to calculate, at any point in a calendar year, what its liability will be under VEET, by multiplying its wholesale purchase of electricity or gas by the GHG reduction rate.

As noted in Chapter 5, the GHG reduction rate is established each year through Ministerial Orders. The actual rate is established by disaggregating the annual scheme target (2.7 million

certificates) according to the two relevant fuel types. Projections are then made as to the residential sector consumption of these two fuels for the calendar year to which the liability applies. These two quanta (x MWh of electricity and y GJ of gas) are then divided into the respective annual fuel targets (x million certificates and y million certificates) to derive the respective GHG reduction rates. This methodology essentially mirrors that used for the MRET renewable power percentage, and allows individual firms to retain confidentiality regarding their market share.

DPI believes that the use of this methodology for calculating liabilities under VEET mitigates the potential risk of inhibiting new market entrants. Further, DPI believes that the objectives of the VEET legislation can only be achieved by employing the preferred regulatory option.

9.4. Scheme will create a business opportunity – creation of certificate creator sector

The VEET scheme will create a market for certificate creators. For those firms that wish to enter the market, administrative costs will be identical.

Administrative obligations for all market participants will be modest and will not adversely affect competition between parties as all participants bear the same costs. These costs have not been quantified in the RIS. However, DPI has estimated that certificate creators' administrative obligation will be approximately 5 per cent of their upfront installed costs on any given activity.

Promote competition within energy retailer, certificate creator and household appliance retail sector

DPI believes the preferred option for the VEET Regulations is expected to be the most conducive to promoting competition between certificate creators. It is also expected to create competition among liable energy retailers that wish to purchase VEECs from certificate creators or that are competing to produce VEECs of their own accord.

The growth in the market for energy efficient appliances and building improvements is expected to promote further competition in the appliance retail, building, electric and plumbing trades. The proposed Regulations are not expected to materially impact on energy retailer competition.

Minimise barriers to entry

The preferred option for the VEET Regulations is designed to minimise any barriers to entry.

Under the scheme, all parties are bound by the same rules, processors, procedures and costs. It is the opinion of DPI that given a Victorian Government statutory authority, the ESC, has developed the website, transactions costs will be the same for all.

The web-based registry will allow certificate creators to enter a minimum set of data points (approximately 12 are envisioned) in order to determine certificate value of an activity. These data points will all be readily answerable by the householder and certificate creator, at point-of-installation, with minimal expenditure of time or effort. Examples of these data points are the name and address of the household, householder signature, date, the name of the activity and – for some activities- the size of the relevant product, its relative efficiency (high or low), and the nature of any product being replaced.

The web-based registry, in addition to performing most of the calculations needed under the scheme, will also allow for scheme participants to run queries in order to observe the general operation of the market. The scheme administrator will also publish guidelines and registries of products which will lower transaction and search costs for scheme participants.

In addition, the costs of registering to be an accredited certificate creator will be set as a once-off application fee by the Minister for Energy and Resources at a level sufficiently low so as not to impede market entry. The application fee to become an accredited certificate creator has not

yet been determined, although an indicative figure is $500. DPI does not believe this will create a barrier to entry.

9.5. Eligible product list

The scheme administrator will maintain a comprehensive list of eligible products under the scheme on its web-based registry. For example, a new product that falls within the definition of an eligible activity (e.g., new energy efficient refrigerators) will be automatically added to the eligible products list on the web-based registry.

The scheme administrator will also have a process in place for applicants that consider a particular product eligible under the scheme, which is not shown on the eligible products list. In this case, the applicant will be required to complete a short form attaching the relevant data and certifications (e.g. certificates stating compliance with MEPS) that will be considered by the scheme administrator. The information required will not be extensive as the scheme administrator will largely rely on the technological certification assessment of the relevant body (e.g. Standards Australia). The scheme administrator anticipates that the overwhelming majority of eligible products will be automatically updated to the eligible products list alleviating the prospects of this process being required.

9.6. Householder engagement in scheme

The work conducted in establishing this scheme included calculating abatement levels on a per activity basis and examining commonly purchased products. It is the opinion of DPI that the Victorian Government's upfront work may increase householder's confidence in the abatement potential per activity and the overall net benefit of engaging in the scheme. This may facilitate, other things being equal, greater householder participation in the scheme than if the scheme was conducted by a private organisation.[95] This may encourage engagement in the scheme by potential certificate creators and provide greater competition.

[95] Similarly, the *Slip Slop Slap* information campaign was a successful campaign. It was launched by the Cancer Council Australia and is widely recognised as playing a significant role greater social awareness on sun protection attitudes and behaviour over the past three decades. (see Cancer Council of Australia, available at http://www.cancer.org.au/cancersmartlifestyle/SunSmart/Campaignsandevents/SlipSlopSlap.htm)

10. Change in administrative burden

It has been determined that the regulatory framework is not sufficiently detailed to enable a Victorian SCM measurement of the changes to the administrative burden to be conducted as part of the RIS.

An ex-post measurement of the changes to the administrative burden will be conducted and an SCM Report will be provided to the VCEC within three months of the Regulations taking effect.

11. Implementation and enforcement issues

The implementation and enforcement of the preferred option will be in accordance with the Act and the Regulations. The Act states that the ESC is responsible for the general administration of the Act. As identified in section 6.4, the administration of the Act under the preferred option is expected to require an additional 12 full-time equivalents (FTEs) for the ESC at an annual cost of $1.3 million.

The departments and agencies involved, and their roles in, administering and enforcing the preferred option include:

DPI:

- design and setup of the scheme;
- communicate with and educate energy retailers as to their obligations under the VEET scheme and the operation of the Regulations and thereby assist retailers in the transition to the VEET scheme;
- engage with other relevant stakeholders on an ongoing basis;
- act as a member of the Eligible Activities Review Panel (see section 12); and
- facilitate the evaluation of the first phase of the VEET scheme at the end of each 3 year phase.

ESC:

- general administration of the scheme, in particular the online registry;
- accreditate persons who may create certificates;
- monitor and administer the creation, registration, transfer and surrender of the certificates;
- enforce the imposition of the energy efficiency shortfall penalties;
- undertake audits and monitoring compliance with the Act and the preferred option;
- engage with the independent consultant during the evaluation of the first phase of the scheme;
- act as a member of the Eligible Activities Review Panel; and
- report to the relevant Minister.

Sustainability Victoria:

- act as a member of the Eligible Activities Review Panel;
- engage with the independent consultant during the evaluation of the first phase of the scheme; and
- offer technical advice to DPI as necessary.

12. Evaluation strategy

The Garnaut Review made the following observation with respect to white certificate schemes:

> *Another alternative is to create obligations or incentives for parties, such as energy retailers, to deliver energy efficiency improvements in households and firms. Market-based schemes have the advantage that they are more flexible and responsive than government schemes, and are used extensively both the United States and Europe … These schemes appear to be worth testing, but the detail of design will be critical and any scheme that is introduced in Australia should be rigorously monitored and evaluated.*
>
> *As noted earlier, some programs go further to provide incentives or obligations for third parties to identify and implement energy efficiency improvements in homes and businesses, such as the Victorian Energy Efficiency Target. These programs may be more effective at improving energy efficiency, but there may be significant methodological problems and it is not yet clear how cost effective these programs can be …. there is a case for testing these types of programs, but they should be rigorously assessed and focused on low-income households.*[96]

DPI agrees that rigorous evaluation will be required, commensurate to the impact of the Regulations, to determine whether the first phase of the VEET scheme has been successful in achieving its objectives as identified in Chapter 5 above:

(a) reduce GHG emissions;

(b) encourage the efficient use of electricity and gas; and

(c) encourage investment, employment and technology development in industries that supply goods and services which reduce the use of electricity and gas by consumers.

It was an intentional decision by DPI to conduct a formal evaluation at the end of each phase. This evaluation will allow for potential weaknesses in the VEET scheme to be identified and rectified on an ongoing and timely basis. It is the intention of DPI to constantly monitor the operations of the scheme throughout the first phase to facilitate a strong and meaningful evaluation.

It is the opinion of DPI that the evaluation strategy must be flexible to allow it to meaningfully examine the effectiveness of the VEET scheme in accelerating GHG abatement at lower costs. This is particular important given the number of current unknowns surrounding the proposed ETS.

12.1. Reduce GHG emissions

Quantity

Optimally GHG emissions reductions delivered through the VEET scheme would be clearly measured based on an initial assessment of Victorian household sector emissions before the start of the scheme, followed by subsequent measurements of actual emissions. In practice, however, this is not feasible, given the multiplicity of factors which will ultimately influence the actual energy use (and, by association, GHG emissions) of Victorian households over the course of the regulatory period. In the first instance, it will not be possible to state with absolute certainty what would have happened in the absence of policy intervention. In the second instance, it is not possible to state with absolute certainty that a given quantum of energy use/GHG reduction had a unique, causal relationship to the VEET scheme.

[96] Garnaut Climate Change Review. *Draft Garnaut Climate Change Review Report*, July 2008, pp. 462-464

As detailed in Chapter 6, however, estimates of GHG emissions reductions from the VEET scheme are effectively incorporated into the calculation of certificates under the scheme. These calculations estimate energy savings (and, by inference, GHG reductions) based on:

- Estimates of BAU energy and greenhouse performance by activity. These incorporate the best available estimates of endogenous energy efficiency improvements by consumers.

- Estimates of the improvements in energy consumption/greenhouse performance by activity. This incorporates data determined by relevant Australian standards for product energy performance, and market data on average product life.

Consequently, DPI intends to use data on certificate creation and surrender, compiled by the scheme administrator, to determine whether the objective of achieving the stated quantity of GHG emissions reductions has been met. If liable energy retailers meet their annual targets, the scheme will have been successful in achieving the quantum of abatement sought. If any of these parties fail to meet their target, the scheme will have been unsuccessful in this regard.

Cost

As noted in Chapter 5, post full implementation of the ETS, VEET will not, in itself, deliver any GHG abatement. Rather, at that point VEET is expected to act as a means of lowering the costs of abatement, by overcoming residual market failures. The extent to which VEET actually does provide abatement at lower cost than an ETS will be determinable by reference to:

- the market price for carbon under an ETS; and

- the price of a VEEC.

Should the price of a VEEC prove lower than the market price for carbon under an ETS, it may be safely deduced that the VEET scheme has achieved its objective of securing emissions reductions at lower costs than would otherwise be the case. Conversely, if the costs of VEECs exceed ETS carbon prices, the scheme will have been unsuccessful in meeting this objective.

While the VEET registry captures information for each certificate on the type of activity, its timing and location, the registry will not capture certificate price information. Consequently DPI proposes to undertake an evaluation of the VEEC market to obtain this price information.

Currently, the cost of a VEEC does not include the sum of costs associated with achieving one tonne of GHG abatement under the scheme. The administrative cost to householders, which all engage voluntarily in the scheme, is not included in the cost of each VEEC. To effectively measure the schemes ability to deliver accelerated and low-cost GHG abatement against the proposed ETS, the sum of householder's administrative costs will need to be internalised in the examination. It is expected that this approach will allow the evaluation to determine whether the cost of a tonne of GHG abatement under the VEET scheme was cost-effective relative to the proposed ETS. As a result, DPI anticipates that the evaluation will incorporate the economy-wide costs of both the VEET scheme and the proposed ETS facilitating a meaningful and robust comparison.

Timeliness

As discussed in section 4.4, the VEET scheme aims to assist in achieving GHG abatement earlier and at lower costs than would otherwise be the case. Hence, it will be important for the evaluation to examine the success of the VEET scheme in accelerating GHG abatement prior to the introduction of an ETS.

The VEET scheme calculates VEECs on a given eligible activity based on its expected lifetime GHG abatement. This means that in the first phase total avoided energy use – and associated

GHG abatement - will be lower than the number of VEECs created.[97] To evaluate the effectiveness of the VEET scheme to deliver accelerated GHG abatement, DPI intends to examine actual avoided energy savings and GHG abatement which occurs in the years 2009-2011. This will be a function of the volume of certificates created for specific activities, divided by the average lifespan assumed for those activities in the certificate creation methodology discussed earlier in this RIS.

12.2. Encourage efficient use of electricity and gas

Much of the detail above on GHG emissions reductions also applies to encouraging efficient use of electricity and gas. While certificates surrendered to the scheme administrator are denominated in terms of units of avoided GHG, these certificates also contain sufficient information to allow for an analysis of the avoided energy attributable to the activities in question.

Similarly, the evaluation of the VEEC market will also determine the relative costs of undertaking individual activities under the scheme. This is expected to reveal itself in terms of the composition of the certificate market by activity, with least-cost activities being undertaken in larger numbers than higher cost activities.

DPI plans to work with the ESC to interrogate the information provided by certificate surrender to determine the actual energy use avoided as a result of the VEET scheme.

DPI also intends to evaluate the impact of rebound on the efficient use of electricity and gas. As discussed in section 6.7.2, DPI anticipates that the impact of rebound[98] is likely to be moderate other than in low income households.[99] It is the intention of DPI to use an anticipated rebound effect of 25 per cent for the first phase of the scheme (see discussion in section 6.7.2). During the evaluation of the scheme, DPI plans to facilitate – as part of the surveys explained in section 12.4 – qualitative surveys with a reasonable sample of householders that engaged in the scheme to evaluate their energy consumption behaviour following the purchase/installation of an eligible energy efficiency product. The results of the survey are expected to offer DPI an indication on the impact of rebound under the scheme.

12.3. Encourage investment, employment and technology development in the energy efficiency industry

The extent to which the VEET scheme encourages heightened investment, employment and development of an energy efficiency industry is more complex than determining the extent to which the first two scheme objectives have been met. The extent to which the VEET scheme delivers additional benefits in employment and investment will be influenced by whether higher returns for the economy were derived from engagement with the scheme compared to the next best activity.

Investment

One measurement for investment is the number of entities which achieve accreditation by the scheme administrator. If this number increases over the period in which the scheme operates, it can be inferred that the scheme has successfully promoted growth in this sector. Conversely, if the number of entities accredited declines over the 3-year regulatory period, it could be inferred that the scheme has not been successful in this regard.

[97] It also indicates that energy efficiency activities undertaken under the VEET scheme prior to the introduction of an ETS will continue to deliver GHG abatement for their operating life post the introduction of an ETS.
[98] As mentioned, rebound refers to the increase in consumption as a result of enhanced energy efficiency.
[99] ACIL Tasman, *'Policies for Energy Efficiency in the Household Sector: an Evaluation of Potential Options'* commissioned by the Victorian Department of Treasury and Finance, 2007, p 46

In this instance, the baseline data may include information on the number of organisations that initially register as accredited certificate creators. This could be measured against any increase or decrease in the number of accredited certificate creators (including accounting for the growth or contraction within the size of certificate creators).

A further measure of investment could be obtained from the financial details of accredited certificate creators. Obtaining this information may, however, be difficult unless the accredited party is a publicly listed company. DPI will employ this information, where available, to ascertain the extent to which the scheme has encouraged investment in the energy efficiency industry.

As noted, the VEET scheme seeks to encourage investment in the energy efficiency sector. In the event that this occurs, there may be economy wide impacts. The evaluation intends to examine these macro impacts and the degree to which other sectors are affected. For example the evaluation may investigate the opportunity cost of investors engaging in the VEET scheme relative to other investment opportunities.

Employment

A measure of employment growth in the industry sector would be the number of staff employed by accredited certificate creators – either directly (full and part time) and indirectly (contracted staff). DPI proposes to survey accredited certificate creators in order to determine the extent to which the VEET scheme has encouraged employment in the energy efficiency industry.

In addition to the gross impacts discussed above, the evaluation aims to examine the economy-wide impacts of shifting employment patterns. The promotion of employment in the energy efficiency sector may have economy wide implications. Consequently, the evaluation will aim to examine the opportunity costs to the economy of the possible shift in employment to the energy efficiency sector and the macro impact of these changes.

Technology development

The extent to which technology development is encouraged by the VEET scheme can be inferred from market surveys of appliances and equipment. DPI, through an inter-agency review panel, will review proposals for the inclusion of new activities in the VEET scheme. It is anticipated that many of these new activities will be based on technologies new to the Australian market. This ongoing process of regulatory review will furnish an opportunity to effect at least a qualitative assessment of the extent to which the scheme has encouraged technology development.

12.4. The extent to which identified residual market failures are addressed

As detailed above, obtaining data on the quantity, and cost, of certificates in the VEET market is relatively straight forward. Similarly, some reasonable measurement can be made of the extent to which the VEET scheme has encouraged investment in the energy efficiency industry. It is more difficult, however, to categorically determine whether these objectives have been met because a particular residual market failure has been addressed.

One possible means of determining the extent to which individual market failures have been addressed is by follow-up surveys of householders that have hosted activities under the VEET scheme. DPI intends to complete such surveys as part of the evaluation of the first phase of the VEET scheme to specifically assess the effectiveness of the scheme in addressing the identified residual market failures.

A survey instrument could seek to determine what prevented or discouraged a consumer from undertaking an energy efficiency activity in the first place. If consumers indicate lack of time or

motivation, this would tend to indicate that bounded rationality was the primary barrier to behaviour change. Conversely, if consumers indicate confusion or lack of awareness, it would tend to indicate that information failures were primarily responsible. To be complete, such a survey would then need to determine what aspect of the VEET scheme induced the consumer to change their behaviour.

The extent to which the split incentive barrier has been overcome can be more quantitatively addressed. In the first instance, it would be desirable to quantify the extent to which this problem exists. As noted above, data which demonstrates the existence of this market failure is limited. In the second instance, a survey of certificate creators could determine how many certificates, and for which activity, were generated from tenancies versus owner-occupied dwellings. Coupled with the above baseline data, this would provide a useful indicator of the extent to which the VEET scheme had overcome the split incentive barrier to energy efficiency. If the data indicates that activities based on building fixtures were being installed in tenancies at a comparable rate to owner-occupied dwellings, it could be inferred that the scheme had been successful in this regard.

The final residual market failure identified is the lack of access to electronic information regarding energy efficient products in regional and rural Victorian. As pary of the intended survey, DPI intends to identify a portion of rural and regional Victorians to establish whether the VEET scheme have experience an ease in access to energy efficency information electronically. This is expected to offer DPI an indication on the effectiveness of the scheme in responding to this residual market failure.

In 2011, DPI intends to conduct a survey on the first phase of the VEET scheme that examines the impact of the VEET scheme in addressing the residual market failures. DPI also intends to undertake such a survey of certificate creators as part of the scheme evaluation.

12.5. Assumptions

This RIS has transparently stated the assumptions used to develop the scheme. It is the opinion of DPI that these assumptions are robust and necessary to create a simple and meaningful scheme. It is expected that the evaluation will allow DPI to evaluate whether these assumptions were strong or further refinements are needed for subsequent phases. Assumptions that are anticipated to be reviewed in the evaluation include uptake rates and GHG abatement methodologies. These assumptions are discussed in section 6 of the RIS.

This RIS discloses six costs associated with the creation of VEECs (upfront purchase and installation costs, forgone life of product costs, disposal costs and scheme participant administration costs). The evaluation intends to examine, and verify, actual costs in the first phase of the scheme against the assumption identified in this RIS. This analysis may inform the development of the second phase of the scheme.

DPI anticipates the evaluation will also examine the assumptions surrounding the expected capital and labour costs in the first phase of the scheme.

The results of this evaluation will inform the setting of annual certificate targets, and penalty rates, for future scheme phases.

12.6. Timing

Where baseline data is required, DPI aims to gather data immediately. Where data is based on VEET market characteristics, DPI intends on undertaking surveys at least 12 months after scheme commencement, or 1 January 2010, to allow for a meaningful assessment of the market.

The Act states that the Act, and therefore the Regulations, must be reviewed before 31 December 2011. Consequently all the above surveys and data gathering indicated above must be completed in time to fulfil this legislated obligation.

The results of the VEET scheme evaluation will be made available on the DPI website, and will inform future decisions on the directions of the scheme.

13.Consultation

In order to develop the proposed Regulations and the development of this RIS, the Department conducted extensive consultations with a range of energy retailers, businesses, industry associations, Government departments and other relevant organisations. These consultations included:

- Three forums:
  - 28 March 2007: launch of the Issues Paper by Energy and Resources Minister, the Hon Peter Batchelor, and (then) Environment Minister the Hon John Thwaites MP.
  - 31 October 2007: launch accompanying the tabling of VEET Bill in Parliament.
  - 5 February 2008: forum with stakeholders identifying key design elements of the Regulations.
- 40 independent one-on-one consultations.

In total over 80 organisations took part in the consultation process, and over 150 were invited to take part.[100] These consultations are in addition to those undertaken by the ESC as part of its consultation obligations as scheme administrator.

The main stakeholder groups included:

- energy retailers, suppliers and peak industry bodies;
- non-energy sector industry groups;
- environmental and social advocacy groups;
- product and appliance manufacturers;
- potential certificate creators;
- technical experts and consultants; and
- local government.

The major themes stemming from stakeholder consultation to date is summarised below.

Energy retailers, suppliers and peak industry bodies

Some in this group expressed scepticism that enhanced energy efficiency policies would be required in the context of a national ETS. In general, this group expressed scepticism that a white certificate scheme would be an effective means of achieving energy efficiency. To the extent that a white certificate scheme eventuates, this group indicated a preference for a nationally consistent approach.

Non-energy sector industry groups

This group were divided in their views on the scheme. Some expressed concern about potential adverse financial impacts on various industry sectors; others saw a white certificate scheme as being a potential economic benefit. Of the later category, some expressed concern that the scheme was too narrowly focussed on the household sector, and could be expanded to other sectors – especially the commercial sector.

[100] A full list of stakeholders who engaged with DPI during the development of the Regulations and RIS is at Appendix A.

Environmental and social advocacy groups

This group expressed strong support for the VEET scheme. Some social advocacy groups expressed an interest in a scheme which targeted low-income groups specifically. This was the approach taken in the UK white certificate scheme (the EEC or its successor, the CERT).

Product and appliance manufacturers

This group expressed strong support for the VEET scheme. Most representations from this group detailed the merits of a particular product.

Potential certificate creators

This group expressed strong support for the VEET scheme. There was considerable divergence of views on the form and manner by which the scheme should be enacted, however. Some groups preferred a more "light handed" regulatory approach, in order to facilitate least-cost generation of certificates. Others preferred a highly regulated approach to ensure quality of product installation and confidence in energy savings and abatement claims.

Technical experts and consultants

This group expressed support for the scheme, but raised numerous questions regarding calculation methodologies and evaluation.

Local government

This group expressed strong support for the scheme, but expressed concern that the focus on residential sector activity precluded numerous cost-effective abatement opportunities to be realised from areas such as municipal buildings and public lighting.

Additional consultation

In accordance with the *Victorian Guide to Regulation,* once the RIS has received VCEC approval, a notice of the RIS will be placed in the Government Gazette and in daily newspapers circulating generally throughout Victoria and in relevant trade, professional or public interest publication if deemed appropriate by the responsible Minister. Public comments and submissions will be invited following the publication of the notice and the consultation period (the period of time during which submission are to be received) will be 30 days. DPI will also send the RIS and Regulations to over 140 parties that have expressed an interest in the VEET scheme and meet with a number of energy retailers during this consultation period.

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15.Appendix A – stakeholders consulted

Below is a list of stakeholder organisations that engaged with the Government during the development of the Regulations and RIS.

Table 15.1: Summary of stakeholders consulted

Organisation	Organisation
Accreditation Assurance Associates	AGL
Air2Energy	Alternative Technology Association
ARUP Partners	Australian Conservation Foundation
Australian Geothermal Energy Association	Australian Glass & Glazing Association
Australian Power and Gas	Balmah Nominees
Beacon Lighting	Victorian Building Commission
Bunnings Warehouse	Camberwell Electrics
City of Banyule	City of Darebin
City of Greater Bendigo	City of Hume
City of Melbourne	City of Moreland
City of Whittlesea	City of Yarra
Clean Energy Council	Clive Peeters
Coles Myer	Commonwealth Department of Climate Change
Commonwealth Department of Environment, Water, Heritage & the Arts	Consumer Utilities Advisory Centre
Consumer Utilities Advocacy Centre	Cool NRG International
Country Electricity	Creative Energy Solutions
Dux Hot Water	E&S Trading
EcoMaster	ECOS
EcoSmart	Eco-Ultimate
EcoVantage	Elgas
Enact Energy	Energy Renovations
Energy Retailers Association of Australia	Energy Supply Association of Australia
Energy Users Association of Australia	Essential Services Commission
EWOV	Fieldforce

Fletcher Insulation	GE Lighting
George Fethers & Co	Gramercy
Green Building Council of Australia	Green Energy Capital
Harvey Norman	Honeywell Building Solutions
ICANZ	ICLEI
Insulation Council of Australia and New Zealand	Ironbark Sustainability
Jackgreen	Kleenmaid
Lawrence & Hanson	Low Energy Supplies & Services
MEFL	Minter Ellison
Mission Australia	Mitre 10
Municipal Association of Victoria	Neco
NetBalance Management Group	NSW Department of Environment and Climate Change
NSW Department of Water and Energy	Origin Energy
Parks Victoria	Peter Lyons & Associates
Power Direct	Red Energy
Residential Development Council	Retravision
Rheem	Royal Melbourne Institute of Technology
South Australia Department for Transport, Energy and Infrastructure	Simply Energy
Smart Options	Smart Roof Australia
Sustainability Victoria	Sustainable Harvest Group
Szencorp	Tenants Union of Victoria
The Good Guys	Tony Isaacs Consulting
TRU Energy	Victoria Electricity
Victorian Department of Sustainability and Environment	Victorian Department of Human Services
Warehouse Sales	Western Port Greenhouse Alliance
Global Green Foundation	Energymad
Rylock Doors and Windows	TFS Brokers
Mission Australia	

16.Appendix B – modelling assumptions

Table 16.1: Modelling assumptions per proposed eligible activity

	Type of Dwelling / Activity	Capital Cost[101]	Percentage consumer willingness to pay[102]	average certificate creation per instance[103]	Cost of certificate per activity (base)[104]	Cost of certificate per activity (including admin costs)[105]	Total costs (including ESC fees)[106]
No.	**Category A: Water Heating**						
1	Gas/LPG water heater replaces an electric resistance water heater	**$ 193**	**0%**	**28.32**	**$ 7**	**$ 9**	**$ 10**
2	Electric boosted solar or heat pump hot water heater replaces an electric resistance water heater	**$ 832**	**0%**	**30.38**	**$ 27**	**$ 29**	**$ 30**
3	Solar Retrofit Kit fitted to an existing electric resistance water heater	**$ 2,175**	**75%**	**16.53**	**$ 33**	**$ 35**	**$ 36**
4	Gas/LPG boosted solar hot water heater replaces electric resistance water heater	**$ 1,058**	**0%**	**51.40**	**$ 21**	**$ 23**	**$ 24**

[101] Capital costs reflect the full purchase cost for activities where the consumer was not expected to make a purchase in the absence of the VEET scheme. For remaining activities, purchase cost is net of what consumer was expected to pay in the absence of the scheme. For relevant activities (solar hot water, insulation) capital costs are net of rebates assumed to be available to the average household at the time of this analysis. As noted in Chapter 7, many of these rebates are limited in terms of eligibility. Consequently actual costs per certificate for these activities will vary considerably from the average figure shown. All capital costs include any labour associated with installation.

[102] Willingness to pay was assumed to be influenced by the extent to which a certificate creator would need to ask for a capital contribution by the householder in order to lower final certificate costs. It was assumed that certificate creators would be primarily motivated by the need to gain consumer acceptance of an activity, that consumers would be more likely to accept an activity when free or low-cost to themselves, and that therefore the certificate creator would seek to minimise any request for a capital contribution. While willingness to pay percentages are expressed as a single figure for a given activity for modelling purposes, in practice they are expected to vary considerably. DPI was unable to obtain data to inform these figures and will rely on market monitoring to better inform future analysis of this nature (as discussed above in Chapter 12).

[103] Figure is an average across all the variables potentially relevant to an activity (geographical location, size of unit, relative efficiency of unit). Actual certificate volumes will vary in practice according to these factors.

[104] Reflects net costs to certificate creator of supplying, on an installed basis, the products in question, divided by the volume of certificates that entity would be expected to create for that job.

[105] Includes $2/certificate administrative costs borne by scheme participants and reflected in effective cost impact of certificates on energy market.

[106] Reflects all costs borne by certificate creator (base, admin and ESC fees). This figure was assumed, for modelling purposes, to represent the final cost to the energy market of a certificate for a given activity. These figures are not net of any energy savings benefit to households, as these are accounted for separately in the RIS and modelling.

5	Gas/lpg boosted solar hot water replaces gas/lpg water heater	**$ 983**	**60%**	**11.95**	**$ 33**	**$ 35**	**$**	**36**
6	Solar Pre-Heater for an existing gas/lpg water heater	**$ 2,325**	**90%**	**5.74**	**$ 41**	**$ 43**	**$**	**44**
	Category B - Space Heating							
7	Installation of high efficiency ducted gas heater to replace existing gas ducted heater	**$ 1,380**	**75%**	**12.01**	**$ 29**	**$ 31**	**$**	**32**
8	Installation of high efficiency ducted gas heater to replace existing central electric resistance heater	**$ 3,780**	**0%**	**176.43**	**$ 21**	**$ 23**	**$**	**24**
9	Installation of ducted Air-to-air heat pump to replace existing ducted air-to-air heat pump	**$ 5,025**	**90%**	**14.43**	**$ 35**	**$ 37**	**$**	**38**
10	Installation of ducted Air-to-air heat pump to replace existing central electric resistance heater	**$ 5,425**	**25%**	**152.59**	**$ 27**	**$ 29**	**$**	**30**
11	Installation of Gas/LPG space heater	**$ 1,420**	**90%**	**4.36**	**$ 33**	**$ 35**	**$**	**36**
12	Install high efficiency space air-to-air heat pump	**$ 1,505**	**90%**	**5.26**	**$ 29**	**$ 31**	**$**	**32**
	Category C - Building Fabric							
13	Installation of ceiling insulation in existing home with uninsulated ceilings	**$ 697**	**0%**	**40.28**	**$ 17**	**$ 19**	**$**	**20**
14	Installation of under floor insulation in existing home with uninsulated floors	**$ 1,035**	**60%**	**11.48**	**$ 36**	**$ 38**	**$**	**39**
15	Installation of a thermally efficient window or door	**$ 199**	**90%**	**0.51**	**$ 39**	**$ 41**	**$**	**42**
16.a	Retrofit of window (additional pane)	**$ 103**	**90%**	**0.36**	**$ 28**	**$ 30**	**$**	**31**
16.b	Retrofit of window (additional film)	**$ 19**	**75%**	**0.14**	**$ 33**	**$ 35**	**$**	**36**
17.a	Weather proof door	**$ 25**	**60%**	**0.36**	**$ 27**	**$ 29**	**$**	**30**

17.b	Exhaust fan	$ 24	0%	0.93	$ 26	$ 28	$ 29
17.c	Weather seal wall vents	$ 23	70%	0.24	$ 30	$ 32	$ 33
17.d	Weather seal windows	$ 7	90%	0.03	$ 27	$ 29	$ 30
17.e	Install chimney damper	$ 121	5%	5.23	$ 22	$ 24	$ 25
	Category D - Lighting						
18	Installation of low energy GLS (general lighting service) lamp	$ 7	0%	0.35	$ 19	$ 21	$ 22
19	Installation of low energy small decorative lamp	$ 6	0%	0.17	$ 37	$ 39	$ 40
20	Installation of low energy reflector lamp	$ 7	0%	0.36	$ 21	$ 23	$ 24
21	Installation of low energy downlights	$ 21	50%	0.29	$ 36	$ 38	$ 39
	Category E - Shower Rose						
22	Installation of low flow shower rose replacing conventional shower rose	$ 25	0%	2.40	$ 10	$ 12	$ 13
	Category F - Purchase of high efficiency appliances						
23	Destruction of fridge built before 1996	$ 72	0%	3.48	$ 21	$ 23	$ 24
24.a	Purchase of HE 1- door refrigerator	$ 163	85%	0.82	$ 30	$ 32	$ 33
24.b	Purchase of HE 2 - door refrigerator	$ 4	0%	1.01	$ 4	$ 6	$ 7
25.a	Purchase of HE chest freezer	$ 13	0%	1.85	$ 7	$ 9	$ 10
25.b	Purchase of HE vertical freezer	$ 183	75%	2.07	$ 22	$ 24	$ 25

17. Appendix C – Administrative cost methodology

17.1. Costs to the Victorian Government

17.1.1. Option 1: Project Assessment

Establishment costs

Modelling undertaken by the Department has indicated that their establishment costs for the scheme under Option 1 would be in the order of $2,500,000. These costs include:

- creating project assessment guidelines for certificate creators;
- IT development costs;
- legal costs; and
- other staff costs and overheads.

The establishment costs under Option 1 are lower than under the other two options. The key reasons for this are:

- Lower R&D costs to Government given that the obligation for developing VEEC-generating projects lies with certificate creators. That is, without the need to prescribe eligible activities and their abatement values (as is required under the other options) it is expected that the need for approximately 3 FTE working over a 12 month period would be avoided.
- Lower IT systems development expenditure. Under Option 1, the required IT infrastructure would not have to handle the input of individual prescribed activities and associated abatement calculations. Accordingly the IT development costs would be considerably less than under the other options.

Regulatory body

The Act states that the regulatory body tasked with the administration of the VEET scheme will be the ESC. The ESC will incur costs relating to the oversight of VEEC market operations, enforcement of the legislation and regulations and the execution of other administrative activities.

Option 1 will require the most administrative staff of all the Regulatory options on an ongoing, operational basis. This is due to the requirement for the ESC to assess VEEC-generating projects on a case-by-case basis. This process would be expected to incur higher costs to the regulatory body in comparison to a prescribed list scenario.

Based on the type and number of staff employed to administer the Demand Side Abatement component of the GGAS scheme (which as discussed earlier is directly comparable to Option 1), it is expected that the costs to the ESC under Option 1 will include the following:

- staff costs;
- overheads, including statutory employment costs, and lease;
- scheme registry maintenance costs;
- travel costs;
- legal consultation; and

- communications and marketing.

These costs are outlined below.

Staff Costs

ESC staff costs will be driven by the requirement to carry out tasks including monitoring and assessing activities, accrediting projects and certificates, maintaining the VEEC registry and annual audits of energy retailers and certificate creators. These costs are summarised below.

Table 17.1: Estimated ESC staff costs under Option 1

Description	Number	Unit cost	Cost
Unit Manager (VPS 6)	1	$128,230	$128,230
Assessment auditors (VPS 6)	10	$128,230	$1,282,300
Registry Manager (VPS 6)	1	$128,230	$128,230
Registry coordinators (VPS 4)	2	$76,819	$153,638
Site inspectors(VPS 5)	4	$94,520	$378,080
Community relations officer (VPS 5)	1	$94,520	$94,520
Licensing officer (VPS 5)	1	$94,520	$94,520
Total staff costs	**20**		**$2,259,518**

Staff numbers have been estimated based on levels of staffing that exist for the GGAS scheme authority.[107] Estimated staff costs are based on the salary ranges contained within the *Victorian Public Service Agreement* using the highest salary point for each VPS level.[108] This RIS estimates the total staff costs at $2,259,518 per year for Option 1.

Staff on-costs and overheads

The Department estimates combined staff on-costs and overheads of $55,621 for each staff member based on the current average level of overhead and on-costs incurred for personnel.[109] These costs include:

- statutory on-costs;
- general office overheads including telephone expenses (fixed line and mobile);
- central business district accommodation and workstation charges;
- information technology including laptop expenses;
- training and development including seminar and conference attendance fees, publication purchases, overnight accommodation and airfares;
- vehicle expenses;
- uniform expenses; and
- administration including printing, copying and postal expenses.

[107] Available at http://www.greenhousegas.nsw.gov.au/
[108] *Victorian Public Service Agreement 2008*, Schedule B
[109] Based on figures supplied by DPI in the *Geo-carbon Sequestration* Business Impact Assessment, 2008.

Given that there an estimated 20 staff, this equates to about **$1,112,400 per year**.

Registry Maintenance Costs

The ongoing maintenance costs of the scheme registry are based on ESC estimates for the solution required to implement regulatory Option 3. These costs total **$180,000 per year**, and cover application support, infrastructure hosting and infrastructure maintenance costs. The simpler IT solution required under Option 1 would imply lower costs than the existing estimates. However, in the absence of an appropriate scaling factor, the full amount has been used as a conservative measure.

Legal costs

The regulatory body may need to regularly consult with external legal advisors to provide guidance on a range of issues including:

- interpretation of legislation;
- dispute settlement and resolution; and
- licence and permit approvals and conditions.

The cost of legal advice is estimated at $450 per hour. The Department expects that under Option 1, a week's worth of legal advice would be required every month of the year. Therefore, this RIS estimates an allowance of up to **$216,000 per year** (40 x $450 x 12) for legal fees is appropriate.

Communications and marketing costs

The regulatory body is expected to undertake communication activities to promote the VEET scheme to retailers and certificate creators, and provide information on updates and amendments to Regulations.

We have allowed **$200,000 per year** for communications and marketing based activities to all relevant parties.

Cost of residual risk

There exists a (non-financial) risk to Government that different projects will attempt to assign a different abatement value to the same activity. This will put Government in a difficult position of either allowing inconsistency, or in insisting on consistency based on the first project methodology to establish an abatement value – even if subsequent analysis shows this to be an inferior methodology.

17.1.2. Option 2: Maximise certificate creation potential

Establishment costs

Under Options 2 and 3, the Department would incur substantial costs in developing a list of prescribed activities and calculation methodologies for the level of GHG abatement attributable to each activity. In practice, the Department has been able to utilise a significant body of existing Australian standards applying to energy efficient products in establishing this information. This has reduced the costs of these options. Nevertheless, due to the increased complexity of the regulations and the IT infrastructure system required to handle prescribed activities and their values, higher establishment costs are expected under Options 2 and 3 relative to Option 1.

Option 2 in involves the inclusion of a number of activities for which accurate performance data is unavailable. This could be resolved through intensive data gathering to determine abatement

levels. However, this exercise is likely to be expensive and potentially intrusive, since home visits or survey would be required to verify energy efficiency performance. As such, it is expected that the establishment cost of Option 2 is higher than that of Option 3.

The 2008/09 Victorian Government budget allocated $10 million towards the establishment of a registry for the VEET and VRET schemes. This RIS assumes that half these costs ($5 million) are attributable to the VEET scheme. This estimate has been formed based on the similarities in market design between the schemes, and on observed allocation of resources by the Department. This amount is intended to cover the following:

- staff costs and overheads;
- legal costs;
- other advisory costs – consultants and independent assessment of the VEET scheme;
- contingency costs;
- communication with retailers and third parties; and
- all other costs associated with the implementation of the VEET scheme.

Under Option 2, the data gathering required to provide the necessary abatement verification for additional activities would be expected to require additional resources over and above this allocation. The Department estimates that the additional effort would amount to a FTE equivalent at a VPS 5 level, and a further $100,000 in consultancy costs[110]. The total establishment costs under Option 2 are therefore estimated to be approximately **$5,250,000** ($5,000,000 + $94,520 + $55,621 + $100,000).

Regulatory body

Staff costs

Staff costs for Options 2 and 3 were calculated using ESC estimates based on internal scheme procedures. These estimates have been used in modelling undertaken to determine appropriate fee levels. This modelling analysed a range of scenarios relating to expected scheme uptake and the staff time requirement for various activities to be undertaken by the Commission in its capacity as scheme administrator. The following steps summarise the broad approach taken in determining the cost estimates:

Define activities - Work undertaken to develop internal scheme procedures has enabled the identification of the key activities in administering the VEET scheme. These have been defined as follows:

- applications for accreditation;
- certificate registration;
- certificate transfer and surrender;
- audit of the creation of certificates (accredited persons);
- relevant entity liability acquittal (including audit);
- review of decisions;
- maintenance of product register; and

[110] Estimate based on an appropriate proportion of consultancy costs already incurred by the Department.

- market monitoring.

Estimate hours per instance of activity - By developing process maps, assigning resource estimates to sub-tasks and probabilities to the decision points within each activity, it was possible to obtain a range of estimates for the staff hours required to undertake each instance of a given activity.

The following table summarises the estimated amount of commission staff time required to complete a single instance of each activity.

Table 17.2: Estimated ESC staff required per instance of activity

Activity	Average number of person-hours
Accreditation applications	8
Certificate registration	8
Certificate transfer	1
Certificate surrender	1
Market monitoring	25
Audit accredited persons	57
Liability acquittal	17
Maintenance of product register	25
Review of Decisions	16

Estimate number of instances of each activity - It was necessary to develop a range of assumptions around the level of scheme uptake and the mix of participants to determine how many instances each of the above activities are expected to occur.

One activity found to be a significant driver of staff costs was the audit of accredited persons. Key among the underlying resource assumptions behind this activity is the number of certificate creators (accredited persons) participating in the scheme. These are expected to number between 45 and 100, based on stakeholder consultation undertaken by DPI and the ESC. It has been further assumed that these entities will be audited once annually.

The other key cost driver has been found to be the registration of certificates. For modelling purposes, the number of instances of this event has been estimated by assuming that accredited persons will register their certificates in batches on a monthly basis. Under mid range scenarios for numbers of accredited persons and numbers of certificates per accredited person, this is expected to occur around 1350 times annually.

Estimate total resource requirement - Based on these estimates, the total resource requirements for the scheme can therefore be expressed as:

hours of effort per activity x number of instances of activity

The ESC modelling was primarily based on the requirements for Option 3, however, due to the higher number of prescribed activities in Option 2, administration costs under this option are likely to be higher in Option 3. These differences have been costed by proportionally increasing the number of auditors and analysts required to undertake the key activities listed above in line with the additional activities under Option 2. That is, since there are 42 activities under Option

2 and 25 under Option 3, the analyst and auditor workload under Option 2 has been expressed as 1.68 times (42/25) that of Option 3.

The associated financial costs to the regulatory body under Option 2 are summarised in table 17.3 below.

Table 17.3: Estimated ESC *staff costs under Option 2*

Description	Number	Unit cost	Cost
Team Support Officer (VPS 3)	2	$66,405	$132,810
VPS5 Analysts (Ops.)	8	$94,520	$756,160
VPS5 Auditors (C&E)	3	$94,520	$283,560
VPS6 Managers	1	$128,230	$128,230
Senior Reg. Manager	4	$177,006	$708,042
Total staff costs	18		**$2,008,784**

Once again, estimated staff costs are based on salary ranges contained within the *Victorian Public Service Agreement*. The highest salary point for each VPS level has been used. This RIS estimates total direct staff costs at **$2,008,784 per year**.

Staff on-costs and overheads

As per Option 1, this RIS includes staff on-costs and overheads of $55,621 per staff member. Therefore, the overhead costs associated with Option 2 are approximately **$1,001,000 per year** (18 x $55,621).

Scheme registry maintenance costs

As discussed under Option 1, the ongoing maintenance costs of the scheme registry are based on ESC estimates for the solution required to implement regulatory Option 3. The costs total $180,000 per annum. It is expected that the corresponding costs under Option 2 would not substantially differ from this. Therefore this RIS assumes that the registry maintenance costs for Option 2 are **$180,000 per year**.

Legal costs

Under Options 2 and 3, legal advice is likely to be required where scheme participants fail to comply with the Act. The extent of the advice required will depend upon the rate of non-compliance and the effort required resolving the matter in question.

For modelling purposes, it has been estimated that based on the shorter list of prescribed activities which are relatively simple to substantiate, non-compliance potentially requiring prosecution may be observed in every 5 per cent of audits. There are expected to be 75 audits per year (one per accredited person per year). It has further been estimated that 160 hours of legal counsel advice would be required per event at a cost of $450 per hour.[111] In applying this estimate to Option 2, the incidence of con-compliance has been scaled up by 1.68 (the ratio of Option 2 activities to Option 3). This results in a total cost of **$453,000 per year** (75 x 5% x 1.68 x 160 x $450) in legal costs.

[111] Based on hourly rate of partner-level consultation for similar services utilised elsewhere in the Commission

External audit costs

Audit of the creation of certificates under Options 2 and 3 will be primarily undertaken by the ESC. However, the Commission may occasionally identify the need to engage external auditors to explore certain aspects of an accredited person's business operations. This need might arise, for example, following an audit which reveals an event which Commission officers have not been trained to address, or if an independent opinion is required to ascertain whether non-compliance has occurred.

This RIS assumes that further independent audits are required for every 10 per cent of Commission audits undertaken for Option 3. These audits have been costed at $5000 per audit.[112] In the same way that legal costs are likely to be proportionally higher under Option 2, audit costs have been increased by a factor of 1.68 (the ratio of Option 2 activities to Option 3). The external audit cost under Option 2 is therefore **$63,000 per year** (75 x $5000 x 10% x 1.68).

Communications and marketing costs

As with Option 1, the regulatory body is expected to undertake communication activities to promote the VEET scheme to retailers and certificate creators, and provide information on updates and amendments to Regulations.

We have allowed **$200,000 per year** for communications and marketing based activities to all relevant parties.

17.1.3. Option 3: Minimise administrative costs

Establishment costs

As discussed earlier, establishment costs for Option 3 are based on half the 2008/09 Victorian Government budget allocation towards the establishment of a registry for the VEET and VRET schemes. The cost is estimated at **$5,000,000**.

Regulatory body

The financial costs for Option 3 are expected to be similar to Option 2. The staffing costs will be lower than Option 1 due to the ability to rely on a list of prescribed activities with pre-determined abatement values. Under Option 3, this list will only include activities for which there is a higher degree of confidence in the abatement benefits over the life of the activity. This equates to a lesser need for data collection or subsequent auditing, which in turn leads to lower costs than those that would be incurred under Option 2.

Staff costs

The staff costs under Option 3 were calculated using the methodology described under Option 2. Table 17.4 presents these costs.

Table 17.4: Estimated ESC staff costs under Option 3

Description	Number	Unit cost	Cost
Team Support Officer (VPS 3)	1	$66,405	$66,405
VPS5 Analysts (Ops.)	5	$94,520	$472,602
VPS5 Auditors (C&E)	2	$94,520	$189,041

[112] Based on 1.5 days work of partner-level consultation for similar services utilised else where in the Commission

Description	Number	Unit cost	Cost
VPS6 Managers	4	$128,230	$512,920
Senior Reg. Manager	1	$177,006	$177,006
Total staff costs	13		**$1,417,974**

Once again, estimated staff costs are based on salary ranges contained within the *Victorian Public Service Agreement*. The midpoint salary ranges for each VPS level has been used. This RIS estimates total direct staff costs at **$1,418,000 per year**.

Staff on-costs and overheads

As noted earlier, this RIS includes staff on-costs and overheads of $55,621 per staff member. Therefore, the overhead costs associated with the alternative approach are **$723,000 per year** (13 x $55,621).

Scheme registry maintenance costs

As discussed earlier, estimates for the ongoing maintenance costs of the scheme registry are based on ESC estimates for the solution required to implement regulatory Option 3. The costs total **$180,000 per year**.

Legal costs

Similarly to Option 2, it has been assumed that non-compliance requiring prosecution is observed in every 5 per cent of audits, and that 160 hours of legal counsel advice is required per prosecution at a cost of $450 per hour.[113] This amounts to legal costs of **$270,000 per year**.

External audit costs

Similarly to Option 2, it has been assumed that further independent audits are required for every 10 per cent of Commission audits undertaken. This amounts to external audit costs of **$37,500 per year**.

Communications and marketing costs

Communications and marketing costs have been estimated **at $200,000 per year** for Option 3, in line with the estimates used in Options 1 and 2.

17.1.4. Summary of costs to the Victorian Government

The table below summarises all of the costs to the Victorian Government.

Table 17.5: Costs to Government from VEET scheme (2009-2011)

Description	Option 1	Option 2	Option 3
The Department			
Establishment Cost	$2,500,000	$5,250,141	$5,000,000
Total cost for project	**$2,500,000**	**$5,250,141**	**$5,000,000**
Regulatory Body			
Staff costs (p.a.)	$2,008,784	$2,071,000	$1,418,000

[113] Based on hourly rate of partner-level consultation for similar services utilised elsewhere in the Commission

Description	Option 1	Option 2	Option 3
Overhead costs (p.a.)	$1,112,000	$1,001,000	$723,000
Registry Maintenance Costs (p.a)	$180,000	$180,000	$180,000
Legal costs (p.a.)	$216,000	$454,000	$270,000
External audit costs (p.a)	$0	$63,000	$38,000
Communications and marketing (p.a.)	$200,000	$200,000	$200,000
Total (p.a.)	$3,716,784	$3,968,000	$2,829,000

17.2. Costs to Certificate Creators

17.2.1. Option 1: Project Assessment

Research and development costs

Option 1 would involve substantial up-front staff and research costs to develop, and gain accreditation for abatement projects. This will involve significant and rigorous R&D and innovation activities to identify, establish and support methods for emissions reduction. In practice, it is likely that related projects would be undertaken by industry under business as usual, given the general imperative to reduce energy use. However, for the purposes of this RIS it has been assumed that some of these costs will be specific to the VEET scheme, to the extent that it requires a specific focus for these efforts and a and delivery timeframe. It has been assumed that the development of a VEET project would require the following.

- 1 x FTE, at a level that would be similar to a regulatory manager for an energy retailer. The FTE would drive the development of the project, and to prepare the scheme for all applications and accreditation assessments.

- Consultants to perform an independent assessment of the project. This is to provide adequate and independent verification of cost forecasting, uncertainties in reduction levels, and variations in levels of activity. Consultants may also be required to provide financial modelling and scientific advice, where required.

Using a benchmarking approach, a salary cost of $150,000 has been applied to the internal resource for energy retailers.[114] The *Victorian Guide to Regulation* produced by the Victorian Department of Treasury and Finance (DTF) suggests that a multiplier of 1.75 of base salary will appropriately account for on-costs and overheads.[115] Therefore, the total cost of this resource can be estimated at approximately $272,500. This cost has been averaged over the five components of the Research & Development item in the standard cost model.

The cost of consultation advice for the Department is currently averaged at $500 per hour. It could be expected that this would be the same for certificate creators, and further, that consulting advice would be required for one standard working day (8 hours) every week of the year. Therefore, this RIS estimates an allowance of up to $200,000 per year (8 x 500 x 52) for consultancy fees is appropriate in the initial year. This cost has been averaged over the "gathering the information" and "calculation and preparation" components of the Research & Development item in the standard cost model.

[114] Benchmarks are taken from Hays Salary Survey 2007/08 available at www.hays.com.au
[115] Victorian Department of Treasury and Finance, *Victorian Guide to Regulation 2007*, 2007, p C-4

The total cost for project development activities will be **$470,000 per year** per relevant entity.

In practice such a large up-front cost is likely to serve as a barrier to market entry to smaller businesses. It is expected that, to mitigate this barrier to entry, energy retailers would facilitate the research and development of possible VEET schemes, and approach certificate creators to facilitate the scheme. Therefore, the cost of research and development for certificate creators under Option 1 is estimated to be $0.

Under Option 1, project assessment audits are required to be undertaken. The cost of undertaking these audits will vary depending on the size and the nature of the project. The average project audit cost under the GGAS scheme has been quoted at $10,000 per project.[116] However, similar to the research and development costs outlined above, it is likely that energy retailers will compensate certificate creators for the costs of these audits. Therefore, the project assessment audit costs for certificate creators under Option 1 are estimated to be $0.

Recordkeeping costs

Under Option 1, certificate creators would be required to maintain records which demonstrate that abatement projects have been correctly executed according to the project plans. This record keeping would be necessary to inform regular audits. In practice, it is difficult to estimate the cost to certificate creators of keeping these records where the specifics of the projects are unknown. It is marginally easier to estimate the requirements when they are effectively defined in the regulations, as is the case in Options 2 and 3. Of these, Option 2 would require comparatively more effort, given that the additional prescribed activities are more difficult to substantiate. Recordkeeping would be similarly complex under a project-based scheme, given the additional effort required to substantiate the veracity of the abatement calculations in addition to simply confirming that activities have been undertaken correctly. This RIS therefore assumes that audit preparation costs under Option 1 are equivalent to those in Option 2, amounting to $3,550,000 across the scheme. Since these costs are calculated on a per-certificate basis, it can be argued that the methodology is comparable across the options. The methodology is discussed in the context of Option 2 below.

Audit preparation costs

As discussed previously, the regulatory body will incur the cost of auditing the creation of certificates. However, it is likely that certificate creators will need to undertake a notional amount of preparatory work in proportion to the amount of recordkeeping required. This RIS assumes that the costs under all Options are comparable, and amount to **$459,000 per year**. The methodology is discussed in the context of Option 2 below.

17.2.2. Option 2: Maximise certificate creation potential

Under Options 2 and 3, certificate creators would incur no compulsory R&D costs. Instead, these would be incurred by the Government in determining the approved activities and the number of VEECs that would be generated for each activity. Apart from this difference, certificate creators would incur many of the same costs as per Option 1, but at a lower level. The outcome of the lower costs above would be likely to result in a larger number of certificate creators to facilitate the surrendering of VEECs.

Recordkeeping costs

Certificate creators have the responsibility of maintaining records which substantiate that prescribed activities for which VEECs have been created have been undertaken in accordance with the requirements, standards and specifications in the Regulations. Options 2 and 3 would require businesses to both collect data for each activity undertaken (data gathering), and enter

[116] Figures available at www.greenhousegas.nsw.gov.au

this into a centralised registry (data entry). The information requirements will vary slightly from activity to activity, but will generally consist of the following:

- consumer name;
- activity date;
- installation address;
- product name and model number;
- verification of certificate electrical safety;
- verification of compliance certificate number;
- verification of electrician licence; and
- verification of plumber/gas fitter licence.

In addition to the requirements, standards and specifications set out in the regulations, prescribed activities must be undertaken in accordance with all laws, regulations and codes of practice applicable to that activity. By way of example, and without limitation, these may include:

- *Electricity Safety Act 1998*;
- *Gas Safety Act 1997*;
- *Building Act 1993*, including the mandatory standards in the Schedule to that Act;
- *Electricity Safety (Installations) Regulations 1999;*
- *Electricity Safety (Equipment) Regulations 1999;*
- *Gas Safety (Gas Installation) Regulations 1999;*
- *Plumbing Regulations 1998*; and
- *Code of Practice for Safe Electrical Work*.

In estimating the level of costs attributable to the VEET scheme, it is necessary to determine which of the records that must be gathered are additional to the base case. Examination of the information requirements suggests that the vast majority of these records would already be needed to comply with existing regulations or normal business requirements (for example, customer and product information is already likely to be held in the form of sales records). Therefore the incremental cost for RIS purposes is low.

Certificate assignment forms, which must be collected by certificate creators under the Act, are a clear example of an additional recordkeeping requirement. These forms provide a useful focal point for quantifying data gathering costs. For data entry costs, it is appropriate to contemplate the amount of staff time required to enter each record. The scheme registry will offer bulk upload functionality, therefore in practice this will amount to the maintenance of a spreadsheet.

In the case of Option 2, it is further anticipated that certificate creators must undertake periodic customer surveys. This is due to the inclusion of activities which require follow-up information to substantiate that the conditions remain in place for the calculated level of abatement to occur.

The estimated staff time commitments for recordkeeping have been calculated using the standard cost model framework. The table shows the cost to each certificate creator, which are

assumed to number 75 in total. Staff time has been costed at a salary of $70,000 per annum[117], with on-costs and overheads calculated using a multiplier of 1.75.[118] The resulting hourly rate is approximately $58.90. It has been assumed that a record-keeping event occurs each time a prescribed activity is undertaken. Based on the cost curve data for energy efficiency activities weighted average for the number of certificates generated per activity has been calculated at 2.75. This equates to approximately 982,000 activities (2.7 million / 2.75). Under Option 2, it is expected that approximately 10 per cent of the total activities would have an additional, follow-on data collection requirement.

The costs have been apportioned to the appropriate items as follows:

Understanding the requirement: 1 week (40 hours) of staff time.

Gathering the information: it has been assumed that the existing information gathering requirements equate to 5 minutes per activity, with the additional effort amounting to one minute per activity. The cost of generating and storing certificate assignment forms has been estimated at 50c per activity. Periodic customer surveys required to substantiate the additional high-compliance activities under Option 2 would be expected to take 5 minutes of staff time for each activity, and result in a further cost of 50c per activity for associated information storage.

Calculation and preparation: data entry could be expected to take one minute per activity.

Finalisation and transmission: Based on the assumption that certificates are registered in monthly batches, the finalisation process has been estimated at 1 day of staff time per month.

Reaching agreement: N/A

The total cost of recordkeeping per annum under Option 2 is expected to be **$3,696,000 per year**.

Audit preparation costs

The estimated staff time commitments for audit preparation under Option 2 have been calculated using the standard cost model framework. Estimates of the number of certificate creators, staff hourly rates and on costs are the same as those used to estimate recordkeeping costs. The costs have been apportioned to the appropriate items as follows:

Understanding the requirement: 1 day (8 hours) of staff time has been allocated for the contemplation of the information gathering requirements for audit.

Gathering the information: 1 week (40 hours) of staff time has been allocated for the collation of data.

Calculation and preparation: A further week (40 hours) of staff time has been allocated for ensuring that data is available in an accessible format.

Finalisation and transmission: 2 days (16 hours) of staff time has been allocated for oversight of the audit and reviewing the audit findings.

Reaching agreement: N/A

The total cost of audit preparation is expected to be **$459,000 per year**.

The table below summarises the standard cost model items for certificate creators under Option 2.

[117] DPI received advice on this figure from the Essential Services Commission.
[118] Victorian Department of Treasury and Finance, *Victorian Guide to Regulation*, 2007

Table 17.6: Option 2 costs to certificate creators from VEET scheme (2009-2011)

		Existing Burden		Proposed change to the Burden		Total
		External Cost ($/event)	Internal Time (hrs/event)	External Cost ($/event)	Internal Time (hrs/event)	
Recordkeeping Costs	Understanding the requirement	0	0	0	40	2,356
	Gathering the information	0	1,200	7,855	327	27,135
	Calculation and preparation	0	0	0	240	14,135
	Finalisation and transmission	0	0	0	96	5,654
	Reaching agreement	0	0	0	0	0
Total						49,279
Audit preparation	Understanding the requirement	0	0	0	8	471
	Gathering the information	0	0	0	40	2,356
	Calculation and preparation	0	0	0	40	2,356
	Finalisation and transmission	0	0	0	16	942
	Reaching agreement	0	0	0	0	0
Total						6,125

17.2.3. Option 3: Minimise certificate creation potential

This option would involve most of the same costs as per Option 2 above.

Recordkeeping costs

The recordkeeping costs under this option were calculated using the methodology discussed under Option 2, based on the number of activities corresponding to the scheme target rather than the extra 10 per cent assumed under Option 2, and with the costs associated with undertaking customer surveys excluded. This amounts to **$3,019,000 per year**.

Audit preparation costs

Audit preparation costs are assumed to be comparable across all scenarios and have been calculated at **$459,000 per year**.

The table below summarises the standard cost model items for Certificate creators under Option 3.

Table 17.7: Option 3 costs to certificate creators from VEET scheme (2009-2011)

		Existing Burden		Proposed change to the Burden		Total
		External Cost ($/event)	Internal Time (hrs/event)	External Cost ($/event)	Internal Time (hrs/event)	
Recordkeeping Costs	Understanding the requirement	0	0	0	40	2,356
	Gathering the information	0	1,091	6,545	218	19,395
	Calculation and preparation	0	0	0	218	12,850
	Finalisation and transmission	0	0	0	96	5,654
	Reaching agreement	0	0	0	0	0
Total						40,254
Audit preparation	Understanding the requirement	0	0	0	8	471
	Gathering the information	0	0	0	40	2,356
	Calculation and preparation	0	0	0	40	2,356
	Finalisation and transmission	0	0	0	16	942
	Reaching agreement	0	0	0	0	0
Total		0	0	0	40	6,125

17.2.4. Summary of costs to certificate creators

Table 17.8: Summary of estimated costs to certificate creators (2009-2011)

Description	Option 1	Option 2	Option 3
Recordkeeping	$3,696,000	$3,696,000	3,019,000
Audit preparation	$459,000	$459,000	459,000
Total	**$4,155,000**	**$4,155,000**	**3,478,000**

17.3. Costs to Energy Retailers

17.3.1. Option 1: Project Assessment

Research and development

Under Option 1, the costs of research and development for projects are expected to be principally borne by energy retailers. These costs are described in the certificate creators section above. They are expected to amount to $480,500 for each energy retailer affected in the first year of the scheme. There are a total of thirteen retailers initially affected. The total cost of research and development activities is therefore estimated to be approximately **$6,247,000 in the first year** ($480,500 x 13).

It has been assumed that once each energy retailer has a satisfactory R&D programme established it is unlikely that ongoing consultant input will be required (for the next two years). The cost to retailers for research and development after the initial year of establishment will therefore be **$262,500 per year**.

For purposes of this analysis, therefore, the R&D costs borne by retailers have been annualised to a figure of $2,257,000 (a simple arithmetic average across three years).

As discussed earlier, energy retailers are likely to bear the cost of audit for the initial project assessment. It has been estimated that each audit would cost approximately $10,000 based on the average project audit cost under the GGAS scheme[119] as there are 13 retailers affected, the annual cost of audits is estimated to be $130,000. This cost has been attributed to the "calculation and preparation" component of the Research & Development item in the standard cost model.

Preparation of energy acquisition statements

The estimated staff time commitments for the preparation of energy acquisition statements have been calculated using the standard cost model framework. The table shows the cost to each relevant entity. Based on the approach taken in VRET, scheme liabilities are incurred for each corporate entity within an energy retailer. There are 13 energy retailers affected by the scheme.

Relevant entities are required to lodge energy acquisition statements on an annual basis. The information required to be in this statement includes scheme acquisitions, VEEC liability, the number of VEECs offered for surrender and any carried forward VEEC surplus to be used to acquit any future year's liability. These same retailers are required to provide almost identical statements under the VRET scheme. The key difference is that gas acquisitions are required to be reported under VEET, and this requirement applies to 3 of the entities.

Staff time has been costed at a salary of $150,000 per annum, with on-costs and overheads calculated using a multiplier of 1.75.[120] The resulting hourly rate is approximately $126.20. The costs have been apportioned to the appropriate items as follows:

Understanding the requirement: An additional half day (4 hours) of staff time.

Gathering the information: It is assumed that 2 weeks of staff time is required to gather the necessary information for VRET. The additional time requirement for VEET is expected to be in the order of 1day (8 hours). The full 2 weeks (80 hours) has been applied as additional time for the gas entities. The average total hours per entity can therefore be expressed as 26 hours (8+3/13x80).

[119] Figures available at www.greenhousegas.nsw.gov.au
[120] Victorian Department of Treasury and Finance, *Victorian Guide to Regulation*, 2007

Calculation and preparation: It is assumed that 1 week of staff time is required to undertake calculations for VRET. The additional time requirement for VEET is expected to be in the order of 1 day (8 hours). The full week (40 hours) has been applied as additional time for the gas entities. The average total hours per entity can therefore be expressed as 17 hours (8+3/13x40).

Finalisation and transmission: The internal signoff process is expected to require 1 day (8 hours) for VRET, and it is assumed that a further half day is required for VEET.

Reaching agreement: N/A

The total cost of preparing energy acquisition statements per annum under Option 1 is expected to be $85,000.

Audit costs

It is a requirement of the Act that Energy Acquisition statements are audited by a third party. While the statements under VEET describe largely the same information as under VRET, a separate audit opinion will be required for each scheme. In practice, however businesses are likely to be able to negotiate lower prices with the nominated auditor, since the additional effort required to audit what is essentially the same information is likely to be low. Relevant Entities will also need to undertake a notional amount of preparatory work for these audits.

Staff time has been costed in the same way as for the preparation of the statements. The costs have been apportioned to the appropriate items as follows:

Understanding the requirement: An additional half day (4 hours) of staff time.

Gathering the information: An additional half day (4 hours) of staff time.

Calculation and preparation: Based on the VRET experience for the 2007 compliance year, average audit costs were observed to be in the order of $4,000 per retailer. The marginal increase in audit costs expected from the VEET scheme is $1,571 per retailer.

Finalisation and transmission: under VRET, 1 week (40 hours) of staff time has been allocated for oversight of the audit and reviewing the audit findings. The additional time requirement for VEET has been estimated at 1 day (8 hours).

Reaching agreement: under VRET, 3 days (24 hours) of staff time has been allocated in signing off on the audit findings. The additional time requirement for VEET has been estimated at 1 day (8 hours).

The total cost of audit for retailers under Option 1 is expected to be $60,000 for the 13 entities.

Certificate acquisition costs

It is expected that retailers will incur costs in sourcing certificates, negotiating their prices and arranging contractual agreements for their purchase. Staff time has been costed in the same way as for the preparation of the statements. The costs have been apportioned to the appropriate items as follows:

Understanding the requirement: 1 week (40 hours) of staff time

Gathering the information: 2 weeks (80 hours) of staff time.

Calculation and preparation: 2 weeks (80 hours) of staff time.

Finalisation and transmission: 1 week (40 hours) of staff time

Reaching agreement: 1 day (8 hours) staff time.

The total cost of acquiring certificates for relevant entities under Option 1 is expected to be **$407,000** for the 13 energy retailers.

The table below summarises the standard cost model items for energy retailers under Option 1.

Table 17.9: Costs to energy retailers from VEET scheme (2009-2011)

		Existing Burden		Proposed change to the Burden		Total
		External Cost ($/event)	Internal Time (hrs/event)	External Cost ($/event)	Internal Time (hrs/event)	
Preparation of energy Acquisition statement	Understanding the requirement				4	$505
	Gathering the information		80		26	$3,328
	Calculation and preparation		40		17	$2,176
	Finalisation and transmission		8		4	$505
	Reaching agreement					$0
Total						$6,514
Audit	Understanding the requirement		8		4	$505
	Gathering the information		8		4	$505
	Calculation and preparation	$4,000		$1,571	$0	$1,571
	Finalisation and transmission		40		8	$1,010
	Reaching agreement		24		8	$1,010
Total						$4,600
Certificate costs	Understanding the requirement				40	$5,048
	Gathering the information				80	$10,096
	Calculation and preparation				80	$10,096
	Finalisation and				40	$5,048

		Existing Burden		Proposed change to the Burden		Total
		External Cost ($/event)	Internal Time (hrs/event)	External Cost ($/event)	Internal Time (hrs/event)	
	transmission					
	Reaching agreement				8	$1,010
Total						$31,298
Research and Development	Understanding the requirement				416	$52,500
	Gathering the information			$104,000	416	$156,500
	Calculation and preparation			$114,000	416	$166,500
	Finalisation and transmission				416	$52,500
	Reaching agreement				416	$52,500
Total						$480,500

17.3.2. Options 2 and 3

The costs to retailers under Options 2 and 3 are similar to those under Option 1. The exceptions are:

- research and development and associated audit costs, which are not borne by energy retailers under these options; and
- the cost of sourcing certificates.

Under Option 1, energy retailers are expected to have close relationships to certificate creators due to the relationship established during the R&D process. The larger numbers of certificate creators under Options 2 & 3 would be expected to expected to increase the amount of time taken to source certificates and arrange for their sale. This RIS assumes that the 80 hours taken to do this in Option 1 would increase by a factor of approximately 4.75 (which represents the ratio of the number of certificate creators under options 2 & 3 to the number of retailers = 75/13, less the one relationship between certificate creator and retailer assumed under Option 1). The certificate costs under these options are therefore higher by an amount of $48,000 for each retailer, equating to a total difference of $626,000.

The total cost to retailers under Options 2 & 3 is therefore $3,364,000 per annum.

17.3.3. Summary of costs to retailers

Table 17.10: Estimated costs to energy retailers (2009-2011)

Description	Option 1	Option 2	Option 3
Preparation of energy Acquisition statement	$85,000	$68,000	$68,000
Audit	$60,000	$60,000	$60,000
Costs of obtaining certificates[121]	$407,000	$1,033,000	$1,033,000
Research & Development	$2,257,000	$0	$0
Total	$2,809,000	$1,160,000	$1,160,000

17.4. Costs to Victorian households

Households are assumed to incur a transaction cost associated with participating in VEET. This transaction cost is estimated based on the time taken to supply any additional data over and above what would have been required in the absence of the scheme. This is assumed to be 10 minutes per household. There are assumed to be approximately 200,000 households contacted per year. This yields an estimated base cost to households of **$977,700 per year** (200,000 x $29.33 x 10/60).

To the extent that additional data collection is required for a given Option, this is discussed below.

17.4.1. Option 1: Project Assessment

Specifics of the abatement projects developed by certificate creators under Option 1 would remain largely unknown until scheme commencement. It is therefore difficult to estimate whether any additional costs would be incurred by consumers in addition to those described in general terms above. However, it is likely that the initial project audit/assessment process would impose similar verification requirements to those in the regulations under Option 2. As such the requirements for consumers under Option 1 have been calculated as being an additional $240,000 per year, as per the methodology discussed in the context of Option 2 below. This yields total costs of **$1,217,667 per year**.

17.4.2. Option 2: maximise certificate creation

Under Option 2, it is anticipated that certificate creators must undertake periodic customer surveys. This is due to the need to gather follow-up information to substantiate that the conditions remain in place for the calculated level of abatement to occur.

In keeping with the methodology described in section 17.2.2, periodic customer surveys would be expected to take 5 minutes of time for each activity. The activities to which this would apply are likely to be a small proportion of the total activities undertaken, noting the high-cost compliance requirements associated with them. It has been assumed that these activities would constitute 10 per cent of activities undertaken. Based on average full time adult earnings data from the ABS, an appropriate hourly rate has been estimated at $29.33.[122] Therefore, the additional cost to consumers associated with data gathering under Option 2 is $240,000 per year

[121] These are effectively search/transaction costs over and above actual certificate purchase cost. Certificate purchase cost is assumed to cover all costs incurred by certificate creators in producing a certificate.
[122] Australian Bureau of Statistics, *ABS6302.0, Average Weekly Earnings, Australia*, 2008, available at http://www.abs.gov.au/ausstats/abs@.nsf/mf/6302.0

(982,000 x 10% x $29.33 x 5/60). This yields a total cost to households of **$1,217,667 per year**.

17.4.3. Option 3: minimise certificate creation

Under Option 3, no ongoing data gathering is required to substantiate that abatement has occurred in line with the projected estimates. Therefore the cost to consumers under Option 3 has been estimated at the base of **$977,667 per year.**

17.4.4. Summary of costs to consumers

The below table summarises the expected costs to households.

Table 17.11: Summary of costs to households

Description	Option 1	Option 2	Option 3
Base data	$977,667	$977,667	$977,667
Follow-up data	$240,000	$240,000	$0
Total	$1,217,667	$1,217,667	$977,667

17.5. Evaluation of Administrative Costs

Table 17.12 summarises the total administrative costs of each regulatory option for the initial 3 years of the VEET scheme.

Table 17.12: Summary of costs of the VEET scheme options (2009-2011)

Description of cost	Option 1	Option 2	Option 3
Government			
The Department - Financial	$2,500,000	$5,250,000	$5,000,000
Regulatory Body - Financial	$3,717,000	$3,968,000	$2,829,000
Total	**$6,217,000**	**$9,218,000**	**$7,829,000**
Certificate creators			
Recordkeeping	$3,696,000	$3,696,000	3,019,000
Audit preparation	$459,000	$459,000	459,000
Total	**$4,155,000**	**$4,155,000**	**3,478,000**
Energy retailers			
Preparation of energy acquisition statements	$85,000	$68,000	$68,000
Audit	$60,000	$60,000	$60,000
Certificate Costs	$407,000	$1,033,000	$1,033,000
Research and Development	$2,257,000	$0	$0

Description of cost	Option 1	Option 2	Option 3
Total	**$2,809,000**	**$1,160,000**	**$1,160,000**
Households			
Base data	$978,000	$978,000	$978,000
Follow up data	$240,000	$240,000	$0
Total	**$1,218,000**	**$1,218,000**	**$978,000**
Total annual administrative costs of VEET Scheme (2009-2011)			
	$11,899,000	**$10,502,000**	**$8,446,000**