



ACT
Government

Environment and
Sustainable Development

Energy Efficiency Improvement Scheme

Energy Efficiency (Cost of Living) Improvement Act 2012

INCLUSION OF THE NON-RESIDENTIAL SECTOR REGULATORY IMPACT STATEMENT

Environment and Sustainable Development Directorate

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Executive Summary

The *Energy Efficiency (Cost of Living) Improvement Act 2012* (the Act) was passed by the Legislative Assembly on 3 May 2012. The Act provides for a retailer obligation energy efficiency scheme ('the Scheme'), referred to as the Energy Efficiency Improvement Scheme (EEIS), commencing on 1 January 2013 and running initially until 31 December 2015.

The EEIS requires retailers to undertake eligible activities in order to meet an energy savings target. While all electricity users in the ACT will pay pass-through costs associated with the EEIS, currently these activities may only be undertaken in the residential sector.

The ACT Government's Climate Change Action Plan 2 released in September 2012 committed to the completion of a regulatory impact assessment to consider the impacts and opportunities for extending the Energy Efficiency Improvement Scheme to include fuller business participation. This regulatory impact statement (RIS) provides that assessment.

Complementarity

In considering the expansion of the EEIS to the non-residential sector, the Government's broader objectives of achieving greater integration of programs and leveraging off existing programs where feasible, were considered. A review of existing schemes, policies and programs available to the non-residential sector was undertaken which informed the final recommendation to expand the EEIS to small to medium enterprises (SMEs), including non-government community groups.

Alignment with similar schemes in other jurisdictions, in particular the Victorian Energy Efficiency Target (VEET) scheme on which the residential modelling and measures were based, was also a primary consideration.

Expansion of the EEIS has also been considered against COAG's principles for complementarity with a carbon price. Expanding the EEIS is considered complementary as this will reduce the overall cost associated with greenhouse gas abatement in the ACT.

Modelling

Detailed modelling was undertaken by Energetics Pty Ltd to determine the impact of expanding the EEIS to the non-residential sector. This modelling builds on existing modelling undertaken by Energetics and the design features of the Scheme as currently implemented. In particular, the existing EEIS GHG emissions reduction targets, priority household target and EEIS residential sector activities as implemented (and forecast to be implemented), were used in the new model.

The following scenarios for the inclusion of the non-residential sector were modelled and the relative costs and benefits for each scenario have been considered:

- Scenario 1 – No change – Keep as residential only
- Scenario 2 – Residential and small to medium enterprises (SMEs)
- Scenario 3 – Residential, SMEs and large commercial
- Scenario 4 – Residential and all business, excluding government
- Scenario 5 – All sectors, including government

Modelling results

Modelling of the expansion of the EEIS to the business sector indicated that all options for expanding the scheme would reduce the maximum incentive price required to meet the target, and the average cost of compliance. This in turn reduces pass-through costs to electricity consumers who fund the Scheme's operation.

With the inclusion of large businesses and government, total bill savings fall as a consequence of a change in the mix of measures being implemented. This is due to the assumption that households are less likely than large businesses or government to take up measures that have longer payback periods. In all scenarios, the scheme provides positive financial benefits to the ACT economy as reflected in the negative abatement costs (in the order of \$35 saved for every tonne of emissions abated).

Across all scenarios where the non-residential sector is included, a majority of savings come from the residential sector.

Recommended inclusion of SMEs

Expanding the EEIS to the SME sector is considered the best option for the ACT economy as this optimises the Scheme NPV and results in only a modest (5%) reduction in estimated bill savings accruing in the residential sector.

Expanding the EEIS to the SME sector is also expected to encourage Tier 2 retailers to participate in the EEIS by allowing them to undertake measures with their business customers rather than only paying Energy Saving Contribution fees. While this will reduce the payments made by Tier 2 retailers under the EEIS, it will have the positive effect of increasing the amount of abatement that is directly achieved as a result of the EEIS.

It is recommended that for the purposes of the EEIS, an SME be defined as an enterprise that occupies a premises that:

- is not a residential premises;
- is not reportable under the National Greenhouse and Energy Reporting (NGER) Act;
- is not reportable under the Australian Government's Energy Efficiency in Government Operations (EEGO) Policy; and
- is not reportable under the Carbon Neutral ACT Government Framework

This has the effect of excluding large facilities in the ACT such as, for example, the Australian National University, as well as large national companies that operate businesses in the ACT and across Australia. These companies are already covered by the National Greenhouse and Energy Reporting Scheme (NGERS) and the Energy Efficiency Opportunities (EEO) reporting scheme. Targeting SMEs therefore avoids subsidising improvements that should occur under business as usual conditions in the government and large commercial sectors.

Household and business costs and benefits

It is important to note that due to the design of the Scheme, which requires that 25 per cent of total Tier 1 retailer energy savings be achieved in priority households, the net benefits for priority

households are preserved or enhanced when expanding the EEIS to the SME sector. This is because of the combined effect of reduced pass-through costs while maintaining energy cost savings.

The modelling indicates that while the overall savings in the residential sector decline, the pass-through costs also decline meaning that all households, especially those households that do not participate by undertaking energy saving activities, will receive some benefits from the expansion of the EEIS to the non-residential sector. The largest cost of living impacts are associated with middle to high income households, who will experience around a \$5 decrease per household in savings in the 2016-17 financial year as a result of expanding the EEIS.

Estimated average costs to the non-residential sector are more difficult to determine due to the significant differences in energy use between different businesses. Under the original (residential-only scheme), SMEs were funders of the scheme to the tune of \$9 million without a corresponding opportunity to benefit from resulting energy savings. Based on the assumptions inherent in the modelling, including SMEs in the Scheme will result in lifetime benefits to SMEs of around \$7 million reducing net lifetime costs to SMEs to \$2 million. Actual net costs or benefits to SMEs will depend upon the extent of their participation in the Scheme.

Included Activities and timing

The list of activities proposed to be made available to the SME sector under the EEIS is based on the approach taken under VEET.

Existing activities included in the residential sector under the EEIS should be extended to the SME sector as a first priority by 1 July 2013. These activities are of particular relevance to small businesses such as home offices and small retail.

Additional business specific activities, as well as new residential activities planned for inclusion, should be phased in under the EEIS from 1 January 2014. The exact timing for the inclusion of these activities will be contingent on:

- the staffing and budget for the Administrator in the 2013-14 financial year (currently under consideration); and
- consultation with retailers regarding their interest in undertaking these activities.

It is important to note that including any of these activities under the EEIS only acts to expand the range of activities electricity retailers may choose to undertake to meet their targets. It is not expected that all activities will necessarily be offered, particularly in the early stages of the Scheme.

Background

The ACT Government recognises the connection between greenhouse gas (GHG) emissions and climate impacts and, in recognition of the importance of addressing the challenge of climate change, has introduced a number of strategies to reduce GHG emissions. In November 2010, the ACT Legislative Assembly enacted the *Climate Change and Greenhouse Gas Reduction Act 2010*. The Act sets a primary target of zero net emissions by 2060 and an interim target of a 40 per cent reduction in greenhouse gas emissions from 1990 levels by 2020.

Action Plan 2 (AP2) is an update to the ACT's 2007 Climate Change Strategy: *Weathering the Change*. It provides a pathway to achieve the Territory's legislated 2020 greenhouse gas reduction targets, and a set of actions to progress the strategy to its next review point in 2015. AP2 has a strong focus on improving energy efficiency in the ACT, recognising the important cost-effective opportunities for energy and GHG savings across all sectors of the economy. These opportunities will persist under a national carbon pricing scheme, due to a wide range of inherent market failures, and will not be realised without additional Government intervention.

The ACT Government, through the *National Partnership Agreement on Energy Efficiency*, has also committed to the development of a nationally consistent and coordinated package of measures to advance energy efficiency outcomes across the Territory economy. In addition to these measures, a number of jurisdictions (NSW, VIC, SA and recently, the ACT) have developed retailer obligation energy efficiency schemes. These schemes have been demonstrated to be highly cost effective in reducing greenhouse gas emissions and consistently deliver net economic benefits.

In 2010, the Prime Minister's Task Group on Energy Efficiency recommended the development of a national Energy Savings Initiative (ESI) to replace existing state-based supplier obligation schemes. Work is being undertaken by the Commonwealth Government to assess the regulatory impacts of a national scheme. The passage of a national scheme will be subject to Commonwealth agreement and negotiations through the Council of Australian Governments (COAG), and is not expected to be implemented until 2015 at the earliest.

The ACT has a strong interest in the development of a seamless national market for energy retailers and is working closely with other jurisdictions on the development of a national framework for a supplier funded energy efficiency obligation scheme operation through the COAG Select Council on Climate Change. Further, the ACT is also working with other jurisdictions to harmonise existing State and Territory energy efficiency schemes.

Finally, the ACT is committed to ensuring that all measures undertaken to meet the ACT's GHG emissions targets will be complementary to a national price on carbon. To be complementary, the ACT has adopted a policy that a measure must be either:

- Complementary – being consistent with COAG Complementarity Principles that limit measures to those that reduce overall costs for greenhouse gas abatement in the Territory; or
- Additional – Resulting in greenhouse abatement above and beyond national pollution caps.

The Energy Efficiency Improvement Scheme

Given the large and immediate opportunity for cost-effective energy efficiency in the ACT to achieve the GHG reductions required, the ACT Government has acted to implement a retailer obligation energy efficiency scheme.

The *Energy Efficiency (Cost of Living) Improvement Act 2012* was passed by the Legislative Assembly on 3 May 2012. The Act provides for a retailer obligation energy efficiency scheme – the Energy Efficiency Improvement Scheme (EEIS) – commencing on 1 January 2013, and running initially until 31 December 2015.

The objects of this Act are to:

- a) encourage the efficient use of energy;
- b) reduce greenhouse gas emissions associated with stationary energy use in the Territory;
- c) reduce household and business energy use and costs; and
- d) increase opportunities for priority households to reduce energy use and costs.

The Act establishes a Territory-wide Energy Savings Target (EST) which correlates to mandatory energy savings obligations for individual electricity retailers based on their electricity sales in the ACT. The EST is set by the Minister for the Environment and Sustainable Development by Disallowable Instrument. The ESTs for the initial three year phase of the Scheme have been set by the Minister as:

- 2013 – 7%
- 2014 – 13%
- 2015 – 14%

It is important to note that the lifetime savings of measures are deemed upfront and effectively ‘given’ to the retailer in the year that they are undertaken, meaning that the targeted savings actually occur over a longer time period.

Retailer obligations

The individual retailer obligation is represented in tonnes of CO₂-e, calculated by the following formula:

$$\text{Obligation} = \text{EST} \times \text{emissions factor} \times \text{retailer sales (MWh)}$$

The emissions factor is also a Disallowable Instrument made by the Minister and has been set at 0.89 for 2013 to 2015.

The way in which a retailer must meet this target is determined by their electricity sales as well as the number of customers they have. Retailers are defined as being either Tier 1 or Tier 2.

Tier 1 Retailer

- Electricity sales of 500,000MWh or greater to customers in the ACT in a compliance year; and
- Greater than 5, 000 customers in the ACT.

Tier 2 Retailer

- All other retailers.

In order to meet their energy savings obligation, Tier 1 retailers must undertake eligible energy saving activities approved under the Act. Tier 1 retailers are also obliged to achieve 25 per cent of their energy savings obligation in low-income households, as determined by the Minister by Disallowable Instrument.

Tier 2 retailers may choose to undertake eligible energy saving activities or they may pay a contribution fee set at the expected average cost of abatement for a Tier 1 retailer. The contribution is set by the Minister by Disallowable Instrument and is set at \$37/tonne of abatement based on the predicted average cost determined by the Scheme modelling. This provides a simplified obligation for smaller retailers who may not have the customer base or resources in the ACT to fully participate in the Scheme, and who may be discouraged from participating in the ACT market if required to undertake EEIS activities. This equalises the cost of participation for all retailers and, in turn, mitigates potentially adverse effects of the Scheme on competition in the ACT's retail electricity market.

In order to ensure reasonable incentive exists for Tier 1 suppliers to undertake abatement activities, the penalty for not achieving the abatement target is set at \$70 per tonne CO₂-e. This is set slightly higher than the expected maximum price a retailer will pay per tonne of abatement (originally modelled to be \$60).

Based on these targets, the projected energy use in the ACT and assuming abatement action only by Tier 1 retailers, the Scheme was modelled to reduce the Territory's emissions by around 750,000¹ tonnes over the lifetime of actions.

Eligible activities

A Notifiable Instrument, providing for an initial list of activities which retailers may undertake to meet their obligation under the EEIS, has been made by the Minister, effective 14 September 2012. While the Act allows for the Scheme to be extended to business participation, the list provides for a wide range of activities that can be undertaken only in ACT households, therefore effectively restricting the benefits of the EEIS to the residential sector in the first instance.

Limitations on Tier 2 retailer participation

While the EEIS has been designed to balance competition issues in the ACT by allowing smaller Tier 2 retailers to elect to pay a contribution fee equal to the estimated compliance cost for a Tier 1 retailer, there are some residual issues with this approach.

A number of Tier 2 retailers in the ACT only have a relatively small number of customers and may have no residential customers. Currently the non-residential sector will pay a portion of the pass through costs without a corresponding opportunity to participate and benefit from the scheme and retailers who only sell electricity to non-residential customers have a reduced opportunity to

¹ Noting that the amount of abatement achieved will depend on retailer compliance with their obligations and the market share of Tier 1 retailers who are obligated to undertake activities.

participate in a scheme that does not include the non-residential sector. In this situation Tier 2 retailers will elect to pay the contribution fee, representing a lost cost-effective abatement opportunity for Tier 2 retailers, rather than implementing eligible activities.

Scheme review

The Act provides that the Minister must commence a review of the Act in January 2014. The review is to consider the operation of the Act after 2015, any changes required to improve the Act and the impact of any new Commonwealth, State or Territory energy efficiency schemes.

Action 1 under AP2 commits that the EEIS will be extended to 2020 subject to outcomes of the Scheme review in 2014 and developments at the national level.

Alignment with the Victorian Energy Efficiency Target scheme

The EEIS has been developed specifically to align closely with the Victorian Energy Efficiency Target (VEET) scheme – widely recognised as the leading Australian energy efficiency scheme. While the ACT non-certificate market based scheme differs from the VEET scheme which is certificate based (due to the small size of the ACT economy), EEIS activity and eligible product requirements are the same where possible. This simplifies retailer participation, with many retailers in the ACT also operating in Victoria under the VEET scheme, and will also help facilitate the transition of the EEIS to a national scheme should it eventuate.

Consultation

A consultation paper, seeking stakeholder input on a wide range of key energy efficiency scheme parameters, was circulated to key stakeholders by the Environment and Sustainable Development Directorate in May 2011.

Of particular relevance to this RIS process, the paper outlined an intention that the EEIS, in time, cover both the residential and non-residential sectors. Respondents to the consultation paper broadly acknowledged that including more sectors in the scheme would increase the potential for low cost energy efficiency improvements. In particular, retailers noted that given the relatively small size of the ACT energy customer base, broadening the eligible base of participants would facilitate the successful achievement of emissions savings at the most efficient cost.

The Problem – Energy Efficiency in the Non-Residential Sector

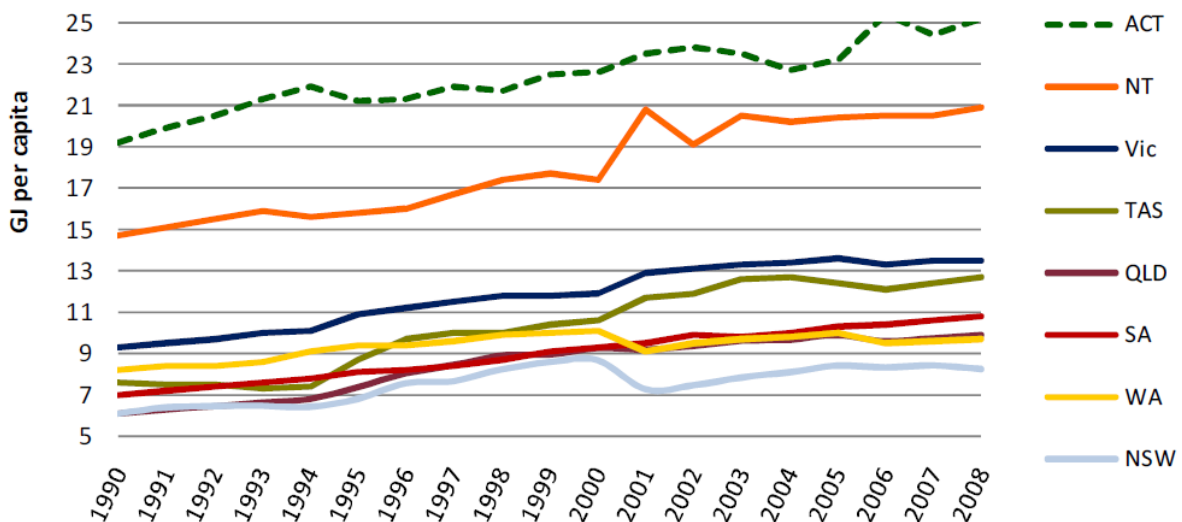
The problem and its magnitude

Australian household electricity price levels are mid-range for a developed economy. According to statistics compiled by the International Energy Agency,² Australia’s residential electricity prices are lower than those of European developed economies, such as Germany and Denmark, but are higher than those of the United States.

Within Australia, the ACT enjoys the lowest household electricity prices of any jurisdiction, according to statistics compiled by the Australian Energy Market Commission (AEMC)³, in 2012-13 the residential electricity price for the Territory was two-thirds of the average national household electricity price and was 28 per cent lower than the price of the next lowest state or territory (Queensland).

Low prices, it is widely accepted, have led to the inefficient use of energy in ACT households, business and industry. We are currently highly dependent on the delivery of reliable, low-cost energy in order to maintain our lifestyle. As **Figure 1** shows, the ACT has the highest per capita non-residential sector energy use in Australia. This reflects the high proportion of office space for government operations and national institutions, as well as the more extreme climate in the ACT compared to other population centres.

Figure 1: Non-residential sector energy use⁴



² 2012 Key World Energy Statistics, International Energy Agency, Paris, 2012, p. 43.

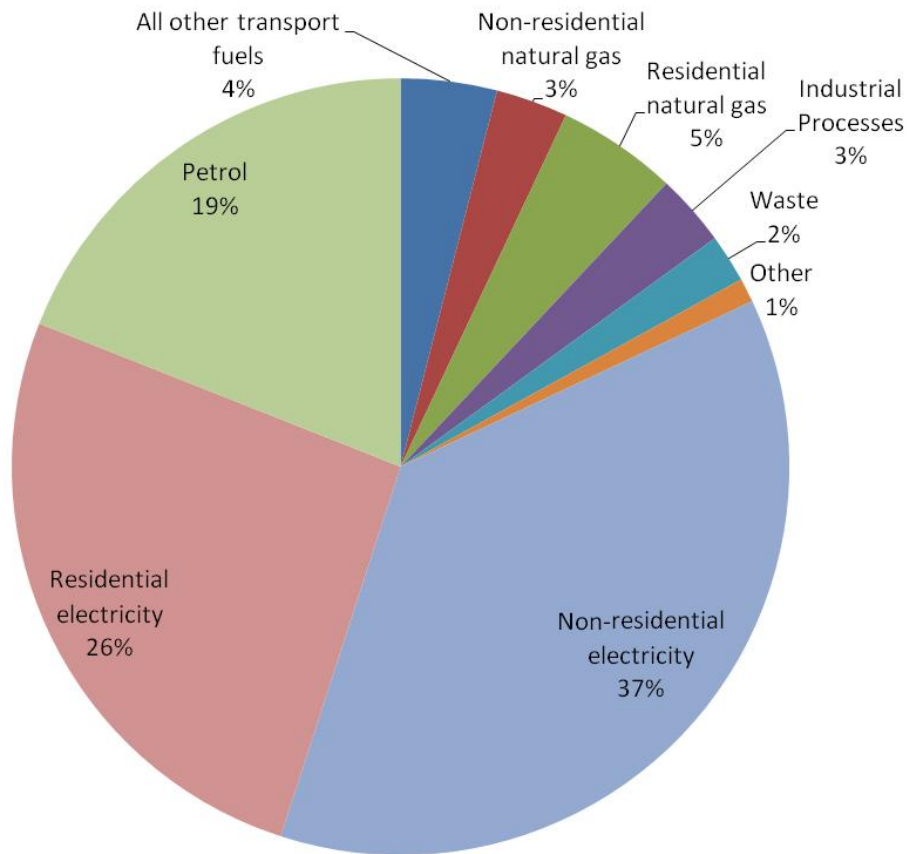
³ Possible Future Retail Electricity Price Movements: 1 July 2012 to 30 June 2015, Australian Energy Market Commission, Sydney, 2013, p. 3.

⁴ ACT Government, 2010, ACT Greenhouse Gas Inventory 2008 http://www.environment.act.gov.au/data/assets/pdf_file/0015/200175/ACT_Greenhouse_Gas_Inventory_2008.pdf

The shift from fossil fuel based generation to large-scale renewable energy generation is a major focus of AP2, accounting for around 72% of potential emission reduction effort in 2020. The ACT Government is committed to increasing renewable energy generation in the ACT through initiatives such as the Solar Auction, provided for by the *ACT Electricity Feed-in (Large-scale Renewable Energy) Act 2011*. However, the ACT, as part of a broader Australian economy and the National Electricity Market, will continue to be dependent for some time on non-renewable fossil fuel sources from generators in other states.

The use of stationary energy sources significantly contributes to the GHG emissions profile of the ACT. In 2008, the ACT produced 4.18 million tonnes of greenhouse gas emissions, and, as shown in Figure 2, non-residential electricity use accounted for 37 per cent while non-residential natural gas consumption accounted for around 3 per cent.

Figure 2: The ACT’s sources of greenhouse gas emissions⁵



As outlined in AP2, meeting the ACT’s GHG targets in 2020 will require the ACT to displace around 90% of total electricity demand from the National Electricity Market with emissions-free renewable energy. This amount will be periodically reviewed in light of the extent to which the Territory is able

⁵ ACT Government, 2010, *ACT Greenhouse Gas Inventory 2008*
http://www.environment.act.gov.au/data/assets/pdf_file/0015/200175/ACT_Greenhouse_Gas_Inventory_2008.pdf

to achieve lower cost abatement, such as through energy efficiency or through transport and waste management.

The ACT's relative electricity price advantage is expected to persist after the achievement of the ACT's climate change reduction and 90% renewable energy targets in 2020⁶.

ACT energy prices

The National Electricity Market will absorb high levels of investment in generation and network infrastructure over the coming decade. Much of this investment relates to demand for gas generation plants required to meet ever higher peak loads resulting, to a large extent, from the increasing use of air conditioning on hot days. Some of the extra investment also relates to new renewable energy generation capacity. These costs will be amortised across all users in the National Electricity Market and will result in higher electricity prices for all ACT customers, however, the household cost of electricity is not expected to keep increasing at the rate that it has recently.

Over the past five years, national residential electricity prices have increased quite significantly. In the ACT, between 2007-08 and 2012-13, the regulated (Transitional Franchise Tariff) household price of ACT electricity increased at an average compound rate of 7 per cent per year⁷, however, future price increases in the Territory are expected to moderate in the short to medium term. Between 2012-13 and 2014-15, the AEMC has forecast an average rate of increase in the residential ACT electricity price of around 3 per cent per year which is less than half of the average compound rate of increase between 2007-08 and 2012-13 and only marginally above the likely rate of inflation over the period.⁸ Nearly all of the forecast increase in ACT residential electricity prices between 2012-13 and 2014-15 is likely to be accounted for by increases in network costs, all other costs, including retail and renewable energy costs, are forecast to remain roughly static over the period.

Improving energy efficiency can reduce the need for generation and peak demand network infrastructure investment and therefore lower overall wholesale prices and network charges. This has been a significant justification for the development of the NSW Energy Savings Scheme and the recent expansion of the VEET Scheme to the non-residential sector. While it is difficult, due to our small size, to model the impact of reduced ACT energy consumption on required investment in the National Electricity Market, it is anticipated that reduced electricity consumption in the ACT will also contribute to reduced wholesale prices and required network investment.

The need to move to a low carbon economy and renewable energy sources will also have an impact on energy prices. These costs are primarily manifest in scheme costs passed through to energy users, such as the Commonwealth's Renewable Energy Target Scheme and the ACT's Feed-in Tariffs.

Natural gas price rises in Australia's eastern states are also expected to increase markedly over the coming decade. This is a result of increased demand as well as increased exports, which will move

⁶ ACT Government, 2012, *Action Plan 2*, p.27

http://www.environment.act.gov.au/_data/assets/pdf_file/0004/254947/AP2_Sept12_PRINT_NO_CROPS_SML.pdf

⁷ Average compound growth between 2007-08 TFT rate of \$13.76/kWh and 2012-13 TFT rate of \$19.32/kWh.

⁸ *Possible Future Retail Electricity Price Movements: 1 July 2012 to 30 June 2015*, Australian Energy Market Commission, Sydney, 2013, p. 32

wholesale natural gas pricing closer to the relatively high international export contract prices. This price change may be compounded by high network investment costs and short term production constraints prior to 2020. While there is some uncertainty regarding future natural gas prices, pricing pressures can be expected to be eased through the commercial development of significant non-conventional 'coal seam gas' natural gas sources primarily in NSW and Queensland.

Emission reductions

Analysis undertaken for AP2 demonstrates that energy efficiency is the most cost-effective way for the Territory to address higher energy costs and reduce greenhouse gas emissions.

It also indicates that the non-residential sector (including business and government) has the potential to reduce annual emissions by at least 180,000 tonnes CO₂-e per year by 2020 through implementing cost-effective upgrades to existing buildings and increasing the efficiency of new commercial buildings. This represents a saving of around 14% from projected business as usual non-residential sector emissions in 2020. This will be counted in the ACT's Greenhouse Gas Inventory as a reduction in imports of electricity and gas into the Territory and their associated emissions.

Reducing electricity and gas imports will also reduce the cost burden of achieving the Territory's emission reduction targets by reducing requirements to offset energy purchases with investments in renewable energy. As set out in AP2, these investments will be designed to produce additional emissions reductions above and beyond national pollution caps.

The ACT, through the Council of Australian Governments (COAG), has agreed to a set of principles to guide the assessment of emission reduction measures and determine whether the measures complement emissions trading. These principles include the need for measures to be targeted at a market failure that is not expected to be adequately addressed by pricing carbon. This includes where the carbon price signals are insufficient to overcome other market failures that prevent the take-up of otherwise cost-effective abatement measures. Complementary measures may also be targeted to manage the impacts of the carbon price on particular sectors of the economy.

Nature of the market barriers and failures

The ACT Government continues to advocate for a national price on carbon as the most economically efficient way of reducing national emissions and the emissions intensity of electricity supplied to the ACT through the National Electricity Market. The ACT will, however, require additional complementary measures to reduce emissions in line with existing emissions reduction objectives and to mitigate some of the impacts of a carbon price on the community.

The range of market failures and barriers which prevent optimal uptake of cost-effective energy efficiency in the non-residential sector, even under a national system for pricing carbon, are outlined below.

Bounded rationality

Even with access to information, individuals and organisations can fail to recall, process or use information effectively⁹. While markets rely on individuals to make rational decisions, in practice, perfectly rational decisions are often not made as individuals and organisations have a limited ability to process and analyse information to make decisions that maximise their benefit.

In the case of energy efficiency, assessing the relative benefits of purchasing an energy efficient product that has lower operating costs, but higher upfront capital costs, can be a complex and time consuming task for organisations, especially small business and community groups, that can be time poor or lack specialist expertise.

Discount rates

Related to bounded rationality problems, market behaviour studies show that consumers often place greater emphasis on upfront purchase costs than whole-of-life costs. Savings on energy bills made over the life of an energy efficient appliance may be discounted more than the upfront savings associated with selecting a less energy efficient appliance¹⁰.

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.

When organisations make decisions to purchase cheaper, less efficient products, this can imply that a high discount rate has been applied to the financial benefits from energy efficiency¹¹. Implicit discount rates for energy efficiency investments presented in several studies range from 25 per cent to 300 per cent across a range of measures¹². Such high discount rates may be applied to cover business, financial and technical risks, but such rationales are rarely explicit and not always justified¹³.

Compounding this issue is the fact that, for many organisations, energy is not yet a significant budget consideration. While low-cost energy in the ACT is not a market failure, it offers some explanation for low uptake of energy efficiency products and services.

⁹ Energy Efficiency Council, 2010, *Submission to the Prime Minister's Task Group on Energy Efficiency*, p8

¹⁰ Garnaut, R, 2008, *Garnaut Climate Change Review*, Cambridge University Press P408

¹¹ Ernst and Young, 2009, *A review of the theoretical and empirical evidence surrounding energy efficiency policy*

¹² Gillingham, K, Newell, RG & Palmer, K, 2009, *Energy Efficiency Economics and Policy*, Resources for the Future

¹³ O'Malley, E, Scott, S and Sorrell, S, 2003, *Barriers to Energy Efficiency: Evidence from Selected Sectors*

Principal-Agent Problems

Also called misplaced or split-incentive problems, principal-agent problems refer to the frequent misalignment of incentives and goals facing landlords, tenants and building managers, resulting in sub-optimal outcomes¹⁴.

In relation to energy efficiency, principal-agent problems occur when the economic benefits of energy conservation do not accrue to the person that is trying to conserve energy. For example, in the commercial offices sector, principal-agent problems occur when the person choosing the energy equipment for the office space (the office owner/agent) is not the same person paying the energy bill (the tenant/principal)¹⁵.

Public good information problems

Many organisations lack an understanding of energy efficiency issues due to a range of 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 emissions trading scheme in Australia is to correct an information failure¹⁶.

While there is a considerable amount of information available to organisations on energy efficiency, such as that available online, this information is only as useful as its capacity to inform consumers and influence their decision making.

Information about electricity and gas use is commonly received by consumers at a much later time than when the resources are used. This time lag may affect the ability of price information to influence consumer awareness and energy use behaviour. As stated in the Productivity Commission's report, *The Private Cost Effectiveness of Improving Energy Efficiency*, "most consumers act as if they have no control over their electricity bill, [and with the limited feedback they receive] it is often too late for them to respond"¹⁷. This is supported by research that shows that small commercial customers often know little about energy use in their facilities and are unaware of the unit cost of electricity¹⁸.

Further, while information may be available relating to potential energy and cost savings, the time, effort and technical knowledge required to gather, assess and apply information about energy saving potentials and relevant technologies may mean that the realisation of cost-effective improvements in energy efficiency become uneconomic¹⁹. This is particularly relevant in the small business sector.

¹⁴ International Energy Agency, 2007, *Mind the Gap – Quantifying Principal-Agent Problems in Energy Efficiency*

¹⁵ As above.

¹⁶ Productivity Commission Submission to the Garnaut Climate Change Review, 2008, *What Role for Policies to Supplement an Emissions Trading Scheme?*, p 14

¹⁷ Productivity Commission, *The Private Cost Effectiveness of Improving Energy Efficiency*, 2005, p105

¹⁸ Ernst and Young, 2009, A review of the theoretical and empirical evidence surrounding energy efficiency policy

¹⁹ As above.

Early mover spill-overs

Support for research and development is required to extend the potential of energy efficiency. Currently, in most cases, an industry or producer that moves to produce new energy efficient products early will bear the costs of developing and bringing the product to market. Later movers will then share in the associated benefits that spill over directly from the early mover's investments – thus resulting in a strong disincentive for early innovation²⁰.

Existing non-residential energy efficiency initiatives and mutual recognition

When considering the options available to encourage the uptake of energy efficiency initiatives in the non-residential sector, it is also necessary to consider the Government's objective to achieve greater integration of programs and to leverage off existing programs where possible. The following existing programs have been identified as relevant to achieving energy savings in the non-residential sector in the ACT.

ACTSmart Business Energy and Water Program

Through ACTSmart, the ACT Government is helping households, businesses, schools and community groups contribute to a more sustainable future and to reduce resource consumption and environmental impacts.

The ACTSmart Business Energy and Water program aims to reduce energy and water use in businesses while lowering operating costs.

Program participants receive:

- a comprehensive energy and water assessment by an experienced assessor;
- a written report suggesting ways to improve energy and water efficiency; and
- advice on organising the installation of new efficient equipment if needed, including a \$5000 cost sharing rebate to help businesses with upgrade costs.

To be eligible for the program businesses must be operating in the ACT with electricity bills of up to \$20,000 per annum and/or employ up to 10 full time staff.

National Strategy on Energy Efficiency

Two key focus areas of the National Strategy on Energy Efficiency (NSEE), relevant to the non-residential sector, are assisting businesses to transition to a low-carbon future and improving the energy efficiency of buildings.

Achievements under the NSEE in these areas include the passage of the *Building Energy Efficiency Disclosure Act 2010*, providing for the mandatory disclosure of energy efficiency ratings for commercial buildings, and the development and publication of more stringent energy efficiency

²⁰ Garnaut, R, 2008, The Garnaut Climate Change Review: Final Report, <http://www.garnautreview.org.au/chp18.htm>

provisions for all new non-residential buildings and major upgrades to existing non-residential buildings in the 2010 Building Code of Australia.

Australian Government Community Energy Efficiency Program

The Community Energy Efficiency Program is a merit-based grant program established by the Australian Government to provide matched funding to local councils and non-profit community organisations to undertake energy efficiency upgrades and retrofits in council and community-use buildings and facilities.

One ACT bid was successful in the first round of funding, announced in May 2012, with the Community Services Directorate successful in securing \$3,205,000 towards upgrading the lighting, heating, cooling and ventilation systems and insulation in 12 community hub buildings in the ACT²¹.

Energy Efficiency Information Grants Program

The Energy Efficiency Information Grants Program is a \$40 million merit-based grants program established by the Australian Government to assist industry associations and non-profit organisations to provide practical, tailored energy efficiency information to small and medium enterprises and community organisations.

28 applications, seeking a total of \$20 million, were successful under round one of the program, announced in mid 2012²². While there are no projects specific to the ACT, some programs run by large national industry associations may be relevant to ACT organisations.

Low Carbon Australia Energy Efficiency Program

Low Carbon Australia, an Australian Government company limited by guarantee and with an independent board of directors, manages an Energy Efficiency Program to provide finance solutions and advice to eligible businesses and the public sector for the retrofit of commercial properties.

The program brings together public and private seed funding to enable property owners, business and governments to access innovative finance solutions for energy efficiency upgrades²³. Rather than offering grants for energy efficiency, Low Carbon Australia supports projects that are likely to provide a positive return on investment.

²¹ Australian Government, 13 June 2012, Media Release: Communities Share In \$42 Million For Smarter Energy Use, <http://climatechange.gov.au/~media/Files/minister/combet/2012/media/june/CombetDreyfus-MediaRelease-134-12.pdf>

²² Australian Government, Energy Efficiency Information Grants Program – Funding Round One, 2012, <http://www.climatechange.gov.au/government/initiatives/energy-efficiency-information-grants/round-one.aspx>

²³ Australian Government, 2012, *Low Carbon Australia*, <http://www.climatechange.gov.au/government/initiatives/low-carbon-australia.aspx>

The primary focus is longer term projects in larger businesses, however, there are opportunities for SMEs to lease energy efficient assets for projects valued between \$3,000 - \$100,000²⁴.

Energy Efficiency Opportunities

The Australian Government's Energy Efficiency Opportunities (EEO) program requires large energy users, using above 0.5 petajoules, to identify, evaluate and report publicly on cost-effective energy savings opportunities. Medium energy users may also voluntarily participate.

The 2011 report indicates that obligated organisations have implemented projects reported to deliver 88.8 petajoules of energy savings, worth an estimated \$800 million²⁵.

Australian Government Energy Efficiency in Government Operations Policy

The Energy Efficiency in Government Operations (EEGO) Policy is the Australian Government's strategy for improving the energy efficiency of its operations, with a particular focus on building energy efficiency. The policy sets targets for the per person tenant light and power and for central services and requires that when agencies enter into a new lease for office space that is larger than 2000m², for a term of more than two years, a Green Lease Schedule be included with the lease. EEGO also requires separate metering for buildings and requires that agencies purchase energy efficient equipment that is Energy Star compliant²⁶.

ACT Government operations

The diverse range of properties and facilities required by the ACT Government to provide services to the community are estimated to be responsible for around 4% of the ACT's greenhouse gas emissions.

The ACT Government is committed to leading by example and working to achieve carbon neutrality in its own operations by 2020. The long term strategy for achieving this is outlined in the Carbon Neutral ACT Government Framework²⁷, endorsed by Government in August 2012. Implementation commenced in late 2012 with an initial focus on:

- Resource Management Plans for each Directorate;
- an increase in the loan funding available to Directorates for cost and greenhouse gas savings initiatives; and

²⁴ Low Carbon Australia, 2012, *FlexiGroup – Energy Smart Finance*, <http://www.lowcarbonaustralia.com.au/business/finance-solutions/co-finance-partners/flexigroup.aspx>

²⁵ Australian Government, 2012, *Energy Efficiency Opportunities Program: Continuing Opportunities 2011*, p16. <http://www.ret.gov.au/energy/efficiency/eoo/resmaterial/Pages/default.aspx>

²⁶ Australian Government, 2012, About EEGO, <http://www.climatechange.gov.au/government/initiatives/eego/about-eego.aspx>

²⁷ ACT Government, 2012, *ACT Government Operations*, www.environment.act.gov.au/climate_change/actgov_ops

- a 12 month trial of onsite energy and water advice under the ACTSmart Government Energy and Water program.

Sustainability Data Management System

The ACT Government is establishing a comprehensive Sustainability Data Management System to support the collection and analysis of accurate whole-of-government data on energy and water use. This will provide a basis for future reporting as well as an opportunity for facility managers across the government to more actively monitor energy usage and identify opportunities to implement energy efficiency measures.

Carbon Neutral Government Fund

The ACT Government is in a strong position to invest in many of its own buildings and energy-using assets, since there is long term certainty of tenure and service provision. The 2012-13 ACT Budget provided an increase in the loan funding available to Directorates with the creation of a \$5 million Carbon Neutral Government Fund. This Fund incorporates \$1.9 million previously available under the Resource Management Fund, enabling a total pool of \$6.9 million in loan funds for Government resource saving projects.

The Environment and Sustainable Development Directorate administers the Fund, which Directorates can access to fund cost and greenhouse gas savings projects. The loans are interest free and are repaid from energy savings over an agreed period of time.

To date, eleven projects have been funded, with each demonstrating cost and energy savings. For example, the ACT Property Group was supported with a loan of \$1.7 million for the retrofitting of LED lighting across 28 Government sites in 2013-14. The project is expected to save an average of 30% on previous electricity bills for the sites and take 4 years to repay in full.

Mutual recognition

The interaction and complementarity between the inclusion of the business sector under the EEIS and other pre-existing and proposed schemes is discussed below.

Carbon pricing

The most notable development at a national level with respect to energy consumption is the introduction on 1 July 2012 of a price on carbon under the 2011 *Clean Energy Future* package. The carbon price 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 carbon price, fixed at a \$23/tonne CO₂-e for the first three years, rising at 2.5 per cent each year in real terms, will provide some incentives for low-carbon energy sources and more efficient use of energy in the ACT. An important consideration when contemplating the expansion of the EEIS to the non-residential sector is therefore complementarity with the carbon price.

A set of complementarity principles have been developed by COAG. In summary:

1. Complementary measures are targeted at a market failure that is not expected to be adequately addressed by the carbon price.
2. Where complementary measures have a regulatory impact, they meet best-practice regulatory principles, including that the benefits of any government intervention outweigh the costs.
3. Complementary measures also help manage the impacts of the carbon price on particular sectors of the economy.
4. Complementary measures are implemented by the level of government that is best able to deliver it, and they are effectively coordinated across jurisdictions.

Despite the carbon price, a number of residual impediments to the uptake of energy efficiency will still persist across the economy. A review of ACT Government climate change measures has found the EEIS to be complementary to a carbon price, being consistent with COAG Complementarity Principles and reducing the overall cost for greenhouse gas abatement in the Territory. Furthermore, a national energy efficiency scheme currently under investigation by the Commonwealth Government is also considered to be complementary. The extension of the EEIS to the non-residential sector will overcome market failures that obstruct the operation of the carbon price and barriers that increase the cost of emission reduction – delivering low-cost abatement complementary to a carbon price.

A National Energy Efficiency Scheme

In 2010, the Prime Minister’s Task Group on Energy Efficiency recommended the development of a national energy savings initiative to replace existing state-based supplier obligation schemes²⁸. The Task Group reported that an energy savings initiative would form the final piece of a comprehensive framework of market-based instruments, in addition to a carbon-pricing scheme and national renewable energy targets, that work together to provide incentives for all Australians — households, businesses and industry — to contribute to reducing Australia’s greenhouse gas emissions.

In-principle support for the development of a national retailer obligation energy efficiency scheme was voiced in the Commonwealth Government’s *Clean Energy Future* package.

As a first step, the Commonwealth Government is undertaking consultation with stakeholders, including the ACT Government, and detailed analysis to assess the potential costs and benefits of a national ESI.

A number of consultants have been engaged to undertake technical modelling work²⁹ to inform the Commonwealth’s consideration of whether to proceed with negotiations on a national ESI.

Should the Commonwealth agree to pursue a national ESI scheme, the development will then be subject to COAG agreement and there are a number of varying jurisdictional priorities that will need

²⁸ Prime Minister’s Task Group on Energy Efficiency, *Report of the Prime Minister’s Task Group on Energy Efficiency*, 2010 <http://www.climatechange.gov.au/government/submissions/pm-task-group.aspx>

²⁹ Australian Government, 2012, *Energy Saving Initiative – Reports*, <http://www.climatechange.gov.au/government/initiatives/energy-savings-initiative/reports.aspx>

to be addressed before all jurisdictions will agree to a national scheme. For this reason it is not expected that a national ESI would be implemented before 2015 at the earliest.

ESDD's analysis of the current national political situation suggests that the greenhouse gas reduction targets set by the ACT Government mean efficiency targets or schemes developed at a national level are unlikely to be ambitious enough to meet the ACT's targets.

The modelling undertaken to inform the extension of the EEIS to the non-residential sector (see Appendix B – Summary of Modelling Approach) has been based on the considerable work undertaken to inform the development of a national ESI, explained in further detail below.

Existing jurisdictional legislation

In Australia, the following supplier obligation schemes are in operation:

- **The Victorian Energy Efficiency Target Scheme (VEET)** commenced in January 2009 and applies to all electricity and gas retailers with over 5,000 customers. The scheme is certificate based with energy savings measures being delivered by third party providers to the residential sector, with the scheme extended to the business sector in December 2011 following a RIS which also recommended the doubling of the scheme target from 1 January 2012.

Initially the residential VEET measures were made available to the business sector (excluding insulation and weather sealing) before a number of business only measures were also made available. Notably, the NSW Commercial Lighting Tool has been adopted under the VEET and refrigeration and motor upgrades have been included.

- **The NSW Energy Savings Scheme (ESS)** commenced in July 2009, replacing the demand side abatement rule under the NSW/ACT Greenhouse Gas Abatement Scheme. The scheme is market-based with the majority of energy savings services being delivered by third party providers. It applies to electricity retailers and large wholesale purchasers of electricity. Energy savings measures can be delivered in the residential, commercial and industrial sectors.
- **The South Australian Residential Energy Efficiency Scheme (REES)** commenced in January 2009 and applies to all electricity and gas retailers with over 5,000 customers. Energy savings measures, as well as energy efficiency audits, must be delivered in the residential sector, with a focus on low-income households.

The initial list of eligible activities under REES was extended to include the installation of standby power controllers and high efficiency pool pumps, as included under the VEET scheme.

A review of the REES is currently in progress and, amongst other things, will consider the extension of the scheme beyond the residential sector.

Options Analysis

Objective

In consideration of the outlined problem and the underlying causes of inefficient use of energy in the ACT, the principal objectives of a Government response to include the non-residential sector under the EEIS are to:

- encourage the efficient use of electricity and gas in the non-residential sector;
- reduce greenhouse gas emissions associated with stationary energy use by the non-residential sector in the Territory; and
- reduce energy costs for the non-residential sector.

A further important objective when considering the extension of the EEIS to the non-residential sector is complementarity with existing programs and balancing the potential for non-residential participation with potential cost of living and social equity impacts.

Summary of modelled scenarios

Five options were modelled in order to assess the possible range of impacts of expanding the EEIS to the non-residential sector. The scenarios are described below.

Scenario 1 – No change - residential only

Scenario 2 – Expand to include small to medium enterprises

Scenario 3 – Expand to include small to medium enterprises and large commercial

Scenario 4 – Expand to include all business excluding government

Scenario 5 – Expand to include the entire non-residential sector (including government)

Background to scheme impact modelling

Modelling was undertaken by Energetics to determine the potential energy saving opportunities available to the non-residential sector in the ACT and the impact of expanding the EEIS to this sector. The central focus of the modelling was to assess the likely take-up in the business sector if the EEIS was expanded, and the consequent impact on Scheme costs and benefits for ACT households and businesses.

The original residential sector modelling undertaken to inform the development of the EEIS was updated to reflect the Scheme as currently legislated, update energy prices in line with the most recent forecasts and the measure take-up curve was adjusted to be more sensitive (using a linear interpolation curve, rather than a stepwise take-up curve).

Particular elements considered when undertaking the modelling included:

- Consideration of the key existing Scheme parameters.

- Development of robust energy baseline for the non-residential sector in the ACT.
- Estimation of energy efficiency opportunities in ACT non-residential sectors, taking into consideration existing business-as-usual conditions in the ACT, the cost-effectiveness of identified measures in terms of their net present value and abatement potential and anticipated uptake.
- Analysis of impact on key performance variables of the Scheme as a result of including the different non-residential sectors, specifically including average cost of abatement and changes in costs and benefits to households.
- Assessment of the potential, and impact of, households cross subsidising energy efficiency in the non-residential sector if the EEIS is extended beyond the residential sector.

Existing EEIS parameters

In consideration of the recent commencement of the EEIS, and the time required for retailers and the service delivery sector to build their capacity, the EEIS energy savings targets and priority household target as currently set have been used in assessing the expansion of the EEIS to the non-residential sector.

There may be an opportunity to increase or adjust the targets following the review of the EEIS's first year of operation.

In undertaking the modelling, residential activities currently included under the EEIS³⁰ have been considered for extension to the business sector. It is also assumed that a number of residential measures will be phased in over time and will be included under the Scheme in the residential and non-residential sectors. Finally, a number of business specific activities have been included. Expanding the EEIS in this way is based on the strategy taken under the VEET scheme, and aligns with the ACT Government's commitment to align with the VEET scheme where possible.

Categorising the non-residential sector for modelling purposes

In considering the extension of the EEIS to the non-residential sector it is necessary to consider the way in which different sub-sectors of the broader non-residential sector are defined and the possible inclusion or exclusion of these sub-sectors.

Sub-sectors identified within the non-residential sector which could be modelled in the ACT included:

- Small to Medium Enterprises (SMEs)
- Large Commercial
- Federal Government
- Defence
- ACTEW Water
- ANU

³⁰ *Energy Efficiency (Cost of Living) Improvement (Eligible Activities) Determination 2012 (No 1)*, 14 September 2012, <http://www.legislation.act.gov.au/a/2012-17/ni.asp>

Following the identification of these sub-sectors, a more specific definition was required in order to build the non-residential sector energy use baseline and gain a greater understanding of the opportunities in each sector. In particular, defining the non-government sectors (SMEs and Large Commercial) required careful consideration.

The Australian Bureau of Statistics (ABS) provides a commonly referenced definition of business by number of employees. Categories of business include:

- **non-employing businesses** – sole proprietorships and partnerships without employees
- **micro businesses** – employing less than 5 people, including non-employing businesses
- **small businesses** – employing 5 or more people, but less than 20 people
- **medium businesses** – employing 20 or more people, but less than 200 people
- **large businesses** – employing 200 or more people

The employment size ranges are based on “headcount”, rather than a measure of full-time equivalent persons³¹.

Defining businesses in this way creates difficulties for modelling energy savings opportunities, as, due to a lack of data, the types of buildings and typical operations associated with these categories in the ACT are not well known, and may also lead to problems with compliance verification should the Scheme participation be determined on the basis of these categories, given that staffing numbers can change substantially over time.

Alignment with other schemes and reporting requirements in Australia was also considered in categorising businesses for the purposes of modelling. Under the VEET scheme SMEs are targeted by defining a business premises as one that:

- is not a residential premises (i.e. not classified under Part A3 of the Building Code of Australia as a Class 1, 2, 3 or 4 Building); and
- does not appear on the Victorian ‘EREP’ register of scheduled activities within the meaning of section 26G of the Environment Protection Act 1970 (i.e. does not use more than 120 megalitres of water and/or more than 100 terajoules of energy in a financial year³²).

In modelling the expansion of the EEIS, the granularity of energy data was not sufficient to allow for a strict cut-off at the precise SME threshold of 100 terajoules per facility that was proposed for the modelling of the national ESI. Further, energy efficiency solutions are generally related to building types rather than total employee numbers or financial turnover. Therefore, for the purposes of the modelling, it was necessary to disaggregate the energy use in terms of the energy used in each of the building classes within each of the segments.

Consistent with modelling undertaken to inform the development of the national ESI, organisations with less than 200 employees were classed as SMEs. Energy use was assigned to building class based on the ANZSIC Division. So, for instance, energy use by industrial SMEs was determined by difference

³¹ ABS, 2002, *Small Business in Australia* <http://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/1321.0>

³² EPA Victoria, 2013, *Environment and Resource Efficiency Plans*, <http://www.epa.vic.gov.au/our-work/programs/erep>

between total energy use reported by the ABS for ANZSIC Division B and C and energy use attributable to “large industrial” entities that reported under the National Greenhouse Energy Reporting Act 2007 (NGER Act). The SME sector is covered by the following building classes: Hospitality; Small office; Small trade (including retail); and SME Industrial.

The total consumption in the national ESI data differed from the total energy consumption deemed to be the ACT baseline. Therefore the ESI consumption data was normalised by building type so that the total matched the deemed baseline.

The definition proposed for the purpose of including the non-residential sector under the EEIS is detailed in the section *Definition of SME for eligible activity determination*.

Energy costs savings assumptions

The modelling assumed that, for the purposes of determining Scheme benefits, annual electricity prices are static (and not impacted by Scheme cost impacts). This has the effect of making the savings attributable to the Scheme potentially conservative in the short term and neutral over the longer term.

Energy cost savings calculations in the Scheme modelling do not assume any reduction or increase in distribution network charges across the economy resulting from the Scheme. This reflects that distribution network charges generally recover fixed capital costs that may not decrease as a result of reduced energy consumption. It is acknowledged that any material reduction in total ACT electricity or gas consumption would result in a proportional reduction in revenue to ActewAGL Distribution. This may impact future AER distribution price determinations beyond 2013-14 and also trigger a review of the current price determinations. Neither of these outcomes would adversely impact costs attributable to the Scheme. Any benefits associated with deferred capital investment resulting from the Scheme are additional to those modelled.

A carbon cost has been applied, based on a mid-range estimated cost per tonne of CO₂ emissions and multiplied by the published annual state-specific Scope 2 and Scope 3 emissions factor for electricity generation or the Scope 1 emissions factors for natural gas (which are constant over time). In line with Commonwealth Treasury modelling, it is expected that only 85% of carbon costs are passed through to electricity prices due to the operation of wholesale energy markets. This factor is kept constant through the duration of the forecast.

Timing of inclusion of the non-residential sector

Extending the Scheme will require the Administrator to approve additional eligible activity determinations, codes of practice and may require updated product registers and associated training material for installers. This is expected to require additional administration resources, noting that existing resources are occupied with the initial implementation of the residential EEIS.

It is also considered that retailers will require adequate lead time to develop their business systems to deliver activities in the business sector and are unlikely to undertake measures in the business sector in the initial phase of the EEIS.

For the purposes of the modelling, following consideration of retailer and Administrator readiness, the model assumes that the EEIS is extended to the business sector from the commencement of the

second compliance period (1 January 2014). Noting this, it is proposed that a selection of measures be extended to the business sector before this modelled date. This will allow adequate lead time for retailers and businesses to prepare for implementation. Proposed business activities, and the timing of their inclusion, are provided at *Appendix A – Summary of Eligible Activities* on page 46.

A detailed description of the modelling, including general assumptions, key variables and changes from the original model, is provided in *Appendix B – Summary of Modelling Approach* on page 49.

Summary of modelling results

Table 2 shows the split of modelled savings across the sectors in each scenario. As the scope of the Scheme expands, there is a reduction in savings in the residential sector and an increase in non-residential savings.

Table 1: Split of abatement across the various sectors under different modelled scenarios

	Residential only	Residential and SME	Residential, SME and large commercial	Residential and all business	All sectors including government
Residential	100.0%	94.9%	85.6%	81.5%	72.4%
SME		5.1%	4.8%	4.7%	4.4%
Large commercial			9.7%	9.4%	8.7%
ANU				4.3%	4.2%
ACT Government					4.8%
Federal Government					3.7%
Defence					1.8%
ACTEW Water					0.03%

Variations between the sectors reflect the size of the overall energy efficiency opportunity in relation to the specific activity areas included in the model and the relative cost effectiveness of those opportunities. Sectors that have a larger scope for those activities, and where they are the most cost-effective, accrue a greater proportion of the overall savings target.

While all sectors fund the EEIS, the benefits in a residential-only scheme accrue only in the residential sector. Cash transfers between the residential and non-residential sectors were modelled for all scenarios modelled.

For this analysis, the distribution of pass-through costs was estimated by splitting the total Scheme costs across the various residential and non-residential sectors in proportion to the total energy

used by the respective sectors. Savings were distributed on the basis of modelling results in relation to the expected take-up of activities in each sector.

The modelling indicates that under the original, residential-only, scenario, the non-residential sector would subsidise the residential sector by up to \$21.24 million over the three year modelled life of the Scheme. The magnitude of the cross-subsidy depends on the extent of any expansion of the Scheme into the non-residential sector. Extending the EIS to SMEs reduces this cross subsidy in the order of \$1.3m, while extending the Scheme to all sectors including government reduces the cross subsidy by around \$5.2m.

Table 2 (page 29) shows that as the Scheme expands in scope, both the maximum incentive price required to meet the target, and the average cost of compliance, comes down. This is because an expanded scope provides a greater range of low cost opportunities for retailers to implement in order to achieve a fixed target. This is reflected in reduced program implementation costs for retailers and a marginally lower average level of incentives that retailers are required to pay.

Residential energy cost savings also reduce as the scope of the scheme is broadened and as a greater proportion of savings accrue in the non-residential sectors.

The model assumed that larger businesses and governments would undertake measures with longer paybacks. This is reflected in the results which show that lifetime energy cost savings reduce slightly with the inclusion of non-residential sectors because of changes in the mix of measures implemented and discounting, in the model, of long term savings compare to short term savings. This is reflected in the different average payback periods for each scenario.

Economic benefits

The net present value (NPV) associated with each scenario is a key indicator of its overall economic outcomes. The NPV includes an assessment of all costs and benefits that accrue under the scheme for all parties, with future costs and benefits discounted in relation to inflation and estimated costs of capital. **Table 2** shows that the NPV is highest in the scenario that includes residential and SMEs, peaking at \$42 million. While the difference between scenario NPVs is relatively small, this analysis supports the extension of the Scheme to SMEs on economic grounds.

As the targeted abatement for the Scheme as a whole is fixed across all scenarios, differences in the cost of abatement for the scenarios, as modelled, directly reflect the difference in NPV for each scenario. These costs are presented as negative net present cost (a positive NPV) per tonne of abatement (the ACT economy marginal abatement cost).

Table 2: Summary of financial outcomes

Scenario / Sectoral inclusion	Residential only	Residential and SME	Residential, SME and large commercial	Residential and all business	All sectors – including government
Maximum incentive price (\$/tCO ₂ -e) ⁽¹⁾	\$54.06	\$41.48	\$34.54	\$32.52	\$27.06
Average incentive price for Tier 1 retailer (\$/tCO ₂ -e) ⁽²⁾	\$38.48	\$35.72	\$32.29	\$30.96	\$27.41
Program implementation costs for retailers (\$, millions) ⁽³⁾	\$46.4	\$44.6	\$44.9	\$45.4	\$45.3
Program incentive payment excluding admin fees (\$, millions) ⁽⁴⁾	\$27.4	\$25.4	\$23.0	\$22.0	\$19.5
Lifetime total energy cost savings (\$, millions) ⁽⁵⁾	\$134.05	\$133.11	\$132.52	\$132.18	\$131.33
Lifetime Residential energy cost savings (\$, millions) ⁽⁶⁾	\$134.05	\$126.32	\$113.43	\$107.72	\$95.1
Average participant lifetime simple payback (years) ⁽⁷⁾	1.47	1.40	1.42	1.44	1.45
ACT economy NPV (\$, millions) ⁽⁸⁾	\$40.5	\$42.0	\$41.8	\$41.3	\$41.5
ACT economy marginal abatement cost (\$/tCO ₂ -e) ⁽⁹⁾	-\$34.72	-\$35.97	-\$35.78	-\$35.42	-\$35.52

1. The 'maximum incentive price' refers to the maximum amount a retailer will pay to achieve 1 tonne of abatement under the EEIS.
2. The 'average incentive price' refers to average cost of abatement to a retailer of achieving 1 tonne of abatement under the EEIS.
3. The 'program implementation costs for retailers' refer to the total cost to all retailers to comply with their energy savings targets.
4. The 'program incentive payment' refers to the value of the benefit provided by retailers to encourage household participating.
5. The 'lifetime total energy cost savings' refer to the aggregate expected value of savings on the wholesale only components of energy prices as a result of energy efficiency improvements.
6. The 'lifetime residential cost savings' refer to the proportion of the total energy cost savings that remain in the residential sector under each scenario (accounting for savings occurring in the non-residential sector).
7. The 'average participant lifetime payback' refers to the average time it will take residential and non-residential participants to recover capital costs associated with implementing a measure through energy bill savings.

8. *The 'ACT economy NPV' refers to the total value of the Scheme to the ACT economy in present value terms.*
9. *The 'ACT economy marginal abatement cost' takes into account the net 'societal cost' including costs to retailers and households in present value terms.*

Selection of preferred scenario

Inclusion of SMEs only

It is considered that expanding the EEIS to the SME sector is the best option for the ACT for a number of reasons.

Including SMEs will provide an opportunity to address significant barriers to the uptake of cost-effective energy efficiency activities among small business and community organisations that are not effectively targeted by other ACT or Commonwealth Government policies. Conversely, larger businesses and government are not considered to face the same barriers, such as with regard to available time, capital or specialist expertise, and are already targeted by a range of existing government policies.

Large commercial businesses are targeted by a range of Commonwealth initiatives such as the National Greenhouse and Energy Reporting Scheme (NGERS) and the Energy Efficiency Opportunities (EEO) program that have been in operation for several years. These programs work to increase transparency on energy use and costs, as well as energy efficiency opportunities, within business management. The Commonwealth's emissions trading scheme also, to an extent, addresses market externalities with regard to greenhouse gas emissions. In this context, the scope of market failures for large businesses is considered to be considerably less than those present in smaller businesses and non-government community organisations. Therefore, in keeping with the ACT Government's agreement to COAG's Complementarity Principles, the rationale for government intervention for large businesses is weaker compared to SMEs.

Both ACT and Commonwealth Government owned facilities and operations are covered by programs targeted at reducing GHG emissions and energy costs.

The Commonwealth's 2006 Energy Efficiency in Government Operations (EEGO) Policy has been in operation for a number of years, and seeks to address market and organisational failure for Government owned and rented property, primarily through agency reporting and minimum standards for new buildings and rental tenancies. The Commonwealth's presence in the ACT (representing an estimated 14% of total ACT energy consumption in 2013) means that the achievement of the ACT's energy efficiency and greenhouse gas abatement objectives will be influenced by the extent to which the Commonwealth's policies are effective over time.

The ACT Environmental Leasing Policy and Commonwealth Green Lease Policies are understood to have made a significant impact on the energy efficiency of new buildings in the ACT since their introduction. It is noteworthy, however, that the Commonwealth has exempted their agencies, as well as state and territory government agencies, from the significantly more stringent reporting and opportunity assessment obligation that have been imposed on Australian corporations of equivalent size. This can be expected to lessen the extent to which cost-effective energy efficiency opportunities in existing premises are identified and implemented over time, compared to private sector organisations with requirements under the NGERS and Energy Efficiency Opportunities policies. While this indicates that further work is required in Commonwealth buildings, the Commonwealth is considered capable of addressing these issues without the assistance of the ACT community.

The Carbon Neutral ACT Government Framework addresses the significant opportunity to improve energy efficiency in government operations with a goal for ACT Government operations to be carbon neutral by 2020. This commitment is supported by new information systems to collate and report on energy usage and identify opportunities for energy efficiency improvements. Specific

accountabilities will be created for ACT Government Directorates for effective energy management and carbon reduction. Significant capital funding has also been provided through a revolving loan fund for Directorates to access capital to implement energy savings projects.

In the above context, extending the EEIS to government and large commercial businesses is considered duplicative and an inefficient use of community resources.

A decision to extend the scheme to SMEs is also supported by modelling results that show that while differences between the scenarios modelled is small, expanding the EEIS to the SME sector achieves the highest net benefit for the ACT economy and presents the highest value for Scheme participants in terms of lifetime participant bill savings.

Definition of SME for eligible activity determination

A number of possible approaches exist to define an SME which would have different implications for the Scheme with regard to transparency, scope of participation and compliance verification.

The following definition has been developed that takes into consideration these factors and the rationale for excluding large commercial businesses and government from the Scheme. This definition sets out the principles for SME inclusion and is subject to final policy development:

An SME is an enterprise that occupies a premises that:

- *is not a residential premises³³;*
- *is not reportable under the National Greenhouse and Energy Reporting (NGER) Act;*
- *is not reportable under the Australian Government's Energy Efficiency in Government Operations (EEGO) Policy; and*
- *is not reportable under the Carbon Neutral ACT Government Framework*

Building on the existing reporting frameworks of NGERs, EEGO and CNF will provide a degree of certainty and transparency with regard to the extent to which facilities and consumers in non-residential sectors are eligible to participate. A building owner or tenant should be able to easily determine whether or not their premises is reportable under NGERs, EEGO or CNF as they themselves would be involved in the reporting.

Under this definition, it is anticipated that hospitality, small office, small trade and small industrial in the private and non government community organisation sectors will be able to participate in the EEIS in most instances.

National Greenhouse and Energy Reporting Scheme

There are two thresholds which may require a corporation to report under the NGER Act: facility thresholds and corporate group thresholds. The facility and corporate thresholds for the 2010-11 reporting year (the third reporting year under the NGER Act), onwards are³⁴:

³³ A residential premises has been defined in the EEIS Eligible Activity Determination as meaning:

a building or part of building located in the Australian Capital Territory and classified under Part A3 of the Building Code of Australia as a class 1 building, a class 10a building associated with a class 1 building, a sole occupancy unit in a class 2 building, or a class 4 building, or is a transportable home or vehicle designed for habitation that is not used for short-stay or holiday accommodation, but is not a new residential premises;

Facility

- 25 kilotonnes (kt) or more of greenhouse gases (carbon dioxide equivalence (CO₂-e)); or
- production of 100 terajoules (TJ) or more of energy; or
- consumption of 100 TJ or more of energy.

Corporate group

- 50 kt or more of greenhouse gases (CO₂-e); or
- production of 200 TJ or more of energy; or
- consumption of 200 TJ or more of energy.

Facilities that are reportable under NGERs in the ACT are typically mid-sized office buildings and large retail chains, such as supermarkets, that are reportable as a result of aggregate energy consumption (for all sites nationally) exceeding the corporate group threshold. It is important to note that under NGERs a tenancy that occupies a building where base-building services are reportable under NGERs may still be able to participate in the Scheme for their tenancy light and power. Conversely, a tenancy that is part of a corporate group that is reportable under NGERs would not be able to participate, regardless of whether base building services are reportable or not.

A small number of sites in the ACT may exceed the facility threshold, noting that Commonwealth agency and ACT Government sites are exempt from NGERs. Facilities could include university campuses and private health care facilities.

The Clean Energy Regulator is required to publish data reported under NGERs each year and information is available online³⁵.

Australian Government's Energy Efficiency in Government Operations (EEGO) Policy

The EEGO policy applies to all Australian Government agencies covered by the *Financial Management and Accountability Act 1997* and all agencies and statutory bodies covered by the *Commonwealth Authorities and Companies Act 1997* whose operations are substantially budget-dependent. Budget dependent agencies are defined as deriving more than half of departmental/agency funds either directly or indirectly from the Commonwealth.³⁶

Like NGERs, a reportable facility under EEGO may be a base building or a tenancy. Under the proposal to include SMEs in the EEIS, it is intended that a private tenancy that does not report its energy usage under EEGO but that occupies a Commonwealth owned building, would be able to participate in the Scheme. Conversely a building owner, which has a Commonwealth tenant, would

³⁴ Clean Energy Regulator, 2012, National Greenhouse and Energy Reporting – thresholds, <http://www.cleanenergyregulator.gov.au/National-Greenhouse-and-Energy-Reporting/steps-for-reporting-corporations/NGER-reporting-step-1/Pages/default.aspx>

³⁵ Clean Energy Regulator, 2013, *National Greenhouse and Energy Reporting*, <http://www.cleanenergyregulator.gov.au/National-Greenhouse-and-Energy-Reporting/Pages/default.aspx>

³⁶ Australian Government, 2012, *Government Greenhouse Energy Reporting* <http://www.climatechange.gov.au/government/initiatives/eego/government-energy-use-reporting.aspx>

be able to participate in the Scheme in relation to their other tenants or their base-building energy consumption.

Carbon Neutral ACT Government Framework

The Carbon Neutral Government Framework applies to those budget-dependant, administrative units defined in the Annual Report Directions, and covered under the *Annual Reports (Government Agencies) Act 2004*, for which the ACT Government has operational control. Operational control is defined as the authority to introduce and implement any or all of the operating, health and safety and environmental policies for the facility, which is consistent with definitions in the NGER Act. The Framework excludes independent entities, for example ACTEW and ACTAB.

Tenancies reportable under the Carbon Neutral ACT Government Framework include:

- All ACT Government tenanted sites (where the Government pays energy bills)
- All ACT Government owned and occupied buildings (where the Government pays base building services bills)

Energy used by tenants that are not ACT Government (i.e. commercial or not for profit) in Government owned buildings will not be reportable under the Framework. It is deemed that the Government does not have operational control of these entities.

Actions to improve the energy efficiency (in particular base building upgrades) of privately tenanted, Government owned, buildings may be deemed eligible for loan funding under the Carbon Neutral ACT Government Fund.

Selected scenario detailed analysis

Stakeholder participation

The inclusion of the SME sector in the EEIS under the selected scenario is expected to have an impact on the following key stakeholders:

- Household energy customers – will voluntarily participate in energy saving activities and absorb a proportion of pass-through costs, while the total energy savings in this sector will decrease depending on the overall participation by SMEs;
- ACT SMEs (including non-government community organisations) – may voluntarily participate in energy saving activities and receive financial benefits whilst also absorbing a proportion of pass-through costs;
- ACT large commercial sector – faces pass-through costs, without a corresponding opportunity to benefit from the Scheme;
- Electricity retailers – will have a more diverse group in which to target energy savings to meet their obligation under the Scheme. Tier 2 retailers with only business customers may undertake activities rather than pay the EEIS contribution fee. This may reduce the cost of compliance with the Scheme for retailers;
- Energy efficiency service providers and associated trades – the distribution of benefits created in this sector may not be even, with some small businesses and trades benefiting more from the Scheme than others, depending on how electricity retailers participate in the market for these services. A clear net benefit for this sector will exist, however, as a result of the Scheme;
- Commonwealth Government – faces pass-through costs, without a corresponding opportunity to benefit from the Scheme; and
- ACT Government – faces pass-through costs, without a corresponding opportunity to benefit from the Scheme. Administers the Scheme.

Electricity price impacts

It is expected that a key impact of the expansion of the EEIS will be a modest reduction in electricity price increases associated with the Scheme over time.

Electricity retailers participating in the Scheme are expected to pass-through a proportion of their compliance costs to government, business and residential electricity customers through electricity bills. For modelling purposes this proportion is assumed to be 100 per cent.

Table 3 shows that the average projected increase in electricity cost per MWh under the selected scenario is \$3.62/MWh. This represents an average 6.2% reduction compared to the original EEIS that only includes the residential sector.

Table 3: Modelled electricity price increase

Scheme period	Original EEIS (Residential only) \$/MWh ⁽¹⁾	Expanded EEIS (Residential and SMEs) \$/MWh ⁽¹⁾	Change from residential only EEIS ⁽²⁾ %
1 January 2013 to 31 December 2013	\$2.71	\$2.54	-6.3
1 January 2014 to 31 December 2014	\$4.42	\$4.15	-6.1
1 January 2015 to 31 December 2015	\$4.45	\$4.17	-6.3
Average	\$3.86	\$3.62	-6.2

1. *These changes are from business as usual price forecasts for each year and are not cumulative.*
2. *The change from the residential only EEIS is based on the new scheme modelling undertaken, not the original modelling undertaken to inform the development of the EEIS.*

Unlike total Scheme costs, which include varying levels of household and retailer co-funding, the costs to suppliers, and therefore the pass-through costs, include only the subsidy component, plus administration costs.

How these changes translate to estimated impacts on households and businesses is discussed in further detail below.

Modelled versus likely costs and benefits

It is important to note that financial and environmental benefits associated with the Scheme are likely to differ from the modelling. The modelling assumes a 100 per cent participation rate by retailers and a 100 per cent pass-through of estimated compliance costs. Estimated energy savings must be discounted from the modelled amounts to reflect that 15% of the targets are expected to be met by Tier 2 retailers paying an Energy Savings Contribution, rather than undertaking activities. This discounting has been applied in assessing the cost of living impacts associated with the Scheme changes.

In **Table 4**, household price impacts assume average electricity usage of 8MWh/year and savings assume that all ACT households will participate in the Scheme and receive an equal share of the savings. In reality, it is likely that some households will not participate and that savings in participating households will be influenced by the energy saving activities they undertake and their individual household characteristics.

In addition, analysis undertaken for Action Plan 2 indicates that ACT household energy consumption can be expected to decline over the coming decade. This will result in a corresponding reduction in Scheme costs, especially if the operation of the EEIS is extended beyond 2015, as retailer targets are established in relation to ACT electricity consumption.

Household costs and benefits of SME inclusion

The impacts of the original EEIS (covering residential measures only), and the proposed expansion of the EEIS (covering SME measures in addition to residential measures), have been assessed and the difference calculated, shown in **Table 4**. The net household saving impact is calculated based on the expected pass through per MWh to an average household bill (based on an annual consumption of 8MWh) and the potential electricity and gas cost savings resulting from the implementation of measures under the EEIS, divided by the number of households. Savings are based only on savings on the wholesale energy and related variable energy cost components.

While an EEIS expanded to SMEs decreases overall savings in the residential sector by around 6 per cent, it is anticipated that households will be net beneficiaries of a Scheme expanded to the SME sector. In particular, the expansion to include SMEs does not reduce the EEIS Priority Household Target for Tier 1 retailers. As a result, low-income households will continue to benefit disproportionately as a result of the Scheme and will not be greatly affected by the Scheme expansion.

Table 4: Estimated costs and benefits for the residential sector as a result of expanding the EEIS

Lifetime impact in residential sector ⁽¹⁾	Total pass-through cost impacts \$M	Lifetime pass-through cost for average household use of 8MWh	Total energy cost savings (gross) \$M	Total energy cost savings (net) \$M	Average household energy cost savings (gross) \$	Average household energy cost savings (net) \$
Original Residential Only Scenario	\$13	\$93	\$134	\$121	\$915	\$822
New Residential and SME Scenario	\$12	\$87	\$126	\$114	\$862	\$775
% change for households from original EEIS	- 6.2%	- 6.2%	- 5.8%	- 5.7%	- 5.8%	- 5.7%

1. While pass-through costs will cease with the end of the EEIS in 2015, savings from the implementation of measures will accrue over the lifetime of implemented measures. Costs and savings as nominal (not discounted for inflation).

Cost of living impact

When considering the impact of the EEIS generally, and specifically the expansion of the Scheme to SMEs, it is useful to assess the impact of the Scheme on the range of households with different incomes in the ACT. This is consistent with commitments made in AP2 regarding the need to assess the impact of Actions on low-income households, to ensure that climate change measures do not decrease social equity or adversely impact the welfare of vulnerable groups in society.

Generally, the cost of living impacts associated with the proposed scheme changes are very small and are within expected error margins for modelling of this type.

An analysis of the change between cost of living impacts as a result of expanding the EEIS to the SME sector between the 2012-13 and 2016-17 financial years, shows that the highest increase in the cost of living impact is on the medium and high income quintiles. These quintiles can expect their net savings to decrease from \$67.30 to \$62.70 in the 2016-17 financial year as a result of expanding the EEIS.

The modelling indicates that while the overall savings in the residential sector decline, the pass-through costs also decline meaning that all households, especially those households that do not participate by undertaking energy saving activities, will receive some benefits from the expansion of the EEIS to the non-residential sector.

It is important to note that due to the design of the Scheme, which requires that 25 per cent of total energy savings be achieved in priority households, the net benefits for the lowest income quintile are preserved or enhanced when expanding the EEIS to the SME sector. This is because of the combined effect of reduced pass-through costs while maintaining energy cost savings.

Business costs and benefits

Estimated average costs and benefits for business are more difficult to determine than in the residential sector due to the significant differences in the nature and extent of energy use between different businesses. The total pass-through costs and energy cost savings (on the wholesale only components of energy prices) for the SME sector are shown in **Table 5**.

In line with the expected lower average pass-through cost of \$3.62/MWh associated with the expansion of the EEIS to the SME sector, the pass-through costs in the SME sector are expected decrease in the order of \$1M. All businesses in the Territory will benefit from potentially reduced pass-through costs associated with the Scheme.

Table 5 shows that in the original (residential-only Scheme), SMEs were net funders of the scheme to the tune of \$9 million over the life of the Scheme without a corresponding opportunity to benefit from resulting energy savings. Based on the assumptions inherent in the modelling, including SMEs in the Scheme will result in benefits to SMEs of around \$7 million reducing the net Scheme cost to SMEs to \$2 million. Actual net costs or benefits to SMEs will depend upon the extent of their participation in the Scheme.

Table 5: Estimated costs and benefits for the SME sector as a result of expanding the EEIS

Lifetime impact SMEs	Total pass-through cost impacts \$M	Total energy cost savings (gross) \$M	Total energy cost savings (net) \$M
Original Residential Only Scenario	\$9	\$0	-\$9
New Residential and SME Scenario	\$8	\$7	-\$2

While organisations that are eligible under the proposed definition of an SME will be able to participate and benefit from energy saving activities available under the EEIS, larger businesses will not and will bear pass-through costs without an opportunity to benefit. Examples of gross costs and savings that may be expected for different types of businesses are provided in **Table 6**. Flow-through costs for electricity spends of \$1,000 and \$10,000 assumes franchise electricity contract rates apply. Flow-through costs for electricity spends of \$100,000 and \$1,000,000 assumes large electricity contract rates apply.

Table 6: Pass-through cost impacts for a range of business energy users (not discounted)

Business Size	Small	Medium	Medium	Large
Example	Home business	Lease of single office floor	Large retail or restaurant	Large shopping centre or supermarket
Annual electricity spend \$ p.a. >	\$1,000	\$10,000	\$100,000	\$1,000,000
2013	\$12.70	\$127	\$1,426	\$14,264
2014	\$19.87	\$199	\$2,213	\$22,128
2015	\$18.81	\$188	\$2,091	\$20,911
Total	\$51.39	\$514	\$5,730	\$57,302

Impact on service provider sector

It is anticipated that the industry sector delivering energy efficiency activities will grow to meet the increased demand created by the EEIS, however, it is difficult to predict the extent of this growth. While including business measures under the EEIS is not expected to increase the overall demand created by the EEIS, it may have the effect of further diversifying the range of services delivered by the industry sector. This could lead to a situation where further resources and expertise beyond those currently available in the ACT are required.

Impact on Scheme Administrator

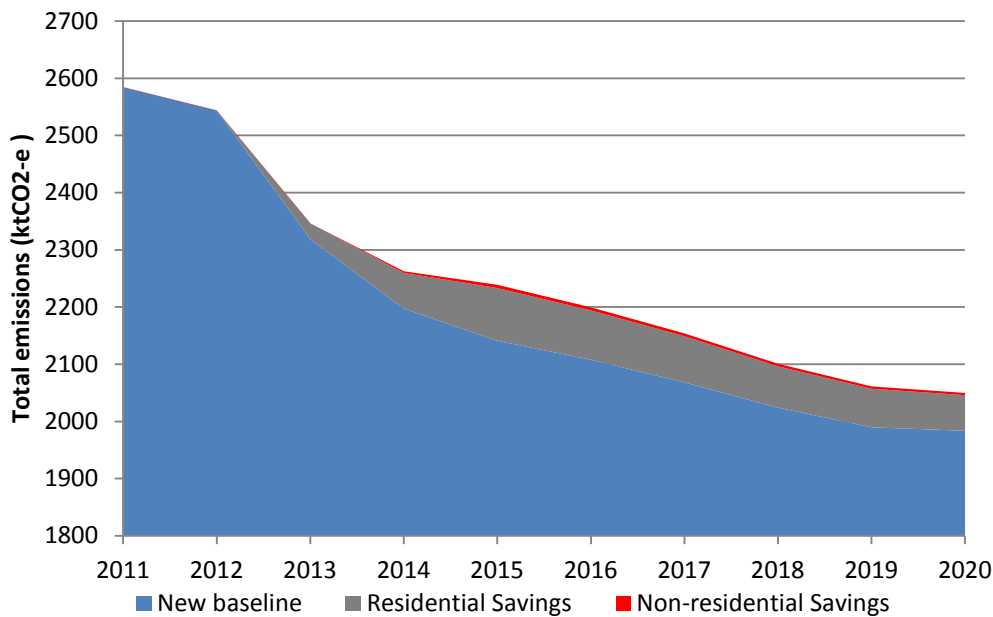
While diversification of this industry may be positive for the ACT economy in the long term, the conduct of retailers, businesses and individuals implementing energy efficiency measures creates inherent risks to property, life and the environment. These risks must be carefully managed, and it is proposed that an increase in energy efficiency activities provided for under the Scheme should be accompanied by an appropriate regime of technical inspection and the development of new training or other educational material for providers and consumers.

This is likely to require resources beyond those currently provided for in funding of the Scheme Administrator.

Greenhouse gas reductions

The non-residential sector is responsible for a greater proportion of total greenhouse gas emissions than the residential sector in the ACT. The modelling indicates, however, that the bulk of savings achieved by the EEIS when expanded to the SME sector remain in the residential sector, as shown in **Figure 3**. Note savings assume full retailer participation and are not discounted for Tier 2 retailers paying a contribution rather than undertaking energy saving activities.

Figure 3: Emission abatement by sector



It is important to note that these savings will not be considered additional under a national emissions trading scheme. The EEIS will, however, remain complementary to the carbon price, in line with the GOAG Complementarity Principles, by reducing the cost of emissions abatement both in the ACT and nationally.

Sensitivity analysis

All modelling is inherently sensitive to changes in key input parameters and assumptions. In particular, projected future energy prices, the bill savings multiplier used, projected retailer market shares and the discount rates used to calculate Net Present Value (NPV) have an impact on the modelled outcomes.

Table 7 demonstrates the change in estimated NPV for an expanded EEIS when the discount rate applied is varied.

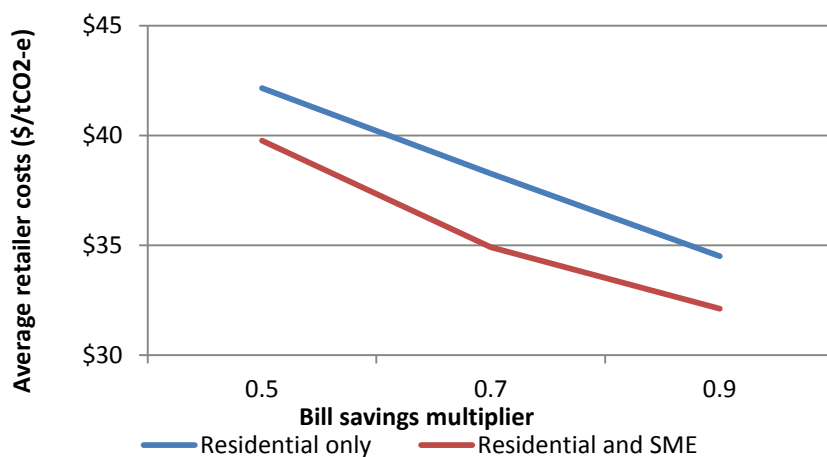
Table 7: Discount rate sensitivity analysis – residential and SME sectors included

Discount rate	NPV (\$M)
7%	53.7
9.5%	42.0
12%	32.7

Figure 4 shows the impact of the bill savings multiplier. The bill savings multiplier defines the bill savings that a household or business will consider, in addition to a cash incentive provided by a retailer, when deciding whether to undertake an activity. For example, if the bill savings multiplier is 0.7, the household or business will take into account savings from the first 0.7 years of the activity. As the multiplier is increased, the incentive offered by the bill savings, and perceived by participants, increases and so less incentive needs to be offered by the obligated retailers.

While changes in the bill savings multiplier do not impact the overall costs of the Scheme, they change the allocation of cost between participants and retailers, and therefore costs passed on to electricity consumers as a result of the Scheme.

Figure 4: Effect of the bill savings multiplier on the scheme cost



The changing market share of the single Tier 1 retailer in the ACT, ActewAGL Retail, also has implications for the amount of abatement achieved in the ACT as a direct result of retailers undertaking energy saving activities. The modelling assumes 100% participation when calculating the

uptake of measures required to meet the target and the associated cost. In reality this outcome is unlikely to be met as Tier 2 retailers have an opportunity to pay a simplified contribution fee (at the calculated average cost of abatement for a Tier 1 retailer) rather than undertaking activities. It is expected that this would have the net effect of making the costs conservative, as reduced participation by Tier 2 retailers would result in more cost-effective opportunities being available to ActewAGL Retail.

While changes in market share are not material to the merits of extending the Scheme to SMEs, they do have the potential to influence the overall scale of the Scheme, including resulting costs and benefits, and emissions reductions.

Assuming that all Tier 2 retailers elect to pay the Energy Savings Contribution, rather than undertaking activities, the actual targeted abatement resulting in a changing market share for ActewAGL is provided in **Table 8**.

Table 8: Changing market share sensitivity analysis

ActewAGL market share	GHG abatement directly achieved (ktCO ₂ -e)
85	756
75	667
65	578

The results of this analysis indicate that, while the modelling is sensitive to changes in key input parameters and assumptions, in no instance do the net benefits of the Scheme become negative. There are also no implications of this analysis for the decision as to whether to extend the EEIS to SMEs as the relative merits of extending the Scheme are maintained in all instances.

Changes required to expand EEIS to the SME sector

Key Scheme parameters

As a result of increasing the overall opportunity for low-cost abatement activities, it is anticipated that expanding the EEIS to the SME sector could reduce the average cost of compliance for retailers. As such, expanding the EEIS to the SME sector has the potential to impact on a number of key parameters of the Scheme that were set based on the original modelled costs.

Penalties

The penalty for a retailer not achieving its Energy Savings Target or Priority Household Target in a compliance period is set in the *Act* at \$70 per tonne of CO₂-e. This was set to be slightly higher than the expected maximum amount a retailer would pay per tonne of CO₂-e abated (originally modelled at \$60 per tonne of CO₂-e) and is consistent with the penalties under the South Australian Residential Energy Efficiency Scheme.

Under the modelled expansion of the EEIS to the SME sector, it is anticipated that the maximum cost a retailer would pay per tonne of CO₂-e abated is \$41.48/tonne of CO₂-e. However, it is proposed that the penalty remain fixed at \$70 in the first instance, thereby maintaining the strong incentive for retailers to meet their targets.

There may be an opportunity to adjust the penalty following the review of the operation of the EEIS commencing in 2014 and the experienced rate and cost of compliance.

Energy Savings Contribution

Smaller Tier 2 retailers are able to pay an Energy Savings Contribution (ESC) to meet their obligation under the EEIS. This recognises the increased difficulty for smaller retailers to deliver energy savings in the ACT.

The ESC is set by the Minister by Disallowable Instrument to the Act and is currently set at \$37 per tonne CO₂-e. This is based on the originally modelled expected average cost of compliance for a larger, Tier 1 retailer. The newly modelled average cost of compliance is \$35.72 per tonne CO₂-e.

It is acknowledged that there is some degree of uncertainty around this figure, as it is difficult to predict how the market will respond and the innovative solutions retailers and service providers may develop. Further, this represents the expected average cost across the three compliance years of the EEIS and it is acknowledged that the actual cost of abatement from year to year may change. It is therefore proposed that the contribution remain fixed at \$37/tonne in the first instance to maintain the price signal currently given to retailers. Adjustment of this value should be considered following the review of the operation of the EEIS and any changes to efficient pass-through costs for ActewAGL granted by the ACT Independent Competition and Regulatory Commission (ICRC).

Timing for the inclusion of measures and changes required

The modelling considered the expansion of the EEIS through the expansion of existing (and planned) residential eligible activities to the non-residential sector as well as the inclusion of activities specific to the non-residential sector. This is in line with the approach taken under the Victorian Energy Efficiency Target (VEET) scheme.

A list of residential activities to be expanded to SMEs, as well as new SME activities to be included, is provided in *Appendix A – Summary of Eligible Activities*.

As per the expansion of the VEET scheme to SMEs, it is proposed that the same requirements and abatement factors for residential activities be applied to these activities when undertaken in the business sector in the ACT.

While the inclusion of the business sector has been modelled from 1 January 2014, it is recommended that the existing residential measures (and those scheduled for inclusion) be extended to the business sector from 1 July 2013. This provides retailers, business and industry with greater certainty and ensures adequate lead time to prepare for implementation of these measures and ensures businesses are able to benefit from the scheme as early as possible. It is not anticipated that significant changes will be required to accommodate these alterations, and that these activities can be expanded within the existing resources of the Administrator, noting that increased activity by Tier 2 retailers and in a new sector may increase work (by an unknown degree) for the Administrator in the future.

It is recommended that the remaining business specific activities be included under the EEIS from 1 January 2014. This will allow adequate time for the development of specific activity requirements suitable to the ACT and to settle any health, safety and environment requirements.

The inclusion of activities within the identified timeframes would be subject to the following considerations made by the Scheme Administrator:

- Further detailed risk assessment;
- The capacity of the Administrator to deliver and monitor activities;
- Reprioritisation of inclusion based on consultation with retailers about their interest in undertaking identified activities; and
- Developments in other jurisdictions.

It should be noted that the eligible activities included under the EEIS are not fixed. The emergence of new or improved information on the performance of products, or of consumer behaviour, will influence the consideration of including new activities in the Scheme – including a capacity for suppliers to propose project-based measures if this proves to be cost-effective for them. While the ACT will build on Victoria's included measures, the ACT will also have the flexibility to adopt measures based on its own assessment processes, with the Minister able to approve activities by Disallowable Instrument.

Future consideration of expanding the EEIS target

There may be an opportunity in the future to expand the Scheme abatement targets in line with the increased scope of opportunity for savings when expanding the Scheme to the SME sector.

Table 9 shows how the economic abatement potential increases as more sectors are included for a constant cap on the incentive of \$54.05 per tonne CO₂-e. This cap represents the maximum incentive that can be paid to achieve the reduction in emissions. As expected, the abatement increases as the scope of the Scheme is expanded.

It is not recommended, however, that the target be expanded at this stage in recognition of the Scheme’s infancy and the lead time that is required for retailers to prepare to meet their targets. It is recommended, however, that the expansion of the EEIS target in the future be considered during the Scheme review commencing in 2014.

Table 9: Impact of scheme size on abatement

Scenario	Lifetime abatement potential (tCO ₂ -e)
Residential only	889
Residential and SME	943
Residential, SME and large commercial	1037
Residential and all business	1080
All sectors included	1196

Appendix A – Summary of Eligible Activities

Existing eligible activities in the residential sector – to be extended to business by 1 July 2013

	Residential Activity	Expand to business by 1 July 2013
Building Envelope Activities	Seal external doors	No ¹
	Seal external windows	
	Decommission ceiling or wall exhaust fan and installing a self-sealing ceiling or wall exhaust fan	
	Seal exhaust fan	
	Seal ventilation openings in an external wall	
	Install a closable damper or flap in the chimney or flue of a solid fuel burning appliance	
	Thermally efficient window replacement	
	Thermally efficient window retrofit	
	Install lined block-out curtains or equivalent	
	Install window pelmets	
Space Heating and Cooling Activities	Decommission ducted gas heater and install high efficiency equivalent	Yes
	Decommission central electric and install high efficiency ducted gas heater	Yes
	Install gas/LPG space heater	Yes
	Install a high efficiency ducted gas heater in new residential premises	No ²
	Install insulating gas heating ductwork	Yes
Hot Water Service Activities	Decommission electric water heater and install gas/LPG storage water heater	Yes
	Decommission electric water heater and install gas/LPG instantaneous water heater	Yes
	Decommission electric water heater and install gas/LPG boosted solar water heater	Yes

	Residential Activity	Expand to business by 1 July 2013
	Decommission gas/LPG water heater and install gas/LPG boosted solar water heater	Yes
	Replace an existing shower fixture outlet with a low flow shower fixture outlet	Yes
	Hot water tap improvements	Yes
Lighting Activities	Install low energy GSL lamp	Yes
	Install low energy reflector lamp	Yes
	Install low energy lamp in place of an existing 12 volt halogen	Yes
	Install a mains voltage low energy down light	Yes
Appliance Activities	Retirement of pre-96 refrigerator	Yes
	Purchase HE chest freezer	Yes
	Purchase HE upright freezer	Yes
	Purchase HE single door refrigerator	Yes
	Purchase HE two door refrigerator	Yes
	Install HE electric clothes dryer	Yes
	Install HE gas clothes dryer	Yes
	Install a Standby Power Controller (SPC) for IT equipment	Yes
	Install a SPC for AV equipment	Yes
	Purchase HE television	Yes
	Install HE pool pump	Yes

1. This activity is not included under the VEET Scheme in the business sector and is not considered necessary for the business sector in the ACT at this time, however, this activity may be considered for inclusion in the business sector at a later date.
2. This activity is not considered necessary for the business sector in the ACT, noting uptake is expected to be low and there may be administrative difficulties associated with including it under the EEIS. This activity may be considered for inclusion in the business sector at a later date.

Activities to be considered for inclusion under the EEIS

Note:

The timing and inclusion of all activities below is subject to further detailed risk assessment and the resources available to the Administrator to develop and regulate the delivery of these activities. All activities may be reprioritised for inclusion based on consultation with retailers and their interest in undertaking identified activities.

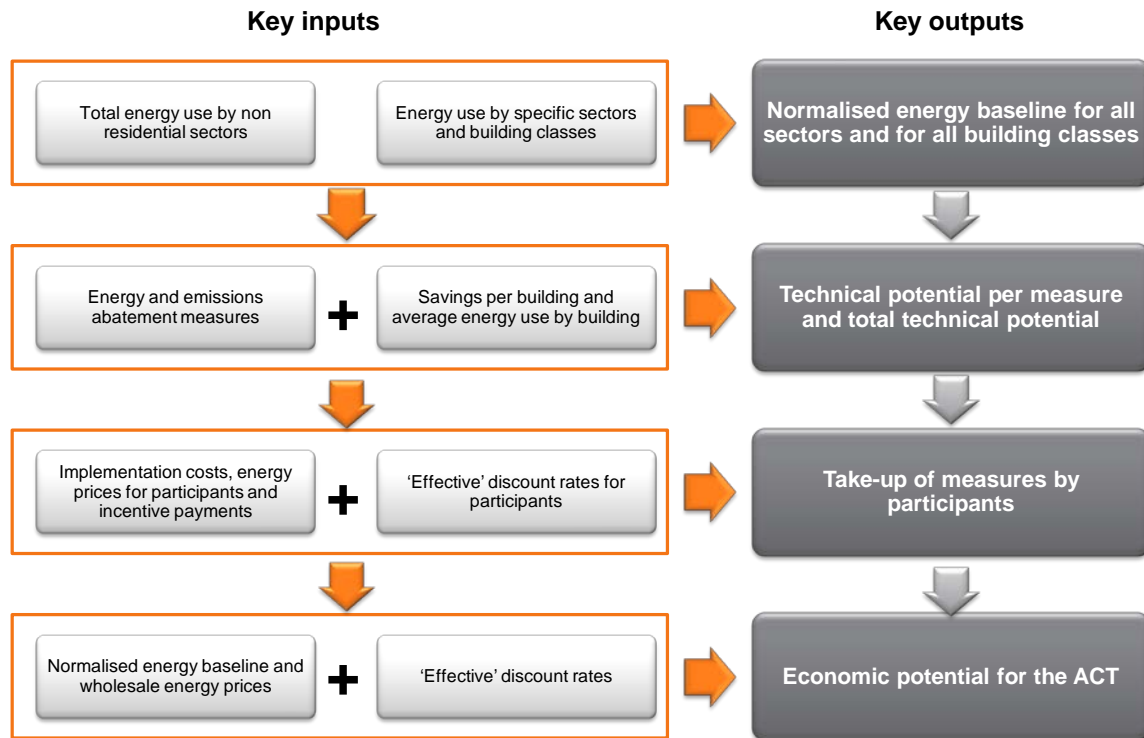
		Residential	Business
Building Envelope Activities	Install ceiling insulation	Yes	No ¹
	Install under floor insulation	Yes	No ¹
Space Heating and Cooling Activities	Decommission existing ducted air to air heat pump and install HE equivalent	Yes	Yes
	Decommission central electric and install HE ducted air to air heat pump	Yes	Yes
	Install space air to air heat pump	Yes	Yes
	Decommission a refrigerative AC and install a ducted evaporative cooler	Yes	Yes
Hot Water Service Activities	Decommission electric water heater and install electric boosted solar	Yes	Yes
	Decommission electric water heater and install heat pump water heater	Yes	Yes
	Install solar retrofit kit to existing electric water heater	Yes	Yes
	Install solar pre-heater to existing gas/LPG water heater	Yes	Yes
Motors	Replacing electric motor with high efficiency motor	No	Yes
Refrigerated Display Cabinets	Replacing refrigerated display cabinet with high efficiency unit	No	Yes
Refrigeration Fans	Replacing refrigeration fan and motor with high efficiency fan and motor	No	Yes
Commercial Lighting Upgrades	Undertaking a commercial lighting upgrade	No	Yes
Other	Energy savings achieved under an Energy Performance Contract	No	TBA ²

1. This activity is not included under the VEET Scheme in the business sector and is not considered necessary for the business sector in the ACT at this time, however, this activity may be considered for inclusion in the ACT SME sector at a later date.
2. Subject to further analysis, developments in other jurisdictions, the work required to implement the measure and the capacity of the Administrator to deliver the activity. This activity is not included under VEET.

Appendix B – Summary of Modelling Approach

Work was undertaken by Energetics to model the expansion of the EEIS to the business sector. Figure 5 provides an overview the modelling approach taken by Energetics’.

Figure 5: Overview of EEIS model



An underlying requirement of the model is the energy baseline, which describes the energy used by the various target sectors. The baseline must also account for the consumption by the various classes of buildings in each sector. The requirement to consider building classes emerges from the definition of the energy saving measures, which are specified in terms of building class. Details of the energy saving measures include the savings that are achieved for each instance of the measure, the cost to implement the measure and the technical potential³⁷ of the measure. Finally, the model needs energy cost data both for the end-users participating to the Scheme and for the ACT.

The following section describes the development of the energy baseline for the model. This is followed by a discussion of the energy saving measures.

Energy baseline for the modelling of the Scheme

The energy saving measures used in the model are taken from the modelling process for a national ESI and defined in terms of the classes of buildings they apply to. It was therefore necessary to

³⁷ Technical potential: estimate of potential energy savings based on the assumption that all existing appliances, equipment, and processes are replaced with the most efficient commercially available units, without consideration of the cost effectiveness of the measure.

disaggregate total business energy use by energy used in each of the building classes within each of the business sectors. Work undertaken to inform the national ESI provided a robust dataset to disaggregate the ACT Climate Change Action Plan 2 energy baseline into energy use by different building types. The process used to develop the final baseline is described in **Table 10**.

Table 10: Construction of the energy baseline

Step	Comments
<p>Normalise the energy use breakup by building class for the ACT</p>	<p>The commercial building data for the modelling of the national ESI³⁸ included a breakup of the energy use in the ACT by building class. The total consumption in the ESI data differed from the total energy consumption deemed to be the ACT baseline. The normalisation step adjusted the ESI consumption by building type so that the total matched the deemed baseline.</p>
<p>Define the energy consumption breakup by building class for certain key energy users in the ACT</p>	<p>The modelling of the EEIS was to consider inclusion or exclusion of the ACT Government facilities, buildings occupied by the Commonwealth Government including the Defence facilities, ACTEW Water and the Australian National University (ANU). The consumption for these various users was apportioned to the various building classes. In most cases, energy consumed by the key energy users within the ACT was known. The exception was the Commonwealth Government (excluding Defence) and here the energy used by the Commonwealth in the ACT was determined by apportioning the total energy use according to the percentage of Commonwealth employees who are working in the ACT.</p>
<p>Determine the residual energy used by the large commercial and SME sectors</p>	<p>The energy used by the various building classes in the large commercial and SME sectors was found by deducting the energy used by the different buildings in the key sectors from the normalised baseline. Because of the way that the ESI dataset was defined, energy used for tenant light and power by the key energy users was deducted from the SME energy use in the baseline.</p>
<p>Determine the number of notional buildings or sites</p>	<p>As the energy saving measures to be modelled define savings and costs as a function of the energy used by a nominal building, an estimate of the number of nominal buildings was required. The ESI dataset included the average energy use by the notional buildings and these average figures were used to calculate the number of notional buildings.</p>

Where required, consumption values were extrapolated based on the average growth in energy use for non-residential customers used in the ACT Climate Change Action Plan 2 over this period, by applying historical compound annual growth figures.

A summary of the ACT non-residential baseline as used in the modelling is provided below in **Table 11**.

³⁸ Australian Government, 2013, *Energy Savings Initiative – Reports*, <http://www.climatechange.gov.au/government/initiatives/energy-savings-initiative/reports.aspx>.

Table 11: ACT non-residential energy use baseline

	Electricity Use (TJ/yr)	Gas Use (TJ/yr)	Average electricity use per site (GJ/yr)	Average gas use per site (GJ/yr)	Number of nominal sites
Government	2003.5	591.7	214081	125393	1482.7
Large office	455.7	177	37908	20343	24
Shopping Centre	110.4	0.6	9824	54	11.2
Large retail (R)	143.6	11.5	12384	994	11.6
Large retail (NR)	50.3	4	6869	551	7.3
CBD Hotel	25.5	44.5	19580	34087	1.3
Warehouse (NR)	72	0	11380	0	6.3
Hospital	28.6	62.6	30524	66867	0.9
University / TAFE	369.3	196	98468	41757	7.5
School	57	8.9	3762	537	15.1
Hospitality	255.5	188.7	572	28799	446.6
Small office	1698.8	353	878	35931	3869.8
Small trade	326.5	353.6	169	35985	1932.1
SME Industrial	205.3	185	1440	8333	142.6
TOTAL non-residential	5802	2177.1	447839	399631	7959

Notes:

1. The number of nominal sites for a class of buildings was derived by dividing the energy used by the average consumption of that building class in Australia. Because commercial buildings in the ACT are generally smaller than the corresponding building types elsewhere in Australia, it means that the number of nominal sites will be smaller than the number of actual sites. However, as the savings and cost of the measures relate to the characteristics of nominal sites (as defined in the national ESI modelling), these should be used to establish the technical potential.
2. Large retail (R) refers to a standalone refrigerated retail outlet such as a supermarket. Large retail (NR) refers to a standalone non refrigerated retail outlet such as a bulky goods retailer.
3. Hospitality, small office, small trade and SME Industrial are the building classes for the notional SME sector. The others belong to the large commercial sector.

Abatement measures for the modelling of the Scheme

Central to the modelling of the whole abatement scheme is the modelling of each measure. The national ESI modelling data provided a comprehensive set of abatement measures applicable to the commercial and SME building types identified in the baseline. These measures were used in the modelling of the EEIS extension, adjusting a number of key parameters to be suitable to the ACT. The key parameters that define each measure are listed in Table 12.

A brief overview of the modelling steps of each measure follows.

1. Assess the savings for each fuel energy type due to a single instance of the measure. This includes the application of a possible annual decay of savings relative to the initial savings.
2. Determine the year by year take-up of the measure. This requires the calculation of the energy savings and the value of the incentive payment. The latter is derived from the expected lifetime abatement and the incentive payment per tonne of abatement. The payment per tonne is capped so that the total incentive does not exceed the cost of implementation. Once the total incentive is known (the sum of the incentive payment and the bill savings) the take-up can be calculated from a predefined take-up curve.
3. Once the year by year take-up is known, the year by year total energy, cost and emission savings are calculated. Adding in the implementation cost allows for the calculation of the net cash flow of the measure from the perspective of the ACT.
4. Finally, the overall outcomes of the measure are calculated. These include the net present value (NPV), the lifetime abatement and the average abatement cost.

Table 12: Parameters that define abatement measures

Key parameter	Details
Size of opportunity (units)	This is the (annual) technical potential for the opportunity. This depends upon the available building stock that the measure can apply to and where the measure has not yet been applied.
Units	The unit of measure of the abatement measure. The capital cost, technical potential and savings must be measured in terms of 'Units'.
Energy prices	Defines the energy prices that apply to the measure. Energy cost savings are included in the financial analysis and so need to be defined for each measure and customer segment. Residential and SME customers were assumed to be on franchise rates and all others were assumed to be on typical contract rates.
Maximum annual uptake rate (% of size of opportunity)	This can be defined by some fraction of the available stock of buildings or equipment when the measure involves replacing or upgrading equipment prior to the end of its life, or by the annual sales of equipment. An example of the former is upgrading building insulation and an example of the latter is installing a high efficiency appliance rather than a MEPS compliant appliance.
Lifetime of abatement savings (years)	Estimate of a particular investment's useful life i.e. the expected duration of the savings from the measure.
Installed cost (\$/unit)	This is the capital cost of the measure, and is the cost to implement one unit of the measure.
Energy savings (MJ/unit p.a.)	The savings in fuel or electricity due to the implementation of one unit of the measure. Note that savings can be negative in the case of fuel switching.
First year's savings included in incentive (years)	This accounts for the payback that participants (and particularly participants from the business sector) expect from implementing a measure. Work done for the modelling of the ESI showed that the maximum payback period for energy efficiency measures in businesses is around three years.

Take-up curve

Gives the percentage of the maximum potential take up in any year that will be taken up given the financial return. The latter is modelled as a percentage of the capital cost that is covered by the incentive and the energy cost savings.

The work described by this report considered the modelling of an abatement scheme. This is a separate exercise from the definition of the abatement scheme, and the measures used for the modelling are not necessarily the same as those included in the scheme when it is implemented. Factors that need to be taken into account when selecting measures for implementation include the ease of clearly defining the measure and the existence of suitable standards to establish a correct implementation of the measure. The measures proposed for inclusion under the EEIS in the business sector are outlined in *Appendix A – Summary of Eligible Activities*. The measures broadly cover the same energy saving opportunities.

Describing the Scheme

Energetics modelled the EEIS across the combined residential and non-residential sectors using the fixed abatement target of 889,040 tonnes of CO₂-e over the life of measures incentivised by the Scheme.

Variables available for manipulation include:

1. the scope of the Scheme in terms of the non-residential sectors included;
2. the forecast energy prices;
3. the discount rate for the estimation of the NPV to the ACT; and
4. the rate of take-up of measures relative to the baseline rate.

For each scenario, the model calculates:

5. the incentive required to achieve the target abatement, which is effectively the incentive required to abate the last tonne of greenhouse gases (the incentive cap);
6. the average cost of abatement across the Scheme for a given fixed abatement target; and
7. the abatement split between the residential and the various non-residential sectors.

Updates to the original residential model

The original modelling undertaken to inform the development of the residential EEIS was updated to reflect the EEIS as currently implemented and to make a number of adjustments to make the model more robust. These changes are summarised in **Table 13**.

Table 13: Updates to the original residential model

Change	Details
Switching to piecewise linear interpolation of the uptake function.	This was a change to the implementation of the model. The uptake curve for a measure is described by pairs of points that give the percentage uptake for a given percentage of the capital cost of the measure provided by the incentive. Interpolation between the points is needed whenever the percentage of the capital cost does not correspond to one of the data points. The earlier residential model

	<p>used stepwise interpolation. The updated model uses piecewise linear interpolation.</p> <p>This gives a much more realistic representation of the scheme as uptake is more likely to be a smooth curve rather than a series of steps. Further, it meant that the goal seeking function of Excel could be used to find the incentive cap to achieve an abatement target.</p>
<p>Removing minimum constraint of incentive.</p>	<p>The original model had a constraint that guaranteed that at least the capital cost needed for minimum take-up was provided by the incentive scheme, and this minimum incentive was provided whether or not the bill savings provided any incentive. This resulted in some measures being over incentivised, and so an option to remove the lower constraint was added to the model code.</p> <p>The scenarios described in this report were modelled without the lower constraint in operation.</p>
<p>Changing the first year bill savings multiplier from 1.5 to 0.7.</p>	<p>This is a parameter in the model, and captures the effective discount rates used by homeowners. Analysis for the national ESI modelling suggested that paybacks are commonly less than a year.</p>
<p>Changing the measures to align with the Regulations.</p>	<p>The current model uses the measures that are included in the list of eligible activities in the Regulations.</p> <p>The earlier modelling was carried out prior to the publication of the Regulations and did not include certain measures that were eventually incorporated in the Regulations after the modelling was complete. In particular, a number of measures relevant for low income residences were added, along with the installation of a new gas heater in a room.</p>

Uncertainties and assumptions

A number of assumptions and simplifications were made in developing the model of the EEIS and these must be acknowledged when considering the results.

The adoption of measures was determined using an empirical relationship between the value participants see in the measure and the percentage of the potential annual take-up of the measure. The former was assessed as the percentage of the cost of the measure that is provided by the cash incentive and some multiple of the first year bill savings. The same take-up curve was applied across all sectors although the multiple applied to the first year bill savings was different for large energy users compared to small energy users. There are major assumptions here:

1. That the take-up curves, adopted from the modelling of the VEET scheme, describe the behaviour of participants in the ACT EEIS. The two schemes are different in their design. For instance, the VEET is a market based ‘white certificate’ scheme compared to the ACT’s retailer obligated scheme and the behaviour of a single large entity such as ActewAGL may not be well captured by the take-up curves.
2. That the inclusion of a multiple of first year bill savings as part of the value of a measure as perceived by the participant is realistic, given the complex behaviour of participants when deciding whether to invest in an energy saving measure. This is particularly significant in the case of the ACT EEIS as the obligated retailers may need to convince participants to contribute their own money to see measures adopted. The results are sensitive to the value of the first year savings multiplier, where a reduction in the multiplier from 0.7 to 0.5 sees the average cost of the scheme rise by around \$4 per tonne CO₂-e.

The technical potential of the energy efficiency measures defines the maximum number of instances of a measure that can be taken up, ignoring all financial and other considerations. For instance, the technical potential for residential solar hot water heating is the total number of residences that do not have solar hot water heating. For the modelling of the ACT EEIS, the technical potential of the residential measures was derived from the technical potential of measures used when modelling the VEET. Various factors were taken into account when scaling from Victoria to the ACT. These included the respective number of dwellings and the energy used by the respective residential sectors. The scaling did not account for the different circumstances of the ACT and Victoria or the characteristics of the actual residential building stock.

The technical potential of the non-residential measures was derived from work done on the modelling of the national ESI³⁹. This work did account for the characteristics of the different classes of commercial buildings in the ACT, and related the energy saving measures to the various types of buildings. However, the split between large commercial operations and 'SMEs' was not the same as the definition used by the Australian Bureau of Statistics, and some manipulation of the baseline data was required so that the national ESI data set for the ACT was suitable for use in the modelling of the ACT EEIS.

Finally, the implementation costs and energy savings for the residential measures were taken from the VEET. Some validation of costs was performed but, in general, the costs must be considered to have a noteworthy degree of uncertainty.

³⁹ Australian Government, 2013, *Energy Savings Initiative – Reports*,
<http://www.climatechange.gov.au/government/initiatives/energy-savings-initiative/reports.aspx>