Review of the NSW Energy Savings Scheme

Part 2: Options Paper

April 2015

The new state of business

Contents

Executive summary

Part 2: Options Paper sets out the NSW Government's preferred options for strengthening the ESS following a review of the scheme. This options paper has been prepared by the NSW Office of Environment and Heritage and NSW Trade & Investment and is Part 2 of the Review of the NSW Energy Savings Scheme. Part 1 of the Review of the NSW Energy Savings Scheme is a draft statutory review report.

The ESS was established in 2009 under the *Electricity Supply Act 1995* ('the Act'). The Act provides that the primary objective of the ESS is to create a financial incentive to reduce the consumption of electricity by encouraging energy saving activities.[1] The ESS works by placing an obligation on NSW energy retailers and large energy users to purchase energy savings in the form of certificates each year.

The ESS has been highly successful to date. The ESS has supported projects that will deliver around 11 000 gigawatt hours of electricity savings over their lifetimes. These electricity savings are estimated to deliver around $1.6 billion in bill savings for NSW households and businesses over the next decade or more.

This is the first review of the ESS since it commenced. The NSW Energy Efficiency Action Plan[2] commits the NSW Government to review the ESS to see how it could be enhanced including:

- targets, penalties and scope of the scheme to help meet the *NSW 2021* annual energy savings target of 16 000 gigawatt hours (GWh) above business as usual
- scheme functions and capabilities to define roles and responsibilities to make the administration of the scheme more understandable, logical and transparent
- the state of the current energy efficiency market to identify pathways for market transformation.

In preparing this options paper the NSW Government has considered stakeholder feedback on the issues paper released in December 2013.

On 11 November 2014, the Minister for the Environment and the Minister for Resources and Energy announced initial enhancements to the ESS. The announcements included that the NSW Government intends to enhance the ESS by:

- expanding the scheme to include gas
- extending the scheme to 2025
- introducing a regional network factor
- improving the administration and effectiveness of the scheme.

This paper provides further details on these initial announcements and analyses further options to enhance the scheme in the following categories:

- targets, penalties and duration
- fuel coverage
- sharing costs and benefits
- scheme administration
- continuous improvement of the Energy Savings Scheme.

[1] *Electricity Supply Act section 98*
[2] NSW Government, 2013, *NSW Energy Efficiency Action Plan*. www.environment.nsw.gov.au/energyefficiencyindustry/policy.htm

If implemented, collectively the reforms proposed in the paper are estimated to lead to additional electricity savings of around 23 400 GWh, and additional gas savings of 22 500 terajoules (TJ) by 2040. This represents an additional benefit to the NSW economy of $847 million in present value terms. The additional bill savings from these reforms are estimated at around $3.2 billion in present value terms to NSW households and businesses. This would deliver an additional $29.20 savings on the average annual household energy bill between 2016 and 2025.

Scheme targets, penalty rates and duration

The scheme targets, penalty rates and the duration of the ESS have not been reviewed since the ESS began in 2009. The Act provides that the Minister may amend scheme targets and penalty rates by regulation if any of the statutory conditions are met.[3] Two of these conditions have now been met, as follows:

- there is sustained over supply of energy savings certificates as evidenced by two consecutive years of significant oversupply of certificates with 38 per cent more certificates available than required to meet targets for the 2012 compliance year and 70 per cent more than required for the 2013 compliance year (section 105 (c))[15]
- significant changes have been made to the rules governing the creation of energy savings certificates with the ESS Rule change in May 2014 (section 105(d)).

Accordingly, the review considered options to amend ESS targets and penalty rates. The review also considered future approaches to setting targets and penalty rates.

Targets – preferred option

The Act currently requires that electricity retailers and large electricity users surrender energy savings certificates to meet an annual target of five per cent of liable electricity sales.[4]

The NSW Government's preferred option is to increase the ESS targets to 6.5 per cent of liable electricity sales from 2016 by amending the Act. Analysis conducted by the NSW Government has found that an increase in targets from 5 per cent to 6.5 per cent from 2016 is forecast to result in an estimated additional $16 million in net present value terms to the NSW economy. This change would contribute a further 378 GWh in 2020 towards the NSW energy savings target.

An additional increase to the target is proposed to accompany the inclusion of gas within the ESS. This is discussed below in fuel coverage.

Penalty rates – preferred option

The Act provides that scheme participants must pay a penalty rate for each certificate they fail to surrender to meet their targets.[5] In 2014, the penalty rate was $37.10, including tax implications.[6]

The NSW Government's preferred option is to increase penalty rates under the ESS from a tax effective equivalent of $37 to $42 per certificate from 2016 by amending the Act. This penalty rate reflects the short term cost of electricity supply, and would cap the price to be paid for certificates at a price that reflects the value of the energy savings to the NSW economy.

[3] *Electricity Supply Act section 104, section 105*
[4] *Electricity Supply Act section 103*
[5] *Electricity Supply Act section 112, section 113*
[6] IPART, *Market basics: Certificate pricing and penalty rates*, accessed August 2014: www.ess.nsw.gov.au/Certificate_market/Market_basics

Future approach to setting targets and penalty rates – preferred option

The Act provides that the Minister may amend targets and penalty rates by regulation if any specified conditions are met. These conditions are qualitative.

The NSW Government's preferred option is to prescribe by regulation when these conditions will be considered to be met. IPART would identify whether any of these conditions have been met as part of its future annual reports. This is expected to improve market confidence and potentially reduce the volatility of certificate prices.

Scheme duration

The Act provides that the ESS will terminate at the end of 2020.[7]

In November 2014, the NSW Government announced that it intends to extend the automatic termination of the ESS to 2025. This would provide greater investor certainty and help avoid the need for additional electricity generation capacity that is likely to be required in the mid to late 2020s. An extension of the ESS to 2025, combined with increased targets, is forecast to result in an additional $383 million in net present value terms to the NSW economy.

The NSW Government will bring forward legislative amendments in 2015 to extend scheme duration until 2025.

Fuel coverage

Expansion of the ESS to gas

The ESS currently only provides financial incentives to reduce electricity consumption.

The NSW gas market is in a period of significant change with wholesale gas prices expected to increase rapidly in the short term. Average annual bill increases for residential customers are estimated at $81 over the next two years, and $378 for small business customers. There are significant opportunities for NSW households and businesses to reduce their gas consumption and place downward pressure on gas bill price rises.

In November 2014, the NSW Government announced that it intends to expand the ESS to cover gas, and create a financial incentive for gas efficiency.

Mechanism to expand the ESS to gas – preferred option

The NSW Government's preferred mechanism to expand the ESS to gas is to increase the energy savings targets for electricity retailers and large electricity users by 1.5 per cent by 2018, and include a new conversion factor which would allow gas savings to generate energy savings certificates. If targets are increased to 6.5 per cent as per the preferred option in relation to electricity savings targets above, including gas would result in an additional increase to scheme targets from 6.5 per cent to 7 per cent in 2016, with a further increase to 8 per cent by 2018.

Expanding the fuel coverage of the ESS to gas would significantly increase the energy efficiency opportunity that can be captured by the scheme. It is estimated that this could deliver gas savings of over 5100 TJ in 2020. This is forecast to result in an estimated additional $292 million in net present value terms to the NSW economy or $847 million in net present value terms to the NSW economy when combined with an extension to 2025.

[7] *Electricity Supply Act section 178*

Under this preferred option, the NSW Government would bring forward legislative amendments to include gas in the ESS and increase targets from the 2016 compliance year. Following legislative amendments, the ESS Rule would be amended to enable the ESS to support gas efficiency.

Sharing costs and benefits

The ESS benefits all energy consumers in NSW. By saving energy, the need for investment in costly new generation capacity and network infrastructure is reduced. These savings are passed on to all electricity consumers through lower pressure on bill price rises. However, the consumers who participate in the ESS by saving energy and creating energy savings certificates receive larger benefits than those who do not.

In November 2014, the NSW Government announced that it intends to introduce a regional network factor to provide a level playing field for regional energy customers.

The options paper also considers further reforms to better spread the benefits of the scheme, specifically in relation to vulnerable low income households, energy savings at peak times, and the treatment of Emissions Intensive Trade Exposed Industries.

Regional customers

The ESS does not currently include any particular provisions in relation to regional customers. Regional customers typically pay more for energy than those in metropolitan areas and face larger costs for energy efficiency services due to smaller economies of scale in providing these services. Saving energy in regional NSW can have a higher economic value than saving energy in metropolitan areas because more energy is lost in the transmission and distribution networks that supply these customers.

The NSW Government intends to assist regional customers to undertake energy efficiency projects by introducing a regional network factor of 1.03. This factor reflects the additional three per cent value of saving energy in regional areas. The NSW Government will also provide regional coordinators to help service providers in regional and metropolitan NSW form partnerships to access the ESS.

The NSW Government will amend the ESS Rule to include a regional network factor of 1.03 for activities undertaken from the 2016 compliance year onwards.

Low income households – preferred option

The ESS does not currently include any particular provisions in relation to low income households. By comparison, similar schemes in South Australia and the ACT include provisions such as sub-targets to encourage energy savings in low income households.

Vulnerable low income households face more severe market barriers to energy efficiency than other energy consumers. The NSW Government's preferred option is to assist these customers to undertake energy efficiency activities by providing a supplementary program which is complementary to the ESS. This option is preferred as it would specifically target the market barriers which prevent vulnerable households from becoming more energy efficient, and enable a more flexible program and eligibility criteria than other identified options.

On 2 March 2015, the NSW Government announced a $61.5 million energy efficiency package which includes funding to help low income households reduce their power use and cut their energy bills.

Emissions Intensive Trade Exposed Industry – preferred option

Emissions Intensive Trade Exposed Industry activities receive partial exemptions from contributing to the cost of the ESS to maintain their international competitiveness. These customers can access incentives under the ESS like all other customers.

The NSW Government's preferred option is to retain existing exemptions for Emissions Intensive Trade Exposed Industry activities, and to not impose restrictions on certificate creation at exempt sites. Altering the treatment of exempt sites could reduce the number of certificates from low cost industrial activities, and lead to increases in certificate prices, forecast from around $23 to $29 between 2015 and 2025. While the net economic benefit of changes to the scheme would increase from $847 million to $934 million, it would place an additional impact on all electricity consumers, including non-participants, from $1.57 per megawatt hour to $2.02 per megawatt hour.

Energy saving at peak times – preferred option

The ESS currently does not contain a mechanism to target energy savings at the times and locations of peak demand. Saving energy at peak times helps avoid the use of more expensive generators, reduces pressure on electricity networks and can help to defer investment in additional network capacity.

The NSW Government's preferred option is not to amend the ESS to directly target energy savings at peak times. Instead the preferred option is to work with industry stakeholders and network service providers to collect and publish information that could be used to value the benefit of energy efficiency projects in constrained network locations. This would enable energy efficiency service providers to identify energy efficiency opportunities available to manage demand and overcome network constraints.

Scheme administration

The review considered options to improve the administration of the ESS.

Responsibilities of the scheme administrator

IPART is the scheme administrator and scheme regulator for the ESS in the absence of a formal appointment by the Minister of a person or body to these positions.

The NSW Government intends to formally appoint IPART as scheme administrator and scheme regulator for the ESS, and define IPART's responsibilities in the letter of appointment.

Compliance powers – preferred option

Under the Act, IPART has only a limited range of enforcement tools it can use to address compliance issues. The NSW Government's preferred option is to enhance the range of enforcement powers for IPART to reflect those of a modern and responsive regulatory regime.

Certificate price transparency and trading regularity – preferred option

There is no comprehensive public source of information on certificate prices. However, a number of private sector organisations act as a trading desk and publish spot price information.

The NSW Government's preferred option in relation to certificate price transparency and trading regularity is for IPART to estimate average costs paid for certificates through an annual survey of scheme participants. IPART would publish an aggregate average price in its annual compliance report to the Minister published each year. This would enable greater price transparency on consumer costs, and would maintain the commercial in confidence nature of the prices paid by individual businesses.

Cost recovery – preferred option

IPART has the ability to charge fees to recover the costs of services provided to businesses accessing financial incentives under the scheme. IPART only charges fees for some of these services and does not recover sufficient funds to cover the cost of scheme administration and regulation. As a result the administration of the ESS is partly funded by the NSW Government.

The NSW Government's preferred option is to increase existing fees charged by IPART by a modest amount, and to set fees for services that are currently provided for free. These fees would only be used to recover the costs to IPART resulting from the ESS, and will be reduced if they result in surplus funds.

Continuous improvement of the Energy Savings Scheme

As an outcome of this review, and in response to stakeholder feedback, the NSW Government will implement measures to facilitate continuous improvement of the ESS. These measures will include:

- developing a comprehensive evaluation measurement and verification framework for the ESS
- annual updates of the ESS Rule
- engagement with industry to maximise access to opportunities under the ESS.

The Commonwealth Government's Emissions Reduction Fund will fund emission abatement activities in NSW. The NSW Government will work with the Commonwealth Government to establish formal information sharing arrangements between the two schemes to harmonise the schemes and prevent double counting of energy savings.

Next steps

The release of this options paper starts a four week consultation period. The NSW Government encourages stakeholders to provide written comments on this options paper by 18 May 2015 to energysavings.scheme@trade.nsw.gov.au.

1 Introduction

This document is an options paper for a review of the NSW Energy Savings Scheme (ESS). The paper outlines options across the following five themes:

- targets, penalty rates, scheme duration and the target setting process
- fuel coverage
- sharing costs and benefits
- scheme administration
- continuous improvement of the Energy Savings Scheme.

In each section this options paper considers:

- the case for action and the objective of government intervention
- the potential options
- analysis of each option including their effectiveness, efficiency and administrative simplicity
- the preferred option.

1.1 Terms of Reference

Action 1 of the Energy Efficiency Action Plan[8] commits the NSW Government to review the ESS to identify how it could be enhanced, including:

- targets, penalties and scope to help meet *NSW 2021* targets (that is, the annual energy savings target of 16 000 gigawatt hours (GWh) above business as usual) and drive sustainable industry growth
- scheme functions and capabilities to define roles and responsibilities to make the administration of the scheme more understandable, logical and transparent
- the state of the current energy efficiency market to identify pathways for market transformation.

This has formed the Terms of Reference for this review. This review is a major input into the statutory review due by 30 June 2015.

1.2 Statutory Review

The Minister for Resources and Energy is required under Section 175 of the *Electricity Supply Act 1995* (the Act) to review the operation of the ESS to determine whether the policy objectives of the scheme remain valid and whether the terms of Part 9 of the Act remain appropriate for securing those objectives. To reduce duplication of consultation processes on the same topics, this consultation period will cover both the ESS Review and Statutory Review.

A Draft Statutory Review Report forms Part 1 of the two part Review of the NSW Energy Savings Scheme. Part 2, this Options Paper, examines enhancements to the ESS to better meet the scheme objectives.

[8] www.environment.nsw.gov.au/energyefficiencyindustry/policy.htm

1.3 How the review relates to recent Rule changes

The NSW Government made amendments to the ESS Rule on 30 May 2014 after an extensive consultation process. These amendments enhance the ESS within its existing legislative and regulatory settings, by improving the way energy savings are calculated for eligibility requirements. It applies three guiding principles:

1. open the scheme up to a broader range of technologies, making it easier for all businesses and households to benefit
2. simplify and reduce red tape
3. improve the accuracy of calculations to ensure benefits are delivered.

More information on the ESS Rule changes can be found on the NSW Trade & Investment website at www.resourcesandenergy.nsw.gov.au/energy-consumers/sustainable-energy/efficiency/scheme.

This review considers other aspects of how the ESS operates, including the legislative framework and how it is administered.

1.4 Issues paper and stakeholder feedback

On 23 December 2013, the Office of Environment and Heritage and NSW Trade & Investment released an issues paper for this review of the ESS.[9] The issues paper raised issues across four broad themes:

- scheme performance—general issues with the scheme and its performance to date
- the energy efficiency market—explores issues around building a national market for energy efficiency and the scheme's role in transforming the products and services market
- roles and responsibilities—the parties involved in delivering the ESS and the roles that may be required to ensure the scheme is a success
- scheme design—scheme penalty rate and targets and the scope of these targets in terms of fuel coverage, exemptions, support of vulnerable low-income and regional households, and peak demand reduction.

A total of 39 written submissions from stakeholders were received. A public forum was held in February 2014. This forum was attended by 245 stakeholders from 148 organisations. The submissions and documentation of the public forum are available on the NSW Trade & Investment website.[10]

Stakeholder groups that made submissions to the issues paper included energy retailers, distributors and generators, large energy users, industry bodies, community organisations, government bodies and energy efficiency product and service providers.

Energy retailers and industry associations representing electricity generators expressed their preference for a national scheme or alternative approaches, such as the roll out of smart meters and cost reflective pricing.

Some energy retailers, such as AGL and Origin, did not support expanding the scheme to include gas, on the basis that this would create a new obligation on gas retailers. However, APA Group and Envestra, large gas distribution service providers, supported including gas, and also supported continuing the ESS in the absence of a national scheme. ERM Power, an energy generator and

[9] see http://www.resourcesandenergy.nsw.gov.au/__data/assets/pdf_file/0005/499658/ESS-Review-Issues-Paper.pdf
[10] see www.resourcesandenergy.nsw.gov.au/energy-consumers/sustainable-energy/efficiency/scheme/energy-saving-scheme-review

retailer, supported the current ESS design and did not support adding complexity to support low income households or regional customers.

Large energy users did not support scheme changes that would increase compliance costs. However, Norske Skog supported including gas and saw the ESS as an important policy to help industrial users improve their energy efficiency. Large energy users also expressed the view that the ESS review outcomes should not change the treatment of emissions intensive, trade exposed industries.

Community organisations supported expanding the scheme to gas, and extending the scheme duration while it continues to deliver benefits. They also made suggestions on how to better assist vulnerable low income households and small businesses to overcome the barriers to energy efficiency.

IPART stressed the need for rigorous cost benefit analysis before carrying out any significant changes to the ESS. IPART supported initiatives to target peak demand and noted there were significant opportunities for gas savings in NSW. The City of Sydney strongly supported the ESS and the inclusion of gas energy savings. The Office of Small Business identified the need to ensure that small businesses could access energy savings.

Energy efficiency product and service providers and their peak bodies were unanimously supportive of the ESS. They strongly supported extending the scheme duration, increasing ESS targets and including gas. They highlighted the ability of their industry to support higher energy efficiency targets in NSW, and the risks they face of job losses and businesses folding if the current oversupply of certificates persists. These stakeholders also stressed the need to reduce administrative costs and to make the roles and responsibilities of the scheme more transparent and efficient.

The Office of Environment and Heritage and NSW Trade & Investment have considered written submissions and input from stakeholders at the public forum in developing this options paper.

1.5 Review timeline

The release of this options paper starts a four week public consultation period. This paper and stakeholder responses will inform recommendations to NSW Government.

Table 1 below sets out the timeline for the review.

Table 1: Milestones for completing the ESS Review

Milestone	Date
Issues paper released	Monday 23 December 2013
Issues paper submissions close	Monday 10 March 2014
Development of policy options	April 2014–June 2014
Analysis and consideration of options	June 2014–August 2014
Information paper	Tuesday 11 November 2014
Consultation on Options paper	April 2015
Report to NSW Government	Mid 2015
Statutory review of the ESS tabled in parliament	By 30 June 2015
Changes intended to take effect	January 2016

1.6 Call for submissions

The NSW Government invites submissions from all interested parties on the preferred options in this paper. To help us consider your submission, please set out your responses against the options of interest and refer to sections by number where possible. A template for submissions is available at www.resourcesandenergy.nsw.gov.au/energy-consumers/sustainable-energy/efficiency/scheme/energy-saving-scheme-review.

The closing date for submissions is 5.00pm on 18 May 2015. Submissions received after this time may not be considered.

The NSW Government is committed to an open and transparent process, so all submissions should be provided as documents that can be published on the NSW Trade & Investment website. If you wish for your submission to remain confidential, please clearly state that in your submission, and only your organisation's name will be published. For submissions received from individuals, all personal details will be removed before publication.

If making a submission by post send to:

ESS Review – Options Paper 2015

Department of Trade and Investment
GPO Box 3889
SYDNEY NSW 2001

If making a submission by email send to:

energysavings.scheme@trade.nsw.gov.au

Subject: "Name - ESS Review 2015"

2 Targets, penalty rates and scheme duration

Introduction

On 11 November 2014, the Minister for the Environment and the Minister for Resources and Energy announced initial enhancements to the ESS. These announcements included that the NSW Government intends to expand the ESS to include gas and extend the scheme to 2025.

Section 2.5 outlines the rationale for extending the scheme to 2025. This section outlines details for stakeholder feedback including that projects would be ineligible to create certificates using a baseline under the Metered Baseline Method that is more than 10 years old.

This section considers targets for an electricity only scheme. **Section 3** considers targets for an expanded scheme that provides incentives for both electricity and gas savings.

Summary of the preferred options

Targets

The Act currently requires that electricity retailers and large electricity users surrender energy savings certificates to meet an annual target of five per cent of liable electricity sales.

The NSW Government's preferred option is to increase the ESS target to 6.5 per cent of liable electricity sales. Analysis conducted by the NSW Government has found that an increase in target from 5 per cent to 6.5 per cent from 2016 is forecast to result in an additional $16 million in net present value to the NSW economy. This change would contribute a further 378 GWh in 2020 towards the NSW energy savings target.

In order to implement this option the NSW Government would bring forward legislative amendments to increase targets, commencing in the 2016 compliance year.

Penalty rates

The Act provides that scheme participants must pay a penalty rate for each certificate they fail to surrender to meet their targets. In 2014, the ESS penalty rate was $25.97 per certificate before tax, or around $37 taking into account potential tax implications.[6]

The NSW Government's preferred option is to increase penalty rates under the ESS from a tax effective equivalent of $37 to $42 per certificate. This penalty rate reflects the avoidable short term costs of electricity supply, and would cap the price to be paid for certificates at a price that reflects the short term value of the energy savings to the NSW economy.

Consistent with the approach for targets, the NSW Government would bring forward legislative amendments to increase penalty rates, commencing in the 2016 compliance year.

Future approach to setting targets and penalty rates

The Act provides that the Minister may amend targets and penalty rates by regulation if any specified conditions are met. These conditions are qualitative.

The NSW Government's preferred position is to prescribe by regulation when these conditions will be considered to be met. IPART would identify whether any of these conditions have been met as part of its annual reports. This would provide greater market certainty by allowing businesses to predict whether targets and penalty rates are likely to be amended.

To implement this option the NSW Government would bring forward a new regulation to prescribe conditions for reviewing the target and penalty rates. This regulation would take effect from 2016.

2.1 Background

The ESS is a regulatory obligation on electricity retailers and large electricity users, known as scheme participants, to purchase energy savings represented by certificates each year. Scheme participants are required to surrender enough certificates to meet an annual target, expressed as a percentage of electricity sales.[11] For 2014 through to 2020, the ESS target is five per cent of liable sales.[12]

Scheme participants must pay a penalty rate for each certificate they fail to surrender to meet their targets.[13] This penalty rate effectively acts as a ceiling price under which scheme participants would have a financial incentive to purchase certificates, rather than pay the penalty. For 2014, the ESS penalty rate was $25.97 per certificate before tax.[14]

Sections 104, 105 and 114 of the Act provides that the Minister may recommend the making of regulations to change targets and penalty rates, only if prescribed conditions are met. In reference to amending targets, Section 105 of the Act states that:

> *"The Minister may recommend the making of a regulation to change the energy savings scheme target for a year or years only if the Minister has certified in writing to the Governor that, in the Minister's opinion:*
>
> *(a) the change to the energy savings scheme target is appropriate to achieve greater uniformity or harmonisation with a scheme in another jurisdiction with similar objectives to the energy savings scheme, or for the purposes of implementing a national scheme with similar objectives to the energy savings scheme, or*
>
> *(b) the change to the energy savings scheme target is appropriate because of a sustained under supply of energy savings certificates, as evidenced by scheme participants being required to pay a substantial energy savings shortfall penalty for 2 or more consecutive years, or*
>
> *(c) the change to the energy savings scheme target is appropriate because of a sustained over supply of energy savings certificates, as evidenced by the total number of certificates created substantially exceeding the total number of certificates required to meet all individual energy savings targets for 2 or more consecutive years, or*
>
> *(d) the change to the energy savings scheme target is appropriate because of significant changes to the rules governing the creation of energy savings certificates, or*
>
> *(e) the change to the energy savings scheme target is otherwise appropriate because of significant changes to the policy or regulatory framework, or the market conditions, in which the energy savings scheme operates."*

Section 114 of the Act provides similar provisions in relation to penalty rates. Two of these conditions have now been met. There have been two consecutive years of significant certificate oversupply with 699 546 certificates created above those required to meet targets in 2012 and 1 715 317 certificates in 2013.[15] In May 2014, the Minister for Resources and Energy released significant changes to the ESS Rule.[16] Conditions under which changes can be made to the

[11] *Electricity Supply Act section 106*
[12] *Electricity Supply Act schedule 5*. This percentage is equivalent to 4% of total NSW electricity sales per annum, as electricity used by emissions intensive trade exposed industries are not included in scheme targets, as displayed on the ESS website: http://www.ess.nsw.gov.au/For_Liable_Entities/Targets_and_penalties
[13] *Electricity Supply Act section 112, section 113*
[14] IPART, ESS Website, accessed July 2014: http://www.ess.nsw.gov.au/For_Liable_Entities/Targets_and_penalties
[15] IPART, 2014, *Compliance and Operation of the NSW Energy Savings Scheme during 2013: Report to the Minister*.
[16] NSW Trade & Investment, May 2014, *Energy Savings Scheme Rule Change 2013-2014*, www.resourcesandenergy.nsw.gov.au/energy-consumers/sustainable-energy/efficiency/scheme/energy-savings-scheme-rule-change

penalty rate, under Section 114 of the Act, are the similar to the above conditions for adjusting targets.

Figure 1 below shows historical penalty rates, certificate spot prices, monthly certificate creation and the average monthly certificates required to meet ESS targets. This demonstrates the gradual rise in the certificate spot price as the ESS facilitated the growth of the energy efficiency industry after the scheme's inception, and the depressed certificate price since April 2013.

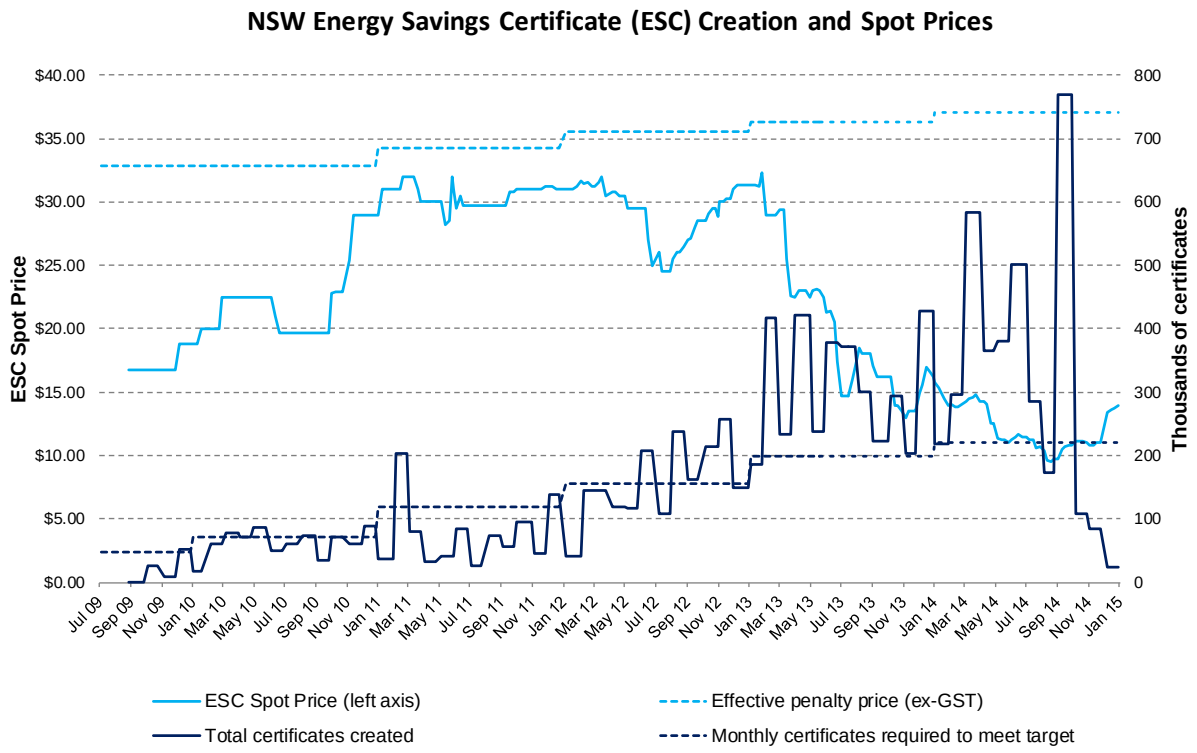

Figure 1 certificate targets, penalty rates, certificate spot prices and certificate supply[17,18,19]

The Act also provides for the ESS to automatically terminate at the completion of the 2020 compliance year.[20]

This section considers options to amend the ESS in relation to:

- ESS targets
- penalty rates
- scheme duration
- future approach to reviewing ESS targets and penalty rates.

[17] IPART compliance reports to the Minister for the years 2009, 2010, 2011, 2012 and 2013 available at http://www.ess.nsw.gov.au/How_the_scheme_works/Scheme_Performance
[18] Certificate creation data from the Energy Savings Scheme Registry, accessed: www.ggas-registry.nsw.gov.au
[19] Spot price data sourced from *The Green Room*, published by Next Generation Energy Solutions (NGES) (see www.nges.com.au). Note this data accounts only for certificates traded through NGES and may not be wholly representative of the price paid by certificate buyers. The NSW Government recommends that persons seek independent advice before buying or selling certificates, and cautions against making decisions based solely on this information.
[20] *Electricity Supply Act section 178*

2.2 Targets

2.2.1 The case for action

The Act currently requires that electricity retailers and large electricity users surrender energy savings certificates to meet an annual target of five per cent of liable electricity sales. Sites conducting emissions intensive and trade exposed activities are given a full or partial exemption from the scheme. This means that the ESS targets are the equivalent of around four per cent of NSW electricity consumption.[12]

Scheme participants are set individual energy savings targets each year based on the ESS targets and their annual liable electricity sales.[21] Scheme participants can meet these energy savings targets by surrendering enough energy savings certificates to meet their energy savings target. If a scheme participant has a shortfall in meeting their target, they are liable to pay a penalty based on the size of the shortfall and the penalty rate.

Conditions to change the ESS targets have been met

Two conditions to change the ESS targets have now been met:

- there have been two consecutive years of significant certificate oversupply with 38 per cent more certificates created than required to meet targets in 2012,[22] and 70 per cent more certificates than required to meet targets in 2013[23]
- in May 2014, the Minister for Resources and Energy released significant changes to the ESS Rule.[24]

This suggests that the energy efficiency opportunity is likely to be larger and cheaper than originally estimated.

The oversupply of certificates in the 2012 and 2013 compliance years has been driven by a growth in commercial lighting upgrades delivered through the ESS. This is the result of a combination of factors including:

- the cost of delivering commercial lighting upgrades being lower than expected[25]
- the ESS Rule providing a simple method for calculating energy savings from commercial lighting upgrades.

The previous ESS Rule had a limited number of simple 'deemed' calculation methods to access ESS incentives. The changes made to the ESS Rule in May 2014 introduced new calculation methods for a wider range of energy efficiency opportunities. These changes include new methods for accessing incentives for business activities, removing red tape that may have prevented appliance retailers from accessing the scheme, and introducing new methods for household energy efficiency upgrades and information programs.

The ability to deliver energy efficiency at a lower cost than anticipated, and the new opportunities introduced into the scheme in 2014, support an increase to the current targets.

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[21] Technically, targets are set via "liable acquisitions". This is more simply described as "electricity sales".
[22] IPART, 2013, *Compliance and Operation of the NSW Energy Savings Scheme during 2012: Report to the Minister*, accessed at http://www.ess.nsw.gov.au/files/3c52c1d3-f61c-427a-926e-a23800bc22ac/Annual_Report_to_the_Minister_2012.pdf
[23] IPART, 2014, *Compliance and Operation of the NSW Energy Savings Scheme during 2013: Report to the Minister*.
[24] NSW Trade & Investment, May 2014, *Energy Savings Scheme Rule Change 2013-2014*, www.resourcesandenergy.nsw.gov.au/energy-consumers/sustainable-energy/efficiency/scheme/energy-savings-scheme-rule-change
[25] The rate of certificates created from commercial lighting upgrades has remained high through 2013 and into 2014 compliance year despite certificate spot prices steadily decreasing over the same period.

Further action is needed to reach *NSW 2021* targets

NSW 2021 sets a long term energy savings target to "*assist business and households to realise annual energy savings of 16 000 GWh by 2020 compared to 'business as usual' trends*". These savings are to be achieved through state and national energy efficiency programs. The ESS is the largest NSW program contributing to this target (see **Figure 2**).

Existing NSW Government, national and Commonwealth Government energy efficiency programs (not including the Commonwealth Emissions Reduction Fund) are forecast to deliver 12 600 gigawatt hours (GWh) of electricity savings by 2020. This leaves a shortfall of 3400 GWh to realise the *NSW 2021* energy savings target. Less than five per cent of these energy savings are likely to come from existing Commonwealth Government funded energy efficiency programs. It is unclear what additional energy savings the Commonwealth Emissions Reduction Fund will deliver towards this target.

Raising ESS targets from 2016 would assist in achieving *NSW 2021* energy savings targets.

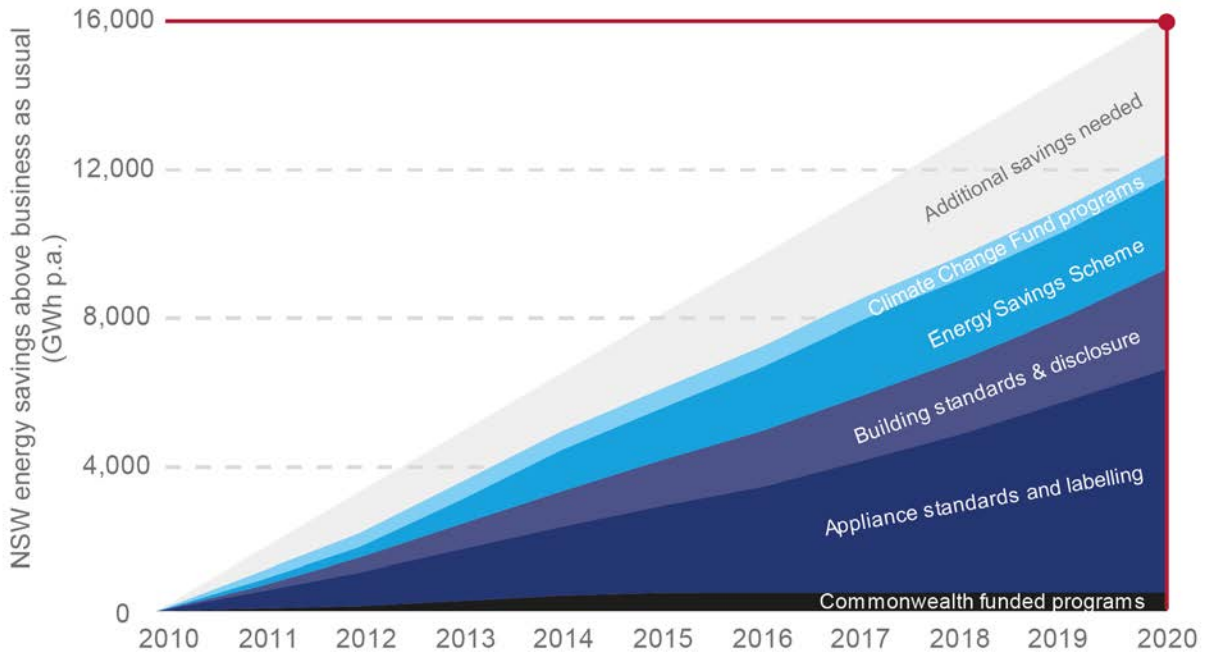

Figure 2 Tracking the estimated cumulative progress towards the *NSW 2021* state plan energy savings target from existing measures.[26]

Government intervention is needed to address market barriers

As discussed in the NSW Energy Efficiency Action Plan[27], there are opportunities for more efficient use of energy in all sectors of the economy, but a series of market barriers restrict their uptake.

These barriers include:

- information gaps and asymmetry where consumers are not aware of opportunities available to them or cannot evaluate different offers from tradespeople and suppliers

[26] Based on analysis by the Office of Environment and Heritage of evaluation of energy efficiency programs active in NSW.
[27] www.environment.nsw.gov.au/energyefficiencyindustry/policy.htm

- lack of skills and time, or 'hassle factor', where the costs and time associated with gaining knowledge and organising energy efficiency actions prevent their uptake
- high upfront costs for high-efficiency products and services which reduce their appeal and accessibility even though they could be the cheapest option over their useful life
- split incentives where one party owns equipment that consumes energy but another pays the bills, leaving both without a reason to invest in more efficient equipment (for example, owners and tenants)
- data as a public good, where no individual has the resources to collect and analyse energy efficiency data even though everyone would benefit from new opportunities being identified.

A smaller scheme may be able to overcome some of these barriers for a number of energy customers. A larger scheme may be able to assist more households and businesses to overcome the barriers to energy efficiency.

Stakeholders support expanding the ESS to help meet the *NSW 2021* energy savings target

Most submissions to the ESS review supported the NSW Government enhancing the ESS as the main mechanism for achieving the state's energy savings targets. There were a variety of views on what that mechanism should entail and which programs could or should complement the ESS.

> *"(…) energy efficiency obligation schemes such as the ESS are the single most effective policy tool available for optimising investment in energy resources to deliver cost effective energy savings equitably and at scale." (Opower, an energy efficiency service provider)*

> *"(…) the ESS is the central mechanism for assisting the NSW Government to assist businesses and households to realise annual energy savings (…) however this must be supported by complementary measures/programs that address non-price market barriers and failures." (The City of Sydney)*

However, energy retailers and industry associations representing electricity generators (who have obligations under the ESS) expressed their general preference for a national scheme or alternative options.

Certificate oversupply may hamper sustainable growth and diversity in the energy efficiency industry

The energy efficiency industry has grown significantly over the past five years with over 100 businesses now delivering services as accredited certificate providers.

Since 2012, the supply of certificates has significantly outstripped demand driven by scheme targets. In their August 2014 market update, IPART forecast that there could be a surplus of up to 2.4 million certificates at the end of the 2014 compliance year at 30 June 2015.[28]

The current surplus of certificates is placing downward pressure on certificate prices. Low prices and high volumes help the scheme achieve more energy savings at lower cost to energy consumers.

However, these low prices may also reduce the viability of investments to deliver a wider range of activities. Commercial lighting upgrades are the dominant activity in the ESS, accounting for more than 80 per cent of energy saving certificates in 2012 and 85 per cent in 2013.[15] Research prepared for the NSW Office of Environment and Heritage found that there could still be

[28] IPART, August 2014, *Market Update: 2014 ESC Supply and Demand*, Figure 1, accessed: http://www.ess.nsw.gov.au/files/bcd67e82-a6a2-4486-b73c-a38d00a47a6d/ESC_Market_Update_August_2014.pdf

opportunities for around 6000 large commercial and industrial lighting projects and 55 000 small retail and hospitality projects across NSW, equivalent to savings of 930 GWh per year.

At certificate creation rates in 2014, modelling by the Office of Environment and Heritage predicted that by the end of 2016, the number of available cost effective opportunities to install commercial lighting upgrades will decline sharply. This is predicted to result in commercial lighting activities providing less than 11 per cent of all certificates by 2020.[29] If commercial lighting activities are unavailable to provide a supply of certificates this could lead to volatility in the market and a boom-bust cycle if industry does not build capacity to deliver new activities.

Larger ESS targets are expected to encourage industry to diversify, lead to a more sustainable energy efficiency industry and avoid volatility. Electricity consumers receive the greatest benefit when the energy efficiency market is stable. This enables the industry to plan its activities with greatest confidence:

> *"(…) which allows for steady, sustainable growth in the certificate market. The current product accreditation framework leads to a boom bust cycle and considerable volatility…although the broad framework for target setting provides liable entities with visibility of a predictable target path, certificate market volatility significantly reduces the ability of these entities to achieve these targets." (EnergyAustralia)*

A larger target will deliver a fairer spread of benefits across the economy

All NSW electricity customers pay a small amount for the ESS via costs passed on to them by energy retailers. All NSW electricity customers benefit from the ESS, as energy efficiency helps defer or avoid investment in electricity network and generation capacity and avoid impacts from generating electricity on human and environmental health. This deferred investment helps to keep downward pressure on future electricity price rises. However, those customers who participate in the ESS by becoming more energy efficient receive greater benefits than those who do not.

If the energy efficiency market continues to focus on commercial lighting upgrades, particular customer segments including vulnerable households and regional customers may not have the opportunity to participate in the ESS and receive greater benefits provided by the scheme.

Objectives of government action

The objectives of government action are to:

- help meet the *NSW 2021* energy savings target
- deliver equitable distribution of benefits, including minimising impacts on customer bills
- encourage sustainable growth and diversity in the energy efficiency industry.

2.2.2 Description of options

Option 1: No change

Under this option, the ESS target remains at five per cent of liable electricity sales from 2016 to 2020.

Option 2: Targets set to meet *NSW 2021* energy savings target

Under this option, ESS targets would be increased to 24 per cent of liable electricity sales from 2016 to 2020 to enable the ESS to drive sufficient energy savings to deliver an additional 2969

[29] Jacobs, 2014, *NSW Energy Efficiency Uptake Model V1.0*, prepared for the Office of Environment and Heritage

GWh in 2020. This would deliver enough energy savings to meet the *NSW 2021* energy savings target entirely through the ESS.

Option 3: Targets set to deliver optimal net economic benefit (preferred option)

Under this option, ESS targets would be set at a level so that the ESS would deliver the greatest net economic benefit. The net economic benefit is the net present value of the ESS to the NSW economy estimated in accordance with the NSW Government's energy efficiency policy cost benefit analysis framework (consistent with the NSW Government Guidelines for Economic Appraisal).[30, 31] Analysis by the Office of Environment and Heritage indicates this target would be 6.5 per cent of liable electricity sales from 2016 to 2020.

2.2.3 Analysis of options

Effectiveness

Table 2 below shows a summary of the estimated energy savings of each of the options considered. Option 2 is expected to deliver the largest energy savings in NSW. Detailed results of analysis of these options are available in **Appendix A**.

Table 2 Comparative effectiveness of target options[32]

Option	Option 1: No change	Option 2: Targets to meet *NSW 2021* energy savings target	Option 3: Optimal net economic benefit
ESS target (%)	5%	24%	6.5%
Additional energy savings in 2020 (GWh p.a.)	n/a	3137	378
Additional energy savings from 2015 to 2040 (GWh)	n/a	70 856	24 614
Additional peak demand reduction in 2020 (MW)	n/a	358	53

Option 1- no change to targets

Option 1 would not contribute any additional energy savings to meet the *NSW 2021* energy savings target. Option 1 is unlikely to meet other government objectives, including delivering energy efficiency benefits to all electricity consumers and encouraging sustainable growth and diversity in the energy efficiency industry.

Under Option 1, the existing ESS target is estimated to require the creation of around 2.6 million certificates each year from 2016 to 2020.[33] This is expected to deliver around 1391 GWh of energy savings in 2020. However, these energy savings have already been incorporated into forecasts of energy savings in 2020 so will not contribute any further to the *NSW 2021* energy savings target.

Under Option 1, the certificate price is forecast to remain low, encouraging only very low cost energy savings. Modelling commissioned by the Office of Environment and Heritage forecasts that activities supported by the ESS would be dominated by commercial lighting activities until such time as these opportunities are exhausted.[34] Other cost effective energy savings remain in many

[30] NSW Government, *Guidelines for Economic Appraisal (TPP07-5)*, July 2007
[31] More detail on the analysis can be found at **Appendix A**
[32] The results presented in Table 3 are based on analysis that assumed Scheme Participants would choose to purchase certificates rather than pay penalty rates even if certificate prices were well above penalty rates
[33] Based on demand forecasts in the AEMO, 2014, *National Electricity Forecasting Report (NEFR)* 2014
[34] Jacobs, 2014, *NSW Energy Efficiency Uptake Model V1.0*, prepared for the Office of Environment and Heritage. The model estimates uptake based on the cost-effectiveness of energy efficiency activities at variable certificate prices, policy settings and targets. It integrates methods developed from

energy efficiency activities across residential, industrial and commercial sectors. These savings are unlikely to be realised under Option 1.[35] This means that the energy efficiency industry is unlikely to diversify, and the scheme is less likely to deliver an equitable distribution of benefits.

Option 2 - targets set to meet *NSW 2021* energy savings target

Option 2 examines setting the ESS target at a level which would deliver the entire *NSW 2021* energy savings target of 16,000 GWh by 2020. Modelling commissioned by the Office of Environment and Heritage forecasts that ESS targets of 24 per cent from 2016 could deliver almost the entire additional 3400 GWh of energy savings in 2020 required to meet the *NSW 2021* energy savings target (see **Figure 2** above).

Under this scenario, the demand for certificates would increase around five fold to 12.5 million each year from 2016 to 2020. The average cost of purchasing certificates predicted under Option 2 is forecast to be around $126 per certificate between 2016 and 2020. This is higher than the tax effective penalty rate ($37.10 in 2013 dollars). In this case, scheme participants are likely to choose to pay penalty rates rather than purchase certificates, meaning that the targets would not be met.

As a result, if penalty rates are maintained at their current level, Option 2 is forecast to deliver only 610 GWh of additional energy savings in 2020. Option 2 is only likely to allow *NSW 2021* energy savings targets to be met entirely from the ESS if there is also a significant increase in penalty rates to over $126.

In line with international experience with white certificate schemes, the NSW energy efficiency industry, supported by the ESS, has innovated and found ways to deliver energy efficiency activities well below the cost anticipated by the NSW Government when the scheme was devised.[36] Despite this, the modelling forecasts that the energy efficiency industry may not be able to build sufficient capacity to meet the additional demand for certificates. If the target is increased to 24 per cent, the rapid increase in demand for certificates may increase price volatility in the short term and attract unsustainable business models.

Option 2 may deliver a more equitable distribution of benefits than Option 1, as a larger target will allow more households and businesses to directly benefit from the scheme through a wider range of energy efficiency activities. However, these activities will come at a far higher price per certificate, which will flow through to the electricity bills of all electricity consumers.

The likely increased cost of certificates in Option 2 and the added price volatility means that this option will not maximise the economic benefits for the ESS and is likely to impose costs on the NSW economy. Option 2 would only be able to meet targets by paying more for energy efficiency activities than the benefits they will deliver. Option 3, discussed below, can deliver a better balance of contributing towards the *NSW 2021* targets without eroding the economic benefit delivered by the ESS.

Option 3 - targets set to deliver optimal net economic benefit

Option 3 involves setting the ESS target at a level that would maximise the net benefit of the ESS to the NSW economy. The net economic benefit has been determined by calculating the net present value based on a seven per cent discount rate according to the NSW Government's energy efficiency cost benefit analysis framework[37] (consistent with the NSW Government

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the UK Department of Energy & Climate Change's Energy Use Simulation Model, the US Energy Information Agency's National Modelling System, and Jacobs' internal established methods undertaken for a number of federal and state government agencies over the last 15 years.

[35] Energetics, 2014, *NSW Energy Efficiency Opportunity Model V1.0*, prepared for the Office of Environment and Heritage

[36] Sorrell et al 2008, *White certificate schemes: Economic analysis and interactions with the EU ETS*, Energy Policy 37 (2009) 29–42

[37] More detail on these calculations can be found at **Appendix A**

Guidelines for Economic Appraisal).[38] Larger targets under Option 2 would likely result in the cost of energy efficiency outweighing the benefits. Option 3 would provide an increase in targets that can be met at a lower cost, increasing the likelihood that the scheme delivers net economic benefits.

The Office of Environment and Heritage analysed a range of target options to test the likely outcomes of a revised ESS target on the NSW economy. The results of this analysis are shown in **Figure 3** below. This shows that a target of 6.5 per cent delivers the greatest net economic benefit. Targets above or below this point deliver less net economic benefit to NSW either because they drive fewer energy efficiency activities, or they result in higher certificate prices.

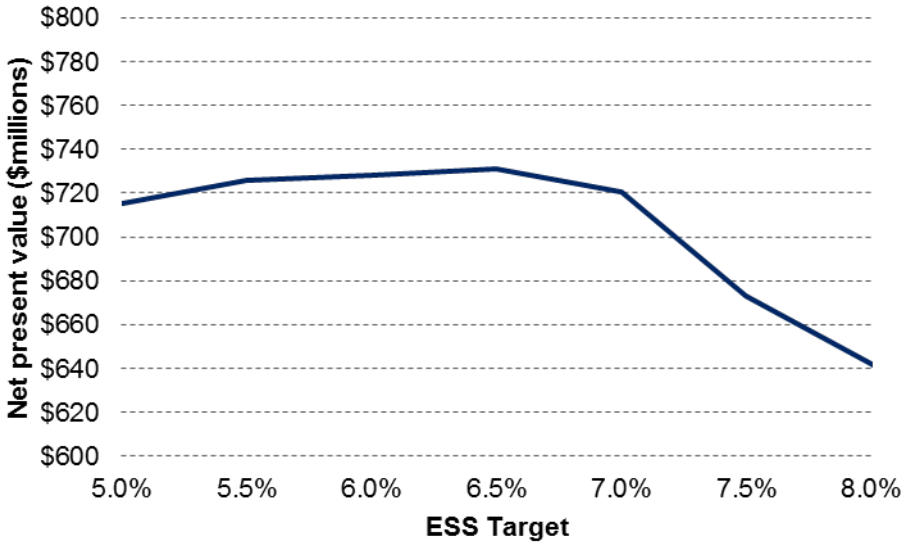

Figure 3 Net economic benefit of ESS target[34]

It is estimated that an ESS target of 6.5 per cent would create demand for around 3.4 million certificates each year from 2016 to 2020. This is 19 per cent lower than the 4.1 million certificates created in 2013, and 25 per cent higher than the predicted demand for certificates out to 2020 under the current target of 5 per cent (Option 1). The average certificate price under this scenario is predicted to be $26 per certificate between 2016 and 2020, roughly the same as the historical average spot price for certificates.

This certificate price is likely to encourage the energy efficiency industry to deliver a wider range of activities under the ESS. For example, analysis by the Office of Environment and Heritage and Jacobs predicts that under Option 3, activities would shift towards the residential sector. Accredited certificate providers are predicted to create 5 per cent more certificates from residential activities, including lighting and high efficiency appliances, than under Option 1.[34] This may also lead to Option 3 delivering a more equitable distribution of benefits than Option 1 (see below).

The analysis predicts that Option 3 would deliver an additional 378 GWh of energy savings in 2020. This would leave a shortfall of 3022 GWh to meet the *NSW 2021* energy savings targets.

An increase of targets to 6.5 per cent in 2016 may send a price signal to increase current activity. But this price signal could be dampened in the time period between setting the new target in 2014, the new target coming into effect in 2016 and the 2016 compliance period ending in April 2017. Increasing the target to 6.5 per cent may not immediately address the current certificate oversupply issue, and low certificate prices may remain in the short term in 2015, however the ESS market should return to equilibrium over time.

[38] NSW Government, *Guidelines for Economic Appraisal (TPP07-5)*, July 2007.

While it would take some time, Option 3 is likely to be the most effective option to help the NSW energy efficiency industry to grow and maximise the net economic benefit of the ESS to all NSW electricity consumers and the NSW economy. Option 3 is predicted to contribute an additional 378 GWh in 2020 to the *NSW 2021* energy savings target, or around 11 per cent of the expected shortfall.

Efficiency

A comparative analysis of the cost effectiveness of each option is shown in **Table 3** below. This shows that Option 3 delivers a net present value above the current policy settings and a benefit cost ratio above 1. Option 1 would fail to maximise the economic benefits of the ESS. The larger target in Option 2 would increase the marginal cost of certificates for scheme participants and would erode the net economic benefit of the ESS.

Table 3 Comparative cost effectiveness of target options (assumed no penalty rate, scheme to continue to 2020)

Option	Option 1: No change	Option 2: Targets to meet NSW 2021 energy savings target	Option 3: Optimal net economic benefit
ESS target	5%	24%	6.50%
Net present Value (2013 $m)	n/a	-$3666	$16
Benefit Cost Ratio	n/a	0.4	1.1

The economic analysis conducted for the options paper uses a framework developed by NSW Treasury, in consultation with the Office of Environment and Heritage and NSW Trade & Investment, and is similar to the administrator cost test applied by the Californian Public Utility Commission.[39]

The economic cost of the ESS is taken to be the cost to scheme participants of purchasing certificates, the costs to IPART of administering the scheme and the costs to the NSW Government from managing the scheme. The private costs for energy consumers who undertake energy efficiency activities is not considered an economic cost as they exhibit a willingness to pay when offered a financial incentive.

The economic benefits of the scheme are taken to be the avoided marginal costs of electricity generation, deferred marginal costs of electricity transmission and distribution, and avoided external impacts on society from emissions of greenhouse gases and air pollutants. These benefits are outlined further in **Appendix A**.

Administrative simplicity

While a higher target under Options 2 or 3 may result in a slightly increased administrative burden on scheme participants, accredited certificate providers and IPART, the broadened scope and increased quantity of energy efficiency activities should see efficiencies developed causing a lower administrative cost per certificate.

In 2012, IPART commissioned a study of the costs of participating in the ESS,[40] and found that the administrative burden for scheme participants of complying with the ESS relate mainly to staff and administration, including the submission of Annual Energy Savings Statements and certificate

[39] See the CPUC, 2001, *California Standard Practice Manual Economic Analysis of Demand-Side Programs and Projects*, accessed at http://www.cpuc.ca.gov/nr/rdonlyres/004abf9d-027c-4be1-9ae1-ce56adf8dadc/0/cpuc_standard_practice_manual.pdf

[40] IPART, July 2013, *Compliance and Operation of the NSW Energy Savings Scheme during 2012 - Report to Minister*, p10, www.ess.nsw.gov.au/How_the_scheme_works/Scheme_Performance/Annual_compliance_report_-_2012

purchasing. As administrative systems have been developed and implemented, these costs per certificate have been declining over time and can be expected to continue to do so.

For accredited certificate providers, the administration, compliance and audit part of the cost of participating in the ESS in 2012 was estimated at $2.74 per certificate.[22] Under Options 2 and 3, while accredited certificate providers may need to modify their business plans with the likely expansion of their businesses, increasing targets should result in decreased administrative costs per certificate through larger economies of scale.

Under Options 2 and 3, any increase in energy certificate creation activity will also create some additional administrative work for IPART. The increase in administration costs to IPART is a result of increased staffing to deal with the rapid growth in energy savings activities that occurred during 2012 (See **Section 5.4** below).

Equity between participants and non-participants and across sectors

The ESS has been highly successful to date and has supported projects that will deliver over 11 000 gigawatt hours of electricity savings over their lifetimes. These electricity savings are estimated to deliver around $1.6 billion in bill savings for NSW households and businesses over the next decade or more.

However, the benefits of the ESS are not spread evenly across the economy. Those that participate in the scheme (participants) by saving energy receive greater benefits than those who do not (non-participants).

The section below considers the impact of different options for targets on the equity between participants and non-participants including:

- the direct benefit to households and businesses that participate in the ESS by implementing energy efficiency projects and creating certificates
- the downward pressure on energy bills for both participants and non-participants as a result of reducing electricity demand
- the cost of compliance for scheme participants that would be passed through to both participants and non-participants through a small charge on their electricity bills
- overall equity is impacted by the relative number of participants who receive direct benefits compared to non-participants who do not receive direct benefits
- the share of certificates likely to be created by sectors across the economy compared to their relative contribution to the costs of the scheme.

Bill savings for energy users that participate

Energy users that participate in the ESS by implementing energy efficiency projects receive direct benefits in the form of bill savings.

Option 3 would deliver an estimated $2.76 billion of bill savings for households and businesses in present value terms. For Option 2 this figure is significantly higher at $8.44 billion.

Under Option 3, the annual average electricity bill saving across a typical NSW household is forecast to be $29.60. The annual bill savings are forecast to be $23.10 under Option 1, and $112.10 under Option 2 (see **Table 4**).

The average annual bill saving for a household that chooses to participate in the ESS could be as much as twice the average amount for all households.[41]

Table 4 Comparative residential energy bill savings from ESS target options

Option	Option 1: No change	Option 2: Targets to meet NSW 2021	Option 3: Optimal net economic benefit
ESS target	5%	24%	6.5%
Average annual household electricity bill savings between 2016 and 2020 (2013$)	$23.1	$112.1	$29.6
Bill savings in present value terms (2013$ millions)	$2131	$8443	$2759

Downward pressure on all electricity bills for participants and non-participants

By reducing peak demand, the ESS would place downward pressure on wholesale electricity prices and help defer avoidable investment in electricity networks. These indirect benefits would be passed on to all electricity users in downward pressure on prices.

The ESS is forecast to have an average conservation load factor of approximately 0.8.[42] This means that the ESS is likely to have a larger impact on energy demand at times of peak demand than on average across the year.

The total avoided costs to the energy supply system are estimated to be $719 million under Option 1, $2.7 billion under Option 2 and $950 million under Option 3. These savings would place downward pressure on the cost of electricity supply for all electricity consumers.

The NSW Government has not attempted to estimate changes in wholesale and network prices, as methods available to estimate these impacts vary widely, are highly sensitive to assumptions and can give a false sense of accuracy.

However, analysis of similar schemes in Australia indicates this downward pressure on wholesale electricity prices could offset the costs of the ESS on electricity bills. For example, energy market modelling prepared for the Commonwealth Government's investigation into a National Energy Savings Initiative found that a national version of the ESS would decrease wholesale electricity prices by between $1 and $2 per megawatt hour of electricity.[43] This is consistent with recent analysis of the Victorian equivalent of the ESS which found that it would decrease wholesale electricity prices by between $1.05 and $1.72 per megawatt hour.[44]

Electricity retailers are likely to pass through these savings to both participants and non-participants through electricity prices.

---

[41] The average household bill savings have been calculated based on the total bill savings from residential energy efficiency activities divided by the projected number of households between 2016 and 2020.

[42] This conservation load factor is based on the annual electricity savings and peak demand reduction forecast as a result of the ESS. This factor is the relationship between the impact of energy efficiency on average demand over a year compared to the times of peak demand. Although energy savings and peak demand reduction change in absolute terms between options, the relationship was found to remain relatively consistent.

[43] SKM MMA, 2013, *Assessment of Economic Benefits from a National Energy Savings Initiative*, prepared for the Commonwealth Department of the Environment, available at http://www.industry.gov.au/Energy/IndustrialEnergyEfficiency/NationalEnergySavingsInitiative/Documents/Economic-benefits-from-NESI.pdf

[44] Oakley Greenwood, 2013, Energy Market Modelling of the Continuation of the Victorian Energy Efficiency Target (VEET) Scheme , 2015 through 2017, prepared for the Victorian Department of State Development Business and Innovation, available at http://www.energyandresources.vic.gov.au/__data/assets/word_doc/0008/211103/Appendix-8.5-Energy-Market-Modelling.doc

Cost of compliance

The total costs to scheme participants (i.e. electricity retailers and large electricity users) are estimated to be $175 million under Option 1, $6.3 billion for Option 2 and $441 million for Option 3 million in present value terms.[45]

As shown below in **Table 5**, these costs would be passed through to customers at $0.53 per megawatt hour under current settings (Option 1), $30.30 per megawatt hour under a 24 per cent target (Option 2), or $1.69 per megawatt hour under a 6.5 per cent target (Option 3).

Table 5 Comparative impact on residential energy bills from ESS target options

Option	Option 1: No change	Option 2: Targets to meet NSW 2021 energy savings target	Option 3: Optimal net economic benefit
ESS target	5%	24%	6.5%
Electricity price impact between 2016 and 2020 ($/MWh)	$0.53	$30.3	$1.69
Average cost on annual household electricity bill between 2016 and 2020 (2013$)	$3.1	$167.9	$9.9
Costs in present value terms (2013$ millions)	$175	$6357	$441

Sites that are conducting emissions intensive and trade exposed activities receive a partial exemption under the ESS of either 60 per cent or 90 per cent. This means the charge on bills for these large energy users under Option 3 would be between $0.17 and $0.68 per megawatt hour.

Up until 2014–15, IPART regulated retail electricity prices for NSW small customers. Under the regulated prices, electricity retailers passed through the cost of the ESS at the $37 penalty rate rather than the price of purchasing certificates (approximately $26). In 2013–14, households were charged an average of $15 a year to cover the cost of the ESS.[46]

Now that electricity prices are deregulated, electricity retailers are likely to pass on their actual compliance costs. This means that under both Options 1 and 3, the average household may pay less for the ESS in 2020 than they did in 2013–14.

Potential number of participants compared to non-participants

The NSW Government has not attempted to estimate the number of future participants and non-participants in the ESS across different sectors in the economy. Developing these estimates would require an understanding of the number of activities undertaken by individual customers.

Larger targets are likely to improve the equity of the ESS because they are more likely to drive energy efficiency activities across a range of sectors and technologies.

Under a 6.5 percent target (Option 3), the ESS is predicted to have the potential to ensure that all households can participate directly in the ESS. Under this scenario, it is estimated that there will be as many residential activities delivered through the ESS as there are households by 2020. In comparison, maintaining the target at 5 percent (Option 1) is estimated to only deliver 80 percent

[45] See **Appendix A** for further details.
[46] IPART, 2013, The impact of green schemes on a typical residential electricity retail bill from 1 July 2013, accessed: http://www.ipart.nsw.gov.au/files/2f03abae-b009-425d-8347-a1e00099a976/Fact_Sheet_-_The_impact_of_green_schemes_on_a_typical_residential_electricity_retail_bill_from_1_July_2013.pdf

as many activities as there will be households by 2020, which would result in at least 20 per cent of households unlikely to directly participate in the ESS.

Figure 4 illustrates a potential range of households who could participate in the ESS under different scheme targets. This is intended to illustrate the potential for households to participate in the ESS.

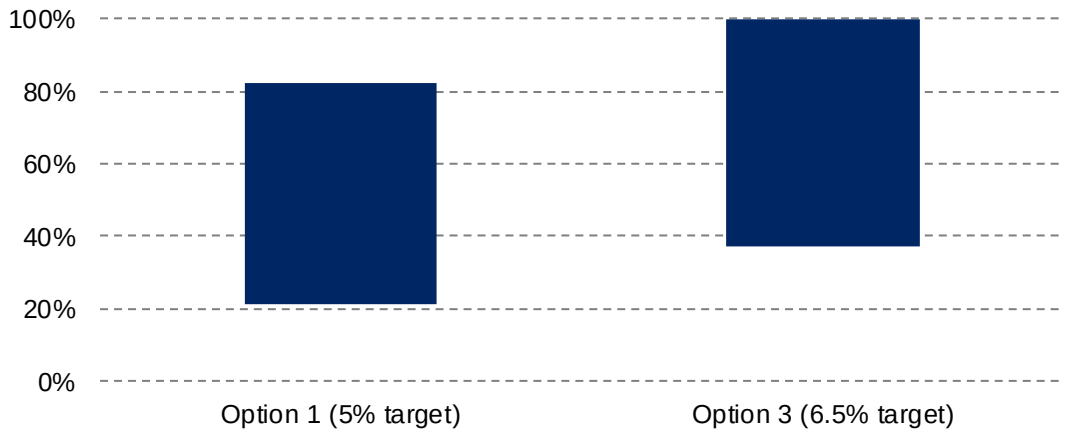

Figure 4 Potential range of household participation under target scenarios[47]

On balance, Option 3 is likely to enable more customers participate in the scheme, and more equitably spread the benefits of the ESS.

Equity across sectors of the economy

Each target option may have different distributional impacts on different sectors of the NSW economy. **Figure 5** uses the share of liable electricity consumption and certificate creation to indicate the differences in the residential, commercial and industrial sectors' contribution to the costs of the different target options and the benefits they receive from certificates.

Figure 5 shows that Option 3 provides a more equitable distribution of bill savings and certificates created for each sector.

[47] The minimum number of households participating is based on the number of instances that an individual residential activity is forecast to take place under the ESS. The individual activity with the highest number of projected instances is LED lighting upgrades. The maximum number of households participating is based on the assumption that each residential activity represents an individual household. Analysis by the Office of Environment and Heritage based on outputs from Jacobs, 2014, *NSW Energy Efficiency Uptake Model*.

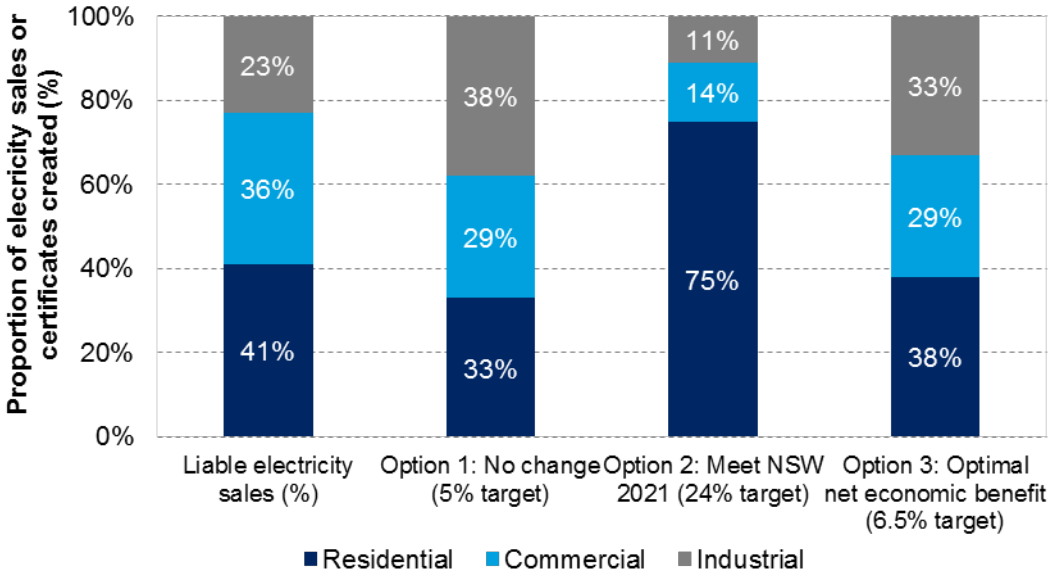

Figure 5 Comparison of share of liable electricity sales (left hand column) and certificates created by industry sectors under each target option[48]

2.2.4 Preferred option

Option 3, increasing targets to 6.5 per cent from 2016, is the preferred option as it best meets the objectives for government action. In particular Option 3:

- would optimise the net economic benefit of the ESS
- would contribute 11 per cent of the remaining energy savings in 2020 required to help meet the *NSW 2021* energy savings target
- is likely to lead to a fairer share of costs and benefits across the economy
- could give industry confidence to invest in delivering a more diverse range of energy efficiency activities and develop innovative energy efficiency solutions would minimise impacts on customer bills.

In order to implement this option, the NSW Government would bring forward amendments to the Act to increase targets, commencing in the 2016 compliance year.

2.3 Penalty rates

Scheme participants must pay a penalty if they fail to meet their energy savings target for the year (i.e. they have an 'energy savings shortfall').[49] The energy savings shortfall penalty is calculated by multiplying the amount of the energy savings shortfall by the scheme penalty rate.[50] The penalty rate is prescribed under Schedule 5A of the Act, and the Regulations allow IPART to adjust the rate for CPI[51]. In 2014, the ESS penalty rate was $25.97 per certificate before tax, or around $37 taking into account potential tax implications.[6]

[48] The estimates for the industry sector share of liable electricity sales is based on estimated electricity consumption in 2012-13 from Bureau of Resource and Energy Economics, 2014, *Australian Energy Statistics: Table F2*. Commercial sector is taken to be Commercial and Services, Division I Transport, Postal and Warehousing and Division E Construction. Industrial sector is taken to be Divisions A, B, C and D excluding electricity consumed by Subdivision D26 Electricity Supply and subtracting for exempt load.
[49] *Electricity Supply Act section 111, section 112*
[50] *Electricity Supply Act section 112*
[51] *Electricity Supply (General) Regulations 2014* clause 30

A review of best practice energy efficiency schemes similar to the ESS describes the role of a penalty rate:

> *"A financial penalty:*
>
> - *offers energy providers a financial incentive to meet their obligations;*
> - *presents an opportunity to use any revenue from penalty payments to fund energy efficiency projects administered by others; and*
> - *sets a ceiling price where trading of energy savings is included (...).*
>
> *The level of the penalty should be set high enough to mobilise energy providers to meet their targets."*[52]

As shown below in **Table 6**, a number of scheme participants paid penalties instead of meeting their obligations by surrendering certificates in the 2009, 2010 and 2011 compliance years. This resulted in scheme participants paying penalties adding up to about $13.3 million across the three compliance years. In 2012 and 2013 compliance years, no scheme participants paid a penalty.

In 2009, there were enough certificates created to meet the targets. However some scheme participants elected to pay penalties. In 2010, although 804 318 certificates were created, scheme participants only surrendered 651 655 certificates.[53] This suggests that almost half of the penalties paid could have been avoided in the 2010 compliance year, had scheme participants purchased and surrendered the remaining 152 000 certificates created in the 2010 compliance period.

Table 6 Penalties paid by scheme participants in the ESS[17]

Compliance year	Number of scheme participants that paid penalties	Total penalties in certificates	Total penalties in dollars (approximate)
2009	3	347	$8000
2010	8	316 952	$7 300 000
2011	4	250 790	$6 000 000
2012	0	0	0
2013	0	0	0

This section considers whether the penalty rate should be changed, and what the appropriate basis for a penalty rate should be.

2.3.1 The case for action

Policy rationale for penalty rates

The current penalty rate was set in 2009 with the intent of enabling the ESS to deliver greatest possible net economic benefit based on economic modelling at the time. It was predicted that the penalty rate would allow ESS targets to be achieved, while being able to accommodate the market if the ESS did not perform as modelled, and sought to eliminate the risk of scheme participants

[52] The Regulatory Assistance Project, 2012, *Best Practices in Designing and Implementing Energy Efficiency Obligation Schemes Research Report Task XXII of the International Energy Agency Demand Side Management Programme.*
[53] IPART, 2011, NSW Energy Savings Scheme – Compliance and Operation in 2010 - Annual Report to the Minister, accessed: http://www.ess.nsw.gov.au/files/edc85498-353d-4d48-82d6-9fad00e2bd98/ESS-SchemeReport-2010.pdf

being required to purchase 'expensive' energy efficiency through the ESS.[54] This policy rationale is still valid, but the penalty rate itself may no longer be up to date.

Penalty rates should be reviewed to ensure they current

The current penalty rate is based on economic analysis now over five years old, and does not necessarily still represent the optimal setting according to changes in the market. The energy efficiency market established by the ESS has evolved since penalty rates were set in 2009.

There are economic benefits from energy savings that were not valued when determining the existing penalty rates that could be valued in setting future penalty rates. These include reduced air emissions, peak demand reductions and network expenditure.

Scheme participants supported the current penalty rates

More than three quarters of submissions to the ESS Issues Paper agreed that the current penalty rate should be changed. However, a number of scheme participants indicated a preference in keeping certificate penalty rates low as a result of the potential impact on their businesses.

> *"In relation to penalty prices, these seem to have achieved their objective to date. There seems to be little reason to raise the penalty price" (AGL)*
>
> *"There is no need to increase the current penalty price, as liable entities are buying certificates rather than paying the penalty." (Simply Energy, an energy retailer)*

Penalty rates do not have a direct impact on electricity prices

Penalty rates are not a direct factor in electricity prices for consumers. This has been the case since the deregulation of electricity prices in July 2014. The focus of the modelling on penalty rates is on managing the scheme if the market does not behave as predicted.

Objectives of government action

There are two key components to the rationale for setting penalty rates:

- to enable the scheme to deliver the optimal amount of energy efficiency to maximise economic benefits (i.e. the penalty rate must be above the marginal price of delivering energy efficiency)
- to ensure the economic benefits of the scheme outweigh the costs (i.e. the penalty rate must be set below the economic benefit).

The objectives of government action are to:

- establish a transparent method for setting the ESS penalty rate
- ensure the penalty rate is set above the marginal price of energy efficiency required to maximise economic benefits
- ensure the penalty rate acts as a safety valve to ensure the ESS delivers a net economic benefit.

[54] NSW Department of Water and Energy, May 2009, *Better Regulation Statement – Proposed NSW energy savings scheme targets and reform,* www.resourcesandenergy.nsw.gov.au/energy-consumers/sustainable-energy/efficiency/scheme/sustain_renew_neet_better_regulation_statement.pdf

2.3.2 Description of options

Option 1: No change

Under this option, the penalty rate would remain at $25.97 per certificate in real terms. This is equivalent to $37.10 for the 2014 compliance year when considering company tax.[6] This option is based on the marginal cost of delivering energy efficiency to optimise the net economic benefit of the scheme according to modelling conducted in 2008.

Option 2: Penalty rate set to reflect the avoidable short term costs of electricity supply (preferred option)

Under this option, the ESS penalty rate would be increased to the tax effective equivalent of $42 to reflect the avoidable costs in the short term (in economic terms known as the Short Run Marginal Cost) of energy supply.

Short Run Marginal Cost is the cost of increasing energy supply in the short term period where capital costs and fixed operating costs, such as building power stations and networks, are fixed. This approach would not rely on forecasting future technology costs and demand.

The inputs to calculate the short term cost of energy supply for this review used the following variables:

- fuel costs of power stations estimated to be $15.40 per MWh in 2016[55]
- variable operating and maintenance costs of power stations estimated to be $2.70 per MWh in 2016[55]
- line losses estimated to be an average of 6 per cent or $2.40 per MWh saved in 2016[56]
- the cost of carbon based on the price of future derivatives for European Emission Allowance Unit of $8.60 per tCO_2e in 2016 or around $7.40 per MWh in 2016[57]
- the health impacts of air pollutants (NO_x, SO_x, PM_{10}) estimated to be $14.40 per MWh in 2016.[58]

Option 3: Penalty rate set to reflect the avoidable long term costs of electricity supply

Under this option, the ESS penalty rate would be increased to the tax effective equivalent of $125 to reflect the avoidable costs in the long term (known as the Long Run Marginal Cost) of electricity supply.

Long Run Marginal Cost is the cost of increasing energy supply in the period (the longer term) where all costs (including capital costs) are variable. It is based on a number of network, generation and peak demand assumptions. So it is of great benefit where a comprehensive range

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[55] Analysis by the Office of Environment and Heritage based on a capacity weighted average of forecast electricity generation published in Australian Energy Market Operator, 2013, *National Transmission Network Development Plan: Zero Carbon Price Scenario Model Results (Excel workbook)*, available at http://www.aemo.com.au/Electricity/Planning/~/media/Files/Electricity/Planning/Reports/NTNDP/2013/2013%20NTNDP%20zero%20carbon%20price%20scenario%20modelling%20results.xlsx.ashx

[56] Australian Energy Market Operator, 2014, *Distribution Network Loss Factors for the 2014/15 Financial Year*, available at http://www.aemo.com.au/Electricity/Market-Operations/Loss-Factors-and-Regional-Boundaries/~/media/Files/Other/loss%20factors/DLF_FINAL_V2_2014_2015.ashx

[57] Independent Economics and Frontier Economics, 2014, *Economic and Energy Market Forecasts*, prepared for the Australian Energy Market Operator, available at http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report/~/media/Files/Other/planning/NEFR/2014/2014%20Supplementary/Independent_and_Frontier_Economic_and_Energy_Market_Forecasts_final.ashx see **Appendix A** for further details.

[58] Based on the approach to quantify health impacts from coal fired power stations developed in Australian Academy of Technology, Science and Engineering, 2009, *Hidden Costs of Electricity: Externalities of Power Generation in Australia*, available at http://www.atse.org.au/Documents/Publications/Reports/Energy/ATSE%20Hidden%20Costs%20Electricity%202009.pdf see **Appendix A** for further details.

of programs or longer term, large scale investments are to be assessed for their economic benefit over a long period.

The Office of Environment and Heritage estimates the long term cost at $125 per MWh over a 25 year period from 2016 to 2040. This is based on:

- electricity generation including a carbon price $83.30 per MWh[59]
- transmission and distribution network capacity $18.9 per MWh[60]
- line losses estimated to be an average of six per cent or $7.20 per MWh
- the health impacts of air pollutants (NO_x, SO_x, PM_{10}) estimated to be $14.40 per MWh.

Using the long term costs of increasing energy supply involves a high level of uncertainty. Future requirements to build new energy supply infrastructure, and their associated costs, are uncertain.

2.3.3 Analysis of options

Effectiveness

Forecasts of average certificate prices under both the current and preferred target (see **Section 2.2** and **Section 3)** do not exceed the current penalty rate.

This indicates that, if the targets increased to 6.5% of liable electricity sales (as recommended in **Section 2.2.4**) or a combined target of 8.0% of liable electricity sales (as recommended in **Section 3.3**), a change to the penalty rates to support the new target would not be required.

Although the current penalty rate is higher than the average certificate price forecast under the preferred option for targets, the predicted certificate price is not guaranteed to happen. Certificate prices in schemes like the ESS are unpredictable irrespective of the modelling method employed as this is an inherent feature of markets.[36,61,62]

Penalty rates are employed as a safety valve to ensure that energy efficiency schemes continue to deliver net economic benefits even when scheme modelling proves to be inaccurate.

Table 7 below shows a summary of the potential energy savings that could be driven by the ESS between 2015 and 2020 given a fixed certificate price at the penalty rate. It shows that Option 2 would make 7% per cent more energy savings possible than the current penalty rate. Option 3 would unlock 126% per cent more than the current penalty rate.

Table 7 Net economic benefit of the ESS if the cost of purchasing certificates is the penalty rate[34]

Option	Tax effective penalty rate in 2016 (2013$)	Potential uptake of annual energy savings in 2020 (GWh p.a.)	Relative potential energy savings above current penalty rate
Option 1: No change	$37.10	2000	n/a
Option 2: Short Term Cost	$42	2142	7%
Option 3: Long Term Cost	$125	4518	126%

[59] NERA, 2013, *Wholesale Electricity Costs in the NEM*, prepared for the AEMC, accessed at http://www.aemc.gov.au/getattachment/e90537f9-ce0d-4f3e-9f17-4ffa1d797920/NERA-Economic-Consulting-–-Projections-of-Wholesal.aspx
[60] The network capacity value is based on an average Long Run Marginal Cost of network capacity cost of $132/kW p.a.(see **Appendix A** for details) and an average conservation load factor of 0.8.
[61] Bertoldi et al, 2009, *Energy supplier obligations and white certificate schemes: Comparative analysis of experiences in the European Union*, Energy Policy 38 (2010) 1455–1469
[62] Oikonomou & Mundaca, 2008, *Tradable white certificate schemes: what can we learn from tradable green certificate schemes?* Energy Efficiency (2008) 1:211–232

Option 1 - no change to the penalty rate

The current penalty rate was determined based on economic modelling in 2008. This modelling may now be out of date as the marginal cost of delivering energy efficiency and the maximum price under which the scheme delivers benefits may have changed. This creates a higher level of uncertainty around whether the current penalty rate will deliver the optimal amount of energy savings, or provide a suitable safety valve. Maintaining this rate without any further modelling to confirm its effectiveness would not improve transparency, and would not assist market confidence.

Option 2 - penalty rate set to reflect the avoidable short term costs of electricity supply

The short term cost of electricity supply is a clear and transparent method of determining penalty rates, and these costs can be estimated based on publicly available information.

The references used to estimate the short term costs of electricity supply are publically available and based on either market prices (e.g. fuel prices, cost of carbon) or empirical studies (line losses, health cost of air pollution). Therefore a penalty rate based on short term costs of electricity supply would be transparent to stakeholders.

In the current market, where there is spare capacity in generation capacity, the short term cost is a suitable method to use to determine the benefits of saving energy. Although there may be future requirements to build infrastructure, these costs can be uncertain. This option will also ensure the penalty rate is updated to act as a safety valve. Therefore a penalty rate based on the short term costs would be an effective way to ensure that the ESS delivers a net economic benefit.

Option 3 - penalty rate set to reflect the avoidable long term costs of electricity supply

The long term cost takes into account more than just electricity generation costs such as network costs and generator capacity, and would result in a larger penalty rate than the short term cost in Option 2.

This calculation of long term costs is highly sensitive to a number of assumptions on how energy efficiency relates to peak demand, when generation and network capacity would be required, and what technology will be used and how much it will cost in the future. While assumptions can be reasonable and documented, the high level of uncertainty means that different analysis could result in significant differences in long term costs. Therefore Option 3 would not be effective in making the basis for determining the penalty rate transparent to stakeholders or ensure the ESS delivers the maximum net economic benefit.

Efficiency

The Office of Environment and Heritage has conducted a cost-benefit analysis of the different penalty rates assuming that scheme participants pay the penalty rate for certificates. The analysis indicates that the higher the penalty rate, the lower the potential cost effectiveness of the ESS.

A comparative analysis of the cost effectiveness of three penalty rates is shown in **Table 8** below. It shows that Option 1 and Option 2 would provide a net economic benefit even if scheme participants pay the full penalty rate for certificates. The penalty rates are compared against the preferred ESS target of 6.5 per cent outlined in **Section 2.2.4.**

Table 8 Comparative cost effectiveness of the ESS assuming that the purchase cost of certificates is the penalty rate

Option	Preferred option for targets (6.5%)	Option 1: No change	Option 2: Short term cost	Option 3: Long terms cost
Penalty rate	n/a ($26 average certificate price)	$37.10	$42	$125
Net Present Value (2013 $m)	$731	$562	$487	-$778
Benefit Cost Ratio	2.7	1.9	1.7	0.6

Increasing the penalty rate to the Long Run Marginal Cost under Option 3 has the potential to erode the net economic benefit of the ESS. Although the penalty rate would reflect the long term benefits of energy savings, it would reward most of these energy savings through upfront certificate creation in the short term. Because of the long term nature of costs in Option 3, when discount rates are considered, certificates that are traded at this price would cost more than the benefits of energy saved. In periods with limited certificate supply, using the long term costs would run the risk of costs exceeding the benefits.

Administrative simplicity

Penalties are adjusted by IPART each year in line with inflation. Penalty rates are applied at the end of each compliance year to scheme participants who have not surrendered sufficient certificates to meet their individual energy savings targets.

Under Option 2 or Option 3, it is unlikely that a change to the penalty rate would have any significant administrative impact on IPART, scheme participants or accredited certificate providers.

2.3.4 Preferred option

The preferred option is to increase the penalty rate from a tax effective equivalent of $37 to $42 per certificate to reflect the avoided short term cost of electricity supply (Option 2). This is higher than the forecasts for average certificate prices under both current and preferred targets, and so is not expected to impact on the net economic benefits of the scheme. However, even assuming that certificates are traded at this penalty rate, each megawatt hour of electricity saved would still deliver a net economic benefit of $46.

In order to implement this option, the NSW Government would bring forward amendments to the Act to increase penalty rates, commencing in the 2016 compliance year.

The penalty rate would be subject to review in line with any review of ESS targets.

Option 2 meets the objectives of government action as:

- the short term cost method is based on publicly available data, making it transparent and easy to communicate the rationale and method for setting the ESS penalty rate
- it enables the optimal net economic benefit of the ESS to be realised
- it ensures the scheme continues to deliver net economic benefits even if the market behaves differently from forecasts.

2.4 Future approach to setting targets and penalty rates

The previous sections considered options for future targets and penalty rates for the ESS.

The NSW Government is committed to the continuous improvement of the ESS (see **Section 6**), including regular reviews of targets and penalty rates. This section considers different options for future approaches for reviewing targets and penalty rates.

2.4.1 The case for action

Transparency and maintaining market confidence

There is no clear process for reviewing ESS targets and penalties. The Act includes conditions which, if met, allow the Minister to amend targets by regulation.[63] The Act does not provide any particular guidance on how the Minister might select a new target or penalty if any of those conditions are met.

Reviews of other market-driven energy efficiency schemes suggest a well-designed scheme should include a clear mechanism for adjusting targets while maintaining market confidence.[52]

In its review of the predecessor of the ESS, the Greenhouse Gas Reduction Scheme (GGAS), IPART highlighted the importance of:

- setting achievable but challenging targets and providing a transparent mechanism for adjusting them over time
- providing sufficient flexibility of design so that unforeseen issues can be addressed
- establishing market confidence in certificates and their value as a tradable commodity.[64]

Stakeholders support a systematic approach to reviewing targets and penalties

The vast majority (90 per cent) of submissions to the ESS Review Issues Paper supported reviewing the ESS targets. Some reservations were expressed regarding the frequency of reviews.

> *"ESS targets should be reviewed at a frequency that is short enough to ensure their relevance, but long enough so as not to substantially compromise business confidence." (ERM Power, an electricity retailer)*

Over three-quarters of the submissions to the ESS Issues Paper that expressed an opinion on the scheme target and penalty setting approach agreed that the NSW Government's approach to setting targets and penalties should be revised.

A number of submissions urge codification of the existing target adjustment mechanism by setting out clear principles and processes in regulation.

> *"(…) that clear principles be set out in regulation for the review and recommendation of targets to the Minister by an appropriate advisory panel, independent to the Scheme Administrator." (Energy Makeovers, an ACP)*

Submissions opposed to Government intervention argued that market forces will rectify supply issues over time without intervention. While that may be the case, modification of ESS target and penalty rate setting processes should be designed to maximise the benefits of the ESS to the NSW economy.

Objectives of government action

The objectives of government action are to:

[63] Electricity Supply Act section105
[64] IPART, 2013, *NSW Greenhouse Gas Reduction Scheme - Strengths weaknesses and lessons learned - Final Report – July 2013*, accessed at: www.ess.nsw.gov.au/ESS_Notices/Updates/NSW_Greenhouse_Gas_Reduction_Scheme

- provide transparency in the target and penalty setting process with the intention of improving market confidence
- ensure that the ESS delivers optimal net economic benefit by being responsive to changed market conditions.

2.4.2 Description of options

Option 1: No change

The Act outlines conditions under which the Minister may recommend changes to the ESS targets or penalty rates, as outlined in **Section 2.1** above. These conditions are qualitative and the process for how the Minister would assess changes to targets and penalty rates is not defined.

The Act provides that any change to targets or penalty rates cannot commence within 12 months after the date the change is made.[65]

Under Option 1, there would be no change to this position.

Option 2: Targets and penalty rates reviewed every three years

Under this option, the NSW Government would seek to amend the Act to replace the current conditions for changing targets with a three yearly review of ESS targets and penalty rates.

The reviews would examine the assumptions considered in setting ESS targets and penalty rates. Stakeholders would be engaged through consultations, workshops and issues papers.

For example, the Victorian Government's Victorian Energy Efficiency Target (VEET) scheme fixes targets for three years at a time. During this period there is a comprehensive review of scheme targets and the likelihood of the scheme reaching its energy savings goals.

Option 3: Annual reviews of specified conditions (preferred option)

Under this option, the conditions for changing energy savings scheme targets or penalty rates would remain as they are in Option 1, but with codification of when a condition has been met. The NSW Government would seek to prescribe by regulation when particular conditions set out in the Act for changing targets and penalty rates have been met. The proposed changes are described in **Table 9** below.

Table 9 Proposed clarifications to conditions when targets and penalty rates may be reviewed

Current conditions in the Act	Proposed clarification [66]
"(…) to achieve greater uniformity or harmonisation with a scheme in another jurisdiction with similar objectives to the energy savings scheme, or for the purposes of implementing a national scheme with similar objectives to the energy savings scheme (…)"	This condition has been met when greater uniformity or harmonisation results in greater than 20 per cent change in the estimated energy efficiency opportunity that could be supported by the Energy Savings Scheme in NSW
"(…) sustained under supply of energy savings certificates, as evidenced by scheme participants being required to pay a substantial energy savings shortfall penalty for 2 or more consecutive years (…)"	A "substantial energy savings shortfall" is one greater than 10 per cent each year

[65] *Electricity Supply Act* section 104
[66] The *estimated energy efficiency opportunity* would be calculated through analysis of an energy efficiency opportunity model, such as the one used to inform the analysis of options in this paper.

Current conditions in the Act	Proposed clarification [66]
"(…) sustained over supply of energy savings certificates, as evidenced by the total number of certificates created substantially exceeding the total number of certificates required to meet all individual energy savings targets for 2 or more consecutive years (…)"	"Substantially exceeded" is considered to be greater than 20 per cent each year
"(…) significant changes to the rules governing the creation of energy savings certificates (…)"	A "significant change" to the rules governing certificate creation means one that results in greater than 20 per cent change in the estimated energy efficiency opportunity that could be supported by the Energy Savings Scheme in NSW
"(…) significant changes to the policy or regulatory framework, or the market conditions, in which the energy savings scheme operates (...)"	Significant changes to the policy or regulatory framework are those that result in greater than 20 per cent change in the estimated energy efficiency opportunity that could be supported by the Energy Savings Scheme in NSW.

Under this option IPART, in its role as the Scheme Administrator would review these conditions in its annual report. If a condition has been met, the NSW Government would review whether there is a case to adjust targets or penalty rates, including conducting cost benefit analysis and consultation. This option would retain the full calendar year of notice before a change in targets or penalty rates would take effect.

2.4.3 Analysis of options

Effectiveness and Efficiency

Option 1 - no change to setting targets or penalty rates

The ESS (Option 1) has proven to be effective at delivering least cost energy savings. It has driven a range of residential, commercial and industrial energy savings projects.

However, these benefits could be improved.

The conditions to review targets and penalty rates are qualitative and the mechanism for assessing whether these triggers had been met lacks clarity. This can impact on market certainty, and may not facilitate responsive changes to market conditions, to make sure that the ESS continues to deliver optimal economic outcomes.

Some stakeholders supported the current approach using conditions, or triggers, to review targets:

> *"The current approach under the ESS is superior to that of other certificate schemes, in that targets are set in advance. Advance target setting substantially reduces trading risk, as positions can be confidently managed over a longer period of time. This is distinct from the approach of other schemes where targets remain unknown until during the year to which they refer." (ERM Power, an energy retailer)*

However other stakeholders have highlighted that the process for assessing conditions and setting targets is undefined and unclear:

> *"The principles and provisions for Ministerial adjustment of targets that are set out in the Act are generally sound. However, it is unclear how these provisions are applied in practice. There is a need for greater codification about when and who will conduct reviews, what will be considered and on what basis new targets will set." (Energy Efficiency Certificate Creators Association, an industry body)*

Option 2 - targets, penalty rates, and scheme duration reviewed every three years

Reviews every three years (Option 2) provide a level of market certainty as ESS targets and penalty rates would be fixed for the review period. However, the historical performance of the ESS has shown that supply and demand for certificates can change relatively quickly within a year. There was a 24 per cent undersupply of certificates required to meet targets in 2011 as a result of changes to the ESS Rule that removed a highly used activity (showerhead replacement). The following year in 2012 there was a significant 38 per cent oversupply of certificates above that required to meet targets.

This suggests that a three year review cycle would not allow the NSW Government to be responsive to changing conditions and may result in rapid target expansion or contraction to adjust for market conditions that were apparent years before. This could lead to market volatility and boom-bust cycles for the energy efficiency industry.

A number of submissions supported regular target reviews, usually of between every three and five years.

> *"(…) long-term targets (10-20 years) with regular three-yearly reviews are an appropriate mechanism to allow market participants to provide thorough input into the ESS while also delivering confidence for investors and industry that ESS targets will remain relatively stable." (Knauf Insulation, an energy efficiency product supplier)*

However, regular reviews every three years may negatively impact on investor certainty by fostering a lack of confidence in the scheme's continuity.

Option 3 - Annual reviews of specified conditions

Option 3 provides clarity around conditions precedent for changing targets and penalties, and facilitates an annual review process. This would allow NSW Government to better respond to observed market changes than Option 2 (fixed three year process). Option 3 provides greater responsiveness, flexibility and adaptability to market conditions.

There was considerable support from submissions to build upon the existing approach.

> *"A survey of EECCA members found that the majority of respondents supported a combination of steadily increasing base-targets each year and review triggers to allow for the consideration of targets in the case of sustained over or under performance or substantial design changes." (Energy Efficiency Certificate Creators Association, an industry body)*

Under Option 3, the regulation would be amended to codify the conditions upon which the targets and penalties may be amended. This would allow stakeholders to predict whether targets are likely to be amended, and reduce inefficiencies from the time it takes markets to adjust to a new target. Reducing the volatility in the market should increase investor confidence and improve the likelihood of the ESS achieving its objectives.

However, the potential for more regular changes to targets and penalty rates under this option may have the unintended effect of creating uncertainty and reducing market confidence. Some stakeholders warned against frequent changes.

> *"the roll-out of these energy efficiency technologies are principally governed by costs (…) setting the targets on supply and demand outlooks does seem reasonable. The overriding principle should be to refraining from sudden and constant change, based upon short term occurrences (…) notice of impending changes (…) is the best way to safeguard against 'boom/bust' scenarios." (Woolworths Limited, a large energy user)*

Other stakeholders proposed an automated mechanism for adjusting targets.

> *"If the certificate price significantly exceeds the penalty price for a significant period of time the targets should be reviewed to determine if they should be lowered. If the certificate price drops below a particular price, targets should be reviewed to determine if they need to be raised." (Energy Efficiency Council, a peak industry body)*

A target and penalty rate setting approach with prescribed triggers, annual reviews to determine if these triggers have been met, a process for determining whether any amendments to targets or penalties should be made if triggers are met, and a 12 month notice period before changes are implemented should balance responsiveness to market extremes with market certainty in the scheme's future. This approach may minimise the likelihood of market volatility, such as boom-bust scenarios and improve the scheme's transparency.

Administrative simplicity

Balance is required between frequency and comprehensiveness of reviews

Comprehensive reviews require one or more rounds of stakeholder consultation and submissions. This could be an additional burden placed on scheme participants and accredited certificate providers in their efforts to contribute to the reviews.

Annual reviews with limited prescribed stakeholder engagement are simpler than comprehensive three year reviews, as annual reviews can be scheduled by IPART in advance and systems put in place to limit repeated administrative cost. Administrative systems will need to be developed to manage the process.

Government agencies would still be required to determine new targets or penalties once IPART has reported one or more conditions have been met. Stakeholder engagement would still be carried out prior to any new targets or penalty rates being established.

Annual reviews would not consider scheme duration or the target setting methodology. These would be the subject of five-yearly comprehensive reviews as is the current case.

2.4.4 Preferred option

The preferred option is Option 3. Under this option the NSW Government will seek to prescribe by regulation the conditions which allow the Minister to amend targets and penalties. IPART would review and report annually on whether these conditions have been met.

Under this option the NSW Government would carry out a process to determine whether any changes to targets and penalties should be made, including a cost benefit analysis and stakeholder consultation. The 12 month notice period before any changes would be made would be retained.

These measures are intended to facilitate responsiveness to changes in market conditions, provide transparency and contribute to delivering investor certainty. While changes to targets may risk introducing some uncertainty for businesses, a clear process for assessing whether targets should be reviewed provides the market with better information to plan for any changes.

Any factors taken into account in target adjustments would be published.

Targets would be re-set with sufficient advance notice of their implementation (one calendar year) in order to provide the most suitable balance between being reactive to changed conditions but at the same time enabling the market to adjust the supply and demand of certificates in a smooth manner.

To implement this option the NSW Government would bring forward a new regulation to prescribe conditions for reviewing the target and penalty rates. This regulation would take effect from 2016. These reviews would consider targets and penalty rates from the 2018 compliance year onward.

Further considerations for consultation

The preferred option (Option 3) outlines a series of quantitative thresholds to codify when particular conditions set out in the Act for changing targets and penalty rates have been met. The NSW Government is seeking stakeholder feedback on whether quantitative thresholds are the best option for triggering reviews of targets and penalty rates and, if so, whether the quantitative thresholds outlined in **Table 9** are appropriate.

2.5 Scheme duration

The ESS is legislated to automatically terminate in 2020.[67]

On 11 November 2014, the NSW Government announced that it intends to extend the duration of the ESS until 2025. The NSW Government will bring forward legislative amendments later in 2015.

Combined with preferred ESS targets, this is predicted to generate a net economic benefit of $383 million in net present value above what the ESS would deliver under current settings.

The following section provides information on the NSW Government's decision to extend scheme duration until 2025.

2.5.1 The case for action

The ESS is continuing to deliver benefits

While the ESS continues to deliver economic benefits and unlock new energy efficiency opportunities across industries and technologies for households and businesses, there is a strong argument that the ESS should continue. Analysis prepared for OEH shows that cost effective opportunities to implement energy efficiency projects in NSW will continue past 2020,[6834] and the ESS will therefore also continue to deliver economic benefits beyond 2020.

Section 6.1 outlines the NSW Government's commitment to continuous improvement of the ESS, including monitoring the scheme's performance to ensure it continues to deliver benefits.

The energy efficiency opportunity will continue to grow

There is evidence to suggest that energy efficiency opportunities will continue to grow over time. For example, the US Environmental Protection Agency describes this opportunity in the US:

> *"The opportunity presented for economic investment in EE [energy efficiency] is dynamic, growing over time as technologies and practices advance, as populations grow, and as investment occurs in the construction of new homes, buildings, and industrial facilities. As new policies are enacted, leading to the acceleration of investment in EE, an additional portion of the expanding opportunity is realized. After decades of experience implementing policies to accelerate investment in cost effective energy efficiency, states are finding renewed opportunities as they develop more sophisticated and effective strategies (…)"*[69]

The US Environmental Protection Agency's literature review found that state based energy efficiency programs should aim to deliver "incremental savings" of between half a per cent and one percent of energy retail sales each year in order to realise the cost effective energy efficiency opportunity. This is equivalent to an annual target of between five per cent and ten per cent in a scheme that rewards activities with ten years of energy savings upfront (such as the ESS).

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[67] *Electricity Supply Act section 178*
[68] Jacobs, 2014, *NSW Energy Efficiency Uptake Model V1.0* and Energetics, 2014, *NSW Energy Efficiency Opportunity Model V1.0*
[69] US Environmental Protection Agency, June 2014, *Clean Power Plan Proposed Rule - Technical Support Document: GHG Abatement Measures*, accessed at: http://www2.epa.gov/sites/production/files/2014-06/documents/20140602tsd-ghg-abatement-measures.pdf

Energy efficiency will have benefits beyond 2020

The 2007 Owen Inquiry into Electricity Generation in NSW found that around $7 billion to $8 billion of investment in new base load electricity generation would be required by 2022 in order to meet growing demand. Among other things, the Inquiry recommended continuing efforts on energy efficiency.[70]

Due in large part to better than expected outcomes from energy efficiency, supported by the ESS, electricity demand has plateaued and this cost has been deferred.

The Australian Energy Market Operator's 2014 Electricity Statement of Opportunities identified that due to decreasing electricity demand, no new electricity generation capacity will be required until at least 2023-24.[71]

However, a number of existing generators in NSW are approaching the end of their economic life, indicating there may need to be investment to replace or rehabilitate generation capacity over the next decade. **Figure 6** shows the age of NSW generation capacity by capacity and generator type.

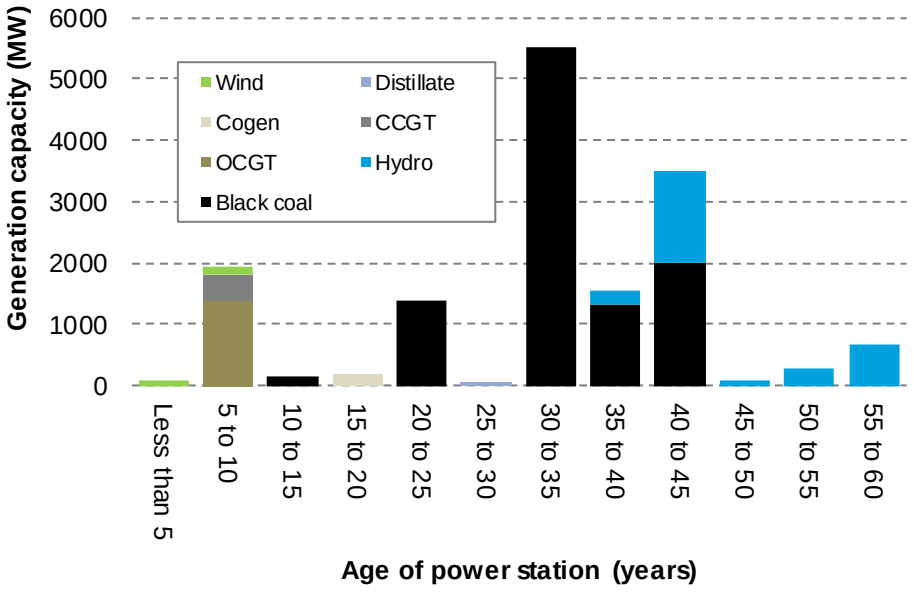

Figure 6 Age of current NSW centralised power generation capacity[72]

The Bureau of Resource and Energy Economics predicts that the cost of replacing existing generators at the end of their life with modern coal technology in 2030 would be around $2,946 per kW. This would be $4,452 per kW if power stations were fitted with carbon capture and storage.[73] These costs would be passed on to NSW energy consumers.

[70] Owen Inquiry July 2007, *Final report - Inquiry Into Electricity Supply in NSW* www.treasury.nsw.gov.au/__data/assets/pdf_file/0011/13340/Owen_Inquiry_-_Main.pdf
[71] Australian Electricity Market Operator, 2014, *Electricity Statement of Opportunities*, accessed at: www.aemo.com.au/Electricity/Planning/Electricity-Statement-of-Opportunities
[72] Based on age of power stations published in: Australian Energy Market Operator, 2013, *National Transmission Network Development Plan: Existing Generator Information*, not including Munmorah or Wallerawang power stations.
[73] Bureau of Resource and Energy Economics, 2013, *Australian Energy Technology Assessment Update*, accessed at www.bree.gov.au/publications/australian-energy-technology-assessments

There are also costs that can be avoided in the shorter term. NSW transmission and distribution networks service providers have proposed to invest $6.6 billion in electricity network upgrades between 2014 and 2019 that could potentially be deferred or reduced with lower demand.[74]

Households and businesses that implement energy efficiency measures over the next decade with the support of the ESS can help defer or reduce the need to build new peaking and baseload power stations, defer investment in network infrastructure and place downward pressure on electricity prices.

Most stakeholders support extending the duration of the ESS

Over three quarters of submissions to the ESS Review Issues Paper supported the government extending the ESS past 2020. A minority of submissions mentioned a specific extension timeframe.

> *"…are extended until 2030 with 5 yearly gateway reviews based on capacity of the energy efficiency market and persistence of barriers." (Energy Efficiency Certificate Creators Association, an industry body)*

Some stakeholder submissions considered that the ESS should not be continued beyond 2020.

> *"(…) it is unnecessary. (…) Energy consumption has already reduced and consumers are taking action…the scheme is creating hidden cross-subsidies, distorting market outcomes and undermining product initiatives a retailer may wish to market (…) It involves significant investment in resources from scheme regulators, liable entities and third-party suppliers to undertake, audit and verify the activities (…) also creates resource misallocations across the broader economy and causes energy consumers to pay higher energy prices." (Simply Energy, an energy retailer)*

A number of stakeholders that made submissions on scheme duration thought the scheme should not have a termination date at all:

> *"The ESS should end once other programs are created to achieve greater energy savings at lower costs or as long as it benefits the economy." (Minus 40, an energy efficiency service provider)*

> *"Government could close the scheme when (the) market has reached its optimum, however there appears to be continual improvement in the development of energy efficiency products." (Ethnic Communities Council, a community organisation)*

Objectives of government action

The objectives of government action are to:

- continue to defer or avoid unnecessary investment in generation and network infrastructure

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[74] Avoidable network investments include capital expenditure on augmentation for increased capacity ($1.4 billion), reliability ($0.3 billion), and aged asset replacement ($4.9 billion). These figures have been estimated based on the NSW transmissions and distribution network service provider's regulatory proposals for the 2014 to 2019 determination period.
Ausgrid, 2014, *Revised Regulatory Proposal and Preliminary Submission: 1 July 2014 to 30 June 2019*, Table 18, 22 and 23, available at http://www.aer.gov.au/sites/default/files/Ausgrid%20-%20Ausgrid%20Revised%20Regulatory%20Proposal%20%28amended%29%20-%20February%202015_0.pdf
Endeavour Energy, 2014, *Revised Regulatory Proposal to the Australian Energy Regulator: Delivering Better Value 1 July 2014 to 30 June 2019*, Table 5.5, available at http://www.aer.gov.au/sites/default/files/Endeavour%20Energy%20-%20Revised%20Regulatory%20Proposal%20to%20the%20Australian%20Energy%20Regulator%20-%201%20July%202014%20to%2030%20June%202019%20-%20January%202015.pdf
Essential Energy, 2014, *Revised Regulatory Proposal: 1 July 2014 to 30 June 2019*, Table 6-4, available at http://www.aer.gov.au/sites/default/files/Essential%20Energy%20-%20Essential%20Energy%20Revised%20Regulatory%20Proposal%20-%20January%202015.pdf
TransGrid, 2014, *Revised Revenue Proposal: 2014/15 – 2018/19*, Table 1.1, available at http://www.aer.gov.au/sites/default/files/TransGrid%20-%20Revised%20Revenue%20Proposal%202014-19%20-%2013%20January%202015.pdf

- ensure the ESS continues to provide a net economic benefit to NSW.

2.5.2 Benefits of proposed reform

The NSW Government will seek to amend the automatic termination clause and targets in the Act to terminate the scheme in 2025. This date would be reviewed in the five-yearly statutory reviews of the ESS.

Effectiveness

Forecasts for the need for generation infrastructure suggest that the ESS could defer additional generation infrastructure from 2023-24 onwards. Modelling by the Office of Environment and Heritage of an extension of the scheme to 2025 suggests that this will benefit the NSW economy by deferring investment in up to 229 MW of additional generation and network capacity. This is an increase of about 157 per cent in deferred investment in generation and network capacity compared to if the scheme terminated in 2020.[75]

Table 10 Energy and power savings in the year 2025 by target option and scheme duration

Option	Current target (5%)		Preferred target (6.5% from 2016)	
	Energy savings in 2025 (GWh)	Peak demand reduction in 2025 (MW)	Energy savings in 2025 (GWh)	Peak demand reduction in 2025 (MW)
Current setting: Termination in 2020	1250	201	1606	250
Proposed reform: Termination in 2025	2210	343	2866	430

Extending the ESS would provide a signal to the energy efficiency industry that there is value in investing in longer term business models.

Under this proposed reform, scheme duration will be subject to five-yearly reviews as stipulated by legislation. This results in the ESS continuing to deliver a net economic benefit to NSW and deferring investment in power generation and network infrastructure, as shown above in **Table 10.**

Figure 7 shows that extending the scheme to 2025 with the preferred target of 6.5 per cent would deliver approximately 200 GWh more energy savings in 2020 than no change to scheme duration with the preferred target of 6.5 per cent. This difference comes from a projected increase in the amount of certificates generated annually under the Metered Baseline Method, and Project Impact Assessment with Measurement and Verification Method.[76] These methods reward energy savings differently than the deemed energy savings method and result in relatively more energy savings per certificate created. The longer the scheme exists, the greater the financial incentive is for projects that use these methods to access the scheme.

This increase in electricity savings is illustrated in **Figure 7**. **Section 3** below discusses the energy savings for a combined electricity and gas scheme.

[75] Jacobs, 2014, *NSW Energy Efficiency Uptake Mode V1.0l*, developed for the Office of Environment and Heritage.
[76] The Metered Baseline Method is used to calculate energy savings for industrial or commercial sites (and residential energy savings following the Rule change of 2014), and allows for annual certificate creation rather than upfront deemed savings. See clause 7, clause 7A, and clause 8 of the Energy Savings Scheme (Amendment No. 2) Rule 2014, accessed: http://www.resourcesandenergy.nsw.gov.au/__data/assets/pdf_file/0019/518302/ESS-Rule-No-2-High-Quality.pdf

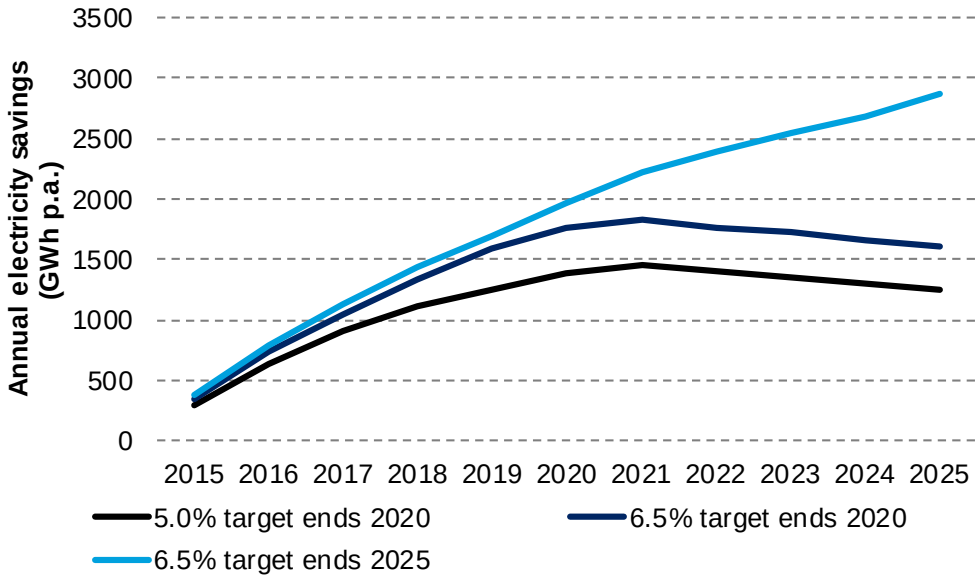

Figure 7 Comparison of target scenarios out to 2020 and to 2025[77]

Efficiency

A comparative analysis of the cost effectiveness of extending the scheme to 2025 and terminating in 2020 is shown below in **Table 11** for two target options discussed in **Section 2.2**.

At current targets, the proposed reform is estimated to deliver an additional net economic benefit of $312 million over the net present value of current settings. Under the preferred option to increase targets the additional benefit extends to $383 million.

Table 11 Comparative cost effectiveness of target options

Option	Current target (5%)		Preferred target (6.5% from 2016)	
	Net Present Value (2013 $m)	Benefit Cost Ratio	Net Present Value (2013 $m)	Benefit Cost Ratio
Current setting: Termination in 2020	n/a	n/a	$16	1.1
Proposed reform: Extension of automatic termination to 2025 with review in 2020	$312	2.5	$383	1.5

Administrative simplicity

There are six compliance years before the automatic termination of the ESS at the end of the 2020 compliance year under current settings.

It is unlikely that stakeholders have existing business plans reliant on the ESS that would extend much further beyond the scheme's currently legislated end date in 2020. The proposed reform of extending the scheme duration until 2025 is likely to result in accredited certificate providers and energy efficiency product and service providers reassessing and extending their business plans. However, this is likely to involve minimal administrative complexity, which would be outweighed by

[77] Analysis by the Office of Environment and Heritage based on Jacobs, 2014, *NSW Energy Efficiency Uptake Model V1.0*, and Energetics, 2014, *Energy Efficiency Opportunity Model V1.0*

the benefits. Scheme participants would have ongoing compliance costs, but the extension of the scheme's duration would not result in any administrative changes.

The proposed reform will require additional administrative effort for the NSW Government as the termination date will need to be reviewed again in the future (scheme reviews are examined in **Section 2.4** below).

Equity between participants and non-participants and across sectors

As discussed above in **Section 2.2.3**, the benefits of the ESS are not spread evenly across the economy.

The longer the scheme is in place, the more opportunities there will be for households and businesses to directly participate in the ESS and receive direct benefits. The section below considers the impact of different durations of the ESS on participants and non-participants.

Bill savings for energy users that participate

An extended ESS would deliver bill savings but as discussed above in **Section 2.2.3**, this benefit would not be shared equally across the economy.

Table 13 shows that bill savings would increase under an extended ESS.[78]

Table 12 Comparative savings for residential energy bills from ESS duration settings

Option	Current target (5%)		Preferred target (6.5% from 2016)	
	Average annual household electricity bill savings (2013$)	Bill savings across all sectors in present value terms (2013$ millions)	Average annual household electricity bill savings (2013$)	Bill savings across all sectors in present value terms (2013$ millions)
Current setting: Termination in 2020	$23.10	$2131	$29.61	$2759
Proposed reform: Extension of automatic termination to 2025	$30.70	$3367	$42.40	$4443

Downward pressure on all electricity bills for participants and non-participants

As discussed above in **Section 2.2.3**, by reducing peak demand, the ESS would place downward pressure on wholesale electricity prices and help defer avoidable investment in electricity networks.

The current scheme settings are estimated to reduce peak demand by 200 megawatts in 2025 and save the energy supply system $719 million in present value terms.

In comparison, a scheme with a 6.5 per cent target that is extended to 2025 under the proposed reforms is estimated to reduce peak demand by 430 megawatts in 2025 and save the energy supply system $1.6 billion in present value terms.

An extended scheme with a 6.5 per cent target would deliver $932 million in additional avoided costs to the energy supply system for an additional cost of $708 million. This indicates that it could place greater downward pressure on prices than the scheme under current policy settings.

[78] The average household bill savings has been calculated based on the total bill savings from residential energy efficiency activities divided by the projected number of households between 2016 and 2025.

Cost of compliance would be passed through to all customers

As discussed above in **Section 2.2.3**, the cost of compliance for scheme participants is passed through to all electricity users in the form of a small charge on their electricity bills.

Table 13 shows that total costs, the impact on electricity prices and the average impact on household electricity bills increase under an extended ESS.

Table 13 Comparative impact on energy bills from ESS duration settings

Option	Current target (5%)			Preferred target (6.5% from 2016)		
	Electricity price impact ($/MWh)	Average cost on annual household electricity bill (2013$)	Costs in present value terms (2013$ millions)	Electricity price impact ($/MWh)	Average cost on annual household electricity bill (2013$)	Costs in present value terms (2013$ millions)
Current setting: To 2020	$0.53	$3.10	$175	$1.69	$9.94	$441
Proposed reform: To 2025	$0.79	$4.70	$385	$2.15	$12.60	$883

Potential number of participants compared to non-participants

As the scheme is extended, more households and businesses have the opportunity to access the ESS. This would potentially increase the number of participants in the ESS, and minimise any cross-subsidy between participants and non-participants.

As stated in **Section 2.2.3**, it is not possible to estimate the number of future participants and non-participants in the ESS across different sectors of the economy. The ESS under current policy settings could support between 21% and 82% of households to participate. An extended scheme with a 6.5 per cent target could support between 55% and 100% of households to participate.[79]

This indicates that extending the scheme would provide greater opportunities for customers to participate in the scheme and access the direct bill savings.

Equity across sectors of the economy

Figure 8 shows a comparison of the distributional impacts of each of the options across sectors of the NSW economy. It shows that the proposed reform of an extended scheme is predicted to result in the same share of certificates across sectors as a scheme that terminates in 2020.

[79] The minimum number of households participating is based on the number of instances that an individual residential activity is forecast to take place under the ESS. The individual activity with the highest number of projected instances is LED lighting upgrades. The maximum number of households participating is based on the assumption that each residential activity represents an individual household. Under the extended scheme with a 6.5 per cent target, there are actually 1.3 more residential activities than households predicted by 2025. Analysis by the Office of Environment and Heritage based on outputs from Jacobs, 2014, *NSW Energy Efficiency Uptake Model*.

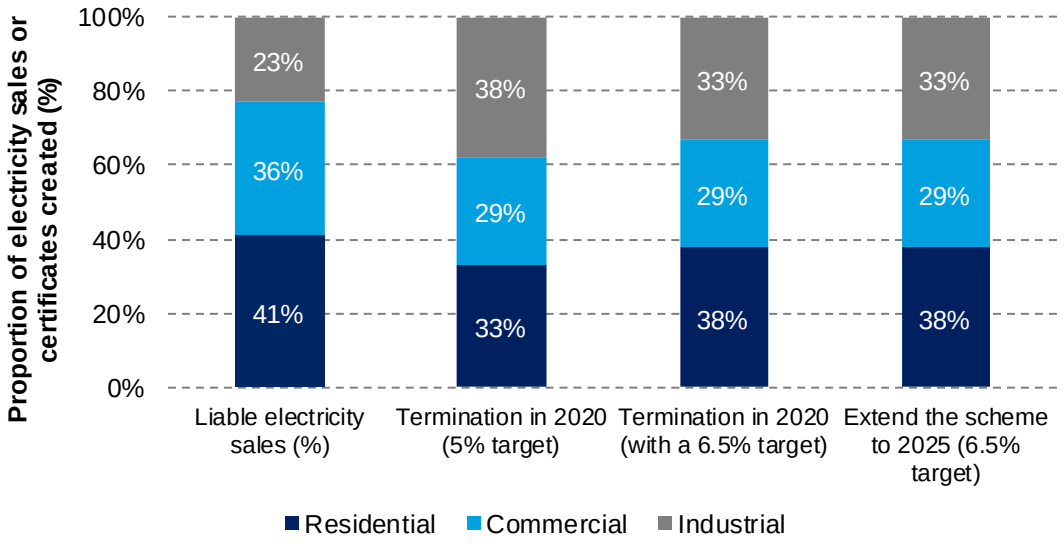

Figure 8 Comparison of liable electricity sales and certificates created based on scheme termination date

2.5.3 Further details for consultation

While the NSW Government intends to extend the duration of the scheme to 2025, there is a further issue for consultation.

Under the current ESS Rule, accredited certificate providers would be able to create certificates after 2020 for existing projects that have been in the scheme since 2009 using the Metered Baseline Method.

The NSW Government is proposing that projects would be ineligible to create certificates using a baseline under the Metered Baseline Method that is more than 10 years old. This would improve the integrity of an extended scheme and encourage new and additional energy savings.

The NSW Government would amend the ESS Rule to reflect these changes from the 2016 compliance year.

3 Fuel coverage

Introduction

The ESS currently only provides financial incentives to reduce electricity consumption.

The NSW gas market is in a period of significant change with wholesale gas prices expected to increase rapidly in the short term. IPART estimates that average annual bills for residential customers will increase by $81 over the next two years, and $378 for small business customers.[83] There are significant opportunities for NSW households and businesses to reduce their gas consumption and place downward pressure on gas bill price rises. The market barriers to greater gas efficiency are the same as electricity efficiency.

Most other similar energy efficiency schemes in Australia and around the rest of the world include gas.

On 11 November 2014, the Minister for the Environment and the Minister for Resources and Energy announced initial enhancements to the ESS. These included that the NSW Government intends to expand the ESS to include gas. This paper outlines options, for consultation, on how the scheme could be expanded to include gas, including the size and nature of the additional target and certificate conversion factors.

Expanding fuel coverage to gas would significantly increase the energy efficiency opportunity that can be captured by the scheme. It is estimated this could deliver gas savings of 5.1 petajoules in 2020.

Summary of the preferred option

The NSW Government's preferred method to expand the ESS to include gas is to increase the energy savings targets for electricity retailers and large electricity users by 1.5 per cent, and include a new conversion factor in the Act which would allow gas savings to generate energy savings certificates. If electricity savings targets are increased to 6.5 per cent as per the preferred option in an electricity only scheme (**Section 2.2**), including gas would result in an additional increase to scheme targets from 6.5 per cent to 8 per cent by 2018.

In order to implement this option the NSW Government will bring forward legislative amendments to include gas in the ESS and increase targets from the 2016 compliance year. Following legislative amendments, the ESS Rule would be amended to enable the ESS to support gas efficiency.

The ESS currently only addresses energy savings in relation to electricity use. The objects of the Act are to:

- ' (…) create a financial incentive to reduce the consumption of electricity by encouraging energy saving activities'
- '(…) assist households and businesses to reduce electricity consumption and electricity costs'
- '(…) complement any national scheme for carbon emissions reduction by making the reduction of greenhouse gas emissions achievable at a lower cost'
- '(…) reduce the cost of, and the need for, additional energy generation, transmission and distribution infrastructure'.[80]

[80] *Electricity Supply Act section 98*

This section considers how the ESS should be expanded to include gas and cover end-use gas efficiency for stationary energy (i.e. natural gas, liquid petroleum gas and variants).

3.1 The case for action

Consumer gas prices will increase to reflect international market dynamics

Several factors are influencing gas market dynamics in eastern Australia. The major influence in the market is the development of the Liquefied Natural Gas (LNG) export market in Queensland which is putting pressure on supply and prices.[81]

The Australian Energy Market Operator's 2014 Gas Statement of Opportunities forecast that there could be around 47 terajoules (TJ) of unserved gas demand for gas in the winter of 2020.[81] As the domestic market is now exposed to global prices, this will put upward pressure on domestic prices.

Gas sales and purchases in eastern Australia take place under bilateral term contracts at both wholesale and retail levels. Estimates of new contract prices provide the best guide to future gas prices. Modelling prepared for IPART indicates that a new gas contract could range from $6.25 to $9.00 per gigajoule (GJ) in 2014–15 and from $6.75 to $9.00 per GJ in 2015–16. This represents an increase of between $0.75 and $3.50 per GJ on current contracts.[82] Spot markets are used to manage network imbalances. If gas contracts alone are unable to meet the demand for gas in NSW, purchases from the spot market may expose consumers to further increases in gas prices.

IPART is responsible for regulating retail gas prices for around one quarter of residential and small business customers in NSW. In June 2014, IPART determined an annual retail gas price increase of up to 17.7 per cent over the next two years. This will represent the third year of rises in regulated retail gas prices in NSW.[83]

This means that residential and small business customers will see annual bill increases estimated at $81 and $378 in 2014–15 and 2015–16 respectively.[83] Households and businesses will need to adjust to these prices.

Current state and national measures are effective but limited

Current state and national measures are limited in their ability to deliver gas efficiency opportunities. Current state and national measures include the following:

- the national E3 program which sets minimum standards and labelling for gas (and electrical) appliances. The E3 program ensures poor performing appliances are not sold in Australia and provides consumers with information to help them choose more efficient appliances.[84]
- the Building Sustainability Index (BASIX) and the Building Code of Australia minimum standards for new and upgraded residential, commercial and industrial buildings. These standards ensure that heating (including the building fabric) and gas (and electrical) hot water systems are efficient.[85]

[81] Australian Energy Market Operator, 2014, *Gas Statement of Opportunities 2014 Update*, available at www.aemo.com.au/Gas/Planning/Gas-Statement-of-Opportunities
[82] Jacobs SKM, 2014, *New Contract Gas Price Projections*, prepared for IPART, 4 April 2014, available at www.ipart.nsw.gov.au/Home/Industries/Gas/Reviews/Retail_Pricing/Changes_in_regulated_gas_retail_prices_from_1_July_2014/23_Apr_2014_-_Consultant_Report/Jacobs_SKM_-_New_contract_gas_price_projections_-_April_2014
[83] Independent Pricing and Regulatory Tribunal, 2014, *Changes in Regulated Retail Gas Prices from 1 July 2014: Gas - Final Report*, available at www.ipart.nsw.gov.au/Home/Industries/Gas/Reviews/Retail_Pricing/Changes_in_regulated_gas_retail_prices_from_1_July_2014
[84] see www.energyrating.gov.au/regulations/legislation/commencement-of-gems-legislation/
[85] see www.basix.nsw.gov.au/basixcms/about-basix.html

- the National Australian Built Environment Rating System (NABERS) for existing buildings. A NABERS rating can help building owners and tenants identify their building's energy performance relative to a benchmark and indicate if there is room for improvement.[86]

Existing actions through the E3 program, BASIX, the Building Code of Australia, and the NABERS program are estimated to deliver around 5.2 PJ of gas savings in 2020 in NSW.[87, 88] These estimates are based on public information on the E3 program and the impact of the Building Code of Australia.

Significant gas efficiency opportunities are still available

There are significant opportunities for further gas efficiency in the residential and commercial sectors. For the commercial sector, increases in gas prices and developments in technology are expected to significantly increase the financial value and amount of energy savings as more energy savings technologies become cost effective.

White certificate schemes like the ESS can encourage a larger range of energy efficiency activities than minimum standards and grant programs. These schemes can encourage energy users to replace inefficient equipment earlier, purchase more efficient equipment and use their equipment more efficiently.

There is emerging evidence that white certificate schemes can create a market for energy efficiency services which may drive competition, lower costs for consumers and make these services more available across sectors of the economy.[89]

> *"One of the benefits of a market mechanism such as the ESS is the ability to roll out large quantities of low-cost energy efficiency technologies very quickly." (Origin Energy)*

International experience shows that significant gas energy savings opportunities can be realised through state based energy efficiency obligation schemes. Four investor-owned utilities in California delivered 7.7 PJ of gas energy savings through energy efficiency activities over the period of 2010 to 2012. This was 33 per cent of the electricity savings achieved over the same period.[90]

The European Union's 2012 Energy Efficiency Directive requires all member states to implement energy efficiency obligations with targets equivalent to achieving new energy savings each year of 1.5 per cent of energy sales. These energy efficiency obligations are to apply to all stationary energy, including both electricity and gas.[91]

In NSW between 2009 and 2013, energy audits of over 460 large to medium businesses identified an average of over 30 000 GJ of gas savings in large businesses and an average of 2500 GJ in

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[86] see www.nabers.gov.au/public/WebPages/Home.aspx

[87] The E3 Program is estimated to deliver 4.1 PJ of gas savings in 2020 through implemented standards and labelling, 2.7 PJ of gas savings in 2020 though projects in train, and 0.6 PJ of gas savings in 2020 from new projects. These savings are above a 2013 baseline and for all of Australia. Estimates of the impact in NSW are based on previous analysis of the E3 program that attributed 34% of energy savings to NSW. Commonwealth Department of Industry, 2014, *Impacts of the E3 program: Projects energy, cost and emissions savings*, available at www.energyrating.gov.au/wp-content/uploads/Energy_Rating_Documents/Library/General/Equipment_Energy_Efficiency_Program_(E3)/Impacts-of-the-E3-Program.pdf, accessed on 25/06/14.

[88] The Building Code of Australia minimum standards for residential and commercial buildings and Commercial Building Disclosure program are estimated to deliver around 2.9 PJ of gas savings in NSW in 2020 from a 2012 baseline. This is based on figures published in Pitt & Sherry, 2013, *Final Report: Quantitative Assessment of Energy Savings from Building Energy Efficiency Measures*, prepared for the Commonwealth Department of Climate Change and Energy Efficiency, available at www.pittsh.com.au/assets/files/CE%20Showcase/Quantitative%20Assessment%20of%20Buildings%20Measures.pdf, accessed on 25/06/14.

[89] Bertoldi et al, 2010, *Energy supplier obligations and white certificate schemes: Comparative analysis of experiences in the European Union*, Energy Policy 38 (2010) 1455–1469.

[90] California Energy Efficiency Statistics, *Energy Efficiency Data Portal*, accessed: http://eestats.cpuc.ca.gov/Views/EEDataPortal.aspx

[91] Directive 2012/27/EU of the European Parliament and of the Council, Article 7, accessed: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012L0027&from=EN

medium businesses over the lifetime of those gas efficiency opportunities.[92] The audits also identified an average opportunity of eight per cent gas savings for large users, worth over $400 000 in bill savings and an average opportunity of almost 25 per cent gas savings in medium businesses, worth over $50 000 in bill savings over the lifetime of the opportunities.[34]

Many submissions to the ESS Issues Paper confirmed that there are significant opportunities to save end-use gas:

> *"there are significant opportunities to improve end-use gas efficiency that face that same market failures as electricity savings activities" (Energy Efficiency Certificate Creators Association, an industry body)*

The Victorian Energy Efficiency Target scheme has covered both electricity and gas since it commenced in 2009. Certificates have been generated for fuel switching activities, such as switching from electric heating for hot water to gas heating (726 000 certificates), space heating including ducted gas (45 168 certificates), and replacing an electric heater with an efficient gas heater (541 481 certificates). Certificates have also been generated for activities that reduce the use of gas, such as weather sealing activities and insulation activities (1 134 095 certificates).[93]

The gas savings opportunities available in the NSW residential sector may not be as large as in Victoria as the penetration of gas use in households is not as high. In 2012, 53 per cent of households in NSW used gas (either mains gas or LPG) in their energy mix, compared to 89 per cent in Victoria.[94]

Figure 9 below is a cost curve for gas savings developed by independent consultants for the Office of Environment and Heritage. This diagram illustrates that there are significant gas efficiency opportunities in NSW. The horizontal axis shows the cumulative annual gas savings from energy efficiency opportunities. The vertical axis shows the levelised cost of the gas efficiency opportunities.[95] The figure shows that there are gas efficiency opportunities in NSW that could save more than 6000 terajoules of gas each year at or below the cost of wholesale gas supply.

[92] Based on NSW Office and Environment and Heritage's analysis of Energy Savings Action Plans and Energy Saver program data.
[93] The figures are derived from searches of the Victorian Energy Efficiency Target scheme registry at https://www.veet.vic.gov.au/Public/PublicRegister/Search.aspx (as accessed August 2014). Note that weather sealing makes up 1 077 079 certificates, and insulation activities around 56 017 certificates.
[94] Australian Bureau of Statistics, *4670.0 Household Energy Consumption Survey, 2012* accessed at http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4671.02012?OpenDocument
[95] Levelised cost in this figure is the present value of the cost of these gas efficiency measures divided by the discounted lifetime gas savings using a 7% discount rate.

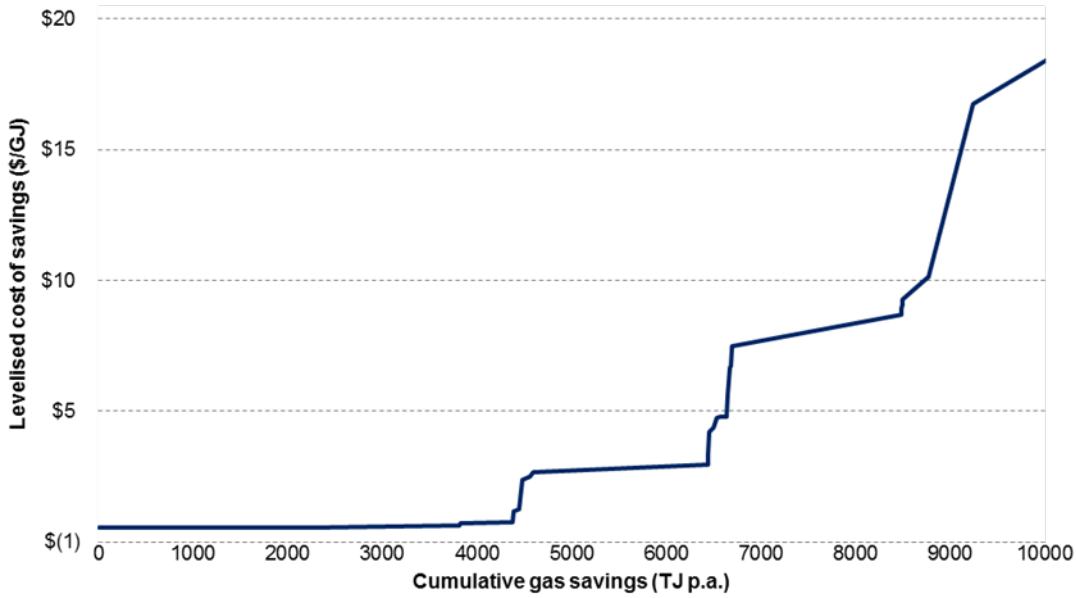

Figure 9 Cost curve for gas savings opportunities in NSW [96]

Additional government intervention is needed to address market barriers

While some energy users may already be reducing their gas consumption without support from the ESS, there is evidence that market barriers limit the opportunities taken up.

For example, between 2005 and 2014 the Commonwealth Government required large energy users (i.e. those that consume more than 0.1 PJ of energy each year) to identify opportunities to save energy under the Energy Efficiency Opportunities program.

Analysis of reporting under the Energy Efficiency Opportunities program by ClimateWorks Australia predicted that less than 40 per cent of the cost effective energy efficiency opportunities would be taken up by large energy users due to market barriers.[97] 90 per cent of the potential energy savings were in the mining and manufacturing sectors.

These findings mirror the experience in the NSW Energy Savings Action Plans, where reporting companies implemented less than a quarter of identified cost effective gas efficiency opportunities over their five year reporting period.[98]

Market barriers that prevent energy customers from choosing more energy efficient options include:

- information gaps where gas users are not aware of the opportunities available to them or cannot properly assess different offers
- lack of skills and time or the 'hassle factor', that is, the costs and time associated with gaining knowledge and organising energy efficiency actions
- the high upfront cost of efficient equipment and improvements that reduce energy bills the most.[99]

[96] Office of Environment and Heritage analysis based on Energetics, 2014, *Energy Efficiency Opportunity Model: Version 1.0*, see **Appendix A** for further details
[97] ClimateWorks Australia, 2012, *Inputs to the Energy Savings Initiative modelling from the Industrial Energy Efficiency Data Analysis Project*, prepared for the Commonwealth Department of Industry
[98] Analysis by the Office of Environment and Heritage of company reports form the Energy Savings Actions Plans program.

NSW energy users have supported the NSW Government's efforts to encourage energy efficiency and urged action to assist natural gas efficiency. This includes submissions to the 2014–15 NSW budget.

> *"To help energy users adjust to these price rises and to help defer additional rises, AI Group urges the Government to maintain support for energy efficiency improvement (...) This should be considered urgently, as a means of providing new opportunities to gas consumers to contain their costs." (Australian Industry Group, an industry body)*[100]

Objectives of government action

The objectives of government action are to:

- assist households and businesses overcome barriers to gas efficiency and adapt to increases in domestic gas prices
- help delay any short term natural gas supply shortages
- encourage the most efficient use of energy
- enable greater harmonisation with other jurisdictions with energy efficiency schemes that include gas.

3.2 Description of options

Under all options, the scope of the ESS would be expanded to provide incentives for gas efficiency. Scheme targets would be increased to drive this additional activity.

Consumers eligible for incentives would include households, small to medium enterprises, commercial buildings and industrial facilities. Projects to improve efficiency in gas powered electricity generation, gas used as a chemical input, or gas used as a transport fuel would not be eligible.

Option 1: New 6.5 per cent target on gas retailers

Under Option 1, a new obligation to purchase certificates would be placed on gas retailers and large energy users of 6.5 per cent of their liable gas sales, following a graduated increase from 2016 to 2018.

New conversion factors would be included in the Act to allow gas savings activities to generate energy savings certificates. Incentives for gas efficiency would have a 'conversion factor' relative to electricity efficiency.

Option 2: Increase target on electricity retailers to 8 per cent

Under Option 2, the existing obligation to purchase certificates on electricity retailers and large electricity users would be increased from 6.5 per cent to 8 per cent of their liable electricity sales, following a graduated increase of 0.5 per cent per year from 2016 to 2018.

New conversion factors would be included in the Act to allow gas savings activities to generate energy savings certificates. Incentives for gas efficiency would have a 'conversion factor' relative to electricity efficiency.

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[99] Office of Environment and Heritage, 2013, *NSW Energy Efficiency Action Plan*, available at www.environment.nsw.gov.au/climatechange/eeap.htm

[100] Ai Group, 2014, *Pre 2014-15 Budget Submissions to the NSW Government*, accessed at http://www.aigroup.com.au/portal/binary/com.epicentric.contentmanagement.servlet.ContentDeliveryServlet/LIVE_CONTENT/Policy%2520and%2520Representation/Submissions/Budget/2014/State/NSW%2520Pre-budget%2520submission%25202014-15.pdf

Option 3: Separate gas certificate and 6.5 per cent target on gas retailers

Under this option, a separate gas savings certificate would be established. Natural gas retailers and large energy users would be required to purchase 'gas savings certificates' equivalent to 6.5 per cent of natural gas sales. The target would be introduced following a graduated increase from 2016 to 2018 (the same as in Options 1 and 2).

Option 3 has two key differences from Options 1 and 2:

- activities which involve replacing electricity powered equipment with gas powered equipment (and vice versa) would not be eligible for financial incentives
- certificates created from electricity savings would not be eligible to surrender against gas savings targets (and vice versa).

Figure 10 illustrates the graduation and includes an electricity only scheme target as a comparison.

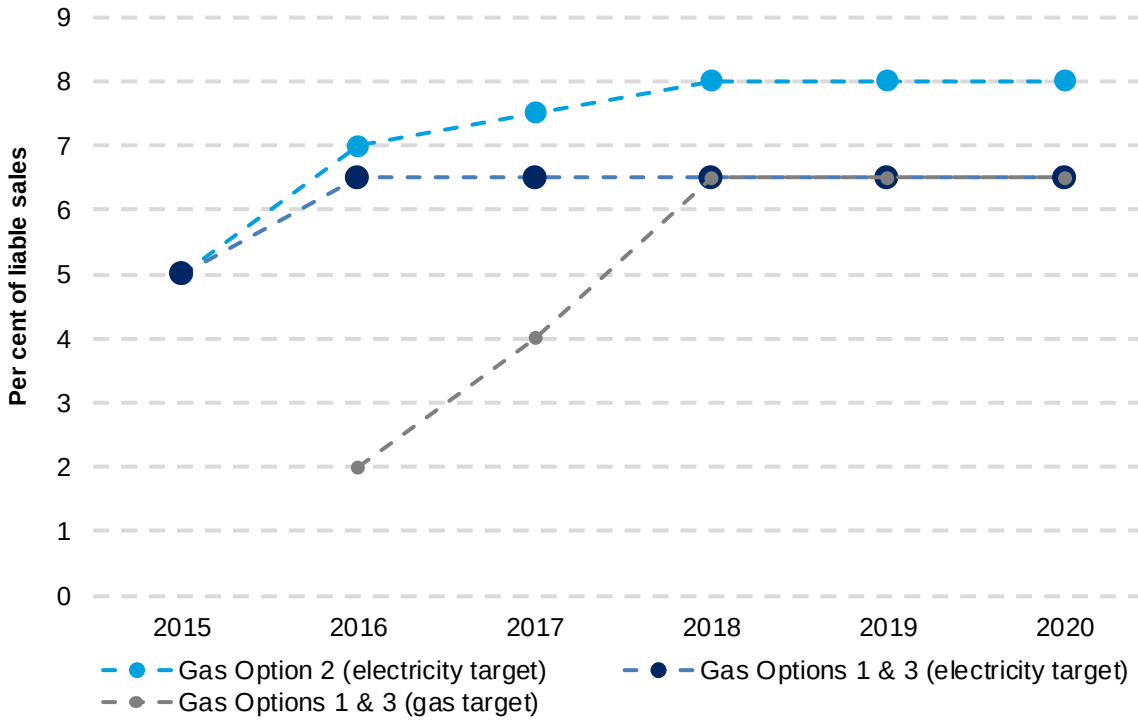


Figure 10: ESS target for electricity only target and combined gas and electricity, 2016 to 2020

The targets in Options 1, 2 and 3 are all equivalent to increasing demand for certificates by approximately 900 000 certificates per year from 2018 to 2020.

The exemptions provided to sites conducting emissions intensive and trade exposed activities would be reviewed to ensure these additional obligations to purchase certificates would not impose undue costs on large energy users.

3.2.1 Analysis of options

Effectiveness

Table 14 below shows a summary of the estimated gas savings of each of the options. This shows that Options 1, 2 and 3 are expected to deliver significant gas savings in NSW in the year 2020.

Table 14 Comparative effectiveness of options

Option	Gas savings in 2020 above a 2014 baseline (PJ p.a.)
Option 1: Target on gas retailers	5.1
Option 2: Additional target on electricity retailers	5.1
Option 3: Separate gas certificate	5.4

It is not clear from any of the estimates of gas savings whether any of the options identified are sufficient to defer the gas shortfalls of around 47 TJ of unserved demand for gas in the winter of 2020 that have been forecast by the Australian Energy Market Operator.[81] The NSW Government has not attempted to estimate the daily demand reductions in the winter of 2020 as a result of the options considered. However, gas efficiency projects are likely to reduce these shortfalls and place downward pressure on gas bills for all households and businesses.

Options 1 and 2 – a single energy savings certificate and target

Options 1 and 2 provide the same level of effectiveness. Analysis by the Office of Environment and Heritage and Jacobs indicates that Options 1 and 2 could deliver gas savings of 5.1 PJ in 2020.[101] The activities forecast to be taken up under Options 1 and 2 include:

- ceiling insulation, ultra low-flow showerheads, high efficiency hot water systems and draught-proofing in the residential sector
- fuel switching activities from continuous electric hot water to instantaneous gas hot water, and from gas space heating to electric air to air heat pumps in the residential sector
- a small amount of insulation, hot water controls and high efficiency hot water systems in the commercial sector
- insulation, boiler upgrades, and optimisation of process heating in the industrial sector.[102]

Options 1 or 2 would encourage consumers to identify the fuel which would deliver the lowest cost energy savings which may or may not be natural gas.

> *"There are clearly situations when gas and electricity are direct competitors as an energy source, for example heating of water in a household or commercial situation." (Norske Skog, a large energy user)*

A scheme with a single energy savings certificate (Options 1 or 2) would also enable greater harmonisation with other jurisdictions that include natural gas in their energy efficiency schemes. Options 1 or 2 are the only options that can help meet the objective of enabling greater harmonisation with other jurisdictions. A number of stakeholders, and in particular those whose business interests cross jurisdictions, supported having a gas scheme.

> *"(…) inclusion of natural gas in the NSW ESS would facilitate harmonisation of the ESS with the ESI [VEET Energy Savings Initiative] and hopefully pave the way to a single national WCS [white certificate scheme]." (APA Group, a natural gas network service provider)*

Section 2.5.2 discusses the additional energy savings that could be gained from extending the ESS to 2025 under an electricity only scheme.

[101] Office of Environment and Heritage analysis using Jacobs, 2014, *NSW Energy Efficiency Uptake Model V1.0*.
[102] Energetics, 2014, *NSW List of Energy Efficiency Opportunities*, analysis commissioned by the Office of Environment and Heritage

A combined electricity and gas scheme (Option 1 or 2) that is extended to 2025 would deliver an additional 96 gigawatt hours of electricity savings in 2020 compared to a combined electricity and gas scheme that terminates in 2020. While a combined electricity and gas scheme extended to 2025 delivers 162 gigawatt hours fewer electricity savings in 2020 compared to an electricity only scheme extended to 2025, it delivers more energy savings than an electricity only scheme that terminates in 2020.

As discussed in **Section 2.5** above, each target scenario leads to a different certificate price and a different mix of energy efficiency activities. This impacts on the electricity savings delivered each year as part of meeting the target scenario. **Figure 11** illustrates these differences.

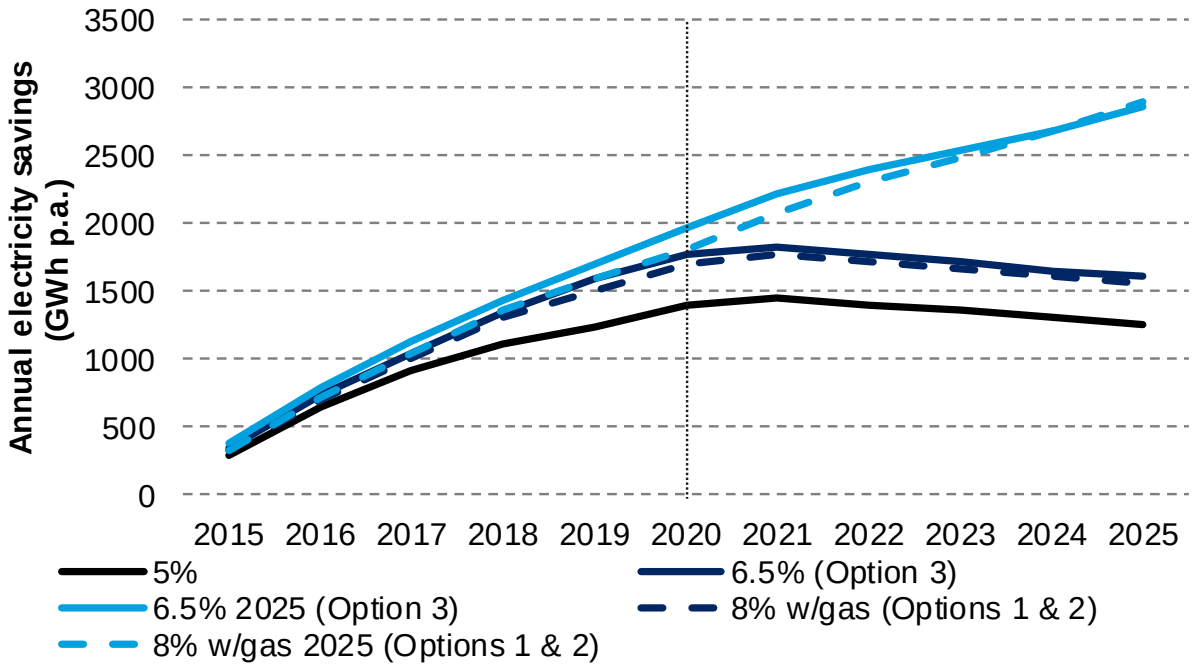


Figure 11 Difference in electricity savings, target scenarios with and without gas

Option 3 - separate gas and electricity savings certificates and targets

Option 3 will result in the highest amount of gas savings above existing measures by 2020. Analysis by the Office of Environment and Heritage indicates that Option 3 could deliver 5.4 PJ gas savings in 2020.

Options 1 and 2 are predicted to lead to lower gas savings than Option 3, because under Options 1 and 2 energy consumers would be supported to improve their energy efficiency by fuel switching. For example, switching from low efficiency electric hot water to high efficiency gas hot water. Other consumers may change from low efficiency gas heating to high efficiency electric space heating.

Under Option 3 consumers could only access incentives to change to more efficient versions of equipment with the same fuel source. This would limit the range of activities to reduce overall energy consumption, but is predicted to lead to greater overall gas savings.

There are a number of energy efficiency obligation schemes internationally and in Australian jurisdictions that include both electricity and gas. These include the United Kingdom, Denmark, France, Italy, Poland, South Korea and a number of states in the USA including California,

Connecticut, Massachusetts, Minnesota and New York.[103] Within Australia, the Victorian VEET scheme, South Australian REES scheme and the Australian Capital Territory's Energy Efficiency Improvement Scheme also include gas.

Most white certificate schemes around the world have a single energy savings target, irrespective of the number of fuels the scheme covers. One exception is the French EEO scheme that has a specific energy savings target for wholesale suppliers of transport fuels, though these obliged parties can save any fuel, not just transport fuels. No scheme has a specific sub-target for gas.[103]

3.2.2 Efficiency

A comparative analysis of the cost effectiveness of each of the options is shown below in **Table 15**. The cost effectiveness of each option has been calculated based on a seven per cent discount rate according to the NSW Government's energy efficiency cost benefit analysis framework[104] (consistent with the NSW Government Guidelines for Economic Appraisal).[105]

The results of a cost benefit analysis by the Office of Environment and Heritage of Options 1, 2 and 3 are shown below in **Table 15**. The analysis found that extending the preferred ESS target of 6.5 per cent to a target of 8 per cent including gas (Options 1 and 2) provides a significant additional net present value of $292 million from 2016 to 2040 or $76 million more than a separate gas scheme (Option 3).

Increasing the target on existing scheme participants (Option 2) is estimated to be very slightly more cost effective than introducing a new target on gas retailers (Option 1) because of lower administrative costs (see **Section 3.2.3** below).

Table 15 Present value of additional cost and benefits Options 1, 2 and 3

Costs and benefits	Option 1 Target on electricity and gas retailers ($2013)	Option 2 Target on electricity retailers only ($2013)	Option 3 Separate gas certificate and target ($2013)
ESS certificate price ($ per certificate)	$22	$22	$26
Gas certificate price ($ per certificate)	n/a	n/a	$46
Total costs ($m in present value terms)	$230	$229	$381
Total benefits($m in present value terms)	$521	$521	$597
Net benefits ($m in present value terms)	$291	$292	$216
Benefit Cost Ratio	2.3	2.3	1.6

Analysis by the Office of Environment and Heritage forecasts that certificate prices will be lower under Options 1 and 2 than under Option 3. Options 1 and 2 would allow fuel switching from gas to electricity and vice versa to create certificates where this would lead to energy savings on a primary energy basis (see **Section 3.3.1** below). This would provide a larger market for energy efficiency and result in lower certificate prices.

Saving significant quantities of natural gas may also defer investments in new gas production and distribution infrastructure. However, the scale of these impacts on the gas market is difficult to quantify and has not been attempted.

[103] The Regulatory Assistance Project, 2012, *Best Practices in Designing and Implementing Energy Efficiency Obligation Schemes Research Report Task XXII of the International Energy Agency Demand Side Management Programme.*
[104] More detail on these calculations can be found at **Appendix A**
[105] NSW Government, *Guidelines for Economic Appraisal (TPP07-5),* July 2007

3.2.3 Administrative simplicity

Options 1 and 3 would establish a new obligation on new scheme participants. These scheme participants would need to establish new compliance, reporting and cost recovery systems to pass through the costs of the scheme to their customers.

A survey of scheme participants conducted on behalf of IPART found that in the first year of the ESS, the costs to scheme participants to establish systems were around $5 per certificate. This indicates that the additional costs of Options 1 and 3 over Option 2 could be over $1 million to scheme participants.[106]

This reflects the costs of establishing new compliance systems, and it is expected that a new obligation on gas retailers (Options 1 and 3) would lead to higher administrative costs in the first year. Having separate obligations on gas retailers and large gas users (Options 1 and 3) would result in additional establishment costs and complexity in calculating their individual targets, reporting for scheme participants and for IPART to review compliance:

> *"We anticipate that the benefits of including gas as a covered fuel would not outweigh the lengthy and complex overhaul of the ESS legislation nor the ongoing administrative burden for all participants." (Origin Energy)*

Other stakeholders recognise this complexity but consider the benefits to outweigh the costs:

> *"Best practices identified in Australia and overseas indicates that the more fuels targeted the greater energy savings can be achieved. However more fuels leads to greater complexity but as a start both natural and LPG could be introduced in addition to electricity." (The Ethnic Communities Council, a non-government organisation)*

There would also be greater complexity in determining liable sales under Options 1 and 3, as some industries use gas as a chemical input and others use gas to generate electricity. The intent of the scheme is to encourage end use energy efficiency and so there is a rationale for these uses of gas to be exempt.

However, determining the amount of gas used for gas powered generation could be complex. For example, the treatment of a gas fired boiler that has a heat recovery turbine to generate electricity is unclear. This equipment could be classed as a gas fired generator and be excluded from the scheme, even though the major end use service being provided is high grade heat. This complexity could lead to many large gas users claiming exemptions and significantly reducing liable sales in the industrial sector.

Expanding the ESS to include gas with an additional target on existing scheme participants (Option 2) would address the concerns raised by some stakeholders regarding the administrative costs on scheme participants. Under this option, the NSW Government would increase the existing obligation on electricity retailers and large electricity users. This would be simpler, as these parties have existing systems and expertise to manage the obligation and the ability to pass through costs of purchasing certificates to consumers.

A scheme with a separate gas certificate (Option 3) would be more administratively complex than Options 1 or 2. This would require establishment costs for the scheme administrator to set up a new certificate class and registry. Given that 'gas savings certificates' would not be able to be surrendered against electricity saving targets (or vice versa), the market size would be relatively small, which would increase the risk of price volatility and the likelihood of an illiquid market. It would also result in higher ongoing administrative costs as there may be new scheme participants, and many would have two separate targets to report against. There may be complexity in

[106] Databuild, 2013, *Energy Savings Scheme Cost of Participation Report 2013*, prepared for IPART, available at http://www.ess.nsw.gov.au/files/0f01cfec-5656-48d9-a4ab-a2610113aee2/ESS_Participation_Costs_Survey_2013.pdf

measuring and verifying gas savings under any option as appropriate project methodologies need to be developed for gas efficiency projects.

> *"AGL cautions on the transferability of project methodologies which have traditionally applied in electrical efficiency projects to gas efficiency projects. There are also a range of challenges in relation to gas metering of industrial customers (…) especially in the context of metered savings methodologies." (AGL)*

The NSW Government will need to review the ESS Rule to:

- consider the applicability of the existing methods for calculating energy savings to gas efficiency projects
- establish new deemed savings factors for small scale gas efficiency projects.

The expansion of the scheme to gas will require amendment to the ESS Rule. The gradual increase in the target under all options will help to smooth the transition from the introduction of the new target in 2016 to a full target in 2018. This would give the market, and IPART as scheme administrator, time to adjust to the higher target.

This would mirror the transitional period put in place when the ESS replaced the Demand Side Abatement component of GGAS in 2009. The first year of the ESS was taken up by the transition from GGAS to the new scheme. Accredited certificate providers and recognised energy savings activities that were accredited under GGAS made up the bulk of the ESS in 2009. In 2010, new accreditations made up more of the ESS activity, with some transitions still occurring. By 2011, certificates were created largely from activities accredited under the ESS.

The NSW Government would have the opportunity each year to assess the impact of the increase in the target and evaluate whether the next increase should be implemented. These considerations would be included in the annual review of scheme targets proposed above in **Section 2.4.4**.

3.2.4 Equity between participants and non-participants and across sectors

As discussed above in **Section 2.2.3**, the benefits of the ESS are not spread evenly across the economy.

An expanded scheme that supports both electricity and gas savings provides more opportunities for households and businesses to directly participate in the ESS and receive the benefits. The section below considers the impact of the inclusion of gas in the ESS on participants and non-participants.

Bill savings for energy users that participate

An expanded ESS would deliver bill savings but as discussed above in **Section 2.2.3**, this benefit would not be shared equally across the economy.

Table 16 shows that total bill savings across all sectors increase under an extended target.[107] Gas savings are forecast to be $13.37 for the average annual household gas bill under Options 1 and 2, but are smaller if a separate scheme is created (Option 3), at $12.96. This is because Options 1 and 2 allow fuel switching activities.

[107] The average household bill savings has been calculated based on the total bill savings from residential energy efficiency activities divided by the projected number of households between 2016 and 2020.

Table 16 Comparative savings for residential energy bills from ESS duration options

Option	Existing ESS target of 5%	Preferred ESS target of 6.5%	Option 1 (6.5% gas target)	Option 2 (8% electricity target)	Option 3 (separate scheme)
Average annual household electricity bill savings between 2016 and 2020 (2013$)	Electricity bills $23.10	Electricity bills $29.61	Gas bills $13.37 Electricity bills $29.81	Gas bills $13.37 Electricity bills $29.81	Gas bills $12.96 Electricity bills $29.61
Bill savings across all sectors in present value terms (2013$ millions)	$2131	$2759	$3471	$3471	$3482

Downward pressure on all electricity bills for participants and non-participants

As discussed above in **Section 2.2.3**, by reducing peak demand, the ESS would place downward pressure on wholesale electricity prices and help defer avoidable investment in electricity networks.

The current ESS is estimated to reduce peak demand by 200 megawatts in 2020 and save the energy supply system $719 million in present value terms. In comparison, a combined electricity and gas scheme with a 6.5 per cent target or an eight per cent target is estimated to reduce peak demand by 248 megawatts in 2020 (Options 1 and 2) and save the energy supply system a total of $1.2 billion in present value terms.

Options 1 and 2 would also reduce demand for gas by around 5.1 petajoules in 2020, freeing up gas supply for energy intensive industries and helping to avoid any supply shortages. This may place downward pressure on gas prices.

A combined electricity and gas scheme (Options 1 and 2) would result in $452 million in additional benefits to the energy supply system for an additional cost of around $229 million in present value terms. This indicates that Options 1 or 2 could place greater downward pressure on prices than the scheme under current policy settings.

Cost of compliance would be passed through to customers

As discussed above in **Section 2.2.3**, the cost of compliance for scheme participants is passed through to all electricity users in the form of a small charge on their electricity bills.

Table 17 shows that Options 1, 2 and 3 would impose additional costs on scheme participants (energy retailers). These costs would be passed through to all energy consumers whether they participate in the ESS or not.

Table 17 also shows total costs, the impact on electricity and gas prices and the average impact on household electricity and gas bills under an extended ESS. Under Option 1 and Option 3, the cost of the scheme would be spread between gas and electricity users. Under Option 2, the cost would only be placed on electricity bills.

Table 17 Comparative impact on residential energy bills from ESS duration options

Option	Existing ESS target of 5%	Preferred ESS electricity target of 6.5%	Option 1 (6.5% gas target)	Option 2 (8% electricity target)	Option 3 (gas certificate with 6.5% gas target)
Energy price impact between 2016 and 2020 ($/MWh)	$0.53/MWh (electricity)	$1.69/MWh (electricity)	$0.11/GJ (gas) $1.33/MWh (electricity)	n/a (gas) $1.43/MWh (electricity)	$0.24/GJ (gas) $1.69/MWh (electricity)
Average cost on annual household bill between 2016 and 2020 (2013$)	Electricity bills $3.10	Electricity bills $9.94	Gas bills $2.36 Electricity bills $7.82	Electricity bills $9.26	Gas bills $5.45 Electricity bills $9.94
Costs in present value terms (2013$ millions)	$175	$441	$405	$404	$556

The majority of stakeholders that made submissions to the ESS Review Issues Paper supported the expansion of the ESS to cover gas. Those that did not support an expansion argued that it would cause additional compliance costs and would exacerbate rising gas prices.

> *"Adding to the cost of natural gas in the current environment will only serve to increase cost pressure on Australian industry and further impact the competitive position of many domestic gas users." (The Bureau of Steel Manufacturers of Australia, an industry body)*

The average certificate price under Option 1 and 2 is forecast to be around $21 per certificate. This is significantly lower than the $26 per electricity saving certificate and $46 per gas savings certificate forecast under Option 3.

Under Option 2, this lower certificate price would offset the increase in targets on electricity users with the price impact forecast to be around $1.60 to $1.70 by 2018 with an expansion to gas. While Option 1 would place a new obligation on gas users and add a small cost on gas bills, Option 2 would avoid any new charge on gas bills and have a negligible impact on electricity bills.

Potential number of participants compared to non-participants

As stated in **Section 2.2.3**, it is not possible to accurately estimate the number of future participants and non-participants in the ESS across different sectors of the economy.

Larger targets are likely to improve the equity of the ESS because they are more likely to drive energy efficiency activities across a range of sectors and technologies. Options 1 and 2 could support between 36 percent and 100 per cent of households to participate. Option 3 would have a slightly higher range of 37 per cent to 100 per cent.

Although these ranges are roughly the same, more activities are projected in the residential sector under Options 1 and 2 when compared to Option 3 (see **Figure 12** below). This suggests that Options 1 and 2 are more likely to support a larger number of households to participate.

Expanding the scheme would provide greater opportunities for customers to participate as a greater range of activities would be eligible for incentives.

Equity across sectors of the economy

Figure 12 shows a comparison of the distributional impacts of each of the options across sectors of the NSW economy. It shows that an expanded scheme (Options 1 and 2) is predicted to result in more certificates created for residential activities than an electricity only scheme. Separate schemes for gas and electricity (Option 3) are predicted to result in roughly the same amount of certificates as an electricity only scheme.

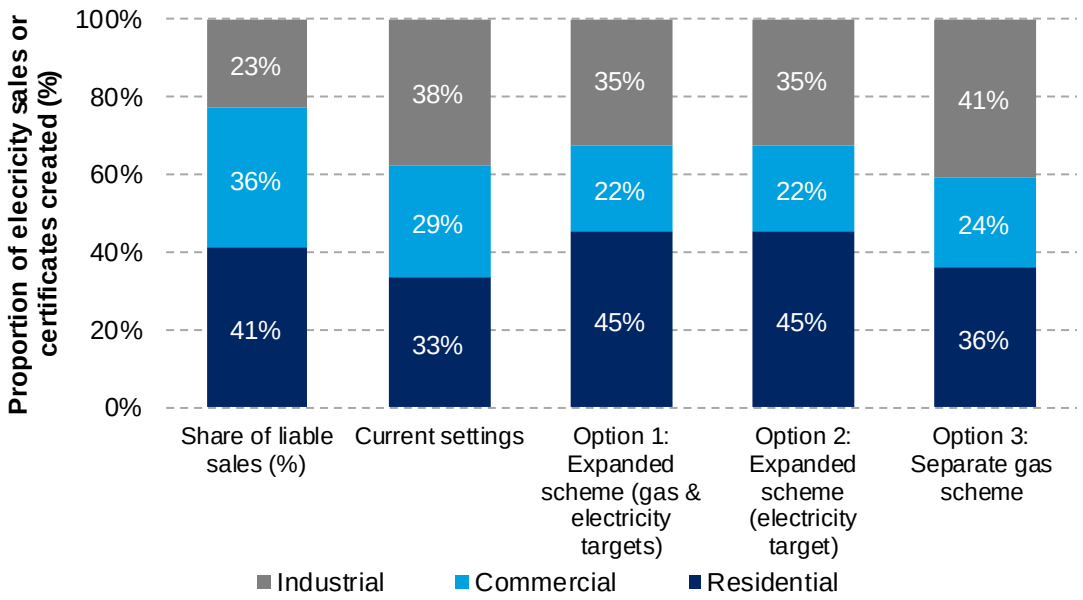


Figure 12 Comparison of share of liable electricity sales and certificates created by industry sectors under each gas option

It should be noted that the sectoral analysis may be limited by the relatively small number of opportunities for gas efficiency in the commercial sector identified in the analysis. There may be more opportunities in this sector than currently considered.

Equity between electricity and gas consumers under Option 2

The distribution of costs and benefits between those who only use electricity and those who use gas is an important consideration in determining the relative merits of Option 2.

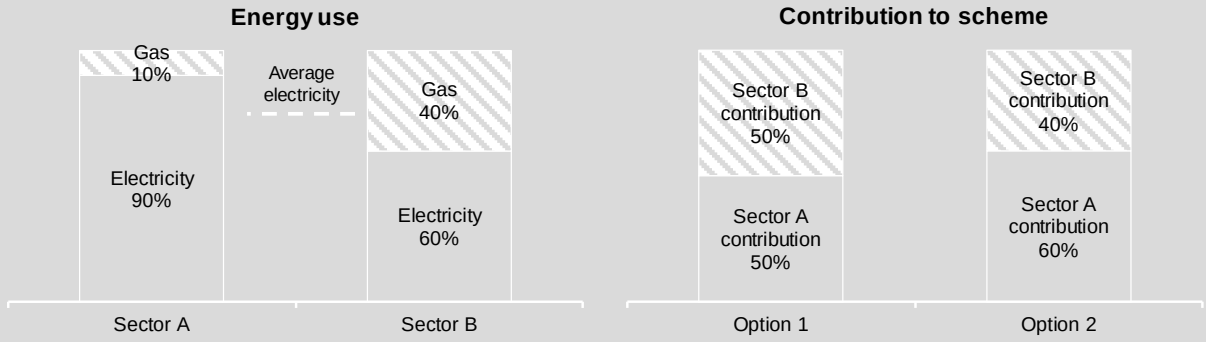
Options 1 and 3 would spread the costs of the ESS between gas and electricity retailers proportional to their energy use. These costs would be passed through to energy customers and reflect the opportunity for those customers to access the financial incentives offered by the scheme. This is the approach taken in Victoria under the VEET and the approach in South Australia under the REES.

Option 2 places the costs on existing scheme participants (electricity retailers and large electricity users), and allows gas savings activities to generate energy savings certificates. This option would not place a cost on gas users as a result of the ESS. This would create potential for a cross subsidy from the sectors of the economy that use relatively more electricity as a proportion of their total energy use (such as households not connected to the gas network) to those who use less (such as manufacturers).

Figure 13 illustrates the potential for a cross subsidy between energy customers under Option 2 for two hypothetical sectors of the economy.

The diagram below shows two hypothetical sectors of the economy. Sector A uses electricity for 90% of their energy needs. Sector B only uses electricity for 60% of their energy needs. Across both sectors, electricity is used for 75% of end use energy. This is shown in the left hand figure below.

Under Option 2, the costs to energy retailers of purchasing certificates would only be passed through on electricity bills. This means that Sector B would contribute 40% to the costs of the scheme and Sector A would contribute 60% as shown on the right below.



If Sector B accesses more than 40% of the financial incentives available under the scheme then it is receiving a cross subsidy from Sector A. However, if Sector B receives less than 40% then it is cross subsiding Sector A.

Under Option 2 the scheme would provide incentives for gas efficiency, so it is more likely that Sector B would access more than their fair share of incentives. However Option 2 would not automatically create a cross subsidy from one sector to another. It would only change the potential for this cross subsidy to occur.

Figure 13 Illustrative example of a cross-subsidy from energy users who use more electricity as proportion of their energy use to those who use less

The potential for a significant cross subsidy from electricity users to gas users is minimal for two reasons.

Firstly, electricity makes up the vast majority (about 85%) of total electricity and gas used (in primary energy terms). For most NSW energy users, electricity is at least 70% of their energy use. Therefore, most gas users would still contribute to the ESS from a large proportion of their energy use. Hence the potential cross subsidy as a result of Option 2 is modest.

This is demonstrated in **Figure 14** which shows estimated electricity and gas consumption by different sub-sectors of the NSW economy. The vertical axis shows the proportion of electricity used. The horizontal axis shows the cumulative primary energy consumption of all sectors.[108]

[108] Primary energy is a metric that takes into account energy as a resource across the whole supply chain from resource extraction through to end-use. Final energy is a metric that considers all energy equal at the point of end use. Using primary energy rather than final energy as a conversion metric between electricity and natural gas reduces the scale of the potential cross subsidy under Option 2. Conversion factors to compare gas and electricity are considered in further detail in **Section 3.3.1** below.

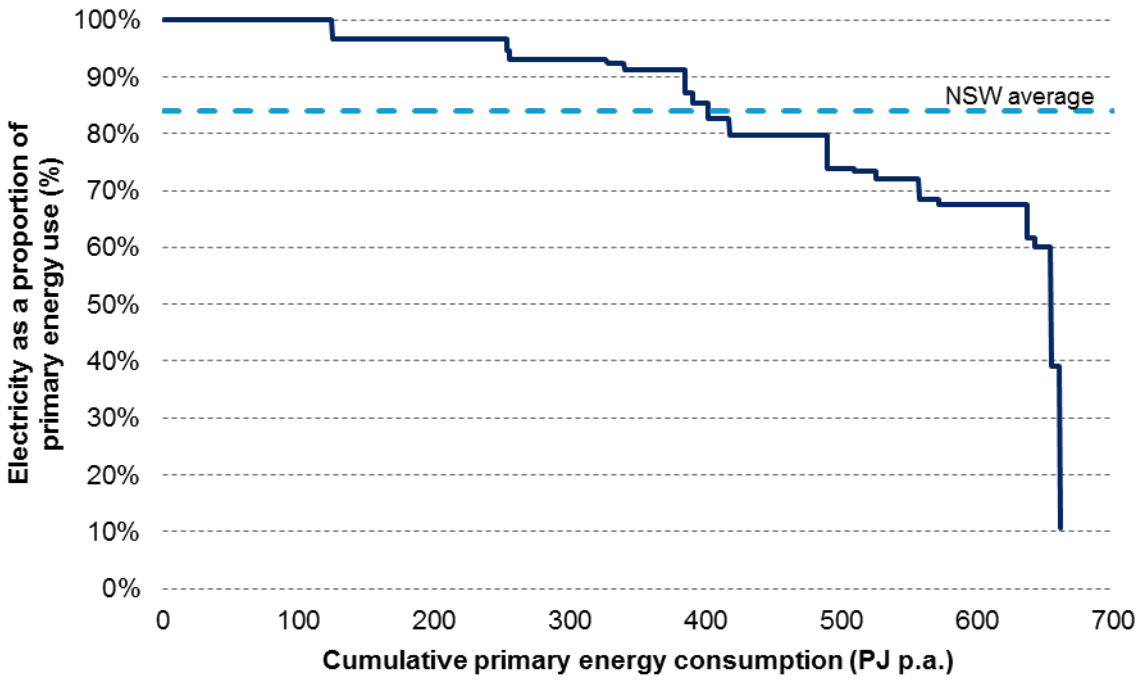


Figure 14 Cumulative proportion of energy consumption in NSW by the proportion of energy use from electricity by sub-sector[109]

This conclusion is also true for LPG users. Under both Options 1 and 2, LPG savings would be eligible to create certificates. Like users of natural gas, LPG users also use electricity and will be contributing to the cost of the scheme. Therefore, the potential for a cross subsidy from other energy users is minimal.

Secondly, the sub-sectors of the economy that rely on gas for the majority of their energy needs do not typically use it for energy but as a chemical input or a production loss (on the far right of **Figure 14**). These industries include petroleum and coal product manufacturing, basic chemical and chemical product manufacturing and oil and gas extraction. Because they do not use the gas for energy, they may have limited opportunities for gas savings. Therefore, there is minimal potential for a cross subsidy to these industries.

Further under Option 1 or 3 it may be necessary to exempt gas used for non-energy purposes if an ESS obligations is placed on gas users, making the scheme more complex.

3.3 Preferred option

Expanding the existing ESS to include gas with an additional obligation on existing scheme participants (Option 2) is the most effective, efficient and administratively simple option to support natural gas users to adjust to rising prices and encourage the productive use of energy. This option would:

- retain more of the existing regulatory, compliance and reporting framework of the ESS than Options 1 and 3
- avoid administrative complexity for the scheme administrator and new scheme participants to establish new compliance, reporting and cost recovery systems under Options 1 or 3

[109] Office of Environment and Heritage based on Bureau of Resources and Energy, 2014, *Australian Energy Statistics 2014* and Energetics, 2014, *Energy Efficiency Opportunity Model V1.0.*

- avoid the administrative complexity to define and report on exemptions for gas powered generation or gas used as a chemical feedstock under Options 1 or 3
- encourage a greater range of gas efficiency measures than Option 3 allow for a more liquid certificate market than Option 3
- facilitate greater harmonisation with other jurisdictions (that is, South Australia, Victoria, the ACT and the Commonwealth Emissions Reduction Fund) than Option 3
- provide a more equitable distribution of financial incentives across the NSW economy than Option 3.
- avoid additional costs on gas users at a time when their gas costs are already increasing
- have a negligible impact on electricity costs passed through to consumers compared to an electricity only scheme.

This section details further design features of the preferred Option 2 for consultation.

3.3.1 Conversion factor to compare gas and electricity

A scheme with a single certificate for both gas and electricity savings requires an appropriate conversion factor to compare fuels. Alternative metrics were listed in the ESS Review Issues Paper including greenhouse gas emissions, retail price, wholesale price, primary energy consumption and final energy consumption. These are shown in **Table 18** below.

Table 18 Illustrative certificate conversion factors for electricity and natural gas

Conversion metric	Unit	Electricity	Natural gas	Ratio
Retail price	$ / MWh	238	40	6.0
Greenhouse gas emissions	tCO_2e / MWh	1.06	0.24	4.4
Wholesale price	$ / MWh	55	20.90	2.54
Primary energy consumption	MWh (primary) / MWh (final)	2.8	1.02	2.7
Final energy consumption	MWh (final) / MWh (final)	1	1	1.0

A number of stakeholders suggested that an energy equivalent metric would allow greater flexibility between energy sources. Other stakeholders supported the retention of the existing greenhouse gas emission based units under the ESS.

> *"To allow ESCs to be fungible between energy sources (…) an energy equivalent measurement should be utilised such as GJ."* (The Clean Energy Council, a peak industry body)

> *"Retaining the ESC unit in terms of greenhouse gas emissions is the simplest, lowest cost solution as participants and IPART have already established systems that manage ESCs on this basis. (…) We do not see any benefit in using a different conversion factor."* (ERM Power, an energy retailer)

In 2012, the Regulatory Assistance Project conducted an international review of energy efficiency obligation schemes like the ESS. The report provides advice to policy makers on best practice on choosing conversion factors and energy units:

> *"(…) Set the target in final energy (…), unless the scheme covers several different fuels, in which case use primary energy. Denominate the target in energy units unless the scheme*

has a policy objective that relates to GHG emissions reductions, in which case consider using CO2-e units (…)"[110][182]

Based on this advice, the preferred conversion factor for natural gas is primary energy equivalence of electricity. This metric reflects the level of energy used over the supply chain to deliver the end use service. Also, the primary energy conversion metric reduces the scale of the potential cross subsidy between energy users (see **Figure 14**).

Electricity would retain the current value of 1.06 certificates per MWh. Gas savings would be allocated a value of 0.39 certificates per MWh or around 0.11 certificates per GJ saved. Primary energy is the preferred metric as it is:

- more aligned with the ESS as an end-use scheme with energy efficiency objectives rather than the greenhouse gas metric (tCO_2e/MWh) currently used
- more representative of the economic benefits from avoided energy use than the final energy metric
- less susceptible to broader dynamics in the energy market than wholesale or retail prices.

3.3.2 Treatment of fuel switching

The ESS would seek to encourage the most efficient use of electricity or natural gas, including activities that switch from electricity to gas, or from gas to electricity. Fuel switching gives consumers flexibility to choose the lowest cost fuel and encourages the most efficient energy use across the supply chain.

To illustrate the benefits of fuel switching under Option 2, the Office of Environment and Heritage has developed an indicative set of scenarios for residential space heating (**Table 19**)**.**

This shows a comparison between regular and high efficiency electric and gas appliances. This shows that moving to an 'air to air' heat pump (Scenarios 2 and 4) results in the highest energy savings. This also shows that the certificates that could be created for each of the scenarios broadly reflect the bill savings for the end consumer.

Table 19: Scenarios for residential space heating technologies and their treatment under the preferred option

Parameter	Scenario 1 3 Star flued gas heater to 5 star flued gas heater	Scenario 2 3 Star flued gas heater to 5 star air to air heat pump	Scenario 3 Resistive space heater to 5 star flued gas heater	Scenario 4 Resistive space heater to 5 star air to air heat pump
Incremental cost of high efficiency equipment[111]	$200	$300	$1400	$1500
Final energy savings (kWh p.a.)[112]	473	1815	-166[113]	1176
Primary energy savings (kWh p.a.)	482	1387	2036	2941

[110] The Regulatory Assistance Project, 2012, *Best Practices in Designing and Implementing Energy Efficiency Obligation Schemes Research Report Task XXII of the International Energy Agency Demand Side Management Programme*.
[111] Incremental cost is the difference between the cost of the inefficient equipment and the efficient equipment. The costs were estimated based on a desktop review of prices for products of a sufficient capacity to heat a 30 m^2 room in Richmond.
[112] Final energy savings are based on the estimated energy consumption of the inefficient equipment and the efficient equipment if gas and electricity are treated equally without a conversion factor. The estimates of energy consumption are based on the predicted thermal demand for heating a 30m^2 room in Richmond rated at 2 Star NatHERS. The assumed efficiency of each product is 70% for a 3 star flued gas heater, 90% for a 5 star flued gas heater, 100% for a resistive space heater and a coefficient of performance of 4.75 for a 5 star reverse cycle air conditioner.
[113] On a final energy basis gas space heaters are less efficient than an electric resistance space heater (around 80 percent compared to 100 per cent).

Parameter	Scenario 1 3 Star flued gas heater to 5 star flued gas heater	Scenario 2 3 Star flued gas heater to 5 star air to air heat pump	Scenario 3 Resistive space heater to 5 star flued gas heater	Scenario 4 Resistive space heater to 5 star air to air heat pump
Greenhouse gas emissions savings (kgCO2e p.a.)	123	233	1089	1200
Annual bill savings ($ p.a.)[114]	$40 to $57	$98 to $176	$187 to 248	$306
Certificates created over 10 years	1.9	5.5	8.1	11.8
Net present value to energy user over 10 years[115]	$94 to $215	$409 to $954	$7 to $431	$746

Scenario 2 in **Table 19**, where a consumer is replacing inefficient gas space heating with high efficiency electrical space heating could have perverse impacts in terms of increased peak demand for electricity.

If the ESS is expanded to cover gas, the ESS Rule may need to limit access to financial incentives for some fuel switching activities to mitigate the risks of increased peak demand. This could include limiting eligibility to:

- air to air heat pumps which only provide heating rather than reverse cycle air conditioners which could be used in summer for space cooling
- products fitted with a demand response mechanism that enables network service operators to switch them off during peak events.

3.3.3 Treatment of emissions intensive and trade exposed activities

Several emissions intensive and trade exposed industries and industry bodies made submissions to the ESS Review Issues Paper.

> *"If [the] ESS is extended to gas then EITE assistance should also be extended to gas for those facilities currently receiving partial exemption from the ESS for their electricity liabilities." (Orora, a large energy user)*

> *"In the context of the Government's Energy Savings Scheme, it is important to provide more opportunities for industry to cut operating costs, and to ensure the scheme does not impose net costs on energy intensive trade exposed businesses." (The Australian Industry Group, a peak industry bodies submission to the NSW Budget)*

Under all options the existing exemptions for electricity use under the ESS for emissions intensive and trade exposed industry activities will be reviewed to account for high gas consuming industries falling within this category.[116]

[114] The range of annual bill savings provided is based on the average price of gas and the marginal cost of gas. Residential gas tariffs in NSW are a "declining block tariff" where the greater the usage, the lower the price. The marginal price assumes a household saves gas that would have been charged in the second block of gas usage (i.e. a lower price). The average price is based on a household that consumes 23 000 MJ a year.
[115] The range of net present value provided is based on the average price of gas and the marginal cost of gas. See footnote above.
[116] Section 119 of the *Electricity Supply Act* allows the Minister to publish an Order granting exemption from the ESS in respect of any electricity load used by persons or activities. Under section 120, as part of that Ministerial Order, the Minister also authorises the Scheme Regulator to make rules relating to assessment of deductions of exempt loads by scheme participants.

4 Sharing costs and benefits

Introduction

On 11 November 2014, the Minister for the Environment and the Minister for Resources and Energy announced initial enhancements to the ESS. These announcements included that the NSW Government intends to introduce a regional network factor of 1.03 into the ESS Rule. This factor would provide a level playing field for regional customers by recognising the additional benefits from saving energy in regional NSW and avoiding additional network losses.

Summary of preferred options

Low income households

The ESS does not currently include any particular provisions in relation to low income households. By comparison, similar schemes in South Australia and the ACT include provisions such as sub-targets to encourage energy savings in low income households.

Vulnerable low income households face more severe market barriers to energy efficiency than other energy consumers. The NSW Government's preferred option is to assist these customers to undertake energy efficiency activities by providing supplementary assistance which is complementary to the ESS. This option is preferred because it will specifically target the market barriers which prevent vulnerable households from becoming energy efficient, and will enable a more flexible program and eligibility criteria compared to other options.

On 2 March 2015, the NSW Government announced a $61.5 million energy efficiency package which includes $26.8 million in funding to help low income households reduce their power use and cut their energy bills.

Emissions intensive trade exposed industry activities

The NSW Government's preferred option is to retain existing exemptions and not impose restrictions on certificate creation at exempt sites. Altering the exemption could reduce the number of certificates generated from low cost industrial activities and lead to increases in certificate prices, forecast from around $23 to $29 between 2015 and 2025. This would reduce the economic efficiency of the scheme from a Benefit Cost Ratio of 2.6 to 2.3. It would also increase its cost impact on all consumer bills, including non-participants, from $1.57 per megawatt hour to $2.02 per megawatt hour. Changes to the exemption could worsen the cross-subsidy between non-participants and participants in the scheme, as non-participants would pay higher electricity prices but not receive the benefits enjoyed by participants in the scheme.

Energy saving at peak times

The NSW Government's preferred option is to work with industry stakeholders and network service providers to collect and publish information that could be used to value the benefit of energy efficiency projects in constrained network locations. This would enable energy efficiency service providers to identify energy efficiency opportunities available to manage demand and overcome network constraints.

The ESS benefits all electricity consumers in NSW and the NSW economy. By saving energy, the need for investment in new generator capacity and network infrastructure is reduced. These savings are passed on to all consumers of electricity by electricity retailers through lower pressure on price rises. However, the consumers who participate in the ESS by saving energy receive larger benefits than those who do not.

This section considers potential reforms to the ESS to improve the spread of costs and benefits from the scheme across the NSW economy.

4.1 Support for regional customers

Regional customers have higher energy bills and less access to energy efficiency services. There is also anecdotal evidence that energy efficiency activities only begin to occur in regional and rural areas as the potential for energy efficiency activities in metropolitan areas begin to be exhausted.[117]

The ESS does not have any particular provisions in relation to regional customers, although some energy efficiency activities involving heating and cooling already reflect the difference in energy savings resulting from different climate zones across the state.[118] Schemes in other jurisdictions include 'regional network factors' which differentiate the amount of certificates that can be created for an energy efficiency activity based on its location.

Goal 3 of *NSW 2021* aims to grow enterprises and job opportunities in regional areas so all people have access to the economic and lifestyle opportunities that NSW offers.

On 11 November 2014, the Minister for the Environment and the Minister for Resources and Energy announced initial enhancements to the ESS. These announcements included that the NSW Government intends to reform the ESS Rule to include a regional network factor of 1.03 from 2016 onwards.

4.1.1 The case for government action

There are structural barriers to energy efficiency in regional areas

Households and businesses in regional NSW typically pay around 10 per cent higher electricity prices[119] because the larger rural network serves a comparatively smaller number of customers.

The lower population density and isolation of regional electricity consumers means that energy efficiency services are less accessible and generally more expensive than for metropolitan consumers.

In their submissions to the ESS Review Issues Paper, stakeholders identified that the major barriers to regional delivery of energy efficiency include:

- high transaction costs - increased distance increases the costs of transport and logistics, which increases the cost of providing warranties, conducting audits, ensuring compliance, and delivering and installing goods and services to regional customers
- lack of information - many existing regional customers and service providers have little knowledge of the ESS or energy efficiency opportunities generally
- lower economies of scale - the market for energy efficiency in regional NSW is smaller than in metropolitan areas.

Stakeholders made suggestions to promote energy efficiency in regional areas

While stakeholders indicated that the NSW Government should try to overcome these barriers, opinions were mixed about potential solutions.

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[117] National Energy Savings Initiative Working Group, August 2012, *National Energy Savings Initiative – Progress report*, M Philipson, *Low-income Aspects of REES, Presentation to National Energy Saving Initiative Low-income Household workshop* Adelaide, November 2011.
[118] As different climate zones have different average temperatures across the average year, the amount of energy required for heating and cooling will differ.
[119] Comparison of residential and small customer electricity tariffs in Essential Energy's network area compared to those in the Endeavour Energy and Ausgrid network areas.

The most commonly proposed solution was to introduce a regional network factor, also referred to as a multiplier.

> *"a multiplier may be an appropriate incentive for the delivery of activities in regional areas. We however urge against the establishment of any targets or obligations to undertake activities in these areas (…) Implementing a multiplier without a target will provide a clear picture of whether the multiplier adequately compensates Accredited Certificate Providers for the cost of undertaking activities in regional areas." (EnergyAustralia)*
>
> *"Scheme multipliers based on regional distribution are an alternative approach (to sub-targets). However, the incremental additional demand that these multipliers would drive also needs to be weighed against the resulting complexity, cost and risk to certificate creation processes and the risk of unintended consequences from market distortions." (The Energy Efficiency Certificate Creators Association, an industry body)*
>
> *"ESS would benefit from the addition of a regional multiplier similar to that applied under the Victorian VEET scheme." (Energy Makeover, an Accredited Certificate Provider)*

Other proposed solutions included increasing the overall ESS targets and regional sub-targets.

> *"Raising the target or increasing prices will assist activity in regional areas. In addition it would help defray audit costs." (CSR Limited, a product supplier)*
>
> *"Government could consider sub-targets but should weigh up benefits against the risks of additional supply bottlenecks and volatility that are could be passed on through higher certificate costs to everyone." (Energy Efficiency Certificate Creators Association, an industry body)*

The approach under the Victorian Energy Efficiency Target to promote energy efficiency in regional areas was effective

The Victorian Energy Efficiency Target scheme is an example of how an energy efficiency scheme can target regional areas. The scheme uses a variable regional factor which takes into account varying spatial elements for the regional Victorian network,[120] including the following:

- local climate - the different temperatures for different parts of Victoria, which would affect the use profiles for different technologies such as space heating and cooling
- emissions coefficients - metro regions predominantly use natural gas for heating (with an emissions coefficient of 0.0573 kgCO_2e/MJ) while regional Victoria predominantly uses electricity (0.2675 kgCO_2e/MJ) and firewood for heating
- line losses - higher amounts of energy are lost when delivering electricity to regional customers because the longer distances in regional networks creates higher levels of resistance.

The regional factor varies for each different energy savings activity. It is uniform throughout Victoria for some technologies, while others have slight or significant variations between metropolitan, and mild, cold, and hot regional locations. The regional factor varies the most with technologies such as insulation and space heating, whose efficacy are most impacted by climate.

The Victorian scheme doesn't specifically target the barriers to regional delivery that stakeholders have identified in the submissions to the ESS Review Issues Paper. However, under the scheme, 61 per cent of certificates were created in metropolitan areas and 39 per cent in regional areas between 2009 and 2013.[121] In NSW, this data is not available. Anecdotal evidence suggests that the regional share of the ESS would be less than in Victoria.

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[120] *Victorian Energy Efficiency Target Regulations 2008*, accessed at https://www.veet.vic.gov.au/Public/Pub.aspx?id=7
[121] Cefai, Jeff (2013) *Presentation from VEET Forum 2013*. accessed at https://www.veet.vic.gov.au/Public/Pub.aspx?id=336

The ESS Rule change of 2014 will ensure the scheme begins to capture data on the location of energy savings, allowing the NSW Government to accurately determine what percentage of energy savings are occurring in regional areas from mid-2014 onwards.

Several stakeholder submissions pointed to the Victorian Energy Efficiency Target's approach to regional delivery. The APA Group notes in its submission that:

> *"the number of VEECs produced in regional Victoria actually exceeded the total number of ESCs created in all of NSW in the same period."*

Existing action

The NSW Government has existing actions to target barriers to regional energy savings through the NSW Energy Efficiency Action Plan.[2] These actions include:

- placing clean energy coordinators in regions
- partnering with local industry and community associations
- establishing an online portal directing consumers to suppliers that service their area.

These actions that may increase awareness of the ESS in regional areas and reduce transaction costs by linking accredited certificate providers with energy savings customers. It may be possible to unlock a significant percentage of cost effective energy savings in regional areas.

There is stakeholder support for the NSW Government assisting regional areas through supplementary actions such as those under the NSW Energy Efficiency Action Plan.

> *"Subsidise the cost of accreditation/training for Accredited Certificate Providers (ACPs) in rural/regional areas. Look at targeting rural/regional businesses with ESS information, e.g. refrigeration in agriculture, cold chain businesses, saw mills etc. Engage with regional industry associations to facilitate contact with aggregators. Adopt VEET approach regarding distribution losses and audit costs." (AIRAH, an industry body)*

However, the overall effectiveness of these actions is not yet clear. The Energy Efficiency Action Plan has only been in place for 12 months which is not sufficient for outcomes to be measured. There is anecdotal stakeholder evidence that while certificate generation is concentrated in the greater metropolitan region, regional supply chains are beginning to engage with the ESS.

The changes to the ESS Rule in 2014 will enable the NSW Government to monitor the proportion of energy savings that are occurring in regional areas.

Objectives of government action

The objectives of government action are to:

- overcome the market barriers to energy efficiency specific to regional areas
- ensure the ESS places appropriate value on the benefit of saving energy in regional areas.

4.1.2 Benefits of proposed reform

The proposed reform will allow accredited certificate providers to apply a regional network factor of 1.03 to energy efficiency activities that benefit customers in the Essential Energy distribution network area. The factor of 1.03 is based on electricity network loss factors for regional areas.[122]

While regional electricity consumers in Endeavour and Ausgrid network areas would not be eligible for the regional network factor, they do not pay higher network fees, as the greater expense of providing network services to regional areas is cross-subsidised by the metropolitan electricity consumers using those networks.

Effectiveness

The proposed reform will reward activities in regional areas with additional energy savings certificates reflecting the large amount of line losses that are avoided. Experience in Victoria suggests that regional factors are effective at delivering net economic benefits to the state economy.

One of the difficulties with a regional network factor approach is determining an appropriate parameter for the factor. In this regard, the Energy Efficiency Council, a peak industry body, and the Energy Efficiency Certificate Creators Association suggested that regional network factors could be based on electricity network loss factors for regional areas.

> *"(…) should be based on scientific results of efficiency (i.e. line loss) and not just a multiplier to stimulate rural uptake." (Green Guys Group, an ACP)*

Measuring the differences in network loss factors is a sensible approach to determining a regional network factor because it is:

- objective, accurate and repeatable
- based on publicly available transparent data
- a sensible indication of the improved short term economic benefit that regional consumers can expect from energy efficiency.

A factor based on measurable differences in network loss factors between metropolitan and regional areas, as under the Victorian scheme, would be around 1.03. This would provide an additional incentive of three per cent to Accredited Certificate Providers to conduct energy efficiency activities in regional areas. However, it may not be a large enough incentive to overcome the additional cost of servicing customers in regional NSW. Compared to low income households, the eligibility requirements for regional electricity customers to benefit from energy savings activities under the ESS are clear.

Applying a regional network factor would provide a fair price signal to regional electricity consumers to save energy. The additional certificates created for an activity in regional NSW would represent the actual additional energy saved by avoiding line losses, so there would not be any 'phantom certificates' (as discussed in **Section 4.2.3** above). This makes the economic benefit to regional electricity customers clear and empirically based.

[122] Based on analysis of distribution loss factors across NSW electricity networks weighted by customer numbers. Distribution loss factors from AEMO, 2014, *Distribution Loss Factors for the 2014/15 Financial Year-Version 2*, accessed at http://www.aemo.com.au/Electricity/Market-Operations/Loss-Factors-and-Regional-Boundaries/~/media/Files/Other/loss%20factors/DLF_FINAL_V2_2014_2015.ashx
Electricity network customer numbers from AER, 2013, State of the Energy Market, accessed at http://www.aer.gov.au/sites/default/files/Complete%20report%20A4.pdf

Efficiency

Distribution losses are a factor in the economic benefits from energy efficiency. Applying a regional network factor to the Essential Energy network area would maintain the cost effectiveness of the ESS. As the three per cent additional energy savings awarded will deliver three per cent additional economic benefit.

This means that although energy saved in regional areas would be given a larger reward through the ESS, this is proportional to the larger economic benefit delivered as a result of avoiding line losses.

A regional network factor based on line losses would help the ESS deliver the most cost effective savings by providing a fair price signal to target energy efficiency in regional areas.

Administrative simplicity

The regional network factor would be enabled through a simple change to the ESS Rule and would have only a minimal increase in administrative complexity. It would not increase complexity for scheme participants and would only be a minor change for accredited certificate providers as auditing already has to take place in regional areas under the current scheme.

Summary

The NSW Government intends to reform the ESS Rule to include a regional network factor of 1.03 for energy saved in the Essential Energy network area. Activities undertaken from 1 January 2016 will be eligible for the regional network factor. This factor will:

- in conjunction with actions specified in the NSW Energy Efficiency Action Plan, contribute to overcoming market barriers to energy efficiency specific to regional areas
- fairly value the energy saved by regional customers helping the energy efficiency market to find the most cost effective energy efficiency opportunities.

4.2 Support for vulnerable low income households

The ESS Rule has recently been amended to broaden the energy efficiency activities for households that can be supported by the ESS. However, the ESS does not include any special provisions in relation to low income households. Similar schemes in South Australia and the ACT include provisions to encourage energy efficiency and bill savings in vulnerable households, such as sub-targets.

This section examines options to amend the ESS to provide additional support for vulnerable households.

4.2.1 The case for government action

Energy bill pressure remains a problem for vulnerable low income households

The NSW Energy Efficiency Action Plan outlines the key barriers that prevent households from implementing energy efficiency measures.[2] These are:

- information gaps and asymmetry where householders are unaware of opportunities available to them from energy efficiency or cannot evaluate different offers from tradespeople and suppliers
- lack of skills and time, or ‘hassle factor’, where the costs and time associated with gaining knowledge and organising energy efficiency actions lowers uptake
- the high upfront cost of efficient equipment and improvements that reduce energy bills the most, such as whitegoods, water heaters and heating and cooling improvements

('high cost–high return' items). A study of the Victorian Energy Efficiency Target scheme found that uptake of high cost–high return opportunities was much lower in areas with relative socio-economic disadvantage[123]

- the split incentive between landlords and tenants that discourages landlords from investing in improvements that would reduce energy bills for their tenants.

These barriers are more acute for low income households for many reasons, including lower access to capital and higher likelihood of living in poorer quality rental housing.[124,125]

Energy efficiency can directly and cost effectively help low-income households reduce their energy bills. In addition to financial savings on energy costs, energy efficiency can increase the well-being of vulnerable households through improvements in comfort, health and broader financial stability.

Some stakeholders request government action

Some submissions to the Issues Paper and the review of energy efficiency programs for low-income households acknowledged that bill pressure was a pressing issue for vulnerable households, and indicated that NSW Government action is still required.

> *"EECCA understands the particular pressures on vulnerable households. EECCA notes that there are many households facing energy poverty that do not have access to existing energy welfare programs." (Energy Efficiency Certificate Creators Association, a peak industry body)*

> *"A sub-target for low-income households should be established under the NSW Energy Savings Scheme (…) [c]are should be taken to ensure the sub-target is suitably inclusive while still directing efforts at those most in need (…) [and] should be supported by measures designed to assist low-income households to access higher value energy efficiency measures." (Council of Social Service of NSW, a peak community organisation)*

Some stakeholders have questioned the ability of the ESS to tackle the barriers faced by vulnerable low-income households.

> *"(…) experience of social banding in the South Australian REES scheme is that it is difficult to firstly identify and secondly engage vulnerable households." (Origin Energy)*

> *"Government needs to consider what the objective of the scheme is and create a regulatory framework which promotes this objective (i.e. is the scheme about assisting low income households or is it about energy saving)" (EnergyAustralia)*

Objective of government action

The objective of government action is to reduce energy bill pressure on vulnerable low income households by targeting the market barriers that prevent these households from accessing energy efficiency activities.

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[123] Sullivan, D and Johnson, V, Brotherhood of St Laurence, Melbourne, 2012, *The Power to Save: An equity assessment of the Victorian Energy Saver Incentive in metropolitan Melbourne*, www.bsl.org.au/pdfs/SullivanJohnson_Power_to_save_equity_assessment_of_VESI_Melbourne_2012.pdf

[124] Chester, L. (2013). *The Impacts and Consequences for Low-Income Australian Households of Rising Energy Prices*. University of Sydney.

[125] Brotherhood of St Lawrence. (2008). *Enabling Low Income Households in the Private Rental Market to Respond to Climate Change* – recommendations and report from the Roundtable convened December 2007 by the Brotherhood of St Lawrence.

4.2.2 Description of options

Option 1: No change

This option would leave the ESS to continue to make energy savings activities available to all NSW energy consumers but would not apply specific mechanisms to address the barriers faced by low income households.

Option 2: Sub-target for vulnerable households

Under this option, the NSW Government would add a sub-target to the ESS which would require scheme participants to meet a proportion of their annual energy savings target by surrendering certificates from activities that benefited vulnerable households.

The ESS Rule would define eligibility criteria for vulnerable low income households.

Accredited certificate providers would keep records on whether or not activities assisted vulnerable low income households.

The ESS Registry would record whether certificates were created for activities that assisted low income households.

Option 3: Multiplier for vulnerable households

Under this option, the NSW Government would provide a mechanism in the ESS Rule to enable accredited certificate providers to apply a multiplier on activities that benefit vulnerable households.

As with Option 2, changes to the ESS Rule, record keeping arrangements and ESS Registry would also be made to enable defined, verify and record energy savings from vulnerable low income households.

This would allow the accredited certificate provider to create additional certificates compared to an activity that benefited a different type of energy consumer. There is no precedent, in any other jurisdiction's energy efficiency scheme, for a vulnerable household multiplier.[126]

Option 4: Supplementary program – separate programs by government or industry (preferred option)

Under this option, a separate government or market delivered program would complement the ESS to facilitate energy efficiency activities in vulnerable low income households. Such a program could be designed to assist low-income households with the purchase of energy efficient high-cost items that they would not normally consider.

4.2.3 Analysis of options

Effectiveness

Option 1 - no change

Option 1, which involves no change to the ESS, would not overcome current barriers to energy efficiency for low income households.

There have been limited opportunities for households generally to access ESS incentives, since the showerhead replacement activities were removed from the scheme at the end of 2011.

[126] Energy Futures Australia, 2014, *Analysis Framework for Introducing Mechanisms to Achieve Sub-objectives in the NSW Energy Savings Scheme*, prepared for NSW Office of Environment and Heritage

The ESS Rule change in 2014 was designed in part to broaden the scope of the ESS to include a greater range of activities applicable to the residential sector. In particular, this included:

- incentives for tradespeople to reduce the cost and increase the quality of household upgrades to lighting, fixed appliances and building fabric
- incentives for appliance retailers to make high efficiency appliances more affordable and accessible for their customers
- lowering transaction costs for businesses to provide services to households to retire old and inefficient fridges and freezers
- incentives for electricity retailers, networks or other parties to give their customers tools and information that are proven to save energy in the home.

While these Rule amendments and changes arising out of this review may lead to an increase in household energy efficiency, this is unlikely to be high in low income households. This is because the ESS is unlikely to sufficiently target the upfront cost and split incentive barriers to energy efficiency for vulnerable households.

The financial incentives available from the ESS are typically worth less than a third of the upfront cost of high cost–high return energy savings opportunities. Anecdotal evidence from Office of Environment and Heritage partner organisations suggests this is not a high enough cost saving to influence appliance purchasing decisions for low income households.

A study of the Victorian Energy Efficiency Target scheme found that uptake of high cost–high return opportunities, such as hot water services, space heating and insulation was much lower in areas with relative socio-economic disadvantage.[127]

In the absence of additional intervention, the incentives available under the ESS are unlikely to overcome any upfront cost barrier for vulnerable low-income households.

Stakeholders generally agreed that the ESS alone is unlikely to overcome the upfront cost and split incentive barriers for low-income households in the absence of other mechanisms.

Option 2 - sub-target for vulnerable households

Under Option 2, scheme participants would be required to meet a proportion of their annual energy savings target by purchasing certificates that were created for activities that assist vulnerable households.

Key concerns with the effectiveness of this option relate to identification of low income households, and verification of savings in low income households.

Sub-targets or 'priority groups' as proposed by Option 2 exist in other state and territory based energy efficiency schemes including:

- South Australia's Residential Energy Efficiency Scheme, where the Minister has the ability to determine a percentage of the target that must be delivered to the priority group of households (defined as those holding concession or health care cards issued by the Commonwealth or South Australian Government). For 2013, the Minister set a target of 35% of the greenhouse gas reduction target for the priority group[128]

[127] Sullivan and Johnson, 2012 *The Power to Save: An equity assessment of the Victorian Energy Saver Incentive in metropolitan Melbourne*, prepared for the Brotherhood of St Laurence, accessed at www.bsl.org.au/pdfs/SullivanJohnson_Power_to_save_equity_assessment_of_VESI_Melbourne_2012.pdf

[128] Essential Services Commission of South Australia 2014 *Residential Energy Efficiency Scheme Annual Report 2013*, accessed at *http://www.escosa.sa.gov.au/library/140611-ResidentialEnergyEfficiencyScheme_2013-AnnualReport.pdf*

- the Australian Capital Territory's Energy Efficiency Improvement Scheme, where a percentage (25% for 2013) of the target must be delivered from low-income households.[129]

It is difficult to estimate the effectiveness of sub-targets in overcoming the upfront cost or split incentive barriers (discussed in **Section 4.2.1** above). In the South Australian Residential Energy Efficiency Scheme, all energy retailers have exceeded their sub-target for the "priority group" (concession card holders) for 2013.[130] However, no information is available on the type of energy savings activities that were carried out in priority households in comparison to non-priority households. The impact of this sub-target in overcoming upfront cost or split incentive barriers is not clear as there is no information of any changed behaviour regarding household appliance purchases.

Some stakeholders supported introducing sub-targets in to the ESS.

> *'Setting additional sub targets for households (…) will ensure that the direct benefits will also flow to the household sector. This sector faces greater market barriers to business in terms of access to information and upfront capital, and pays more for their electricity than large commercial and industrial customers." (Insulation Council of Australia and New Zealand, an industry group)*

However, it is difficult to accurately identify vulnerable low-income households.[131] A number of stakeholders have raised concerns about the ability to identify vulnerable low income households and have questioned whether a sub-target can be confined to only vulnerable households.

> *"Sub-targets add complexity and cost, which goes against other objectives discussed in the paper. Sub-targets do not ensure that services are delivered to vulnerable households, as many with concession cards are financially secure and not vulnerable, and there are vulnerable working households who do not qualify for concession cards. If greater assistance to vulnerable households is required then this should be by targeted programmes that address specific issues." (Simply Energy, an energy retailer)*

Energy efficiency obligation schemes in the United Kingdom have experienced difficulty in identifying and targeting vulnerable low income households. A report into these schemes has found that they would *"be insufficient to make a significant contribution to alleviating fuel poverty or may go to homes that are not fuel poor because the policy is poorly targeted."*[132]

This evaluation suggested that a more successful option may be to target all households in socio-economically disadvantaged areas that are identified using census data and other statistics. The study proposed this as the best way to ensure that the benefits of programs designed to assist vulnerable households go where they are intended.

The NSW Government used a similar approach to target its Home Power Savings Program.[133] The program achieved its stated target of supporting 220,000 low income homes to reduce energy use and save on their power bills early and under budget.

Option 3 - multiplier for vulnerable households

Under Option 3, activities that benefit vulnerable low income households would be rewarded with additional energy savings certificates (that is, a multiplier).

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[129] ACT Environment and Planning Directorate, *Energy Efficiency Improvement Scheme*, accessed at http://www.environment.act.gov.au/energy/energy_efficiency_improvement_scheme_eeis
[130] Essential Services Commission of South Australia, 2014, *Residential Energy Efficiency Scheme Annual Report 2013*, accessed at www.escosa.sa.gov.au/library/140611-ResidentialEnergyEfficiencyScheme_2013-AnnualReport.pdf
[131] National Energy Savings Initiative Working Group, 2012, *National Energy Savings Initiative – Progress Report*, p103
[132] Rosenow et al, 2013, *Fuel poverty and energy efficiency obligations – A critical assessment of the supplier obligation in the UK*, Energy Policy 62 (2013) 1194–1203
[133] ARTD Consultants, 2012, *Home Power Savings Program 2012 Independent Evaluation Final report to Office of Environment and Heritage, NSW Department of Premier and Cabinet*, accessed at http://www.environment.nsw.gov.au/energyefficiencyindustry/evaluation.htm

> *"For vulnerable households to participate in the ESS (and energy efficiency more broadly) it is first necessary for the household sector to be able to participate (...) It is possible for the ESS scheme to increase the residential multiplier for qualifying ESC-generating activities undertaken in vulnerable households." (Next Energy, an ACP)*

While this option may be simple, it also may not be effective. Concerns over eligibility and targeting of vulnerable low income households discussed in relation to Option 2 would also be a key consideration in the effectiveness of Option 3. As with Option 2, considerable effort and cost may be required to identify qualified low income households and measure, record and verify any energy savings.

> *"A residential multiplier that at least doubles the number of ESCs that a household project is eligible to create for each service provided under its accreditation would be both sensible and simple to implement in a timely fashion." (Next Energy, an ACP)*

Applying the multiplier to the residential sector overall would simplify the problem of identifying eligibility criteria, but would not help the ESS target vulnerable low income households. The level of multiplier applied to an entire residential sector could also add volatility to the energy efficiency market and could raise equity issues between sectors.

Option 4 - supplementary programs

Under this option, a supplementary program targeting energy efficiency activities in low income households would be developed by the NSW Government. This program would complement the ESS and any government or corporate program that supports low-income household access to energy efficiency activities. Such a program would be designed specifically to overcome the upfront cost and split incentive market barriers to energy efficiency in vulnerable households. Many stakeholders supported a separate program.

> *"(…) assistance to vulnerable households should be designed to integrate with and top up the proposed Home Energy Retrofit Program and high efficiency appliances under the ESS, and potentially include top up incentives for solar hot water. Support will also need to be designed so that the landlords of vulnerable renters have an incentive to upgrade the building fabric of properties." (The Energy Efficiency Certificate Creators Association, an industry body)*

Efficiency

Maintaining the current ESS approach to achieve equity objectives is the most cost-effective option

Option 1 would be the most efficient option as there would be no additional compliance costs for scheme participants. Accredited certificate providers would not have to dedicate resources to identify and undertake energy savings activities that benefit vulnerable households. However, as discussed earlier, it is unlikely this will increase the uptake of energy efficiency opportunity activities in vulnerable low income households, which have specific market barriers to participating in the ESS.

A sub-target for vulnerable households would need to be set at a high level and would likely add considerable costs

To provide sufficient cost savings for low-income households, a sub-target for low-income vulnerable households would need to drive the certificate price to a level that it would impact on decision making and overcome the upfront costs market barrier.

A consultant report into the Commonwealth Government's National Energy Savings Initiative found that most households would be willing to invest in energy efficiency once the project had a payback

of two to three years, but that a household with a healthcare card and low resources may only invest in a project if it pays itself back in the same year.[134]

This implies that support for vulnerable households through an ESS sub-target (Option 2) would increase certificate costs and that a multiplier (Option 3) may need to be very generous, reducing the overall benefit of the scheme.[126]

Option 2 is likely to add a considerable cost for scheme participants. This cost would be passed on to all electricity consumers, including vulnerable households, offsetting some of the benefits they receive.

A number of target setting options for the ESS generally are discussed in **Section 2.4**. These options are modelled to ensure the scheme achieves optimal net economic benefit. Adding a high sub-target for vulnerable low income households to an optimal ESS target may reduce the economic benefits of the ESS and increase the cost to scheme participants. These additional costs may eventually be passed through to end-users in the form of increased energy prices.[135] The economic benefits to NSW consumers as a whole would not be realised.

There is also concern among stakeholders that sub-targets may exacerbate the current certificate price volatility in the ESS cause by the oversupply of certificates.

> *"(…) given the relatively small size of the ESS, sub-targets of any kind are likely to exacerbate existing volatility. EECCA would not support the introductions of sub-targets without a significant increase in the size of the ESS." (The Energy Efficiency Certificate Creators Association, an industry body)*

Determining a suitable multiplier for vulnerable households is difficult

A certificate multiplier (Option 3) would provide an incentive for accredited certificate providers' to conduct energy efficiency activities for vulnerable low-income households. Activities that benefit confirmed low-income households would be rewarded with additional energy savings certificates.

As with Option 2, an additional cost of applying this mechanism is the need to be able to identify the qualified low-income households, measure and record the energy savings actually achieved, and verify that they occurred in qualified low-income households.

One of the difficulties with this approach is determining an appropriate multiplier.

A multiplier for vulnerable households may erode the economic benefit of the scheme as it would decrease the energy savings delivered per activity. This also has the potential to distort the certificate market. Achieving a balance between the additional energy savings benefits that would be made available to vulnerable low income households and the impact on the energy savings that may be realised by all households would be difficult.

It may be possible to determine an appropriate multiplier with a detailed cost-benefit analysis. However, there is no accepted value for the increased benefit of energy savings from vulnerable low income households over other sectors of the economy.

No energy efficiency obligation scheme in any jurisdiction applies certificate multipliers to energy efficiency activities in low-income households.[135]

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[134] Jacobs (formerly SKM), 2013, *Assessment of Economic Benefits from a National Energy Savings Initiative*, prepared for the Commonwealth Department of Environment

[135] Energy Futures Australia, 2014, *Analysis Framework for Introducing Mechanisms to Achieve Sub-objectives in the NSW Energy Savings Scheme*, prepared for Office of Environment and Heritage

Supplementary programs can deliver cost effective energy bill savings to low income households

A supplementary low income program under Option 4 has the potential to deliver energy bill savings to vulnerable low income households more cost effectively than other options. A supplementary program can pilot delivery models and practice continuous improvement to drive cost effective energy savings and improve efficiency. Options 2 and 3 would not be as flexible due to the time that would be required to make changes to the regulatory framework of the ESS.

By coordinating a supplementary program to use revenue from certificates, organising bulk purchase discounts from appliance and product retailers, and coordinating existing arrangements for interest free loans available to low income households, a supplementary program could deliver cost effective energy savings.

Administrative simplicity

A sub-target (Option 2) would add additional administrative complexity for IPART, accredited certificate providers and scheme participants. Scheme participants would have additional costs to calculate and report against their annual obligation and purchase certificates. Accredited certificate providers would incur costs to develop business models that could identify and target vulnerable households and entice them to undertake energy efficiency activities. IPART would need to work with accredited certificate providers and scheme participants to understand the new requirements and gain information for audit and verification purposes.

In Options 2, 3 and 4, a clear definition of vulnerable households would need to be determined to ensure that the sub target and multiplier can be applied fairly. Although Option 3 would reduce the administrative complexity for scheme participants and accredited certificate providers, it would make the benefits of the ESS less transparent to stakeholders as there would be ‘phantom’ certificates created that would not correspond to energy savings.

The administration of a separate program (Option 4) would be easier to administer in comparison to Options 2 and 3.

4.2.4 Preferred Option

The preferred option is a supplementary program targeting low income households (Option 4). This option will:

- specifically target those market barriers which prevent vulnerable households from becoming more energy efficient and therefore be more effective than Options 1 or 3
- enable more flexible eligibility criteria and the scale of the program to be changed more efficiently than Option 2
- allow for faster and more iterative policy development than Options 2 or 3 to identify the most effective, efficient and simple approach to assist vulnerable households
- enable the NSW Government to bundle assistance from different existing programs rather than forcing additional complexity onto existing programs under Options 2 and 3.

The NSW Government will continue to work with the private sector, community housing operators and other levels of government to consider supplementary assistance to vulnerable households.

On 2 March 2015, the NSW Government announced a $61.5 million energy efficiency package which includes $26.8 million in funding to help low income households reduce their power use and cut their energy bills.[136]

4.3 Energy savings at peak times

Long term electricity network investment is based on peak demand estimates. Reducing peak demand through energy efficiency is a cost effective method to defer the need for network capital investment. This would reduce future electricity price rises.

The ESS does not contain a mechanism for targeting peak demand although the benefits of energy efficiency activities reduce electricity consumption at all times.

4.3.1 The case for government action

Reducing peak demand can reduce energy bills

Transmission and distribution networks make capital investments when there is a need to increase capacity, replace aged assets, or increase security and reliability (to address voltage and frequency issues). Network capital investment can have a major effect on electricity prices. These costs were the most significant factor behind rising electricity prices over the last decade.[137]

Peak demand is a trigger for all types of network investment. Peak demand affects all areas of the network in the long term, but is more acute in some areas than others in the short term. For example, when replacing aged assets or building a completely new network for a greenfield site, the long term peak demand forecasts determine how much infrastructure needs to be built. In the short term, rising peak demand can necessitate the need to build more network assets or hasten aged asset replacement.

Energy efficiency can reduce peak demand

Energy efficiency has been proven to provide secure reductions in peak demand. Evaluation of the NSW Government's former Energy Efficiency for Small Business Program shows that energy efficiency effectively reduced the maximum peak demand for participating businesses.[138] This is supported by evidence from overseas, where energy efficiency is routinely used to provide cost effective reductions in peak demand.[139,140]

The ESS has no specific mechanism to target peak demand, but there is evidence that it is impacting overall peak demand. For example, Ausgrid stated that energy efficiency programs including the ESS are a key factor in declining future demand in their 2014-15 Transitional Regulatory Proposal.[141]

Peak demand occurs at different times in different locations and affects the network to different levels of intensity. By identifying and targeting the times of peak demand in specific areas (subzones) that are due for capital investment, energy efficiency could be employed to effectively

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[136] For more information see http://www.environment.nsw.gov.au/resources/households/heap-faq.pdf
[137] IPART, 2013, *Review of regulated retail prices and charges for electricity: From 1 July 2013 to 30 June 2016*, www.ipart.nsw.gov.au/Home/Industries/Electricity/Reviews/Retail_Pricing/Review_of_regulated_electricity_retail_prices_2013_to_2016
[138] Energetics, 2013, *Measurement and verification of energy savings within the Energy Efficiency for Small Business Program*, Office of Environment and Heritage: Sydney, Australia, p. 47.,accessed at: www.environment.nsw.gov.au/resources/sustainbus/140079ensveesbp.pdf
[139] York et al, 2007, *Examining the Peak Demand Impacts of Energy Efficiency: A Review of Program Experience and Industry Practices*, Report Number U072, American Council for an Energy-Efficient Economy: Washington, United States of America, accessed atwww.epa.gov/statelocalclimate/documents/pdf/york_paper_ee_peak_demand_4-12-2007.pdf
[140] California Public Utilities Commission, 2013, *Fact Sheet: State-wide Residential Programs (2013-2014)*, accessed at www.cpuc.ca.gov/NR/rdonlyres/3DE5A49C-9E9C-4945-AD78-161338282638/0/201314ResidentialFactSheet.pdf
[141] Ausgrid, 2014, *Transitional Regulatory Proposal: for 1 July 2014 to 30 June 2015*, p.25, accessed at: www.aer.gov.au/sites/default/files/Ausgrid%20-%20Transitional%20regulatory%20proposal%20-%2031%20January%202014.PDF

defer network investment. However, as peak demand and network infrastructure investment are not uniform, the benefits that energy savings provide also varies across the network.

Stakeholders have proposed a number of methods for calculating the impact of energy efficiency activities on peak demand.

> *"Conservation Load Factor (CLF) seems like a reasonable approach but there should be a range of factors available depending on the location and timing of the EE activities." (AIRAH, an industry body)*
>
> *"The impact of energy efficiency activities on peak demand events can be calculated by direct measurement and verification to identify load reduction at the time of the peak demand. Constraint maps can be used in the same way as post codes are used for ESC's to identify the 'hot spots' which align with network constraints." (The Clean Energy Council, an industry body)*

There are market barriers to energy users targeting energy efficiency at peak demand

Market barriers restrict energy consumers and market participants from undertaking energy efficiency activities that target peak demand. These barriers include:

- imperfect information: electricity prices do not reflect the varying costs of peak demand at the subzone level so energy efficiency providers do not know where peak demand reductions are most needed
- split incentives: energy users normally undertake energy efficiency activities when the primary benefit to them is reduced power bills but for most energy users there is no price signal encouraging them to reduce peak demand impacts through energy efficiency[142]
- data as a public good: there is a lack of publicly available data on how different types of energy efficiency reduce demand at different times, and no single player has an incentive to collect this information.

There are regulatory and organisational barriers to network service providers pursuing energy efficiency

Demand management includes energy efficiency, distributed generation, energy storage and demand-response. Under the National Electricity Rules, network service providers must undertake demand management when it is more cost effective than building network infrastructure.[143]

However, the current regulatory process creates market barriers that prevent this from occurring. These barriers include:

- short timeframes: networks and third parties only have a small window of time to identify and implement non-network solutions once a network constraint has been identified
- exclusion of residential and small business consumers: network service providers mainly target the largest load users in a constrained network area to identify demand management opportunities because of the lower transaction costs compared to smaller users
- uncertainty of the reliability of non-network alternative: which creates an additional hurdle to realising the benefits those alternatives could provide[144]

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[142] There are currently only a limited amount of customers on the low voltage network (residential, small business and commercial customers) that receive capacity charges. This may change in the future.
[143] Australian Energy Market Commission, 2014, *National Electricity Rules Version 63*, accessed at www.aemc.gov.au/energy-rules/national-electricity-rules/current-rules
[144] NERA Economic Consulting, 2012, *Peak Energy Savings Scheme Design Options*, prepared for the Energy Savings Initiative Secretariat, accessed at industry.gov.au/Energy/EnergyEfficiency/StrategiesInitiatives/EnergySavingsInitative/Pages/Reports.aspx

- low public engagement: network service providers make public requests for demand management solutions, yet receive very few responses from end users or energy efficiency service providers
- network perspective: demand management screening tests only consider the value of deferring network infrastructure, but energy efficiency usually also provides cost and energy benefits to individual energy users

Objectives of government action

The objectives of government action are to:

- better coordinate the ESS with demand side programs and assist the energy efficiency industry to target energy savings at the times and locations of peak demand
- address the market and regulatory barriers that are preventing network service providers and energy efficiency market industry participants from enabling energy efficient demand management projects to maintain network reliability.

4.3.2 Description of options

Option 1: No change

This option would leave the current ESS unchanged. There would be no increase in monitoring, data collection or reporting beyond the data collection requirements as a result of the changes to the ESS Rule released in May 2014.

Option 2: Improved information (preferred option)

Under this option, the NSW Government would not change the ESS. Instead, the NSW Government would use components of the ESS to provide information to the energy efficiency industry and network service providers about the impact of energy efficiency on peak demand to overcome market and regulatory barriers. This includes:

- integrating information about the impact of energy efficiency on peak demand savings into ESS calculation methods to measure, record and demonstrate peak energy savings at different locations and times
- collating and publishing existing information on when and where energy savings are required to target peak demand
- evaluating, measuring, and verifying the impact of different types of energy savings activities on peak demand at different times and locations (included in actions outlined in **Section 6.1.1**).

Option 3: Certificate multiplier targeting energy savings at peak times

Under this option, the NSW Government would amend the ESS Rule to provide a certificate multiplier for energy savings delivered in specific areas (zone substation areas) with network capacity constraints. This would provide a financial incentive for accredited certificate providers to target customers in these areas.

Additional certificates would be generated for each kW of reduced peak demand in these areas. The additional certificates will only apply in the specific zone substation area where peak reduction is required.

Providing this incentive would require the NSW Government to notify the market when and where energy savings are required in order to identify appropriate certificate multipliers for each zone substation area, in addition to the information and calculation mechanisms outlined in Option 2.

4.3.3 Analysis of options

Effectiveness

Option 1 - no action

The 'no action' option does not overcome any of the market or regulatory barriers to targeting peak demand with energy efficiency.

Although the ESS under the combined preferred options for targets (**Section 2.2.4**) , duration (**Section 2.5**) and fuel coverage (**Section 3.3**) would reduce system peak demand by an additional 247 MW in 2025 and defer network investment, it would not be coordinated with network demand side programs or enable the energy efficiency industry to target energy savings at the times and locations of peak demand.

Option 2 - improved information

Under this option, the NSW Government would seek to collate and publish data for energy efficiency service providers and network service providers on constrained network locations and the impact of energy efficiency on peak demand. This improved information could overcome market barriers by helping to build the knowledge of energy efficiency service providers and network service providers to have a common understanding of the value of delivering energy efficiency to target peak demand savings. This could enable energy efficiency service providers and network service providers to negotiate business arrangements to deliver energy efficiency to deliver peak demand savings.

Accredited certificate providers could benefit from this option as it may make it easier to negotiate financial agreements with network service providers to deliver energy efficiency activities targeting peak demand at constrained network locations. The approach overcomes the 'imperfect information' and 'data as a public good' market barriers identified above.

> *"This would allow energy efficiency aggregators to work with networks to develop projects tailored to their needs, by providing a transparent and common framework, and reducing transaction costs." (Energy Makeovers, an ACP)*

In practice, this may result in energy efficiency service providers creating certificates as a way to prove the amount of peak demand savings delivered. The network service providers could then voluntarily surrender those certificates, as a way of ensuring that energy savings would not be double counted. Alternatively, businesses could use the improved information and calculation framework as a tool to calculate savings delivered outside of the ESS.

Option 3 - certificate multiplier targeting energy savings at peak times

There are no additional energy saving opportunities created using multipliers (Option 3), but there would be a price signal to change the type of energy efficiency activities being undertaken. This could lead to more energy efficiency activities with larger relative reductions in peak demand being undertaken in constrained network locations.

Analysis from the Australian Alliance to Save Energy showed that targeting all types of demand management at the zone substation level is 116 per cent more cost effective than targeting a system-wide peak. For energy efficiency measures alone, societal benefits are 40 per cent greater when targeting the local subzone compared to the system-wide peak. [145]

[145] Kaye et al, 2013, *Benefits of Electricity Demand Management for New South Wales*, prepared for the NSW Office of Environment and Heritage and the Australian Alliance to Save Energy by Energetics and the Institute for Sustainable Futures, University of Technology Sydney

The NSW Government has not attempted to model the additional peak demand that would be delivered by applying a certificate multiplier. This exercise would require a detailed understanding of the type and location of both energy efficiency opportunities and network constraints.

Most energy retailers do not support the expansion of the ESS to target peak demand.

> *"(…) it would be very difficult and costly for the NSW Government to attempt to address peak demand events in a more effective or efficient manner (than existing initiatives including programs run by distribution businesses and energy retailers), given the experience and data utilised by the existing programs." (ERM Power, an energy retailer)*

Efficiency

No further action, and improved information retain the cost effectiveness of the ESS

While there is no additional cost associated with not altering the current ESS (Option 1), there would not be any additional reduction in peak demand. This would represent a lost opportunity for network service providers to undertake energy efficiency as a low-cost alternative to infrastructure spending.

Improved information (Option 2) is an efficient option because it has the potential to overcome information barriers to targeting peak demand without the added costs associated with providing a financial incentive to accredited certificate providers through the ESS or significantly changing the ESS.

Multipliers distort the certificate price but encourage affordable peak energy savings

Introducing a certificate multiplier (Option 3) could provide a financial incentive for peak demand reductions through the ESS. This could distort the certificate price and cause issues with the transparency of the scheme's performance (which is in MWh). This distortion could also reduce the net economic benefit of the scheme if the multiplier is not set at a value that relates to the deferred network investment and the economic benefit of the peak reduction.

> *"(…) a multiplier based on avoided costs and additional fuel costs is the most direct way of targeting these crucial geographically and chronologically targeted savings (…) the multiplier should be linked to the multiple of costs of a peak kWh in a constrained location (and the avoided cost of upgrading infrastructure) vs the normal kWh rate." (Opower, an energy efficiency service provider)*

Administrative simplicity

'No action' (Option 1) has the least complexity, but it does not provide any further improvements.

Improved information (Option 2) is simpler and cheaper to administer than options that provide a financial incentive (Option 3) because compliance and administration are conducted by the market.

A certificate multiplier (Option 3) would be complex to administer. It would require all the elements of the improved information option, plus increased administration costs associated with monitoring and verifying the location and type of activity.

> *"a changed focus of the ESS on addressing peak demand would require a significant redesign of the scheme, including a requirement for ESCs to have both a temporary and a spatial dimension (…) It would therefore appear likely that such an initiative would add considerably to the complexity and cost of the scheme:*
>
> - *variations in ESC values would need to be highly specific and contingent on up-to-date information about the nature and timing of network limitations*

- *auditing and monitoring activities undertaken by IPART would need to be extended to assess the extent to which the claimed demand reductions meet the specifications.*

(…) there are other mechanisms which are already available to NSPs [network service providers], and which are likely to be far less complex and more cost effective in addressing local network constraints. These include time-of-use pricing, as well as a range of demand side participation measures." (National Generators Forum, an industry body)

4.3.4 The risk of duplication

Current National Electricity Market regulations direct networks to undertake Demand Management where it is more cost effective than building network infrastructure.

The certificate multiplier (Option 3) may duplicate these regulations and would be difficult to separate from energy efficiency projects that would be undertaken to defer network infrastructure under the regulatory investment test for distribution process.[146]

However, as the improved information option provides information to overcome barriers, rather than financial incentives, the risk of duplication is lower.

4.3.5 Preferred option

The preferred option is improved information (Option 2).

This option meets the government objectives to address market and regulatory barriers to energy savings at peak times, and coordinate the ESS with demand side management programs.

Under this option, the NSW Government would provide information to the energy efficiency industry and network service providers to overcome market and regulatory barriers in relation to peak demand by streamlining the process for network procurement of energy efficiency. The NSW Government would:

- seek to coordinate and publish information on the times and locations of peak demand
- integrate information on the peak demand impacts of energy efficiency into ESS calculation methods that allow the energy efficiency industry and network service providers to measure, record and demonstrate peak energy savings at different locations and times
- identify how different types of energy savings activities reduce peak demand at different times through evaluation, measurement and verification, and publish this data.

This option would enable the energy efficiency industry to use the comprehensive network constraint data to demonstrate the effect that activities have on peak demand. The intention of this process is that the energy efficiency industry can make a business case to networks that would be attractive to them in resolving network constraints.

This approach also has scope to allow the energy efficiency industry to implement additional technologies like distributed generation and distributed storage that are not eligible under the ESS, but reduce peak demand and reducing bills for energy users.

4.4 Exempt electricity loads

The Act specifies that the Minister may grant an exemption from the ESS in respect of any site specific electricity load if the Minister is satisfied that the electricity load is used in connection with an industry or activity that is emissions intensive and trade exposed.[147]

[146] Australian Energy Regulator, 2013, *Regulatory investment test for distribution (RIT-D) and application guidelines*, accessed at www.aer.gov.au/node/19146

NSW emissions intensive and trade exposed sites have been granted partial exemptions with the exempt component of each electricity load specified as either 60 per cent or 90 per cent (the 'exempt proportion').[148] ESS exemptions were aligned with the exemptions granted under the Commonwealth Government's Jobs and Competitiveness Program until it was discontinued in 2014.[149] ESS exemptions are now closely aligned with the Clean Energy Regulator's list of approved emissions intensive trade exposed activities for the Commonwealth's Renewable Energy Target.

This section considers changes to the eligibility of exempt sites to create certificates.

4.4.1 The case for government action

Exemptions are granted to ensure competitiveness in Australian and overseas markets

Scheme participants do not count exempt electricity load towards their annual obligation to purchase certificates. Therefore, the partially exempt electricity loads at emissions intensive and trade exposed sites reduce the number of certificates that their electricity suppliers need to surrender. This reduces the cost of electricity to emissions intensive and trade exposed sites.

Without exemptions, products produced at NSW emissions intensive and trade exposed sites would become less competitive relative to products in the Australian and overseas markets which do not have to meet these requirements.

In their submissions on the ESS Review Issues Paper, emissions intensive and trade exposed industries identified the potential impact of changes to exemptions on their competitiveness, particularly in the current economic climate.

> *"Imposition of any additional costs associated with carbon and energy policies serve to undermine the international competiveness of large energy and emissions intensive industries such as aluminium smelting, where international competitiveness is already very fragile" (Tomago Aluminium, a large energy user)*

There are potential equity issues with allowing emissions intensive and trade exposed sites to generate certificates

Allowing sites conducting emissions intensive and trade exposed activities to create certificates where they have been granted an exemption creates potential equity issues.

The ESS Better Regulation Statement prepared prior to the introduction of the ESS into the Act indicated that exempt emissions intensive and trade exposed sites should not directly benefit from the creation of certificates. This was due to the principle that businesses that do not pay for the scheme should not be able to benefit. However, under the Act, emissions intensive and trade exposed sites are not ruled out from allowing their service providers (accredited certificate providers) to generate certificates on their behalf.

> *"We are opposed to any moves to reduce the exemption levels afforded to EITE sites (…) At the same time, we are in agreement with the principles that EITE sites should not directly benefit from the creation of ESC's and would support an amendment that prevented ACP's from creating ESC's at an EITE site" (Australian Paper, a large energy user)*

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[147] *Electricity Supply Act section 119*
[148] Energy Savings Scheme - Scheme Regulator Exemptions Rule, accessed at http://www.ess.nsw.gov.au/files/0e7c3e16-8f81-41e4-9f31-a28500df15e5/scheme_regulator_exemptions_rule_no_1_-_14_November_2013.pdf
[149] Clean Energy Regulator, 2014, *Jobs and Competitiveness Program*, accessed at www.cleanenergyregulator.gov.au/Carbon-Pricing-Mechanism/Industry-Assistance/jobs-and-competitiveness-program/Pages/default.aspx

Since 2009, emissions intensive and trade exposed sites have created at least 1 million certificates or about 10 per cent of total certificates in that period.[150]

Exempt sites avoid a financial cost as a portion of their electricity load does not require the purchase of certificates yet they are able to benefit financially from the creation of certificates on their behalf. This results in non-exempt sites cross-subsidising exempt sites.

However, despite the cross-subsidy for emissions intensive and trade exposed sites, the energy savings at these sites results in an overall public benefit. Because of their scale and industrial nature, many emissions intensive and trade exposed sites have generated large energy savings that have contributed greatly to deferring the need for new electricity supply infrastructure and have kept electricity prices lower for all consumers, including non-participants in the scheme.

Objective of government action

The objective of government intervention is to minimise potential cross subsidies as a result of exemptions to emissions intensive and trade exposed activities, while retaining an incentive for emissions intensive and trade exposed sites to benefit from energy savings opportunities.

4.4.2 Description of options

Option 1: No change (preferred option)

Under this option, existing exemptions would remain and there would be no restrictions on certificate creation at emissions intensive and trade exposed sites.

Option 2: Discount factor for exempt sites based on the level of their exemption

Under this option, the ESS Rule would be amended to include a discount factor for certificates created for energy savings from exempt loads at emissions intensive and trade exposed sites. The multiplier would reflect the level of their exemption.

An emissions intensive and trade exposed site with a 60 per cent exemption would have a non-exempt load of 40 per cent of the total load and would be able to register only 40 per cent of the certificates created at the site. Similarly, an emissions intensive and trade exposed site with a 90 per cent exemption would be able to register only 10 per cent of the certificates created at the site.

Option 3: Allow exempt emissions intensive and trade exposed sites to “opt out” of their exempt status

This option would build on Option 2 and allow exempt emissions intensive and trade exposed sites to ‘opt out’ of their exempt status and register 100 percent of certificates at a site. These sites could ‘opt in’ to their exempt status again once all energy savings that have been brought forward have occurred. For those emissions intensive and trade exposed sites which have retained their exempt status or have opted back in, Option 2 conditions would apply to certificates created.

[150] Based on analysis of certificates created for recognised energy savings activities with emissions intensive trade exposed businesses named in the ESS registry as of September 2014.

4.4.3 Analysis of options

Effectiveness

Option 1 - no change

The current ESS exemption arrangements will continue to encourage emissions intensive and trade exposed industries to benefit from energy savings opportunities. Most stakeholders in their submissions on the ESS Review Issues Paper supported the continuation of the existing exemptions to maximise these savings:

> *"Contributions that may be made by large energy consumers (including EITE sites) toward meeting energy savings targets are extensive and often involve significant capital investment to create large, long lasting savings with very low risk to the scheme. Hence it is important that all industries with any obligation under the ESS have the opportunity to participate in meeting energy savings targets through the continued ability to generate ESCs." (The Bureau of Steel Manufacturers of Australia (BOSMA), an industry body)*

Under this option, exempt sites would have the same access to the financial incentives under the ESS as other users that contribute relatively more towards its costs.

Option 2 - discount factor for exempt sites based on the level of their exemption

Option 2 would discount the quantity of certificates created at each exempt site based on the site's exempt proportion, and would reduce the potential for cross subsidies from regular consumers to emissions intensive and trade exposed industry activities.

Given that emissions intensive and trade exposed sites are generally large scale operations with significant energy expenditures, they have an incentive to reduce energy consumption, even in the absence of the ESS:

> *"Industry, and in particular, Energy Intensive Trade Exposed (EITE) industry such as the pulp and paper industry, have a range of drivers that push the organisation to seek energy efficiencies and least cost operation (…) the addressing of these issues has become part of our everyday culture [in a very competitive market]." (Australian Paper, a large energy user)*

Some stakeholders suggested that the exemptions policy should be reviewed and/or that exemptions should be removed:

> *"exemptions for emissions-intensive trade-exposed (EITE) sites should be removed." (Australian Institute of Refrigeration, Air-conditioning and Heating, an industry body)*

> *"The Council recommends a review of the treatment of EITE sites." (Energy Efficiency Council, an industry body)*

Option 2 would minimise the potential for cross subsidies while still providing an incentive to implement low cost energy savings at exempt sites. It could also result in an increase in energy savings for households, as more opportunities for energy efficiency are available to households in place of exempt site activities.

However, applying a discount factor would reduce the volume of certificates available on the market from low cost industrial activities. For example, the result of applying the 60 per cent discount factor to industrial activities is estimated to reduce the industrial share of certificates from 33 per cent to 26 per cent under the preferred options described in earlier sections (that is, to increase targets, extend the scheme duration and expand the scheme to include gas). This reduction is not equal to the full discount factor because the exemption results in higher certificate prices that encourage a different mix of activities across the industrial, residential and commercial sectors.

If the uptake of energy efficiency activities by emissions intensive trade exposed sites was significantly reduced, certificate prices may need to be higher to drive activity in other sectors. The Office of Environment and Heritage forecasts the average certificate price could increase from around $23 to $29 between 2015 and 2025.[151]

These changes would increase its cost impact on all consumers including non-participants by 29 per cent. This indicates that a discount factor to reduce the potential cross-subsidy from non-exempt sites to exempt sites may increase the cross-subsidy from non-participants to participants.

This suggests that Option 2 may not be effective in minimising potential cross subsidies as a result of emissions intensive trade exposed activities.

Option 3 - allow exempt emissions intensive and trade exposed sites to "opt out" of their exempt status

Option 3 builds on Option 2 and would allow emissions intensive and trade exposed industries to opt out of their exempt status and gain the full value of their certificates.

Option 3 would have a similar impact to Option 2 and reduce the potential for cross-subsidies from regular consumers to emissions to emissions intensive trade exposed industry activities. As in Option 2, if changes to exemptions result in a reduction of energy savings activities from emissions intensive trade exposed sites, Option 3 may increase cross-subsidies from non-participants to participants.

Option 3 differs from Option 2 as it could also allow emissions intensive and trade exposed industries to create certificates in their own right rather than through an accredited certificate provider. This option may provide an incentive for emissions intensive and trade exposed sites to seek solutions which may be more financially attractive than those available under Option 2. If these sites save a larger proportion of their energy than the ESS targets, they could choose to 'opt in' and receive more from the ESS than they contribute. However, there may be a low likelihood of emissions intensive and trade exposed industries opting out of their exempt status if no accompanying restrictions are put in place on certificate creation at emissions intensive and trade exposed sites.

Efficiency

The current approach results in benefits for stakeholders and the economy

The existing approach to exemptions (Option 1) was generally supported by accredited certificate providers who are contracted by exempt emissions intensive and trade exposed sites to create certificates, and companies and industry associations representing emissions intensive and trade exposed sites.

> *"Allow ACPs to create ESCs at EITE facilities, as this will further incentivise large energy users to invest in energy efficiency of their operations. It will also help to increase the volume of ESCs available to the market and therefore ensure least cost compliance." (Orora, a large energy user)*

There are large amounts of low cost energy efficiency opportunities in the emissions intensive trade exposed sectors. By providing the full certificate value for these energy savings, the ESS encourages the lowest cost energy efficiency across the economy. This also allows the benefit of energy savings to be spread across the whole economy in the form of downward pressure on electricity prices. Altering the incentives available to these sectors may reduce the cost effectiveness of the ESS.

[151] Analysis by the Office of Environment and Heritage using Jacobs, 2014, *NSW Energy Efficiency Uptake Model V1.0*

Changing the incentives is not economically efficient

Option 2 would result in lower uptake of energy efficiency activities by emissions intensive trade exposed industries. This is predicted to drive up the average certificate price from $23 to $29 between 2016 and 2025. Higher certificate prices would result in higher costs for scheme participants which would be passed through to all electricity customers, including non-participants.

Option 2 would result in a substantial increase in the cost of changing the scheme from $546 million to $730 million. This is reflected in a decreased benefit-cost ratio compared to the current policy settings from 2.6 to 2.3, indicating that the economic efficiency of the scheme would be reduced.

> *"EITE's generate a large number of certificates without which the scheme could probably fall short. Thus EITE's are depressing the cost of the scheme." (CSR Limited, a product supplier)*

Option 3 may minimise the potential cross subsidy to exempt sites while allowing these sites to determine the best option for their business - to either 'opt out' of their exempt status and gain the full value of their certificates or 'opt in' and financially benefit from the non-exempt portion of their load. However, this option would result in the same increase in costs as Option 2 if exempt sites chose to 'opt out'.

Options 1 would have no added economic cost compared with Option 2 or 3, and would give emissions intensive and trade exposed industries the greatest incentive to adopt energy efficiency activities.

Administrative simplicity

Some stakeholders argue that Option 1 reduces administrative costs as the existing exemptions result in the creation of a large number of certificates from a small number of projects.

Partially removing the eligibility of NSW exempt sites to be able to create certificates (Options 2 and 3) or allowing currently exempt emissions intensive and trade exposed sites to 'opt out' or 'opt in' (Option 3) is likely to lead to minor increases administrative complexity for IPART and ESS scheme participants.

If Option 3 were to be adopted, rules relating to the process for 'opting in' would have to be developed for emissions intensive and trade exposed sites which had previously 'opted out'. The greater administrative complexity of Option 3 can be justified by the reduced inequity of Option 3 compared to Option 1 and the costs can be borne by the sites opting in and out.

4.4.4 Preferred option

Option 1 is the preferred option.

Maintaining the current approach partially meets the objective of government intervention to minimise potential cross subsidies as a result of exemptions to emissions intensive and trade exposed activities. The other options would increase the costs of the scheme and increase the cross subsidies from non-participants to participants. Option 1 also retains the same incentive for emissions intensive and trade exposed sites to benefit from energy savings opportunities.

It would allow emissions intensive and trade exposed sites to seek more financially attractive solutions than those available under Option 2 and would not be as administratively complex as Option 3.

While maintaining the current approach will not reduce the cross-subsidy by non-exempt sites of exempt sites, it would prevent a potential worsening of the cross-subsidy by non-participants to participants of the scheme.

4.4.5 Other proposed changes to the exemptions process

The current exemptions process involves some administrative complexity.

The Act states that *"[a]n exemption does not take effect until the beginning of the year after the order granting the exemption is made."*[152] Consequently, if a site is identified immediately after the preparation and publication of the NSW exemptions order then the site cannot become an exempt site until January of the following year (i.e. up to 13 months later).

It is proposed that, to address this issue, the Act be amended to allow more flexibility in the granting of exemptions.

The current process also requires the ongoing cooperation of the Commonwealth Clean Energy Regulator to prepare the exemptions order.

Some stakeholders supported the current exemption process involving the Clean Energy Regulator, while others suggested improvements.

> *"The exemptions are administered very well and we would not like to see any major changes to the exemption process." (Origin Energy)*
>
> *"From a retailer point of view this information (in the order) is incomplete as it does not include specific load information which is required to assess their ESC liability in respect of that customer. EnergyAustralia would find it useful if the Order provided NMI level information to avoid any confusion as to the retailer's liability." (EnergyAustralia)*

It is proposed that the NSW Government directly assess exemption applications on the basis of the exempt activities identified by the Clean Energy Regulator. This could improve administrative processes and streamline the scheme for retailers.

[152] *Electricity Supply Act section 122*

5 Scheme administration

Introduction

IPART is the scheme administrator and scheme regulator for the ESS in the absence of a formal appointment by the Minister of a person or body to these positions.

The NSW Government will formally appoint IPART as scheme administrator and scheme regulator for the ESS, and will clarify IPART's responsibilities in the letter of appointment including improving its reporting on costs, activities and details of energy savings certificates. This will provide business with the information they need to plan and understand the energy efficiency opportunities in NSW.

Summary of preferred options

Compliance powers

Under the Act, IPART has only a limited range of enforcement tools it can use to address compliance issues.

The NSW Government's preferred option is to enhance IPART's current range of regulatory and non-regulatory enforcement tools by giving IPART additional powers to:

- issue official warnings for repeat breaches or serious breaches (non-regulatory)
- issue penalty notices for limited offences (regulatory)
- enforce set-aside agreements (regulatory)
- enforce the surrender or cancellation of certificates (regulatory).

This will give IPART powers that reflect a modern and responsive administrative and regulatory scheme.

Certificate price transparency and trading regularity

There is no comprehensive public source of information on certificate prices.

The NSW Government's preferred option is for IPART to estimate average costs paid for certificates through an annual survey of scheme participants. IPART would publish an aggregate average price in its annual compliance report to the Minister. This would enable greater price transparency on consumer costs and would maintain the commercial in confidence nature of the prices paid by individual businesses.

Cost recovery

IPART has the ability to charge fees to recover the costs of services provided to businesses accessing financial incentives under the scheme. IPART only charges fees for some of these services and does not recover sufficient funds to cover the cost of scheme administration and regulation. As a result the ESS has an impact on the NSW Government's budget.

The NSW Government's preferred option is to increase existing fees charged by IPART by a modest amount and to set fees for services that are currently provided for free. This option would make the cost of providing administrative services more transparent and may help prioritise IPART's workload. These fees would only be used to recover the costs to IPART resulting from the ESS and will be reduced if they result in surplus funds.

This section outlines the roles and responsibilities of the Scheme Administrator and opportunities to enhance its compliance powers. This section also examines certificate price transparency and trading regularity and issues surrounding scheme funding and options for cost recovery.

5.1 The NSW Government will clearly define Scheme Administrator responsibilities

Under the Act, the Minister for Resources and Energy can appoint a person or body as Scheme Administrator and Scheme Regulator. Section 151(2) and section 153(2) of the Act states that the Independent Pricing and Regulatory Tribunal (IPART) is the Scheme Administrator and Scheme Regulator of the ESS in the absence of an appointment by the Minister. These functions have fallen to IPART due to the absence of such an appointment.

IPART's current responsibilities under the Act and *Electricity Supply (General) Regulation 2001* (the Regulation) include:

- accreditation of Accredited Certificate Providers
- acceptance of products for use through the scheme
- registration of certificates
- managing compliance of Accredited Certificate Providers and Scheme Participants to the Rules and Regulation
- fee collection
- issuing penalties and fines
- reporting on numbers of certificates created and surrendered.

The Minister has the power to assign additional roles to the Scheme Regulator or the Scheme Administrator.

This section of the options paper considers reforms to:

- the scheme administrator functions
- cost recovery fees charged by IPART.

5.1.1 IPART is an effective scheme administrator but its role is not clearly defined

An IPART stakeholder survey found a high level of satisfaction with IPART.[153] Submissions to the ESS Issues Paper supported this.

> *"BOSMA has found that IPART has proven to be an effective and efficient Regulator and Administrator of the Scheme." (Bureau of Steel Manufacturers of Australia, an industry body)*
>
> *"Overall, Origin has been pleased with the way the ESS has been administered. As a liable entity, we have received quality and timely administrative support from the Independent Pricing and Regulatory Tribunal (IPART). We note that our IPART's interactions with Origin with respect to our liabilities have been clear and straightforward." (Origin Energy)*

IPART may improve administrative processes over time, but it can only work within the framework of powers and responsibilities set by regulation.

[153] IPART, Annual Report 2012-2013, accessed at www.ipart.nsw.gov.au/Home/About_Us/Annual_Reports/List_of_Annual_Reports, p10. [84% of stakeholders were satisfied with IPART's leadership; 93% with professionalism; 89% with consultative processes; 86% with decision-making processes and 83% with administrative processes]

> *"EECCA recommends that the Government develop and consult on new Regulations that formally set out the roles and responsibilities for the Scheme Administrator. These roles and responsibilities should take a holistic approach to scheme performance: in particular, the Scheme Administrator should move beyond compliance to responsibility for delivering policy outcomes." (Energy Efficiency Certificate Creators Association, an industry body)*

Independent advice commissioned by the Office of Environment and Heritage on the administrative costs of the ESS recommended formally issuing terms of appointment to IPART. The NSW Government will issue a letter of appointment to clearly set out how IPART's role as Scheme Administrator and Regulator and the tasks required to support the ESS.[172]

5.1.2 Administrative processes are not transparent to new entrants and may be increasing costs

IPART is undertaking a number of projects to improve processes and reduce administrative costs for accredited certificate providers and scheme participants. These include:

- implementing a new compliance and performance strategy that establishes a risk based approach to audit
- upgrading IT systems to automate document handling administrative processes.

These projects may reduce administrative costs for accredited certificate providers, but there is still more information required to make the ESS simpler to access for new entrants. When asked about actions to encourage greater participation, stakeholders highlighted the complexity for new entrants.

> *"Reduce the complexity and cost of accreditation, auditing and administration." (AIRAH, an industry body)*

> *"the complexity and cost of the record-keeping and audit processes (…) existing requirements upon ACPs need to be reconsidered to lower the administrative burden and encourage accreditation applications." (Woolworths Limited, an ACP and large energy user)*

Stakeholders have also expressed general concerns with the current administrative costs of the scheme.

> *"(...) a survey of EECCA members found the majority of respondents believed that the current direct and indirect scheme administrative costs were too high and that the Government should focus on streamlining processes to improve efficiency while maintaining compliance." (Energy Efficiency Certificate Creators Association, an industry body)*

> *"Having a robust compliance and audit regime is critical to maintaining community and political support for the scheme. That said we believe that the current audit requirements can be streamlined to reduce costs and time delays." (Green Energy Trading, an Accredited Certificate Provider)*

A report prepared for IPART on the cost of participation in the scheme examines the costs for different scheme stakeholders. This analysis indicates that the costs of compliance and administration are low for scheme participants. As the ESS targets have increased year on year, administration costs per certificate for scheme participants have declined from $5.14 per certificate in 2009, down to $0.31 per certificate in 2012. Over the same period, the administration, compliance and audit costs for accredited certificate providers has increased from $1.55 per certificate in 2009, up to $2.74 in 2012.[154]

[154] Databuild, 2013, *Energy Savings Scheme Cost of Participation Report 2013*, prepared for IPART, available at http://www.ess.nsw.gov.au/files/0f01cfec-5656-48d9-a4ab-a2610113aee2/ESS_Participation_Costs_Survey_2013.pdf

At the weighted average price of $29 per certificate in 2012, administration and compliance costs for Accredited Certificate Providers represented less than 10 per cent of the price per certificate. However, at current reported spot prices just above $10 per certificate, these administration and compliance costs represent over 25 per cent of the value of a certificate.

5.1.3 The NSW Government will clearly define the Scheme Administrator's responsibilities

To address some of the issues raised in **Sections 5.1.1** and **5.1.2**, the NSW Government will clarify IPART's responsibilities as the Scheme Administrator through a letter of appointment outlining:

- requirements for IPART to assist prospective businesses to become involved with the scheme including guidance and training to assist them to comply with the ESS Rule, legislation and regulations
- requirements to report on key performance indicators including:
  - average time taken to process applications for accreditation and product acceptance
  - survey results of estimated audit costs to IPART, accredited certificate providers and scheme participants per certificate created
  - estimated accreditation costs to IPART and accredited certificate providers per certificate created
  - proportion of invalidly created certificates by Recognised Energy Savings Activity
  - number of new Recognised Energy Savings Activities in the scheme
  - details of certificates created by industry sector, end use and postcode (ensuring it will not be possible to identify individual sites at which energy efficiency activities take place)
  - average reported cost of energy efficiency projects to the Purchaser per certificate.

5.2 Enhancing compliance powers

The three main instruments that outline the ESS compliance regime are the Act, the Regulation and IPART's "Compliance and Performance Monitoring Strategy".[155]

IPART currently has a limited range of enforcement tools that it can use to address compliance issues including breaches of the Act or unlawful conduct by a scheme participant or an accredited certificate provider. Offences under the Act include:

- contravening accreditation conditions
- failing to lodge an annual energy savings statement
- improperly creating certificates
- failing to comply with an order to surrender certificates
- refusing or failing to provide information, documents or evidence without reasonable excuse
- obstructing the Scheme Regulator or Administrator
- contravening a direction prohibiting or restricting the divulging of information
- contravening a scheme rule.[156]

[155] IPART, 2015, *Compliance and Performance Monitoring Strategy*, , accessed at http://www.ess.nsw.gov.au/files/32212114-a77b-4160-bbdf-9f5e00f887a7/Compliance_and_Performance_Monitoring_Strategy_-_April_2014.pdf

Specific offences can also attract imprisonment, including conduct that misleads IPART. Court action is needed to impose a penalty or prosecute and offence. IPART also uses a range of administrative and voluntary measures to address non-compliance.[155]

This section considers options to improve the Scheme Administrator and Scheme Regulator's enforcement and compliance powers.

5.2.1 The case for action

Events of non-compliance have been largely addressed through voluntary actions

Since the scheme began in 2009, the majority of scheme participants and accredited certificate providers have complied with their obligations under the Act and Regulation.[157]

Most instances of non-compliance were minor, and resolved through voluntary action by scheme participants and accredited certificate providers.[155] In cases of minor non-compliance, it may have been disproportionate to use the powers outlined in the Act and prosecute offences through court action where a criminal record and imprisonment are potential outcomes. However, where more significant action was warranted, the instances of non-compliance may have been resolved more efficiently if a broader range of tools were available.

Current compliance options can be costly and do not target poor performers

Currently, only a court can penalise a person for committing an offence. A person needs to be convicted of an offence by a court before IPART can make an order to surrender certificates. This compliance action is costly to pursue, and would force scheme participants and accredited certificate providers to incur costs over and above any penalty imposed for the offence.

IPART's administrative compliance tools can also be inefficient to enforce. Current tools include requesting the voluntary surrender of certificates or voluntary 'set-aside' agreements,[158] where an accredited certificate provider agrees to withhold a proportion of certificates from sale or transfer until an audit has shown they have been are validly created. These tools can be burdensome for IPART to negotiate, rely on the co-operation of the accredited certificate provider and may not provide an effective deterrent.

Court action is needed to make an order to surrender certificates. This would be costly to pursue, and would also be costly for scheme participants and accredited certificate providers.

If an accredited certificate provider refuses to enter a voluntary 'set aside' agreement, IPART has the option to consider requiring that person to carry out pre-registration audits of any certificates they seek to create. This requires the accredited certificate provider to carry out an audit prior to creating certificates. This reduces the financial incentive from the ESS, and constrains the accredited certificate provider's cashflow.

IPART is also limited in its ability to cancel accreditations that are no longer active. This causes an administrative burden for both IPART and accredited certificate providers, as the Act still requires quarterly reporting for all accreditations unless cancelled.

Compliance issues can also be addressed through broader regulatory measures such as rule amendments and prescribed accreditation conditions. These regulatory responses do not target poor performers and impact on all businesses, rather than the individual businesses with compliance issues.

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[156] *Electricity Supply Act 1995*, Sections 138, 123, 133, 142, 156, 157, 159 and 168 respectively.
[157] IPART annual compliance reports for 2009, 2010, 2011, 2012 and 2013, accessed at www.ipart.nsw.gov.au/Home/About_Us/Annual_Reports/List_of_Annual_Reports
[158] 'Set aside' agreements are sometimes referred to as Deed of Agreements

Other regulators have a wider range of enforcement powers

IPART does not currently have access to any of the enforcement tools that sit between penalties enforced through court action and voluntary administrative measures that are now common in modern administrative and regulatory regimes. The lack of a mid-tier level of enforcement options leaves limited suitable compliance powers to address situations of minor breaches which may not be serious enough to warrant court proceedings, but which warrant action by the regulator to promote the efficient and equitable function of the scheme. Mid-tier enforcement powers can provide an effective and efficient deterrent to non-compliance.

In comparison, the Victorian Energy Efficiency Target scheme and the Commonwealth's Renewable Energy Target scheme both include a range of mid-tier responses that the respective regulators can draw on. These include the power to issue formal warnings and infringement or penalty notices. The NSW Environment Protection Authority also has these options under the *Protection of the Environment Operations Act 1997*. These kinds of options could be adopted to provide IPART with complementary enforcement powers.

In the Victorian scheme, a formal warning is a legislated power that can be used for specific repeated but unintentional offences.[159] For the Environment Protection Authority, official cautions are a non-legislated measure that can be used for offences that could attract penalty notices.[160]

Infringement or penalty notices are issued by the Environment Protection Authority to deal with minor, one-off breaches of criminal provisions that can be easily remedied.[161] The penalty level is set at a lower amount than the maximum prescribed in legislation. Payment of the fine does not lead to a recording of a criminal act or conviction. In the Renewable Energy Target scheme, infringement notices are issued for civil penalties and non-payment may result in court action.[162] These notices are an efficient and effective way to target poor performers for compliance issues without the need to go to court.

The Victorian and Commonwealth schemes also provide authorised officers with further powers to enter a premise, collect information, seize documents, interview, examine activities and make recordings in order to investigate compliance issues.[163]

Penalties are needed that are proportionate to the offence

To date, IPART has used administrative powers to address non-compliance and encourage scheme participants and accredited certificate providers to change their behaviour.[164] However, these powers may not act as an efficient deterrent to future breaches of the Act.

Mid-tier enforcement powers, such as penalty notices and official warnings, can provide an effective deterrent to non-compliance while being suitable for minor instances of non-compliance. They would provide the regulator with greater flexibility to respond appropriately to instances of non-compliance, in order to support the efficient and equitable functioning of the ESS.

Penalty notice amounts should be set at a level to deter accredited certificate providers from committing an offence or to re-offending, rather than taken as a mere cost of doing business.[160] They should also match the seriousness of the non-compliance incident and its impacts.[168] A fair

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[159] *Victorian Energy Efficiency Target Act 2007* (Vic) section 40A
[160] Environment Protection Authority, 2013, *Compliance Policy* , accessed at http://www.epa.nsw.gov.au/resources/legislation/130251epacompol.pdf
[161] Environment Protection Authority, 2013, *EPA Prosecution Guidelines*, accessed at http://www.epa.nsw.gov.au/resources/legislation/20130141EPAProsGuide.pdf
[162] For example, section 24A of the *Renewable Energy (Electricity) Act 2000* (Cth). Further information is also available in the Clean Energy Regulator, *Compliance, Education and Enforcement Policy*, 2012 accessed at http://www.cleanenergyregulator.gov.au/About-us/Corporate-policies/Documents/CER-Compliance-Education-and-Enforcement-policy.pdf
[163] Part 7, *Victorian Energy Efficiency Target Act 2007* (Vic) and Part 11 of the *Renewable Energy (Electricity) Act 2000* (Cth)
[164] Australian Law Reform Commission, 2003, *Principled Regulation: Federal Civil and Administrative Penalties in Australia* (ALRC Report 95), accessed at http://www.alrc.gov.au/sites/default/files/pdfs/publications/ALRC95.pdf

and effective penalty notice regime should also consider the previous conduct of accredited certificate providers,[162] which is currently an element of IPART's approach to compliance.

The current enforcement tools available under the Act (i.e. court action with significant maximum penalties) are not suitable to apply to minor instances of non-compliance.

Objectives of government action

The objectives of government action are to:

- improve compliance and better target poor performers
- ensure the scheme administrator and scheme regulator has access to an appropriate range of compliance and enforcement actions
- facilitate the efficient and equitable operation of the ESS.

5.2.2 Options

Option 1: No change

Under this option, the existing compliance regime for the ESS would be retained.

Option 2: Enhance the range of compliance powers (preferred option)

Under this option, the NSW Government would enhance IPART's current range of regulatory and non-regulatory enforcement tools by giving IPART additional powers to:

- issue official warnings for repeat breaches or serious breaches
- issue penalty notices for limited offences
- require accredited certificate providers to give undertakings that they will 'set-aside' a proportion of certificates pending the results of an audit.

Under this option, IPART would need to issue an official warning that it intends to issue a penalty notice if a breach is not rectified within a specified timeframe. This would give the accredited certificate provider or scheme participant the ability to rectify the breach before being issued with a penalty notice. If IPART issued a penalty notice, the scheme participant or accredited certificate provider could apply for an internal review of the decision to issue the penalty notice, or elect to have the matter resolved in Court.[165]

The power to require an undertaking to 'set aside' certificates would build on the existing voluntary agreements between IPART and accredited certificate providers. IPART would be able to require an undertaking from accredited certificate providers to withhold a proportion of certificates from sale or transfer until an audit has shown that are validly created certificates. Once an audit is complete, the accredited certificate provider could voluntarily surrender certificates to make up for any invalid certificate creation and sell or transfer the remaining certificates. Compliance with the undertaking would be a condition of accreditation, so a failure to comply with the undertaking would amount to a breach of accreditation.

These powers would support IPART's risk-based approach to compliance, and facilitate an escalating scale of responses in which each response is logically linked to the next response. The approach is illustrated below in **Figure 15**.

The base of the pyramid is made up of non-regulatory responses set out in IPART's compliance strategy and could also follow a tiered response that escalates in severity, for example, an advisory

[165] *Fines Act 1996, Division 2A*

letter would be followed by a caution.[166] Guidelines would be developed to accompany the approach, including a set of factors that IPART could consider when identifying which compliance response to use.

These changes would require amending the Act, Regulation and IPART's compliance strategy.

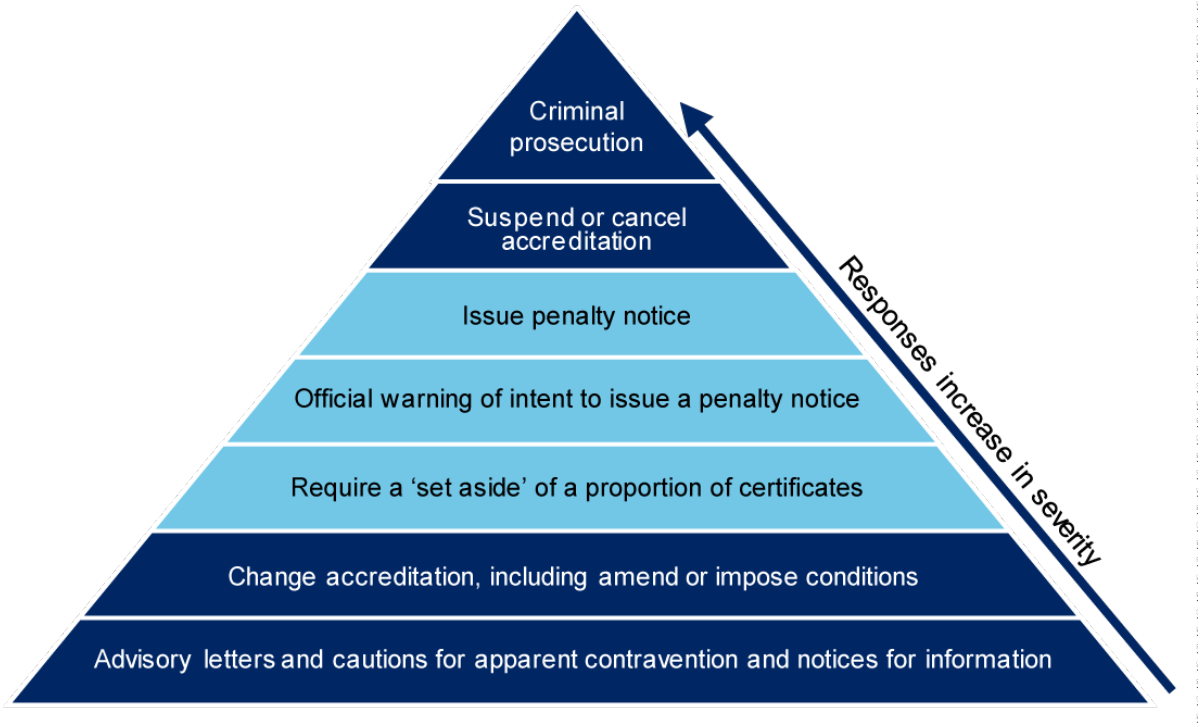

Figure 15 Proposed pyramid enforcement model for the ESS (light blue represents proposed new powers)[167]

5.2.3 Analysis of options

Effectiveness

Option 1 - no change

The 'no change' option would not provide IPART with the full range of enforcement tools it needs to improve compliance and target poor performers. There would be no additional enforcement tools available other than court proceedings, voluntary agreements, amending accreditation conditions and limited powers to require the surrender of certificates.

Option 2 - enhancing the range of compliance powers

An improved range of enforcement tools will give IPART the flexibility to better deal with minor breaches that should be penalised, but where the costs of court proceedings make prosecution inappropriate. Penalty notices may be a more practical and viable deterrent in these circumstances. Formal warnings and penalty notices would also allow IPART to enforce compliance without the need for costly court action.

[166] This approach is similar to the approach taken by the NSW Environment Protection Authority and the Clean Energy Regulator.
[167] The pyramid enforcement model was developed by Ayres and Braithwaite.

An enhanced range of compliance powers could help to ensure that penalties are set at a level which is sufficiently high to deter future breaches of the law, while ensuring that the penalty is not disproportionate to the seriousness of the offence.[168]

For example, a penalty notice for the improper creation of certificates could be set at the tax effective penalty rate for certificates ($37 per certificate). This would mean that it would be in an accredited certificate provider's financial interest to voluntarily surrender or cancel an improperly created certificate, as the cost of paying the penalty would be greater than the financial value of the certificate. This would also be significantly lower than the maximum penalty for this offence under section 133 of the Act ($220 000 per certificate), which may be disproportionate to the offence.

Voluntary 'set aside' agreements have been effective at assisting IPART and accredited certificate providers to resolve the problem of an audit finding non-compliance. Under this option, IPART would be able to require an undertaking for accredited certificate providers to 'set aside' certificates. This could lead to faster resolution of non-compliance more broadly than those accredited certificate providers who already agree to 'set aside' certificates voluntarily. It could also reduce the need for lengthy negotiations of voluntary agreements or disproportionate enforcement action to resolve poor audit findings.

The adoption of an escalating scale of compliance responses would complement the risk based approach to compliance in IPART's "Compliance and Performance Monitoring Strategy". The pyramid model in **Figure 15** outlines the penalties that IPART could apply to businesses for non-compliance.

These changes would provide IPART with the additional tools it needs to effectively target poor performers and improve compliance. This may reduce the use of compliance strategies that impact all businesses when seeking to address non-compliance by a small number of entities. This would also be more effective than requesting the voluntary surrender of certificates as an enforcement tool, which may not lead to desired results.

Efficiency

No change (Option 1) may result in higher costs for government, business and consumers

This option may result in higher costs for the NSW Government, business and consumers over the lifetime of the scheme.

Court action would be unnecessarily costly for all parties. The costs of court proceedings would be passed through to NSW taxpayers and consumers.

This option may increase the likelihood that IPART would require preregistration audits for new accredited certificate providers. This would increase the accredited certificate provider's costs and may represent a barrier to entry into the ESS.

This option may also increase the likelihood that regulatory action would be used to address compliance issues, such as Rule changes or prescribed accreditation conditions. In these circumstances all businesses may face costs where individual cases of poor compliance trigger boarder regulatory action. In these circumstances, businesses may face transaction costs related to altering their business models, lost sales and stranded stock of equipment that can no longer be used.

There is also higher risk of non-compliance under this option as the current powers may not be an effective deterrent. This could reduce the cost effectiveness of the scheme, as there is a risk that

[168] Yeung, K, 1999, *Quantifying Regulatory Penalties: Australian Competition Law Penalties in Perspective*, Melbourne University Law Review 23 (1999) 440-475, 349

less actual energy would be saved. This would result in lower benefits from the scheme overall to the NSW economy.

Better targeting poor performers (Option 2) can reduce costs

Targeting poor performers through official warnings and penalty notices may avoid instances where costly court action or broad regulatory measures are required. Official warnings and penalty notices could also reduce the administrative effort required to negotiate voluntary solutions to compliance issues.

If IPART were able to require an undertaking to 'set aside' a proportion of certificates it would reduce the administrative burden to negotiate voluntary agreements with accredited certificate providers.

The power to require a 'set aside' undertaking would also reduce the likelihood that IPART would need to consider the use of pre-registration audits to manage the risk of invalid certificate creation. Instead of having to wait until an audit is completed, accredited certificate providers would be able to create certificates and sell a proportion of them. This would improve the accredited certificate provider's cashflow, as they could pay for the audit from certificate revenue and continue to implement energy efficiency activities.

Administrative simplicity

Improved powers (Option 2) may increase administrative simplicity

The new range of enforcement powers are likely to be easy to process and cost effective to administer. These enforcement powers may also lead to ongoing cost savings as IPART will not have to rely on administratively complex court action and lengthy negotiations associated with voluntary approaches.

Giving IPART the power to issue penalty notices would require amending the Act to expand the persons who can issue penalty notices to include IPART and amending the Regulation to prescribe relevant offences as penalty notice offences.

Giving IPART the power to require an undertaking for a 'set aside' of certificates would require amending the regulation to expand the type of undertakings that can be required by IPART and for which compliance is a prescribed condition of accreditation.

Accredited certificate providers and scheme participants would have clear guidance on the enforcement action that would be taken against non-compliance. This may also make voluntary action more straight forward as the consequences of inaction would be clear.

Preferred option

The preferred option is Option 2, to enhance the range of compliance powers. This option would:

- provide IPART with an enhanced range of enforcement tools that could target poor performers
- provide IPART with the tools and powers it needs to improve compliance
- reduce costs to businesses and make it easier to understand the costs of participating in the scheme.

Further considerations for consultation

The NSW Government is particularly seeking feedback from stakeholders on appropriate settings for penalty notices for the offences listed in the Act (see above). As discussed above, best practice is to set these penalties at a level which is sufficiently high to deter future breaches, while ensuring that the penalty is not disproportionate.

The NSW Government is also seeking feedback from stakeholders on an appropriate setting for the requirement for an undertaking to 'set aside' certificates. For example, under the current voluntary 'set aside' agreements accredited certificate providers typically agree to withhold 10 per cent of certificates from transfer or sale until after an audit is completed.

5.3 Certificate price transparency and trading regularity

5.3.1 The case for action

The ESS does not have a central trading market or exchange for certificates. Some certificate brokers report on their trades, but there is no aggregated view of all trades. It is understood that most certificates are traded bilaterally between Accredited Certificate Providers and energy retailers. This limits price discovery compared with open markets such as the Australian Stock Exchange.

Unlike an open market it is not possible for all players to know the price of all certificates in the market or to possess information on the types and costs of all energy-saving technologies and processes in the market.[169]

There is some stakeholder support for an ESS registry accessible by the public.

> *"Require all trades and prices in ESS be recorded in the ESS registry and made public." (AIRAH, a peak industry body)*

Some stakeholders favoured increased transparency and recommended an approach used by the Commonwealth Government's Renewable Energy Target.

> *"…that (the) ESS adopt a similar method (to) that (used by) The Renewable Energy Technology [sic]… All traders will need to register online and all trading records can be viewed on a centralized website. The price of ESC(s) is reflected and changed promptly on the website." (Ethnic Communities Council, a non-government organisation)*

Other stakeholders were opposed to collecting or publishing information that would allow the price paid in individual trades to be discovered.

> *"While we agree that improving certificate price transparency will support market development, consideration must be given to parties' commercial and competitive rights. Publishing individual trades in the ESS Registry would breach commercial arrangements between counterparties. We suggest price transparency may be improved by the publication of an average annual price, based on the known trades by an independent certificate broker. Given the poor liquidity of the ESC market, publishing trade volumes and prices more frequently may indicate individual trade behaviour to the market, which we could not support." (ERM Power, an energy retailer)*
>
> *"With respect to transparency of spot ESC prices, it is neither necessary nor appropriate to publicly report on the price of every trade. This is commercially sensitive information." (Energy Efficiency Certificate Creators Association, an industry body)*
>
> *"EnergyAustralia considers that there is sufficient transparency in the ESC price." (EnergyAustralia)*

Objectives of government action

The objectives of government action are to:

[169] Bertoldi et al, 2010, *Energy supplier obligations and white certificate schemes: Comparative analysis of experiences in the European Union*, Energy Policy 38 (2010) 1455–1469

- ensure adequate information is provided to the certificate trading market to limit price volatility
- make the costs of the scheme to energy consumers transparent.

5.3.2 Options

Option 1: No change (preferred option)

Under this option, the NSW Government would not change existing reporting certificate prices or make any change to compliance periods. IPART would continue to report on trends in certificate spot prices in the annual report and include a sales-weighted average spot price paid for each compliance year.

Option 2: Price registry and quarterly compliance cycles

Under this option, the NSW Government would expand IPART's powers to include a power to require certificate prices to be disclosed on the ESS Registry by certificate owners when they are traded.

5.3.3 Analysis of options

Effectiveness

Option 1 - no change

Arguably the current approach (Option 1) already ensures that sufficient information is provided to the certificate trading market to limit price volatility, and makes the costs of the ESS transparent to energy consumers.

The private sector currently offers brokerage and advice services which provide market transparency. There is no strong evidence that the current level of price information provided to the certificate trading market is inadequate or contributing to price volatility.

Option 2 - price registry and quarterly compliance cycles

While a fully open registry (under Option 2) would provide more comprehensive information on certificate prices, it is not clear that there is a role for government to provide this information as the private sector is already providing services. Opportunities for additional transparency may be achieved through voluntary price reporting led by market participants.

Option 2 would assist in meeting the objective of making the costs of the scheme to energy consumers transparent. However, under Option 1 IPART would continue to report on an estimated sales-weighted average spot price in annual compliance reports and in the past has commissioned surveys of scheme participants to establish the certificate purchase costs. The continuation of these processes could provide sufficient information on the costs of the scheme to energy consumers without change.

Efficiency

The benefits of a certificate trading exchange under Option 2 are unlikely to justify the costs of establishing and implementing the exchange, as the market is relatively small. Establishing a public trading exchange would be difficult to justify based on the cost and regulatory implications.

Administrative simplicity

Reporting certificate prices (Option2) would require additional administrative processes for IPART and all market participants.

5.3.4 Preferred option

The preferred option is no change (Option 1).

The current level of information provided to the certificate trading market by government and industry led services has been sufficient to date. There is no clear role for government intervention at this point in time, as the market is providing a number of information services.

The NSW Government will make the costs of the scheme transparent to energy consumers by ensuring that annual reporting includes an estimate of the sales-weighted average certificate spot price and any voluntary information provided by scheme participants.

5.4 Funding and cost recovery

IPART has the power to charge fees to recover the costs of scheme administration and regulation[170] including fees to:

- register certificates (currently set at $0.70 per certificate)
- apply for accreditation (currently set at $500 per first application—no charge for subsequent applications)
- transfer accreditation to a related business (currently set at $500 per transfer)
- investigate and determine an application for accreditation (not set)
- vary or revoke conditions of accreditation (not set)
- investigate and determine a variation or revocation of a condition of accreditation (not set)
- transfer certificates to another party (not set)
- apply to have a product accepted as meeting equipment requirements (not set).

5.4.1 The case for action

The administration of the ESS is dependent on government assistance

Accredited certificate providers receive a financial benefit from accessing the financial incentives provided by the ESS. The costs to IPART of providing services to accredited certificate providers that are not recovered from fees, are paid by other taxpayers.

Table 20 below shows estimated costs and revenue from the scheme administration and regulation. This shows that the ESS has an impact on the NSW Government budget, although this impact has been decreasing over time. In 2013, the budget impact was relatively minor due to the registration of a large number of certificates, with 1.7 million more certificates available in 2013 than required to meet scheme targets. It is anticipated that the market will correct this oversupply of certificates and return to rates of certificate creation that more closely match the demand for certificates set in ESS targets. In the future it is likely that the estimated budget impacts may return to the higher levels experienced in 2011 and 2012.

[170] *Electricity Supply Act* 1995 section 136 and section 139, *Electricity Supply (General) Regulation* 2014, section 92, section 96 and section 104, ESS Rule clause 9.2A.3

Table 20: Administrative costs and revenue from fees from 2011 to 2013[172]

Parameter	2011	2012	2013
Cost of scheme administration and regulation[171]	$2 400 000	$2 700 000	$3 000 000
Certificate registration fees	$790 591	$1 802 086	$2 932 420
Application fees	$22 410	$15 500	$22 000
Total estimated revenue	$813 000	$1 817 586	$2 954 420
Estimated budget impact	**$1 587 000**	**$882 414**	**$45 580**

IPART is investing in an IT system upgrade over the next year that will automate processes associated with assessing applications for accreditation, applications for product acceptance and compliance audits. However, these process improvements alone may not deliver or remove the impact on the NSW Government budget entirely.

A number of submissions supported the NSW Government only partially recovering the administrative costs of the ESS. Several industry bodies representing the energy efficiency industry recommended an independent review of the government's costs for administering the ESS.

> *"…there are substantial public benefits to the ESS that are not captured by energy users or ACPs. Therefore, it is appropriate to supplement income from administration fees with general funding." (The Energy Efficiency Council, a peak industry body)*

However, this budget dependence links the administration of the ESS to general budget pressures and increases the burden on NSW taxpayers.

Administrative fees do not reflect administrative costs

While the oversupply of certificates in 2013 is estimated to cover the costs of scheme administration and regulation in that year, this is an irregularity unlikely to be repeated year on year. The current fees do not recover or reflect the cost to the NSW Government of providing scheme administration services.[172] While the current application fee for an accreditation is $500, it is estimated that the average cost to IPART, based on current administrative processes, is over $10 000.[172]

Over the past five years, 48 accreditations have been used to create less than 500 certificates. The administrative costs of assessing these accreditations may have outweighed the entire financial benefit provided by accessing the scheme.[172]

In 2013, IPART assessed 1448 applications for the acceptance of 2431 new lighting products at an estimated cost of $579 200 in staff time.[173,174] No costs were recovered for applications to have lighting products accepted for the ESS. Some stakeholders suggested that fees should be charged to reflect costs.

> *"In principle Norske Skog believes that administrative fees should reflect the full cost and that all participants contribute equally. We can see no logic behind particular technologies that*

[171] Cost estimates from Compliance reports to the Minister for Resources and Energy for 2011 and 2012 available at http://www.ess.nsw.gov.au/How_the_scheme_works/Scheme_Performance
[172] Analysis completed for OEH by Aptavit, 2014, *Energy Savings Scheme: Reducing Budget Dependence*
[173] IPART, 2014, *NSW Energy Savings Scheme – Compliance and Operation in 2013 - Annual Report to the Minister*
[174] Based on an estimated processing cost of $400 per application extracted from analysis by Aptavit, 2014, *Energy Savings Scheme: Reducing Budget Dependence*, prepared for the Office of Environment and Heritage

utilise scheme administrator resources being exempt from fees". (Norske Skog, a large energy user)

The process IPART developed under the previous ESS Rule meant that accredited certificate providers were required to apply for a product to be accepted for use in the ESS even if another accredited certificate provider had already had that product accepted. IPART estimates that 15 per cent of all applications to accept commercial lighting products in 2013 were duplicating an existing acceptance.[172]

The recent changes to the ESS Rule enable third parties to apply for their product to be accepted as meeting the scheme's requirements, within IPART's guidelines. Although this reform reduces the potential duplication, it creates a risk that product manufacturers and imports would apply for their entire catalogue to be accepted resulting in a large increase in workload for IPART. This risk is mitigated by giving IPART the discretion to place restrictions on product applications through the ESS Rule.

There is no price signal to accredited certificate providers to reflect the amount of work required by IPART to assess or amend applications to conduct Recognised Energy Savings Activities under the ESS, or for product acceptance. The *Australian Government Cost Recovery Guidelines July 2005* emphasises the importance of a transparent 'user pays' system of fees and charges.[175]

"Charges for goods and services can give an important message to users or their customers about the cost of resources involved. It may also improve equity by ensuring that those who use (...) government products and services or who create the need for regulation bear the costs".

Objectives of government action

The objectives of government action are to:

- reduce the budget dependence of the ESS
- provide an appropriate price signal to accredited certificate providers to assist the efficient use of IPART's resources.

5.4.2 Description of options

Option 1: No change

Under this option, administrative fees are left unchanged and IPART continues to rely on the NSW Government to partially fund costs associated with scheme administration.

Option 2: Administrative cost recovery (preferred option)

Under this option, the NSW Government would increase fees to cover IPARTs costs associated with scheme administration from 2016 onwards. These fees would also be reviewed on an ongoing basis to ensure revenue and expenditure are reasonably aligned.

The fees included in this option are based on analysis conducted by independent consultant Aptavit on behalf of the Office of Environment and Heritage. The fees were estimated based on data analysis and interviews with IPART, the Office of Environment and Heritage, accredited certificate providers and auditors.[172] The consultant noted that IPART was going through major process changes in response to the ESS Rule change of 2014 and major IT system upgrades at

[175] Australian Government Department of Finance and Administration, 2005, *Australian Government Cost Recovery Guidelines*, accessed at http://www.finance.gov.au/sites/default/files/australian-government-cost-recovery-guidelines.pdf

the time of interview. Any cost recovery fees discussed in these options should be reviewed after these changes are in place to ensure that they are still accurate cost estimates.

The fees under this option are as follows:

- increase certificate registration fees from $0.70 to $0.80 in 2016 and then index with the Consumer Price Index
- increase application fees from $500 to $2500
- introduce $500 accreditation amendment fees where this is done at the request of an accredited certificate provider and reduces compliance costs
- introduce a $1000 investigation fee required to assess novel or highly complex applications that require additional assessment effort
- introduce a product registration fee of between $200 and $420 per bundle of up to 10 related products.

Option 3: Full cost recovery

Under this option, the NSW Government would increase certificate registration fees from $0.70 to $1.00 to cover all NSW Government scheme costs including policy development and market engagement.[172]

5.4.3 Analysis of options

Effectiveness

Table 21 below shows the estimated revenue and indicative cost range under each of the options. This is based on a potential range of applications for accreditation, product acceptance and certificates registered. The estimates for revenue and costs are most sensitive to the size of the ESS target discussed in **Section 2.2** above.

Table 21 Estimated revenue from fees and indicative administrative costs in 2016

ESS target scenario	Estimated revenue ($ millions)[176]			Estimated cost range ($ millions) [177]		
	Option 1	Option 2	Option 3	Scheme admin and regulation	Policy and market engagement	Total costs
Current target -- 5 per cent	$1.6	$2.0 to $2.4	$2.5 to $3.1	$2.4 to $2.9	$0.6	$3.0 to $3.5
Preferred target -- 6.5 per cent	$2.0 to $2.1	$2.5 to $2.9	$3.2 to $3.8	$2.5 to $3.1	$0.6	$3.1 to $3.70
Preferred combined option (expand to gas – 8 per cent to 2025)	$2.5	$3.0 to $3.4	$3.8 to $4.4	$2.6 to $3.2	$0.6	$3.2 to $3.8

[176] Estimated revenue is a range based on the expected number of accreditation and product registration applications received by IPART.
[177] Scheme administration and regulation cost estimates are based on a fixed annual cost of $2.2 million and a variable cost in line with certificate creation of $0.21 to account for increased costs associated with ACP activity including accreditation applications, auditing and compliance. See **Appendix A** for details.

Option 1 - no change

With no change (Option 1) it is likely that the scheme's administrative functions will continue to be dependent on the NSW Government's budget into the future. The current fee settings do not provide a price signal to prospective applicants on the administrative costs of assessing applications.

This option does not meet government's objectives around reducing the budget dependence of the ESS and providing an appropriate price signal to accredited certificate providers to assist the efficient use of IPART's resources

Option 2 - administrative cost recovery

Option 2 would meet the government's objectives of reducing budget dependence of the ESS and sending a price signal to applicants.

Recovering administrative costs by increasing application and certificate fees (Option 2) would recover the costs of IPART's administrative functions. This option would help meet these objectives by increasing fees collected through certificate registration fees and application fees. Certificate registration fees would drive the majority of cost recovery under this option. Accreditation application fees for accredited certificate providers and product application fees will contribute to reducing the budget dependence of the scheme, but more importantly, send a price signal to applicants to ensure that the Scheme Administrator's resources are appropriately valued. The proposed fees are based on analysis conducted for the Office of Environment and Heritage by independent consultant Aptavit.[172]

The increase of the certificate registration fee from $0.70 to $0.80 in 2016 is slightly less than if the current registration fee had been indexed with inflation from 2009.[178] This would keep the certificate registration fee in line with the penalty rate (see Section 2.3) which has been indexed with the Consumer Price Index since 2010. The increase to $0.80 per certificate in 2016 is based on estimates of funds required to recover costs of managing a scheme with an annual target of 3.5 million certificates.[172]

If the ESS targets are left at their current setting, the NSW Government would need to increase the certificate registration fee to $1.00 in 2016 for IPART's administrative costs to be fully recovered.[172]

The increase of the application fee for accreditation as an accredited certificate provider in the ESS from $500 to $2500 would reduce the likelihood of businesses applying without having assessed the viability of their involvement in the scheme. This fee does not reflect the full cost of assessing the application but it provides a stronger signal than the current setting, which only recovers up to five per cent of the actual cost of processing the average application. This fee is also at the lower range recommended by analysis conducted for the Office of Environment and Heritage.[172]

> *"The detailed nature of applications also places an undue burden on IPART staff charged with assessing and approving applications. A long term focus would not only ensure that legitimate businesses have sufficient certainty to enable them to confidently embark on the accreditation process, it would also discourage rogue operators who are seeking short term gains." (EnergyAustralia)*

New fees for product registration would send a price signal to accredited certificate providers and product suppliers to limit applications of product acceptance to those products that will actually be used. The $400 fee is based on full cost recovery of assessing the applications.

[178] Estimated at $0.82 based on Australian Bureau of Statistics Consumer Price Index for Sydney (2 All Groups, Percentage changes) and an assumed CPI of 2% per year in 2014 and 2015.

Option 3 - full cost recovery

Increased certificate and registration fees (Option 3) would help to meet all costs of running the ESS including regulatory, market development and policy functions. This would mean these functions could continue into the future without dependence on the NSW Government budget.

The cost of policy development functions for the ESS is estimated to be an average of $550 000 a year from now until the end of the 2016–17.[179] This includes funding for ongoing Rule development.

However, charging the market for non-administrative functions may not be equitable, as not all participants, especially smaller accredited certificate providers, benefit from all these functions equally. This view was reflected in a number of submissions.

> *"Policy development should not be funded from the scheme. Good policy is in the public interest and should be funded by Government."(CSR Limited, a product supplier)*

Efficiency

Option 1 would require ongoing partial funding from the NSW Government and may lead to more speculative applications for accreditation and product registration. This could also result in NSW taxpayers subsidising any services IPART could potentially provide to other jurisdictions.

Increasing fees to cover the costs of scheme administration (Option 2) may reduce speculative applications and drive more efficient administration. By funding more of the administrative costs through cost reflective fees, the costs of the ESS would be more transparent to accredited certificate providers and other stakeholders. The associated increase in market confidence would benefit the scheme by encouraging investment in energy efficiency and more businesses to become involved.

> *"(…) EnergyAustralia considers that all costs associated with the scheme should be fully visible to participants and consumers." (EnergyAustralia)*

The option to recover all costs of the ESS (Option 3) could ensure the cost burden of managing the ESS would be independent from the NSW Government budget, including all market and policy development functions.

Option 3 may lead to funding for policy development and market engagement functions becoming entirely dependent on certificate creation, applications for accreditation, or product acceptance. This could result in a lack of funds for policy development and market engagement in years when a smaller number of certificates is created than forecast. These years would be when these functions are needed most.

Funding market engagement functions through fees rather than the NSW Government budget may also reduce the level of rigour applied to assessing the need for these activities. This potential inefficiency could lead to excessive effort and costs that would be better spent on other government services.

Administrative simplicity

Under Option 1, IPART would not need to make changes to existing fee collection systems for certificate registration fees and application fees. IPART would need to continue to seek funds from the NSW Government on an ongoing basis.

[179] Based on the equivalent of four full time employees including salaries on-costs and expenses.

Under Option 2 upfront costs may be incurred to price these services and implement a payment system in order to recover costs, as fees are not currently charged for amendments to accreditations and product registrations.

Full cost recovery under Option 3 would be more challenging to implement. It would require the costing of market development and policy development functions. It would also be difficult to justify the market funding of policy functions that may not directly benefit all Scheme Participants. This is reflected in the Commonwealth Government's *Cost Recovery Guidelines* of July 2005 that recommend that "government fund functions that are not integral or directly related to the provision of regulatory activities".[180]

5.4.4 Preferred option

The preferred option is administrative cost recovery (Option 2). This will:

- minimise the budget dependence of the ESS
- only recover costs from businesses for services they directly benefit from
- prevent NSW taxpayers from subsidising energy efficiency in other jurisdictions
- provide a price signal to the market that would assist in driving the efficient use of IPART's resources.

The changes to the certificate registration fee would not come into effect until 2016 to align with the implementation of changes to ESS targets and penalty rates. Other fees would be subject to further consultation by IPART and would be subject to ongoing review.

If the ESS target is not reformed (see **Section 2.2**), a certificate registration fee of $1.00 and accreditation application fee of $5000 would be required to meet the government's objectives of reducing the budget dependence of the ESS and providing an appropriate price signal to accredited certificate providers to assist the efficient use of IPART's resources.[172]

Under the preferred option, policy development and market development activities would not be funded through fees. These functions would be funded from other NSW Government sources. This is appropriate because it is important that policy development and market engagement functions are not entirely dependent on certificate creation, applications for accreditation, or product acceptance. Times of low certificate creation, when less funding is provided through these fees, may be when the most policy development or market engagement effort is required.

[180] Australian Government Department of Finance and Administration, 2005, *Australian Government Cost Recovery Guidelines July 200*, accessed at http://www.finance.gov.au/sites/default/files/australian-government-cost-recovery-guidelines.pdf

6 Continuous improvement of the Energy Savings Scheme

6.1 Continuous improvement of the ESS

The ESS is the largest program contributing to the *NSW 2021* energy savings target. It is the NSW Government's primary mechanism to transform markets so that they encourage faster, broader and lasting change in energy efficiency.[181]

As an outcome of this review, and in response to stakeholder feedback, the NSW Government will implement measures to promote and facilitate continuous improvement of the ESS. These measures include continuous evaluation, monitoring and verification of the ESS, and continuous engagement with the market to maximise opportunities arising from the ESS. These measures are described below.

6.1.1 Evaluation, measurement and verification of the Energy Savings Scheme

The NSW Government will develop a comprehensive evaluation, measurement and verification framework for the ESS, and will publicly report on the outcomes of the framework. This framework will include:

- improved public reporting on the type and location of energy savings, and on the administrative costs of the scheme to IPART, Accredited Certificate Providers, ESS Scheme Participants and electricity customers
- measurement and verification studies to provide empirical evidence of energy savings from projects that use 'deemed' calculation methods
- monitoring the uptake of energy efficiency opportunities in NSW and assessing the remaining opportunities that could be supported by the ESS
- quantification of economic costs and benefits of the scheme through consistent and transparent analysis.

This approach is consistent with the recommendations of the Regulatory Assistance Project in its review of international energy efficiency obligation schemes. The Regulatory Assistance Project identified that best-practice for energy efficiency schemes include continuous evaluation, measurement and verification of outcomes.[182]

Evaluation, measurement and verification will:

- maintain accuracy of financial incentives to save energy (discussed below)
- make the costs and benefits of the ESS transparent to stakeholders and infrastructure planners (discussed below).

Maintain the accuracy of financial incentives to save energy

Schemes like the ESS *"rely critically on the establishment of robust systems for measuring, verifying and reporting energy savings."* [182] The net economic benefit of the ESS to NSW relies on energy savings being realised.

[181] NSW Government, 2013, *Energy Efficiency Action Plan*, accessed at http://www.environment.nsw.gov.au/energyefficiencyindustry/energy-efficiency-policy.htm
[182] Regulatory Assistance Project, 2012, *Best Practices in Designing and Implementing Energy Efficiency Obligation Schemes*, accessed at www.raponline.org/document/download/id/5003.

Some calculation methods in the ESS 'deem' energy savings to occur if a particular activity takes place. Most methods also allow 'forward certificate creation' that provides incentives for future energy savings that will be realised as a result of the activity.

Evidence of the accuracy of these methods would allow the NSW Government to improve the effectiveness of financial incentives provided by the ESS. The ESS Rule now includes savings factors for 34 different activity types. These factors are based on engineering estimates using the best available information. Measurement and verification studies will ensure that the financial incentives provided to these activities are accurate.

Make costs and benefits transparent to stakeholders and infrastructure planners

Without an evidence base to support projected energy savings, the benefits of the ESS are not always transparent and may not adequately inform network and infrastructure planning. The Australian Energy Market Operator notes that this may make it difficult to realise one of the scheme's legislated objectives which is to *" (…) reduce the cost of, and the need for, additional energy generation, transmission and distribution infrastructure."*[183]

The Australian Energy Market Operator lists energy efficiency as one of the key factors in recent energy demand reduction, but has not included the impact of the ESS on energy demand in National Energy Forecasting Reports since 2012.[184] This is due to the lack of a transparent, public evidence-base to predict ESS energy savings and avoid double-counting with other energy efficiency programs.[185] As a result businesses that rely on the Australian Energy Market Operator forecasts to inform their plans are unable to consider the impact of the ESS.

> *"(…) from AEMO's analysis it does not appear that the ESS has contributed in a material way to [reduced energy demand]." (National Generator's Forum, an industry group)*

However, Ausgrid now includes reduced demand from the ESS in its forecast[186] and the Australian Energy Market Operator and TransGrid forecasts for electricity demand have overestimated future demand every year since 2007.[187] By not including the impact of the ESS on demand, the Australian Energy Market Operator may have overestimated NSW energy demand in 2013–14 by as much as 1207 GWh from the 8.8 million certificates created between 2009 and 2013 under the scheme.[188] If the Australian Energy Market Operator has not included accurate predictions for energy savings from the ESS in their forecasts, then current annual NSW demand forecasts to 2020 would be up to two per cent lower.[189] Several submissions to this Review noted the need for accurate savings forecasts:

> *"Actual energy savings are critical for understanding the extent to which the scheme is meeting its objectives, while [certificate] creation figures (both expected and actual) are critical for managing trading risks." (ERM Power, an energy retailer)*

Without evaluation, confidence in the economic benefit from the ESS could fall, which may reduce the uptake of opportunities created by the ESS:

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[183] Section 98 of the *Electricity Supply Act 1995*
[184] Australian Energy Market Operator, 2012, *National Energy Forecasting Report 2012*, accessed at www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report-2012
[185] Australian Energy Market Operator, 2014, *National Electricity Forecast for the NSW Market*, 4.1–4.5, accessed at www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report
[186] Ausgrid, 2013, *Energy Volume Forecasts to 2018-19*, accessed at http://www.aer.gov.au/sites/default/files/Ausgrid%20-%204.11%20-%20Energy%20volume%20forecast%20-%202014.pdf
[187] Dr Charles Xu, 2013, *Evaluation Measurement & Verification of NSW Energy Efficiency Programs*, a presentation prepared for the 2013 Australian Alliance to Save Energy conference, accessed at http://www.a2se.org.au/files/Charles_Xu.pdf
[188] IPART,2014, *NSW Energy Savings Scheme – Compliance and Operation in 2013: Annual report to the Minister*, accessed at http://www.ess.nsw.gov.au/files/950a8b30-90ae-4265-8aed-a38800a8bcc5/Annual_Report_to_the_Minister_2013.pdf
[189] Estimate by the Office of Environment and Heritage based on electricity savings projects under the base case in Section 4 and NSW energy consumption forecasts from Australian Energy Market Operator, 2014, *National Energy Forecasting Report*

> *"GBCA encourages a further emphasis being placed on the promotion of the scheme and its potential benefits (…) Further to clarifying the benefits, the GBCA recommends that the New South Wales Government considers what measures can be taken to ensure that there is more certainty around the economic benefits which the ESS aims to provide." (Green Building Council of Australia, an industry body)*

The NSW Government will publish evaluation of energy savings from projects supported by the ESS. This would build a stronger evidence base for the benefits of the ESS.

6.1.2 Continuous improvement of the ESS Rule

The NSW Government will manage an annual process to update the ESS Rule. This annual process will:

- incorporate stakeholder feedback and evaluation results
- maintain the effectiveness of the rule, through updates to savings factors, and adding activity schedules for new technologies
- complement changes to building and equipment standards.

These features are discussed below.

Stakeholders were generally supportive of regular updates to the ESS Rule. However, several stakeholders cautioned against reforms as large in scale as the ESS Rule changes released in May 2014:

> *"We endorse the suggested changes [to have a regular process to update the ESS Rule]. However, the Government needs to be mindful of regular reviews also having a possible negative effect as it could create uncertainty in the market place, especially if it allowed for major changes to the ESS on a yearly basis without conditions. (GreenBank, an ACP, submission to the 2013 ESS Rule change consultation paper)*

> *"We support annual reviews to allow for minor adjustments to the Rule, and a less frequent cycle, for example every 3 years, for major reviews of the Rule. The current Rule change qualifies as a major review and we would not support this extensive a change to the scheme within the next 3 years." (IPART, the scheme administrator and regulator)*

The reforms to the ESS Rule released in May 2014 were expansive and included reforms to key definitions including Recognised Energy Savings Activities, the Energy Saver and the requirements to create certificates.

The NSW Government agrees with stakeholder comments that frequent significant changes to the scheme can be disruptive, and can impact on businesses involved in the ESS. While this does not detract from the need for regular reviews of the ESS Rule, over the next three years, the NSW Government intends to limit changes to the ESS Rule arising from the annual review process to minor amendments. Some amendments will also be necessary to implement the findings of this Review.

Enable stakeholder input into policy development

An annual update would provide stakeholders with a transparent process to participate in policy development, and provide opportunities for new technologies and industry to be brought in scope of the ESS. This will improve the overall effectiveness of the ESS. The proposed steps involved in this process are shown below.

Table 22: Annual process for updates to the ESS Rule

Month	Action
February	Minister invites new ideas from the public and stakeholders
May	Minister releases draft amendments to the ESS Rule and consultation paper
August	Minister gazettes new ESS Rule
October	New ESS Rule takes effect

Maintain effectiveness of the Rule

Regular updates of the ESS Rule will maintain the effectiveness of the Rule by ensuring there is a process to implement the outcomes of the evaluation, measuring and verification framework (section 2.2.1), and regularly update savings factors for 'deemed' methods within the ESS. Regular updates to the ESS Rule will target financial incentives at energy efficiency projects that are above standard practice, and accelerate the adoption of innovative technologies and practices.

Annual updates provide a proactive continuous improvement cycle, rather than a reactive one.

The ESS's predecessor, the NSW Greenhouse Gas Reduction Scheme (GGAS), provided an example of the consequences of reactive, rather than continuous policy development. Between 2003 and 2009, GGAS provided incentives for generators, households and businesses to reduce emissions. However baselines were not regularly updated to reflect changes in the market.

IPART's 2013 report on the lessons learnt from GGAS found that, although the overall scheme was effective in reducing emissions, some generators *"(…) were able to create an increasing number of certificates without further reducing their overall emissions."*[190] Over time, businesses were progressively able to claim incentives for activities that had become standard practice, eroding the potential economic benefit of GGAS.[191]

International experience with energy efficiency programs has shown that financial incentives can be inadvertently diverted to 'freeriders' as energy efficient market penetration increases.[192] Freeriders are actors who receive financial incentives for activities that would have occurred anyway, and provide no additional energy saving benefit beyond the status quo.

If freeriders made up an additional five per cent of recipients of financial incentives from the ESS, the economic benefit of the ESS would be reduced by $51 million in net present terms.[193]

Continuous improvement of the ESS Rule through an annual update process will prevent freeriders, and will maintain the effectiveness of the Rule and the operation of the ESS.

Complement building and equipment minimum performance standards

The NSW Government will coordinate the activities in the ESS Rule to complement minimum standards such as the Building Code of Australia, the NSW Government's Building Sustainability Index (BASIX) and the national Greenhouse and Energy Minimum Standards.

A recent review of 17 comparable international energy efficiency schemes including the ESS illustrated how financial incentives can complement minimum standards:

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[190] IPART, 2013, *NSW Greenhouse Gas Reduction Scheme: Strengths, weaknesses and lessons learned final report*, accessed at www.ipart.nsw.gov.au/Home/Industries/Greenhouse_Gas_Reduction_Scheme/NSW_Greenhouse_Gas_Reduction_Scheme_-_Strengths_weaknesses_and_lessons_learned_-_Final_Report_-_July_2013, accessed June 19 2014.

[191] Centre for Energy and Environmental Markets, University of NSW, 2007, *The NSW Greenhouse Gas Reduction Scheme: An Analysis of the NGAC Registry for the 2003, 2004 and 2005 Compliance Periods*, accessed at www.ceem.unsw.edu.au/sites/default/files/uploads/publications/CEEM_DP_070827_000.pdf,.

[192] de la Rue du Can et al, 2014, *Design of Incentive Programs for Accelerating Penetration of Energy Efficient Appliances*, Energy Policy 72 (2014) 56–66.

[193] Based on analysis by the Office of Environment and Heritage of the net economic benefit of the scheme under current settings. See **Section 2.2**.

> *"Incentive programs complement mandatory standards by accelerating market penetration of products that are more energy efficient than standards require, thereby preparing the market for future increases in the stringency of the standards."*[194]

The residential lighting market is an example of how financial incentives and supporting programs interacted to justify cost effective minimum standards in NSW. Energy efficient compact fluorescent lamps (CFLs) have been available in the market since the 1990s but in the early 2000s they were relatively costly ("up to $20 or more"[195]) and the technology was slow to take off in the market.

GGAS provided financial incentives for CFLs. A rapid roll out of the technology began in 2005. By February 2007, CFLs had been demonstrated as cost effective options in the residential lighting market. In response, the then Federal Minister for the Environment announced minimum standards to phase-out incandescent light bulbs by October 2009. Incentives to replace incandescent bulbs were no longer needed to transform the CFL market, and the NSW Government updated the GGAS Rule to refocus effort on new energy savings opportunities.

A review by IPART found GGAS accelerated the adoption of CFLs in NSW, and contributed to the minimum standards:

> *"GGAS also unlocked the creativity of the market in developing innovative marketing strategies, for instance to roll-out Compact Fluorescent Lamps (CFLs) to consumers in large numbers where previously market penetration had been relatively small. Arguably this brought forward by some years the time when CFLs would be widely adopted by consumers."*[196]

A process for regular updates to the ESS Rule will make sure the ESS Rule complements minimum standards, and accelerates the rate that these standards can be introduced. Once these minimum standards are introduced, the ESS Rule will be updated to reflect the new standard practice.

6.1.3 Engage with industry to maximise access to the Energy Savings Scheme

The NSW Government will continue to engage with the energy efficiency supply chain to educate and raise awareness of the opportunities offered by the ESS, and reduce market barriers to participation in the ESS.

The vast majority of submissions to the Issues Paper supported government engagement with the energy efficiency market, for example:

> *"The NSW Government can facilitate the ESS market by (…) addressing the information gaps to ensure the scheme is known and understood by the business community and the public can be facilitated through promotion of and education on the scheme and its benefits." (Clean Energy Council, an industry body)*

Those opposed believed that government intervention could distort the market and lead to inefficiencies. Some stakeholders raised concerns that some market engagement activities were unnecessary and could crowd out innovation by the private sector. These stakeholders emphasised the importance of a clear regulatory framework.

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[194] From a peer-reviewed study by Lawrence Berkeley National Laboratory of energy efficiency incentive schemes in international jurisdictions covering NSW, Victoria, South Australia, Belgium, Brazil, Canada, China, Denmark, the European Union, France, India, Italy, Poland, South Africa, South Korea, the US and the UK. De la Rue du Can et al., 2014, *Design of incentive programs for accelerating penetration of energy-efficient appliances*, Energy Policy 72.

[195] Choice, 2010, *Compact fluorescent lightbulbs*, accessed at http://www.choice.com.au/consumer-action/past-campaigns/sustainability/compact-fluorescent-lightbulbs.aspx

[196] IPART, 2013, *NSW Greenhouse Reduction Scheme: Strengths, weaknesses and lessons learned.* www.ipart.nsw.gov.au/Home/Industries/Greenhouse_Gas_Reduction_Scheme/NSW_Greenhouse_Gas_Reduction_Scheme_-_Strengths_weaknesses_and_lessons_learned_-_Final_Report_-_July_2013

> *"Once an appropriate framework has been developed through a sound policy development process covering consultation, thorough planning and analysis, and a clear link between objectives and scheme design, then government's role should be limited to that of monitoring and publishing information on scheme performance." (APA Group, a gas distribution network service provider)*

Experience in US market transformation programs suggests that market engagement, including training and education may be required to continuously improve access to and effectiveness of the ESS.[197] These activities would require engagement with the entire energy efficiency supply chain, from Accredited Certificate Providers through to product suppliers and manufacturers.

Some businesses may not be aware of ESS Rule changes that provide incentives for products and services they offer and may not change their practices to take advantage of this opportunity. Since its introduction in 2009, the ESS has enabled access to incentives for all kinds of electrical energy efficiency. The vast majority of incentives flowed to commercial lighting (69.6 per cent of certificates). In part, this may be related to the NSW Government providing a simple tool to calculate energy savings and keep records.[198]

Market engagement activities suggested by stakeholders included continual improvement of tools (Energy Efficiency Council, an industry body), on-line training modules to use the ESS (CSR Limited, a product supplier), training suppliers, tradespeople and retail staff to promote the scheme (Clean Energy Council, an industry body), conference presentations, seminars, and communities of practice (Energy Efficiency Certificate Creators Association, an industry body), technical guides and materials (AIRAH, an industry body).

Additional market engagement functions would actively reduce red-tape involved in participating in the ESS. However, these functions may result in increased overall costs if not suitably targeted.

Market engagement would allow changes to the ESS Rule and information on scheme outcomes to be disseminated more quickly. However, excessive market engagement raises a risk that the NSW Government becomes too involved in the operations of the ESS, picks winners, and reduces the ability of the energy efficiency industry to innovate and deliver energy savings at lowest cost.

The Office of Environment and Heritage will support the implementation of the ESS, including the reforms to the ESS Rule and reforms arising out of this review. The Office of Environment and Heritage will work with Accredited Certificate Providers, product suppliers and energy consumers to:

- enable them to understand the opportunities offered by the ESS
- develop simple information tools to illustrate the benefits of the scheme to them.

The Office of Environment and Heritage, with NSW Trade & Investment will also continue policy development, evaluation, monitoring and verification to support the NSW Government's capacity to identify when and where it should engage with industry on a new opportunity and withdraw this intervention.

IPART will provide guidance and training to assist prospective Accredited Certificate Providers to understand the costs and benefits of accessing the ESS (see **Section 5.1**).

[197] Nadel et al, 2003, *Market Transformation: Substantial Progress from a Decade of Work*, American Council for an Energy-Efficient Economy, Report Number A036, available at www.aceee.org/pubs/a036full.pdf
[198] IPART, 2014, *NSW Energy Savings Scheme – Compliance and Operation in 2013 - Annual Report to the Minister*, available at http://www.ess.nsw.gov.au/How_the_scheme_works/Scheme_Performance

6.2 Interaction with the Emissions Reduction Fund

This section outlines the positions of the Commonwealth Government and the NSW Government on the interaction between the Emissions Reduction Fund and the ESS.

6.2.1 Commonwealth Emissions Reduction Fund

On 24 April 2014, the Commonwealth Government released an Emissions Reduction Fund White Paper. On 25 November 2014, the *Carbon Farming Initiative Amendment Bill 2014* was passed by the Commonwealth Parliament and set in place the legislative framework for the Emissions Reduction Fund. The first auction under the Emissions Reduction Fund is scheduled to commence on 15 April 2015. The Emissions Reduction Fund has two major components:

- a reverse-auction process that would purchase greenhouse gas emissions reductions
- a safeguard mechanism that would set limits on emissions from emissions intensity facilities based on their highest levels in the past five years.

Contracts will be auctioned over the next four years with a total value up to $2.55 billion for emission abatement activity, with potential additional funding for contracts in the future. Energy efficiency projects in NSW will be eligible to bid into the reverse auction.

The Commonwealth Government has committed in the White Paper to build on existing state based energy efficiency schemes to ensure compatibility and administrative simplicity.

> *"The [Australian] Government will also work with state, territory and local governments to build on existing programs and develop national approaches to crediting energy savings projects. This will avoid unnecessary duplication, streamline administration and provide continuity for business."*

The Commonwealth Government has indicated in the White Paper that it is open to partnering with the states and territories to deliver the scheme's accreditation and crediting systems.

> *"The Australian Government will seek to partner with state regulatory agencies over time, in particular for crediting emissions reductions from energy savings projects. Partnering with state-based regulatory agencies could reduce duplication and simplify arrangements for abatement providers and aggregators."*

The Commonwealth Government is developing methods for calculation of greenhouse gas emissions reductions from energy efficiency projects based on three of the calculation methods in the recently reformed ESS Rule.[199]

6.2.2 NSW Government position

The NSW Government is committed to growing and maturing the energy efficiency industry in NSW. The ESS is the NSW Government's primary mechanism for achieving this commitment. The ESS is widely recognised as an effective and efficient scheme.[200, 201]

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[199] The Commonwealth Department of Environment is consulting on three methods for energy efficiency based on the Project Impact Assessment with Measurement and Verification method, the NABERS Baseline sub-method and the Aggregated Metered Baseline sub-method from the ESS Rule.

[200] Regulatory Assistance Project, 2012, *Best Practices in Designing and Implementing Energy Efficiency Obligation Schemes*, accessed at www.raponline.org/document/download/id/5003.

[201] Oakley Greenwood, 2012, *Stocktake and Assessment of Energy Efficiency Policies and Programs that Impact or Seek to Integrate with the NEM: Stage 2 Report*, p26-29, accessed at www.aemc.gov.au/Media/docs/Oakley-Greenwood---Stage-2-Report--Stocktake-and-Assessment-of-Energy-Efficiency-Policies-and-Programs-that-Impact-or-Seek-to-Integrate-with-the-NEM-84e621b9-e0a8-440b-843f-5239e07b3054-0.pdf

> *"In an era of rising energy prices the ESS plays a vital role in enabling consumers to reduce their bills and get the benefit of competitively priced energy services. Many homes and businesses have benefited from the ESS (...)" (Clean Energy Council, an industry body)*
>
> *"The NSW ESS is one of the most trusted energy efficiency programs in Australia. It is regarded as one of the most comprehensive and innovative of its kind in the world. It was one of the first of its kind, but there are now over 20 similar schemes across the United States, Europe, Asia and Australia. The European Parliament is currently considering mandating schemes like the ESS across the European Union." (Energy Efficiency Certificate Creators Association, an industry association)*

The NSW Government supports the continuation of the ESS in parallel with the Emissions Reduction Fund. To ensure that the schemes are additional to each other, energy efficiency projects that access the Emissions Reduction Fund would not be eligible for financial incentives under the ESS.

The NSW Government will work with the Commonwealth Government to establish formal information sharing arrangements with the Clean Energy Regulator to harmonise the two schemes and prevent double counting of energy savings. The NSW Government will also investigate other opportunities to work with the Commonwealth Government to harmonise the ESS and the Emissions Reduction Fund.

6.2.3 Sharing information with the Clean Energy Regulator

The NSW Government intends to share information with the Commonwealth Government to avoid double counting of energy savings between schemes and align administrative processes.

Following the reforms to the ESS Rule released in May 2014, IPART is now collecting a range of information on the projects implemented under the ESS.[202] This includes a number of data points that are likely to be required by the Clean Energy Regulator to mitigate the risk of double counting energy savings.

Sharing information may also help the Commonwealth Government to utilise methods and mirror processes from the ESS. This could make it easier for the NSW energy efficiency industry to take advantage of opportunities presented by the Emissions Reduction Fund.

The harmonisation process between the ESS in NSW and the Victorian Energy Efficiency Target [203] delivered benefits to businesses operating in both states and is a good example of how information sharing could avoid unnecessary red tape.

> *"The harmonisation efforts between the ESS and the Victorian Energy Efficiency Target (VEET) schemes in particular have been positive, and ERM Power would like to see this work continue." (ERM Power, an electricity retailer)*

6.2.4 Monitoring the effects of the Emissions Reduction Fund

The NSW Government will monitor the effect of the Emissions Reduction Fund until operations of the scheme become settled. This monitoring will include:

- the scale, type and industry sector of energy efficiency projects supported by the Emissions Reduction Fund in NSW and other jurisdictions
- the average cost of abatement of energy efficiency projects supported by the Emissions Reduction Fund in NSW and other jurisdictions

[202] *Energy Savings Scheme (Amendment No. 2) Rule 2014*, Clause 6.8, www.resourcesandenergy.nsw.gov.au/energy-consumers/sustainable-energy/efficiency/scheme/energy-savings-scheme-rule-change
[203] The Victorian Government has announced the Victorian Energy Efficiency Target (VEET) scheme is intended to close at the end of 2015.

- the number of existing Accredited Certificate Providers who access the Emissions Reduction Fund
- the funding contracted, budgeted and planned for the Emissions Reduction Fund by the Commonwealth Government.

This monitoring would inform future reviews of the ESS targets (see **Section 2.4**) and updates to the ESS Rule.

Appendix A Cost Benefit Analysis

This section outlines the cost benefit analysis on the options for targets, the potential consequences of increasing penalty rates, extending the scheme beyond 2020 and expanding the scheme to gas. This section includes discussion of:

- the estimated energy efficiency opportunity in NSW
- the economic costs considered by the cost benefit analysis
- the economic benefits considered by the cost benefit analysis
- an overview of the approach to determining the policy impact from reforms to the ESS
- a summary of the results of the cost benefit analysis.

The energy efficiency opportunity in NSW

The costs and benefits of the NSW Energy Savings Scheme are linked to the scale and nature of the energy efficiency opportunity in NSW. Energy efficiency activities can have different costs, and different benefits to the NSW economy.

The Office of Environment and Heritage commissioned a consultant, Energetics, to develop a list of the technical potential for energy efficiency in NSW for electricity and natural gas. The list identifies the energy saving potential for over 400 activities including:

- industry sector and sub-sector
- incremental electricity and / or gas savings or consumption
- peak demand savings (electricity only) for a summer and winter peaks in residential and commercial and industrial network areas
- the economic lifetime of the technology or service
- the number of typical sites in NSW where the opportunity is applicable because of both appropriateness (e.g. gas connection) and existing market share (e.g. users already have the technology)
- incremental costs of the energy efficiency measure including the capital and installation costs above the equipment or service that would have been delivered otherwise.

Datasets for the list are drawn from publicly available national and state sources, as well as Energetics internal resources and evaluation of energy efficiency programs administered by the Office of Environment and Heritage.[204]

Figure 16 shows a cost curve for the estimated electricity efficiency opportunities in NSW. It shows the levelised costs of implementing opportunities to achieve cumulative gigawatt per hour (GWh) savings.[205] **Figure 17** shows a cost curve for the estimated gas efficiency opportunity.

[204] Sources include the Commonwealth Government's investigation into a National Energy Saving Initiative, accessed at http://www.industry.gov.au/Energy/IndustrialEnergyEfficiency/NationalEnergySavingsInitiative/Pages/default.aspx; Pitt & Sherry, 2013, *Quantitative Assessment of Energy Savings from Building Energy Efficiency Measures*, prepared for the Commonwealth Department of Climate Change and Energy Efficiency; Commonwealth Department of Environment, Water, Heritage and the Arts, 2008, *Energy use in the residential* sector; and datasets from Office of Environment program evaluations of the Energy Saver Action Plan and Home Power Saving programs.

[205] Levelised cost is the net present value of the incremental costs of the energy efficiency measure, divided by the sum of the discounted energy savings over the life of the energy efficiency measure. The discount rate used for both costs and energy savings is 7 per cent.

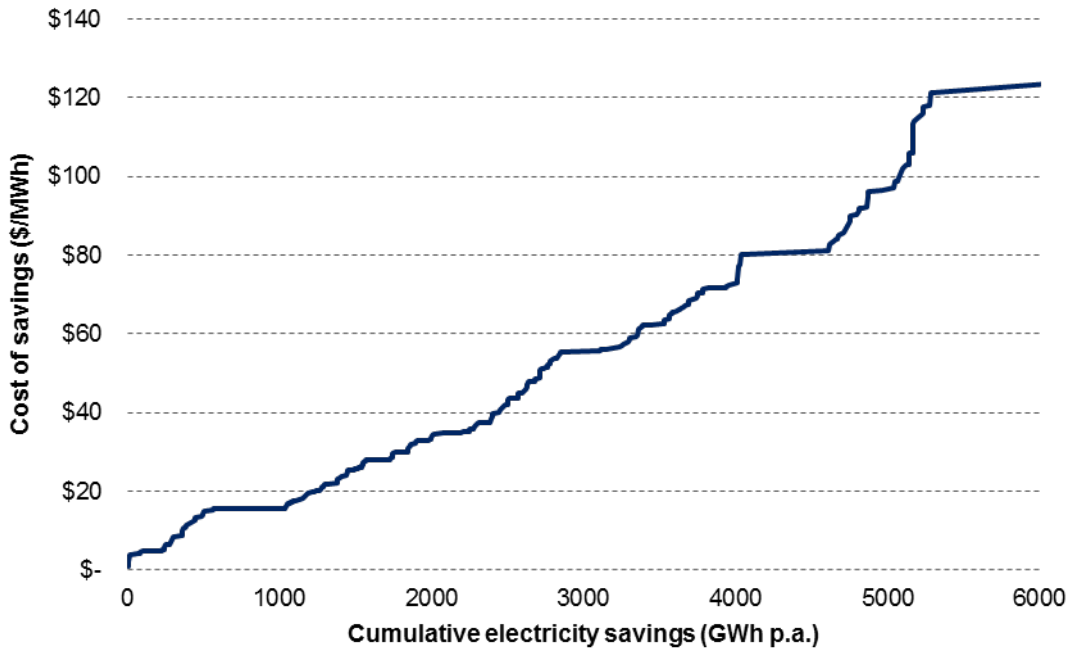

Figure 16 Cost curve for the estimated electricity efficiency opportunity in NSW

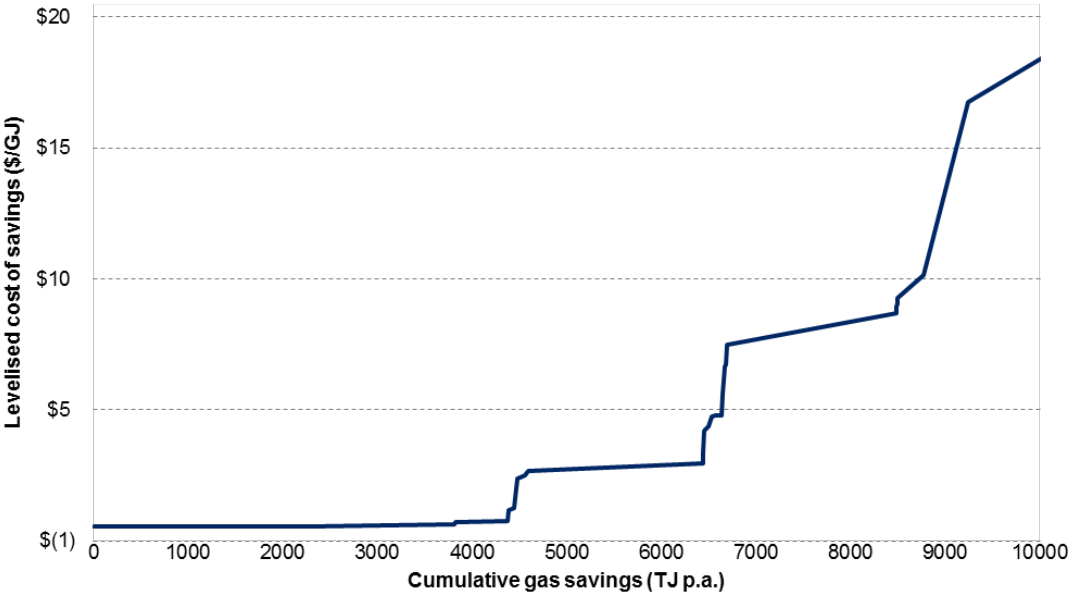

Figure 17 Cost curve for the estimated gas efficiency opportunity in NSW

There are also fuel switching activities (e.g. electric to gas hot water, gas heating to air to air heat pumps) that are not included in the cost curves above but which have been included in the analysis of policy impact and economic costs and benefits. These opportunities cannot easily be displayed in the cost curves above as they result in an increase in consumption by another fuel.

Economic costs

The primary costs faced by NSW as a result of the Energy Saving Scheme are:

1. NSW Government costs in administering and managing the scheme

2. NSW compliance costs on accredited certificate providers and scheme participants as a result of their involvement in the scheme
3. NSW consumer costs to undertake energy efficiency activities.

NSW Government costs

All government resources have an opportunity cost. That is, they could have been valuably directed towards an alternative use. All NSW Government resources directed towards the ESS are an economic cost. These costs include:

- staff and expenses to IPART from fulfilling its role as scheme administrator and scheme regulator
- staff and expenses to the Office of Environment and Heritage and NSW Trade & Investment from developing policy for the ESS
- staff and expenses from administering supplementary programs that may reduce the transaction cost of consumers accessing the ESS.

The costs to IPART of administering the scheme have grown over the past three years from around $2.4 million in 2011 to almost $3 million in 2013. Before 2011, costs to IPART were shared with the administration of GGAS and so the costs of the ESS to IPART are unclear. As **Figure 18** below shows, there is a strong trend between these administrative costs and the number of certificates created.

This trend (y = 0.2096x + 2.1696) indicates that IPART may have variable costs of around $0.21 per certificate created and fixed costs of around $2.2 million. The regression coefficient (R^2 = 0.9994) indicates that the trend has a strong correlation to the data points. This sample of three years is too small to make any definitive conclusions, but provides a basis for estimating the additional costs that IPART would face given changes to the policy settings for the ESS.

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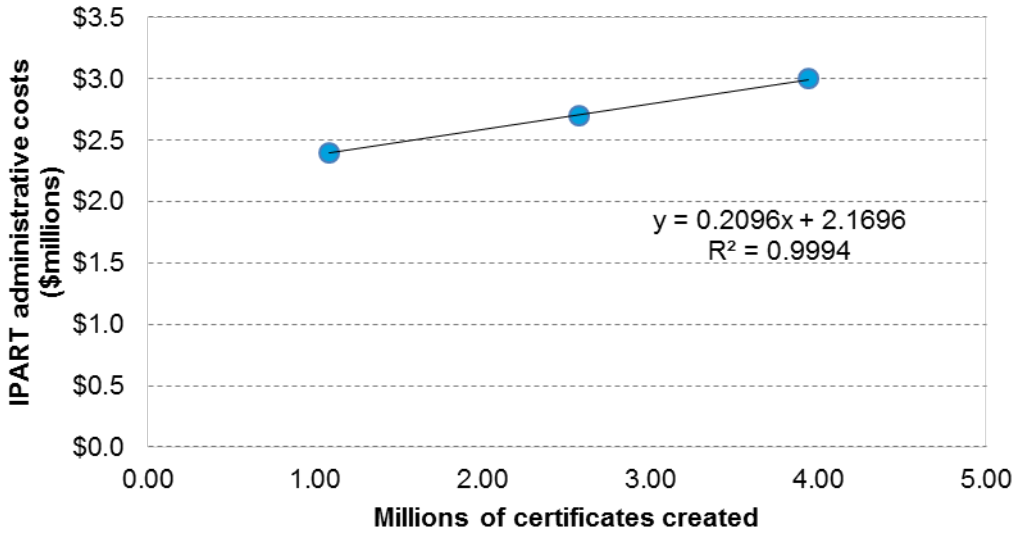

Figure 18 IPART's administrative costs associated with the ESS and the number of certificates created in 2011, 2012 and 2013

For the purposes of this cost benefit analysis the cost of supplementary programs that facilitate the ESS have also been incorporated. These programs are assumed to cost $10 million per year for the scheme duration. This amount is significantly higher than the direct effort on ESS policy

development or the programs that are specifically designed to assist the ESS (e.g. the development of the Home Energy Efficiency Retrofit Tool), but is reasonable if it incorporates the other energy efficiency programs that provide consumers with information that could lead to them accessing the ESS (e.g. the Energy Saver program).

Compliance or regulatory costs

NSW Government energy efficiency policies impose compliance and regulatory costs on NSW businesses. All costs imposed on businesses as a result of government policy reduce the operating surpluses of NSW businesses (holding all other variables constant). In economic terms, this decreased operating surplus is referred to as a reduction in producer surplus.[206]

The ESS requires scheme participants to purchase sufficient certificates to meet their annual energy savings target. The full purchase cost of a certificate includes:

- the cost of the financial incentive required to motivate the consumer to implement an energy efficiency measure
- the cost to the accredited certificate provider of marketing and project feasibility
- the cost to the accredited certificate provider to become accredited, create the certificate, maintain records associated with the certificate and paying for any audits required
- the cost to the scheme participant of the actual transaction of purchasing certificates, reporting on their purchase to IPART and paying for any audit required.

For the purposes of this cost benefit analysis only the costs to the accredited certificate provider and scheme participant associated with ESS administrative processes are considered compliance costs. The cost of the financial incentive required to motivate the consumer and the cost to the Accredited certificate provider of recruiting customers and planning projects are considered to be implementation costs.

In 2013, IPART commissioned consultants, Databuild, to identify participation costs associated with the ESS.[106] The study found that the internal additional costs to scheme participants beyond the price paid for certificates was $0.31 per certificate, and the administrative costs to accredited certificate providers associated with admin and compliance was $2.74 per certificate.

The Databuild study also found that in the first year of the ESS the internal costs to scheme participants were significantly higher, at $5.14 per certificate. This reflects the costs of establishing new compliance systems.

This study has been used to assess the costs associated with the ESS under various policy settings. Although there may be a reduction in these costs over time as compliance systems are streamlined, this potential improvement has not been assessed as part of the cost benefit analysis.

Table 23 Compliance costs used in the cost benefit analysis

Parameter	Unit	Value
Scheme participant establishment costs	Cost per certificate surrendered	$5.14
Scheme participant ongoing costs	Cost per certificate surrendered	$0.31
Accredited certificate provider costs associated with auditing and accreditation	Cost per certificate created	$2.74

[206] For each item sold, a business's producer surplus is the difference between the business's sale price (P) and the minimum price a business is willing to accept (WTA) to supply an additional product or service. This minimum price is called the marginal opportunity cost and is equal to marginal cost of production (which includes regulatory and compliance costs).

Parameter	Unit	Value
Accredited certificate provider costs associated with marketing and project feasibility	Cost per certificate created	$2.34

The cost of the financial incentive required to motivate the customer to implement the energy efficiency has been estimated using an uptake model developed by consultants, Jacobs, on behalf of the Office of Environment and Heritage (see **Policy Impact** below).

Implementation costs

The ESS also places a cost on the customer who chooses to save energy and access the financial incentives available. These costs include creating disruption during installation or supplementary funding from the customer. These costs have an opportunity cost and could have been valuably directed towards an alternative use. This is the case whether costs are direct (such as a customer co-contribution) or indirect (such as disrupted labour or leisure time).

For the purposes of this cost benefit analysis, private costs to households and businesses are assumed to be offset by private benefits to NSW parties (which would include private benefits to the consumer who saves energy).

For the purposes of this cost benefit analysis, the cost of implementing an energy efficiency measure is assumed to be the financial incentive required to motivate the customer and is captured above in regulatory costs.

Economic benefits

The objective of an energy efficiency policy is to reduce the energy consumed for a given level of service (utility or output) by overcoming market failures. This decreases end-use electricity consumption. The end users of energy can benefit by participating in an energy efficiency policy. This benefit comes in the form of energy bill savings to energy consumers.

There are a number of offsetting costs and benefits that occur between parties when an energy bill saving occurs. While an energy consumer makes a saving, parties in the energy supply chain suffer losses. These offsetting effects must be netted off, to provide an accurate estimate of the net economic benefit. This means that the retail price of energy (and the bill savings to the consumer) does not reflect the economic benefits of avoiding energy consumption.

The economic benefits considered by this study are:

- avoided electricity generation costs
- deferred investment in electricity networks
- avoided gas supply costs
- avoided externalities including the cost of carbon emissions and health costs from air pollution.

Avoided electricity generation costs

Avoiding electricity generation in the short run can avoid variable costs including fuel and variable operating and maintenance costs. In the long run, the fixed costs associated with building and maintaining power stations are also avoidable. A review of cost benefit analyses in the United

States by the Regulatory Assistance Project[207] identified two approaches to estimating the avoided generation costs as a result of energy efficiency policy:

- the energy and capacity approach which assesses the impact of energy efficiency on variable short run costs separately from the fixed long run costs associated with generation capacity
- the market price approach which assesses the impact of both short run variable costs and long run capacity costs as the market set price for wholesale electricity.

When there is excess generation capacity the wholesale price of energy tends to reflect the short run costs. In a period where demand reaches nears the limits of generation capacity the wholesale price of energy can tend to reflect the long run costs. In this way, wholesale electricity prices are a price set by the electricity market that signals the need for investment in generation capacity.

The wholesale electricity price may also include avoidable externalities if there is government intervention to send a price signal (e.g. the former Carbon Pricing Mechanism).[208]

The cost benefit analysis for this Options Paper is based on the market price approach using a projected wholesale electricity price.

Figure 19 shows wholesale electricity price forecasts for NSW, prepared by Independent Economics and Frontier Economics for the Australian Energy Market Operator's recent National Electricity Forecasting Report. The 'low', 'medium' and 'high' refer to economic conditions, not the relative price between the different scenarios. For example, the 'low' scenario has a higher forecast electricity price than the 'high' scenario.

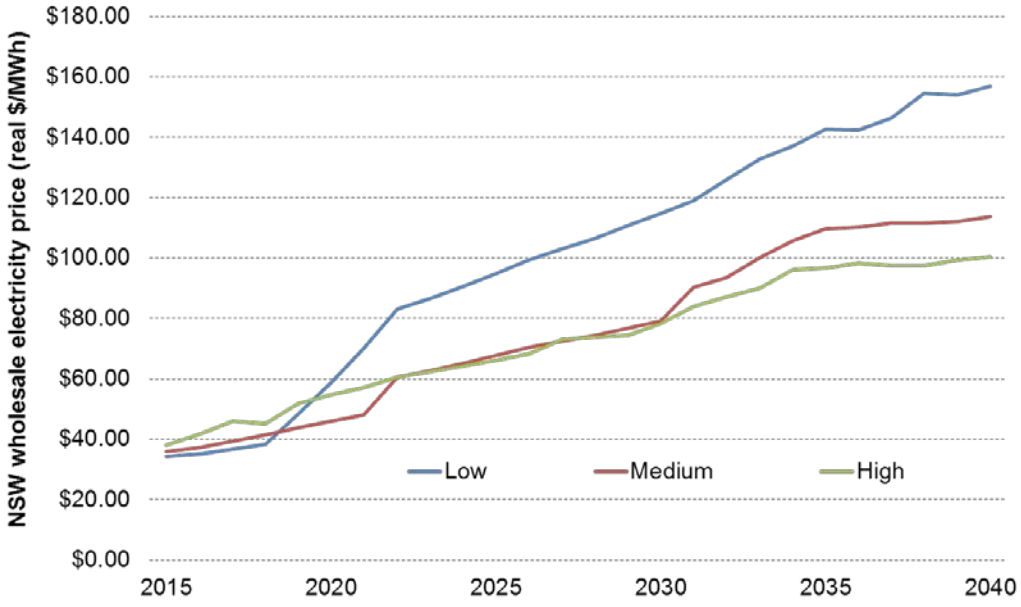

Figure 19 Wholesale electricity price forecast[209]

[207] Regulatory Assistance Project, 2013, *Recognizing the Full Value of Energy Efficiency: What's Under the Feel-Good Frosting of the World's Most Valuable Layer Cake of Benefits*, accessed at http://www.raponline.org/document/download/id/6739

[208] If carbon is priced into electricity bills, it will be captured as an avoidable negative externality through the avoided wholesale electricity price. If carbon is not priced, then it is considered a externality and valued separately.

[209] Independent Economics and Frontier Economics, 2014, *Economic and Energy Market Forecasts*, prepared for the Australian Energy Market Operator, accessed at http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report/~/media/Files/Other/planning/NEFR/2014/2014%20Supplementary/Independent_and_Frontier_Economic_and_Energy_Market_Forecasts_final.ashx

The 'medium' scenario was used as the forecast for wholesale electricity prices for this study. This scenario includes an assumption that a price on carbon is introduced in 2020-21 (see **Avoided Cost of Carbon** below for details).

Deferred investment in electricity networks

Investment in network capacity is influenced by a range of factors, including the ability to meet peak demand and reliability standards. In the long run, the peak demand reduction from energy efficiency can defer the need to invest in network infrastructure.

Network investment is lumpy and characterised by step-changes as certain capacity thresholds are reached or aged assets require replacement. The peak demand impact of a single energy efficiency activity is unlikely to be large enough to avoid network costs. However, the combination of a number of energy efficiency activities that reduce peak demand may increase the chances of deferring network investment.

The economic benefit of deferring a cost is that this cost is more likely to be incurred further in the future. Resources that would otherwise be used to meet this cost in the present can be put to an alternate use until the deferred cost is incurred. In other words, it defers the cost of funding the network investment.

Some Distribution Network Service Providers in NSW (i.e. Ausgrid and Endeavour Energy) identify the long run marginal costs of increasing peak demand across their network area and publish values for voltage level of their network in their annual pricing proposals to the Australian Energy Regulator. These values are estimated using an 'average incremental approach' where the present value of avoidable investment in network infrastructure planned is divided by the forecast increase in peak demand.

Table 24 NSW distribution capacity long run marginal costs by distribution network and voltage level [210, 211]

Parameter	Unit	Ausgrid	Endeavour Energy	Essential Energy
Low voltage	$/kW/year	156.11	159.49	not identified
High voltage	$/kW/year	170.41	39.83	not identified
Subtransmission	$/kW/year	38.99	26.68	not identified

However, these values for the long run cost of distribution capacity are not available for the Essential Energy distribution network area and may overestimate the benefits of reducing demand through energy efficiency.

Energy efficiency may reduce peak demand in areas of the distribution network that are not constrained and may not reduce demand by enough to defer investment. Although the 'average incremental cost' approach taken by the Distribution Network Service Providers should account for the probability that energy efficiency reduces demand in constrained areas, it may overestimate the marginal benefit of reducing peak demand as it is based on an average.

An alternative is to assess the benefits of reducing peak demand at capacity charges set by Distribution Network Service Providers. With capacity charges, energy users pay for the peak demand they place on the distribution network. Capacity charges reflect the revenue a Distribution

[210] Ausgrid, 2014, *Annual Pricing Proposal 2014-15*, accessed at https://www.aer.gov.au/sites/default/files/Ausgrid%20Networks%20Distribution%E2%80%94%20Attachment%20A%20%E2%80%93%20Ausgrid%202014%E2%80%9315%20Revised%20Annual%20Pricing%20Proposal.pdf

[211] Endeavour Energy, 2014, *Annual Pricing Proposal 2014-15*, accessed at http://www.aer.gov.au/sites/default/files/Attachment%20C1%20%E2%80%93%20Endeavour%202014%E2%80%9315%20Annual%20Pricing%20Proposal.pdf

Network Service Provider is willing to forgo if peak demand is reduced, and needs to recoup if peak demand is increased. This is effectively a market set price for distribution capacity.

Capacity charges set by NSW Distribution Network Service Providers are shown below in **Table 25**. These charges are based on the apparent power of peak demand (in kilovolt amperes) either each day or each month.

Table 25 Capacity charges by distribution network and voltage level [212, 213, 214]

DNSP	Ausgrid	Endeavour	Essential
Units	c/kVA per day	$/kVA per month	$/kVA per month
Low voltage	33.83	15.64	15.65
High voltage	18.17	11.41	12.63
Subtransmission	5.78	8.64	5.20

For the purposes of this cost benefit analysis the capacity charges in **Table 25** above have been converted into real power (in kilowatts) using a power factor of 0.9 and adjusted to an annual rate. These figures are shown in **Table 26** below. This table also includes a weighted average across the three distribution network areas using customer numbers.[215]

Table 26 Market set price for distribution capacity by distribution network and voltage level

Parameter	Unit	Ausgrid	Endeavour Energy	Essential Energy	Weighted average
Low voltage	$/kW/year	111.1	153.5	153.7	132.8
High voltage	$/kW/year	59.7	112.0	124.0	70.8
Subtransmission	$/kW/year	19.0	84.8	51.0	30.4

For the purposes of this cost benefit analysis, peak demand reductions in the:

- residential and commercial sectors are assumed to occur at the low voltage level
- industrial sector are assumed to occur evenly at the high voltage and subtransmission voltage level.

Avoided gas supply

This options paper considers expanding the scope of the ESS to cover natural gas. Like electricity generation, avoiding gas supply for the same level of a service delivers economic benefits in the short run. This cost benefit analysis assesses these short run economic benefits as the projected wholesale cost of natural gas.

Figure 20 shows wholesale natural gas price forecasts for NSW, prepared by Independent Economics and Frontier Economics for the Australian Energy Market Operator's recent National Electricity Forecasting Report. As discussed above, the 'low', 'medium' and 'high' refer to economic

[212] Capacity charges from tariffs EA310, EA370 and EA390 in Ausgrid, 2014, *Network Price List 2014-15*, accessed at http://www.ausgrid.com.au/~/media/Files/Network/Electricity%20Supply/Network%20Pricing/Network%20Price%20List%20FY2014-15.pdf
[213] Capacity charges from tariffs N19, N29 and N39 in Endeavour Energy, 2014, *Network Price List 2014-15*, accessed at http://www.endeavourenergy.com.au/wps/wcm/connect/feead84c-5f1d-4982-9fa3-fae2bb8ca9cb/Network+Price+List_201415_Final_v2.pdf?MOD=AJPERES
[214] Capacity charges from tariffs BLND3AO, BHND3AO and BSSD3AO in Essential Energy, 2014, *Network Price List 2014-15*, accessed at http://www.essentialenergy.com.au/asset/cms/pdf/electricitynetwork/NetworkPriceListExplanatoryNotes1415.pdf
[215] SKM MMA, 2013, *Assessment of Economic Benefits from a National Energy Savings Initiative*, prepared for the Commonwealth Department of the Environment, accessed at http://www.industry.gov.au/Energy/IndustrialEnergyEfficiency/NationalEnergySavingsInitiative/Documents/Economic-benefits-from-NESI.pdf

conditions, not the relative price between the different scenarios. For example, the 'low' scenario has a higher forecast electricity price than the 'high' scenario.

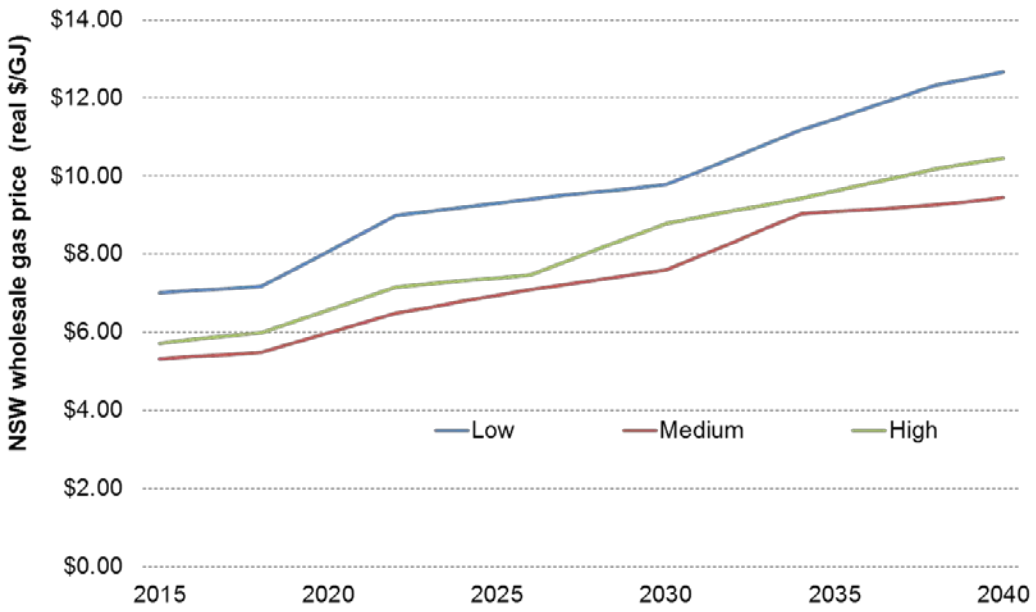

Figure 20 NSW wholesale natural gas forecasts [216]

The 'medium' scenario forecast is lower than other publicly available references.[217] However, for consistency with the wholesale electricity price forecasts the 'medium' scenario has been used.

Although there may also be economic benefits from avoiding fixed costs associated with additional gas transmission infrastructure, these have not been assessed as part of this cost benefit analysis.

Avoided cost of carbon emissions

By aiming to reduce the incremental consumption of energy for a given level of service (utility or output), the Energy Savings Scheme is also be able to reduce negative side effects associated with energy generation such as carbon emissions or air pollutants. As a result, residents across NSW may be able to benefit from any reduction in these negative side effects (referred to as negative externalities).

Figure 21 below shows the projected full fuel cycle emissions intensity of electricity generation in NSW. It is based on the full fuel cycle emissions intensity for NSW power stations and projected generation mix from the Australian Energy Market Operator's 2013 National Transmission Network Development Plan.

[216] Independent Economics and Frontier Economics, 2014, *Economic and Energy Market Forecasts*, prepared for the Australian Energy Market Operator, accessed at http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report/~/media/Files/Other/planning/NEFR/2014/2014%20Supplementary/Independent_and_Frontier_Economic_and_Energy_Market_Forecasts_final.ashx

[217] Jacobs SKM, 2014, *New Contract Gas Price Projections*, prepared for IPART, 4 April 2014, accessed at www.ipart.nsw.gov.au/Home/Industries/Gas/Reviews/Retail_Pricing/Changes_in_regulated_gas_retail_prices_from_1_July_2014/23_Apr_2014_-_Consultant_Report/Jacobs_SKM_-_New_contract_gas_price_projections_-_April_2014

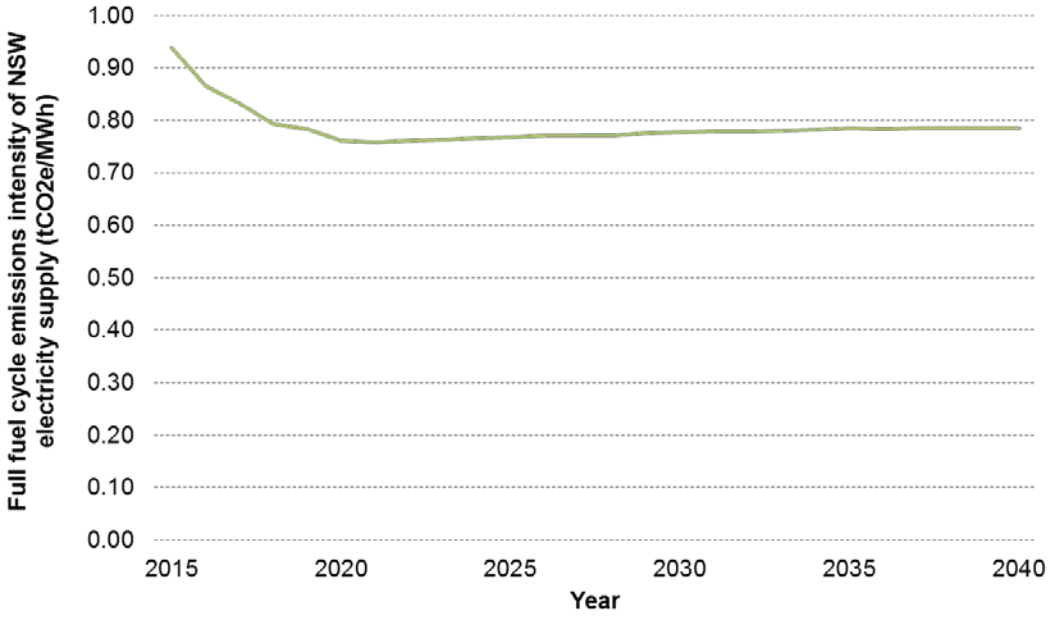

Figure 21 Forecast greenhouse gas emissions intensity of NSW electricity supply[218]

The full fuel cycle carbon emission intensity of gas supply is assumed to be 65.53kgCO_2e/GJ based on figures from the National Greenhouse Accounts Factors.[219]

These carbon emissions from electricity and gas supply would contribute to impacts of climate change on net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services. This Cost Benefit Analysis considers these impacts as the 'cost of carbon'.

There are a number of approaches to estimate the financial cost of carbon emissions, all of which have associated advantages and disadvantages. The approaches include:

- the Social Cost of Carbon – an assessment of the difference in global economic output between a future scenario with and without additional carbon emissions
- the marginal cost of abatement – an assessment of the cost to implement measures that avoid or sequester carbon emissions
- market price of carbon permits – using a price signal set by an emission trading scheme.

In the absence of a locally appropriate study of the whole of economy cost of climate change impacts, the NSW Government preference is for market data to be used where it exists.

The cost of carbon is taken to be the forecast European Union Emission Allowance Units price based on futures derivatives published by the European Energy Exchange. This forecast is shown below in **Figure 22** below. The figure indicates that from 2021 the price is included in wholesale electricity prices consistent with the forecasts in **Figure 19**, however it was not included in the wholesale gas price forecasts in **Figure 20**.

[218] Based on a capacity weighted emissions intensity of NSW generators by fuel type (e.g. coal, gas) as published in Australian Energy Market Operator, 2013, *National Transmission Network Development Plan: Zero Carbon Price Scenario Modelling Results (Microsoft Excel workbook)*, accessed at http://www.aemo.com.au/Electricity/Planning/~/media/Files/Electricity/Planning/Reports/NTNDP/2013/2013%20NTNDP%20zero%20carbon%20price%20scenario%20modelling%20results.xlsx.ashx

[219] Department of Industry, 2013, *Australian National Greenhouse Accounts: National Greenhouse Accounts Factors*, accessed at http://www.climatechange.gov.au/sites/climatechange/files/documents/07_2013/national-greenhouse-accounts-factors-july-2013.pdf

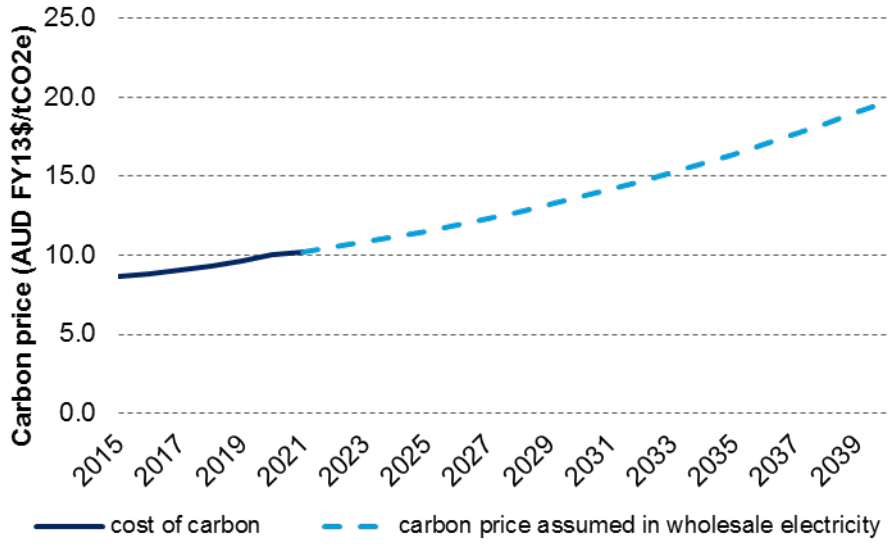

Figure 22 Cost of carbon emissions [220]

This price forecast is considered to be a conservative value for the cost of carbon. **Figure 23** below shows a comparison of different carbon price forecasts. This includes forecasts for the global Social Cost of Carbon published by the US Environment Protection Agency[221] and the market price forecast by the Commonwealth Government in 2011 for the Clean Energy Future Package.[222]

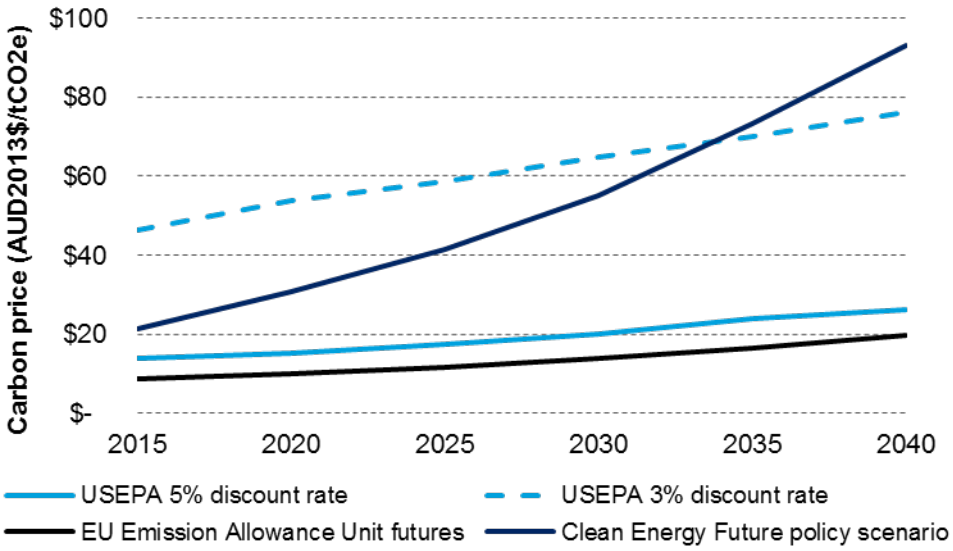

Figure 23 Comparison of different forecasts for prices on carbon emissions

[220] Based on European Union Emission A price trajectory from Independent Economics and Frontier Economics, 2014, *Economic and Energy Market Forecasts*, prepared for the Australian Energy Market Operator, accessed at http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report/~/media/Files/Other/planning/NEFR/2014/2014%20Supplementary/Independent_and_Frontier_Economic_and_Energy_Market_Forecasts_final.ashx

[221] Based on figures published in United States Government Interagency Working Group on Social Cost of Carbon, 2013, *Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866*, accessed at http://www.whitehouse.gov/sites/default/files/omb/assets/inforeg/technical-update-social-cost-of-carbon-for-regulator-impact-analysis.pdf, adjusted for 2013/14 year Australian dollars

[222] The Australian Treasury, 2011, *Strong Growth, Low Pollution: Modelling a Carbon Price*, Chart 5.1 accessed at http://carbonpricemodelling.treasury.gov.au/content/chart_table_data/chapter5/Chart_5.01_update.xlsx

The forecast cost of carbon associated with electricity supply and gas supply is shown below in **Figure 24** below.

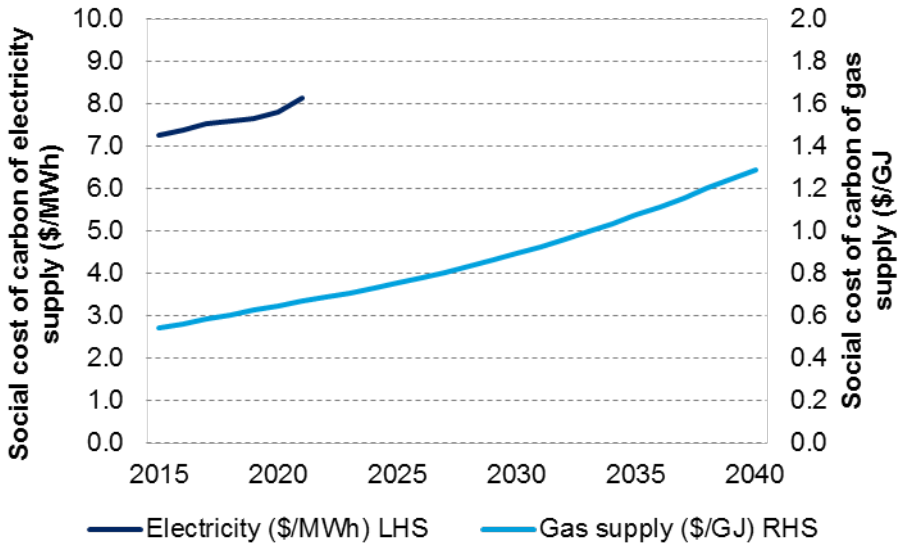

Figure 24 Cost of carbon of electricity and gas supply used in this study

Avoided health costs from air pollution

There are health costs to the residents of NSW associated with air pollution. NSW Health and the NSW Environment Protection Authority estimate that the annual health impacts of air pollution from all sources in the greater Sydney, Hunter and Illawarra regions was between $1 billion and $8.4 billion in 2002.

NSW power stations contribute to this air pollution, the health impacts on NSW residents and the resulting impact on the NSW economy of their illness and premature death.

Table 27 below shows the estimated average air pollutant from NSW power stations in 2012-13. It is based on reported pollutant quantities from the National Pollutant Inventory and the EPA's air emission inventory, and annual generation figures published in each generator's annual report.

Table 27 Major air pollutants from NSW coal fired power stations[223, 224, 225]

Power Station	Oxides of Nitrogen (kg NOx/MWh)	Particulate Matter (kg PM/MWh)	Sulphur Dioxide (kgSO_2/MWh)	Electricity generation in 2012-13 (MWh)
Bayswater	2.41	0.05	4.07	15 562 425
Eraring	1.38	0.05	2.04	11 449 000
Liddell	2.43	0.11	4.71	6 307 004
Mt Piper	2.93	0.01	4.57	8 526 414

[223] Figures for Oxides of Nitrogen and Sulphur Dioxide were based on the National Pollutant Inventory data on NSW power stations for 2012-13, accessed at http://www.npi.gov.au/npidata/action/load/summary-result/criteria/anzsic-division/D/anzsic-sub-division/26/anzsic-group/261/industry-source/261/destination/ALL/source-type/INDUSTRY/subthreshold-data/Yes/substance-name/All/year/2013
[224] Figures for particulate matter were based on the NSW EPA's Air Emissions Inventory Air inventory from 2008.
[225] Annual generation figures for Bayswater and Liddell power stations taken from Macquarie Generation 2012-13 annual report, Mount Piper and Vales Point from Delta Energy 2012-13 annual report, and Eraring from the NSW Audit Office report for the 2012-13 financial year.

Vales Point	3.10	0.03	2.25	7 101 275
Weighted average	**2.4**	**0.05**	**3.5**	**n/a**

The economic impact associated with the health costs from these emissions is based on an approach established by the Australian Academy of Science Technology and Engineering in its report on the Hidden Costs of Electricity Generation. This approach takes values of health damage costs from the European Union and discounts the value based on the local population density (in this case based on the figure published in the same report for the Hunter Valley).

Table 28 Estimated health damage cost associated with air pollution[226]

Pollutant	Median European damage cost $/kg	European population density (population/km^2)	Hunter Valley population density (population/km^2)	NSW value ($/kg)
Oxides of Nitrogen (NOx)	12	100	20	2.40
Sulphur Dioxide (SO2)	17			3.40
Particulate Matter (PM)	49			9.80

Like the cost of carbon above, these damage costs are also considered to be conservative. **Figure 25**, **Figure 26**, and **Figure 27** show a comparison of different values for damage costs from sulphur dioxide, particulate matter and oxides of nitrogen.

The figures include comparison with the ranges estimated by the US Environment Protection Agency for the recently release proposals for carbon emission standards on existing power stations.227 The ranges for the 'West US' do not include the most populated state, California, and as such may be a reasonable comparison for NSW. The figures also include a comparison with the range estimated for both Europe and Australia by the Australian Academy for Technology, Science and Engineering.

Figure 25 shows a comparison of damage costs from sulphur dioxide. It shows that the value used for NSW in this study is slightly above the middle of the range for Australian health damage costs published by the Australian Academy of Technology, Science and Engineering and is below the lower bound of the range published by the US Environment Protection Agency.

[226] European damage costs, European population density and Hunter Valley population density taken from Australian Academy of Technology, Science and Engineering, 2009, Hidden Costs of Electricity: Externalities of Power Generation in Australia, accessed at http://www.atse.org.au/Documents/Publications/Reports/Energy/ATSE%20Hidden%20Costs%20Electricity%202009.pdf

[227] USEPA, 2014, *Regulatory Impact Analysis for the Proposed Carbon Pollution Guidelines for Existing Power Plants and Emission Standards for Modified and Reconstructed Power Plants*, Table 4-7 accessed at http://www2.epa.gov/sites/production/files/2014-06/documents/20140602ria-clean-power-plan.pdf

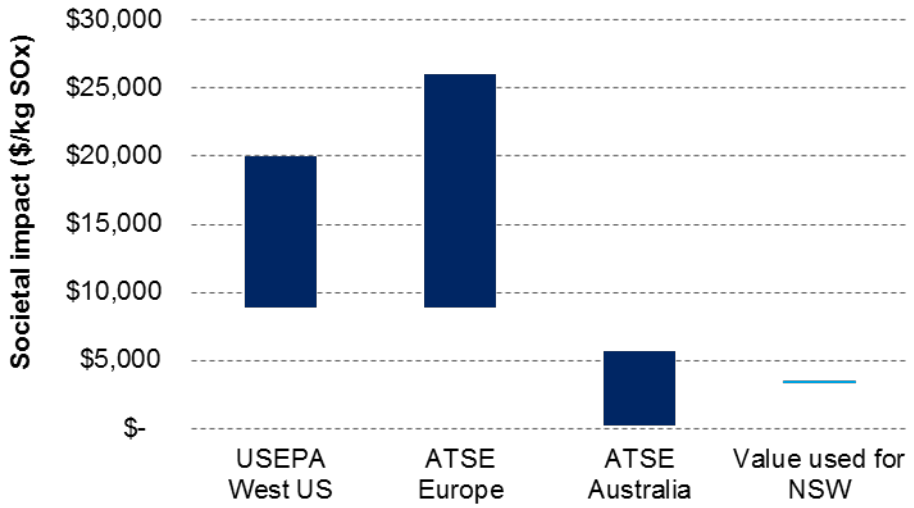

Figure 25 Comparison of estimates for health impacts from Sulphur Dioxide (SOx)

Figure 26 also includes a comparison with the health costs of particulate matter using an approach recently published by the NSW Environment Protection Authority.[228] This approach is not applicable to value sulphur dioxide or oxides of nitrogen emissions without double counting of health impacts and so was not used for this cost benefit analysis.

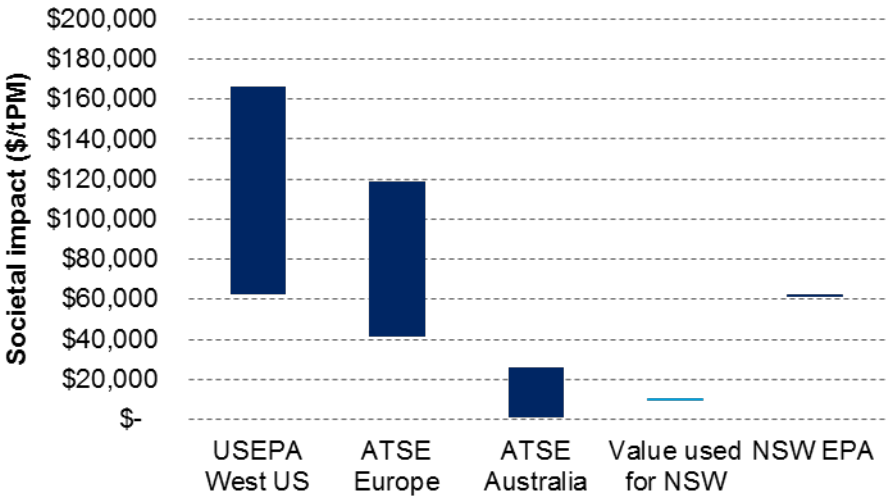

Figure 26 Comparison of estimates for health impacts from Particulate Matter (PM)

[228] PAE Holmes, 2013, *Methodology for Valuing the Health Impact s of Changes in Particle Emissions, prepared for the NSW Environment Protection Authority*, accessed at http://www.epa.nsw.gov.au/resources/air/HealthPartEmiss.pdf

Figure 27 shows the comparison of damage costs from oxides of nitrogen. It shows that the value for NSW used in this study is slightly above the middle of the range for Australian health damage costs published by the Australian Academy of Technology, Science and Engineering and is below the lower bound of the range published by the US Environment Protection Agency.

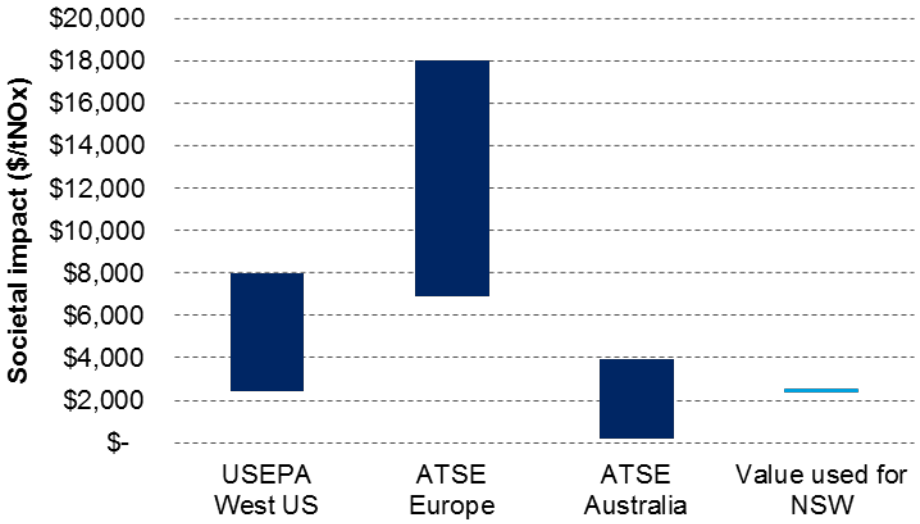

Figure 27 Comparison of estimates for health impacts from Oxides of Nitrogen (NOx)

The estimated health cost of air pollutants from electricity supply in NSW is shown below.[229]

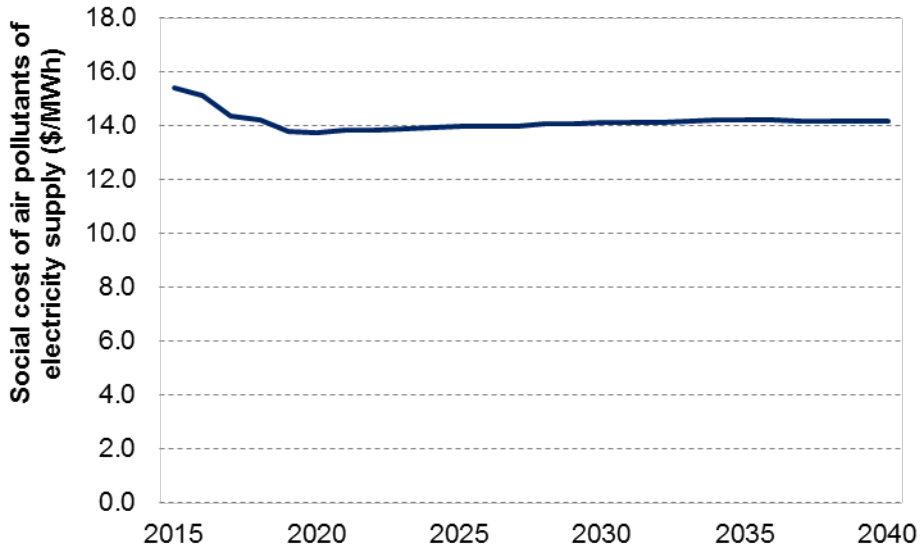

Figure 28 Forecast health cost of air pollutants of electricity supply in NSW

Although gas fired power stations also emit air pollutants they have not been considered as part of this cost benefit analysis. There may also be health impacts from reducing gas combustion in indoor environments such as reducing the use of unflued gas heaters through more energy

[229] Based on the projected share of coal fired electricity generation in NSW published in Australian Energy Market Operator, 2013, *National Transmission Network Development Plan: Zero Carbon Price Scenario Modelling Results (Microsoft Excel workbook),* 'NEMEnergyGeneratedData' worksheet, accessed at http://www.aemo.com.au/Electricity/Planning/~/media/Files/Electricity/Planning/Reports/NTNDP/2013/2013%20NTNDP%20zero%20carbon%20price%20scenario%20modelling%20results.xlsx.ashx

efficient building fabric. These impacts have also not been assessed as part of this cost benefit analysis.

Other benefits

There are likely to be other non-energy benefits from the ESS. For example, energy efficiency that assists low income households could lead to improved health outcomes (over and above the base case), which could lead to avoided costs in the NSW health system.

Energy efficiency may also avoid the need to construct a greater range of energy supply infrastructure than considered in this study such as gas transmission pipelines.

These other benefits have not been assessed as part of this cost benefit analysis.

Policy impact

The main policy impact of the ESS is from the uptake of energy efficiency measures. 'Uptake' in this case refers to the units of an opportunity sold in the market in any given year, such as the number of homes replacing low efficiency halogen bulbs with higher efficiency LED bulbs, or the number of manufacturing sites upgrading process heating boilers.

The Office of Environment and Heritage commissioned a consultancy (Jacobs, formerly SKM MMA) to prepare a model to forecast the uptake of energy efficiency activities at different certificate prices, policy settings and targets.[230] The model is premised on the ESS overcoming market barriers to drive faster, broader, and sustained uptake of energy efficiency opportunities. ESS incentives reduce net private costs for energy efficient technologies and services, which in turn reduces the time it takes for a return on investment to be cost effective (payback period). The ESS also creates a market where competition drives more energy efficiency opportunities to be identified and implemented. The ESS increases uptake of energy efficiency opportunities by making more activities cost effective and supporting the market through reducing financial and non-financial barriers. This results in energy savings that benefit NSW.

Jacobs' NSW Energy Efficiency Uptake Model incorporates the following steps:

- input the list of energy efficiency opportunities developed by Energetics
- input assumed demand for ESCs under different target settings
- input retail gas and electricity price forecasts
- input average payback thresholds reflecting the willingness to pay for energy efficiency across different sectors
- input the maximum annual capacity of the market to take up newly cost effective opportunities
- output likely annual uptake of opportunities by different sectors and end uses
- output energy, peak demand and bill savings over time from increased uptake
- adjust benefits to account for freeriders and spillovers.

[230] The uptake framework recommended by Jacobs integrates methods developed from the UK Department of Energy & Climate Change's Energy Use Simulation Model (ENUSIM), the US Energy Information Agency's National Energy Modelling System (NEMS), and Jacobs' established internal methods undertaken over the last 15 years for a number of Commonwealth and state agencies. *Model Documentation Report: Commercial demand module of the National Energy Modeling System*; US Energy Information Administration, 2012, *Model Documentation Report: Residential demand module of the National Energy Modeling System*; The Environment Agency (UK), 2009, *The CRC Energy Efficiency Scheme: Coverage, abatement and future caps*

Forecasting demand for certificates

Demand for certificates was estimated for each of the different scenarios for targets based on demand forecasts from the Australian Energy Market Operator's 2014 National Electricity Forecasting Report.[231] The historical level of exempt load was assumed to continue into the future in absolute terms (around 11 terawatt hours per year). **Table 30** below shows the forecast demand for certificates under various scenarios considered by this options paper.

Certificates can be created and withheld for trading against targets in the future, known as banking. This study assumes that the level of certificate creation from the period April to December 2013, is consistent over the same period in 2014. This results in an oversupply of 2.8 million certificates beyond targets at the beginning of 2015.

There are also incumbent projects using the Metered Baseline Method that could continue to create certificates in the future. An additional 400,000 certificates are assumed to be created each year for these incumbent projects. This could be an underestimate as it would not incorporate new projects that enter the scheme using the Metered Baseline Method in 2014.

These additional certificates created from oversupply and existing projects have been incorporated by lowering the number of new certificates required to meet the scheme targets under each scenario.

Payback thresholds and willingness to pay

The uptake model predicts whether a consumer will take up an energy efficiency opportunity by calculating the impact of ESS incentives on the payback period for the energy efficiency measure. If these payback periods reach a specified threshold, consumers are assumed to take up the measure. These payback thresholds reflect a consumer's willingness to pay for a given product.

If an energy efficiency opportunity has an acceptable payback (taking into account transaction costs, discount rates and other market barriers), the market is likely to take it up. ESS incentives reduce payback periods by reducing these costs. This increases the number and range of cost effective energy efficiency opportunities available to the market.

Jacobs' estimated payback thresholds for residential, commercial, small businesses and industrial sectors are illustrated in **Table 29**.

Table 29 Payback threshold for return on investment by sector[232]

Market segment	Payback threshold (years)
Average households	2.20
Small to medium enterprises	1.95
Commercial sector	3.20
Industrial sector	4.20

Transaction costs are additional to the capital costs that result from undertaking an opportunity, and count to meeting a payback threshold. They can reflect market barriers, such as information

[231] Australian Energy Market Operator, 2014, *National Electricity Forecasting Report*, NSW and ACT demand projections
[232] Payback thresholds drawn from reports prepared for a possible national Energy Savings Initiative, including SKM MMA, 2011, *Energy Market Modelling of National Energy Savings Initiative Scheme – Assumptions Report*, prepared for Commonwealth Department of Climate Change and Energy Efficiency (DCCEE); Climate Works Australia, 2012, *Inputs to the Energy Savings Initiative modelling from the Industrial Energy Efficiency Data Analysis Project*, prepared for DCCEE; Energetics, 2012, E*nergy use and energy efficiency opportunity data for commercial sector and small/medium business*, prepared for DCCEE

barriers that increase the time and costs required to understand and judge an opportunity's benefits, to source equipment and expertise, or identify customers.

Based on research under comparable policies in Australia and other jurisdictions, Jacobs estimate transaction costs add an additional 10 per cent of total costs after ESS incentives and market facilitation are taken into account.[233]

Market capacity and the Sigmoidal (S) curve

The maximum annual rate at which opportunities can be taken up is estimated through sigmoid curves (S-curves). S-curves show how quickly a technology can overtake available technology on the market, such as how long and at what rate high efficiency LED lights will displace CFL bulbs as standard lighting replacement. The S-curves take into account the market's capacity to deliver new goods and services over time as they become more cost effective and demand increases.

S-curves impose an annual limit equal to the maximum proportion of each opportunity that can be taken up by consumers each year. This reflects market barriers and limitations, including the number of opportunities remaining in the market, transaction costs, slow distribution of information on newly cost effective products, time required to increase output to meet new demand or split incentives limiting investment in tenanted properties. The shape of S-curves can be affected by policies that reduce these barriers, raise maximum market capacity and increase the rate of uptake for cost effective opportunities.

The S-curve attempts to reflect how quickly technologies and services spread as the market evolves from early adopters to mass market potential (diffusion rates). As long as the technology remains cost effective, penetration of opportunities is predicted to proceed smoothly along the remainder of the curve.

The example S-curve in **Figure 29** describes slow initial penetration which increases as the market develops (point A) and slows again (point B) as it approaches saturation and becomes more difficult or expensive to find new customers.

[233] Including opportunity costs of time spent to access and implement opportunities and based on international case studies in Lawrence Berkeley National Laboratory, 2004, *Market failures, consumer preferences, and transaction costs in energy efficiency purchase decisions*, prepared for California Public Utilities Commission; Michaelowa and Jotzo, 2005, *Transaction costs, institutional rigidities and the size of the clean development mechanism*, Energy Policy 33:4, 511-523; Resources for the Future (US), 2011, *Assessing the energy efficiency information gap: Results from a survey of home energy auditors*

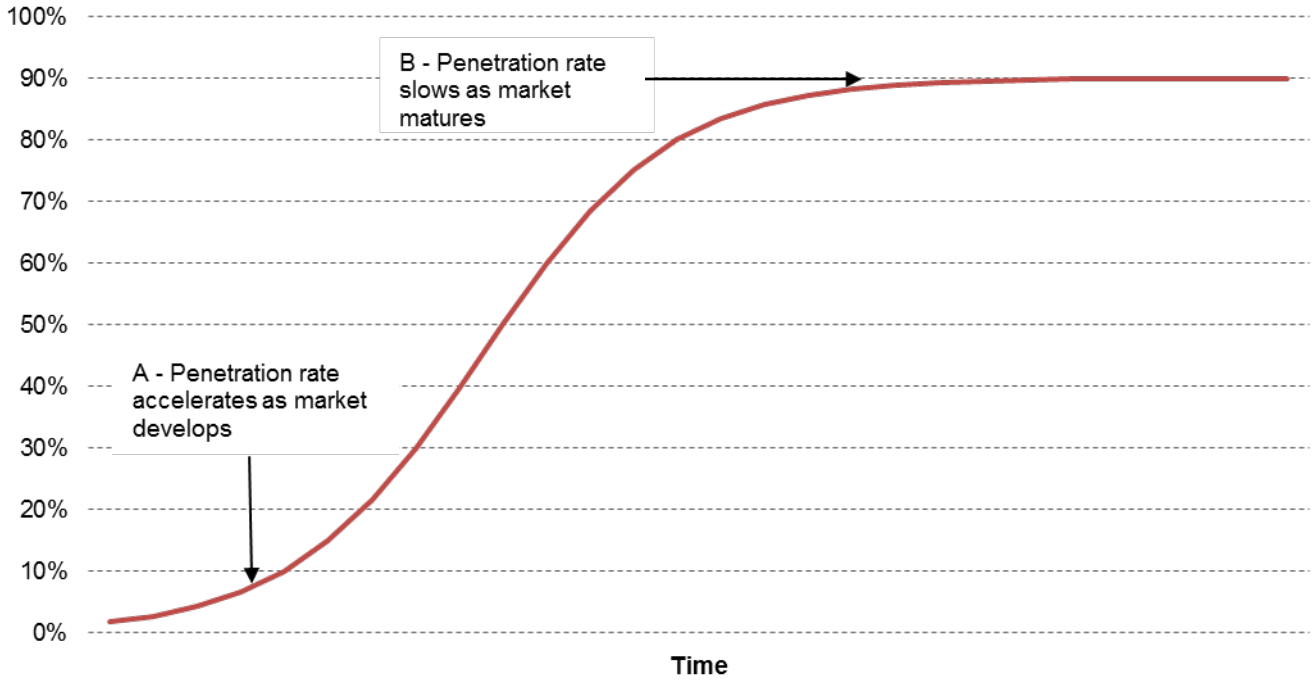

Figure 29 Example of sigmoid uptake curve (S-curve) over time

Forecast certificate prices, uptake and certificate supply to meet ESS targets

The uptake model forecasts the energy efficiency activities that take place given an average financial incentive over the scheme's lifetime.

This forecast is used to estimate the financial incentive required for the market to meet ESS targets under each policy scenario. Although in reality the certificate price and mix of activities will fluctuate under regular market forces, an average price is a good estimate of the cost of different target settings over the lifetime of the scheme.

The forecast of energy efficiency measures that are taken up is reported in the model by individual activities, sector, end use, number of certificates, fuel savings and peak demand savings. The model also projects how the uptake and distribution of technologies and services may change in the market over time.

The model shows how energy efficiency uptake reduces final demand for energy (by MWh), taking into account expected energy demand forecasts. Gas savings are calculated in MWh and converted into petajoules (PJ) for reporting purposes.

Bill savings are calculated based on electricity and gas NSW retail price forecasts for residential, small to medium enterprises, low voltage (electricity), high voltage (electricity), commercial (gas) and industrial (gas) customers.[234]

Freeriders and spillover impacts

International experience with energy efficiency programs has shown that financial incentives can be inadvertently diverted to 'freeriders' as energy efficient market penetration increases.[235] Freeriders are actors who receive financial incentives for activities that would have occurred anyway, and do not contribute additional energy saving benefits beyond the status quo.

[234] Forecast prices developed by Jacobs, 2014, *NSW Energy Efficiency Uptake Model*, prepared for the Office of Environment and Heritage.
[235] de la Rue du Can et al, 2014, *Design of Incentive Programs for Accelerating Penetration of Energy Efficient Appliances*, Energy Policy 72, 56–66

Conversely, policies may have 'spillover' impacts beyond the projects that receive a financial incentive. This may include technology becoming more widely available in the market to other consumers, as well as consumers choosing to implement more energy efficiency measures than the activities they claim an incentive for.[236]

Freeriders and spillovers can be modelled through a 'net to gross' energy savings ratio. The ratio balances the amount of savings that would have been undertaken without the ESS with the amount of savings attributable to spillover.

There are no evaluation studies on the ESS that attempt to quantify its freerider or spillover effects. However there are several studies on state based energy efficiency obligation programs similar to the ESS in operation in the United States.[237]

Based on similar programs in comparable jurisdictions, the net to gross ratio accounting for both freeriders and spillover is assumed to be equivalent to 13 per cent of business as usual benefits for the ESS. This is a conservative assumption as several studies in the United States have concluded that the impact of freeriders and spillovers net each other off.[238]

The cost benefit analysis discounts the benefits of projected energy savings and peak reductions by 13 per cent to reflect the likely balance of freeriders and spillovers that would occur in the ESS.

Summary of results

The following section provides a summary of the results of analysis on potential reforms to the ESS. It covers:

- forecast demand for certificates and average certificate prices
- the predicted breakdown of energy efficiency activities across the economy that access the ESS
- forecast energy savings and demand reductions
- impacts on consumer bills from energy savings and costs passed on to consumers by energy retailers
- economic costs and benefits.

Certificate demand and prices

Table 30 below shows the forecast demand for certificates under various scenarios. It also shows the forecast average certificate price over the duration of the scheme (either from the year 2015 to 2020 or 2025). It shows that the effect of expanding the scheme to gas (Gas Option 3) compared to the preferred option to increase targets (Target Option 3) is a reduction in the average certificate price of around $5 even though the demand is predicted to increase by around three million certificates. This is mainly because Gas Options 1 and 2 open up cost effective fuel switching and gas efficiency opportunities not available in an electricity only scheme.

[236] Skumatz, 2009, *Lessons learned and next steps in energy efficiency measurement and attribution: Energy savings, net to gross, non-energy benefits, and persistence of energy efficiency behavior*, prepared for California Institute for Energy and Environment.
[237] Navigant, 2013, *Custom free ridership and participant spillover jurisdictional review*, prepared for the Sub-committee of the Ontario Technical Evaluation Committee; Skumatz, 2009, *Lessons learned and next steps in energy efficiency measurement and attribution: Energy savings, net to gross, non-energy benefits, and persistence of energy efficiency behavior*, prepared for California Institute for Energy and Environment
[238] Haeri and Khawaja, 2012, *The Trouble with Freeriders: The Debate About Freeridership in Energy Efficiency isn't Wrong, but it is Wrongheaded*, Public Utilities Fortnightly March 2012, available at http://www.nrel.gov/extranet/ump/pdfs/troublewithfreeriders.pdf

Table 30 Total certificates surrendered and average certificate price for selected scenarios

Parameter	Targets Option 1 (5% to 2020)	Targets Option 3 (6.5% to 2020)	Targets Option 2 (24% to 2020)	Scheme duration (5% to 2025)	Scheme duration (6.5% to 2025)	Option 3 for gas (gas certificate)	Option 1 for gas (6.5% elec and 6.5% gas to 2020)	Option 2 for gas (8% to 2020)	Combined preferred option (8% to 2025)	Exemptions Option 2 (60% discount factor)
Total certificates surrendered (mill)	15.4	19.3	63.6	28.3	36.0	3.5	22.5	22.5	42.9	42.9
Average certificate price ($)	$11	$26	$126	$16	$33	$46	$21	$21	$23	$29

Breakdown of certificate creation

Table 31 shows the breakdown of certificates created by industry sector and end use. It shows that increasing the target (Target Option 3) is predicted to result in a relative shift in activity from the industrial sector to the residential sector.

With the expansion of the scheme to cover gas under the combined preferred option, both the industrial and residential share of certificates increases. The commercial sector's share of certificates decreases with the expansion of the scheme to natural gas. However this may be due to the limited number of opportunities for fuel switching and gas efficiency currently identified in the commercial sector.

Table 31 Proportion of certificates created by end use and industry sector for selected scenarios

End use and sector	Targets Option 1 (5% to 2020)	Targets Option 3 (6.5% to 2020)	Scheme duration (6.5% to 2025)	Combined preferred option (8% to 2025)
Commercial subtotal	29.0%	29.1%	29.2%	20.2%
Appliances	2.3%	2.3%	2.3%	1.7%
Compressed Air	0.1%	0.0%	0.0%	0.0%
Hot water (domestic)	0.5%	0.4%	0.4%	0.5%
HVAC	10.6%	9.3%	11.4%	8.2%
Lighting	13.2%	14.9%	12.3%	7.8%
Motor Systems	0.0%	0.0%	0.0%	0.0%
Other	0.3%	0.2%	0.3%	0.2%
Process Heating	0.8%	0.7%	0.8%	0.7%
Refrigeration	1.2%	1.1%	1.7%	1.0%
Industrial subtotal	37.8%	33.2%	33.1%	34.5%
Compressed Air	9.4%	7.5%	6.5%	5.1%
HVAC	2.7%	2.4%	2.7%	7.5%
Lighting	1.5%	4.5%	6.0%	3.0%

End use and sector	Targets Option 1 (5% to 2020)	Targets Option 3 (6.5% to 2020)	Scheme duration (6.5% to 2025)	Combined preferred option (8% to 2025)
Motor Systems	18.8%	14.8%	14.2%	11.2%
Process Heating	2.3%	1.7%	1.0%	5.5%
Refrigeration	3.1%	2.3%	2.6%	2.2%
Residential subtotal	33.3%	37.7%	37.7%	45.3%
Appliances	3.0%	3.5%	4.3%	2.1%
Hot water (domestic)	8.7%	6.3%	6.3%	22.8%
HVAC	0.0%	0.0%	0.0%	5.6%
Lighting	21.6%	27.9%	27.1%	14.8%

Energy savings

Table 32 below shows the electricity savings, gas savings and demand reduction predicted under various scenarios. It shows that Gas Options 1 and Option 2 result in less gas savings that Option 3 due to fuel switching activities. It also shows that the combined preferred option is predicted to result in 42,708 gigawatt hours of electricity savings and 22,519 terajoules of gas savings between 2015 and 2040.

Table 32 Electricity and gas savings for selected scenarios

Parameter	Targets Option 1 (5% to 2020)	Targets Option 3 (6.5% to 2020)	Targets Option 2 (24% to 2020)	Scheme duration (6.5% to 2025)	Scheme duration (6.5% to 2025)	Option 3 for gas (gas certificate)	Option 1 for gas (6.5% elec and 6.5% gas to 2020)	Option 2 for gas (8% to 2020)	Combined preferred option (8% to 2025)	Exemptions Option 2 (60% discount factor)
Electricity savings in 2020 (GWh p.a.)	1,391	1,769	4,528	1,515	1,968	n/a	1,711	1,711	1,807	2,078
Gas saving in 2020 (TJ p.a.)	n/a	n/a	n/a	n/a	n/a	5,390	5,164	5,164	5,143	4,892
Demand reduction in 2020 (MW)	200	253	593	218	282	n/a	248	248	261	301
Electricity savings to 2040 (GWh)	19,297	24,815	70,856	32,687	42,945	n/a	24,011	24,011	42,708	48,779
Gas savings to 2040 (TJ)	n/a	n/a	n/a	n/a	n/a	22,589	19,227	19,227	22,519	20,516

Figure 30 projects electricity consumption under different ESS settings, assuming targets are met through purchasing ESCs rather than paying penalties. Consumption is calculated based on estimated savings deducted from Australian Energy Market Operator (AEMO) 2014 forecasts.

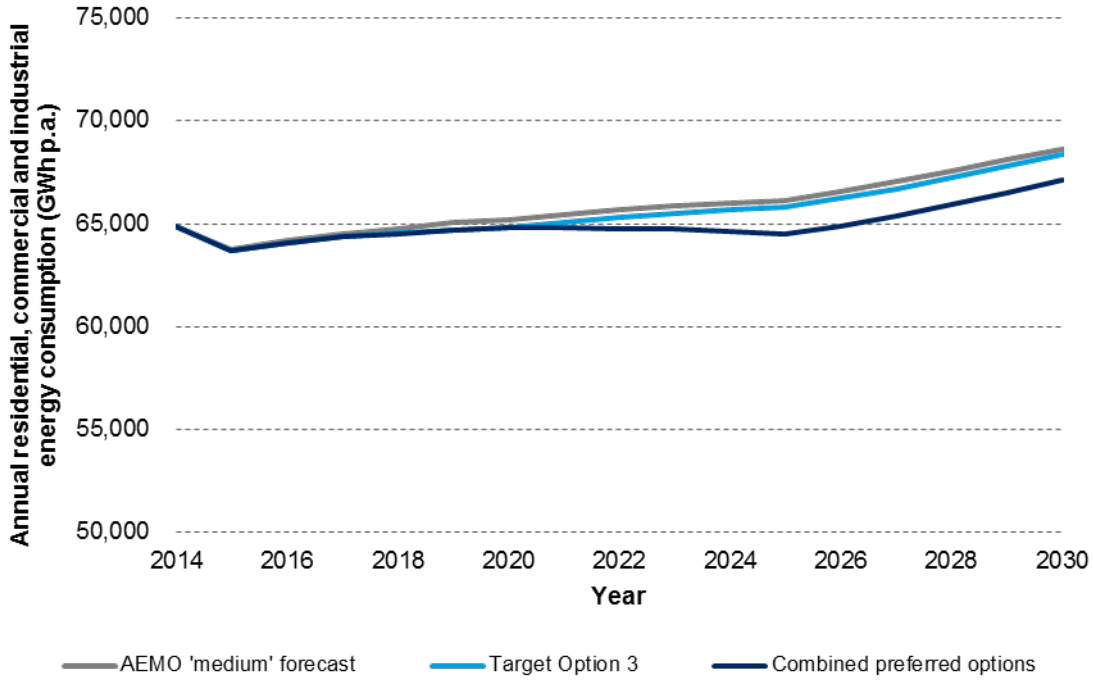

Figure 30 NSW and ACT electricity demand forecasts under different ESS scenarios[239]

Figure 31 below shows forecasts for NSW and ACT electricity consumption if the Australian Energy Market Operator's 2014 forecasts do not fully take the ESS into account (see **Section 6.1.1** for discussion on how AEMO considers the ESS in its forecasts). Under a scenario with a combination of the preferred options for targets, scheme duration and gas NSW and ACT electricity consumption are forecast to remain relatively stable until the scheme terminates in 2025.

[239] Based on industrial, commercial and residential demand forecasts by the Australian Energy Market Operator, 2014, *National Electricity Forecasting Report*, NSW and ACT demand projections

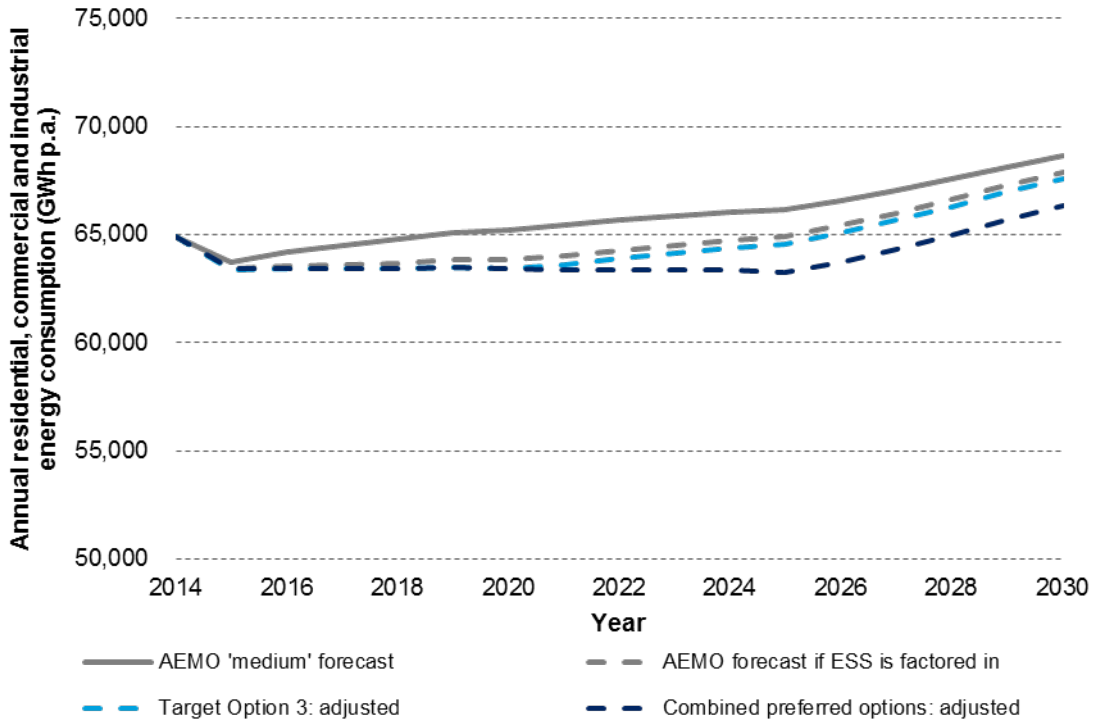

Figure 31 NSW and ACT electricity consumption forecasts under different ESS scenarios if AEMO forecasts have not adequately accounted for the ESS

Consumer bills

Figure 32 projects gas and electricity bill savings to 2040 across all sectors resulting from savings under different ESS settings. The highest total bill savings are under the recommended option of an 8 per cent target including gas, with an extended duration to 2025.

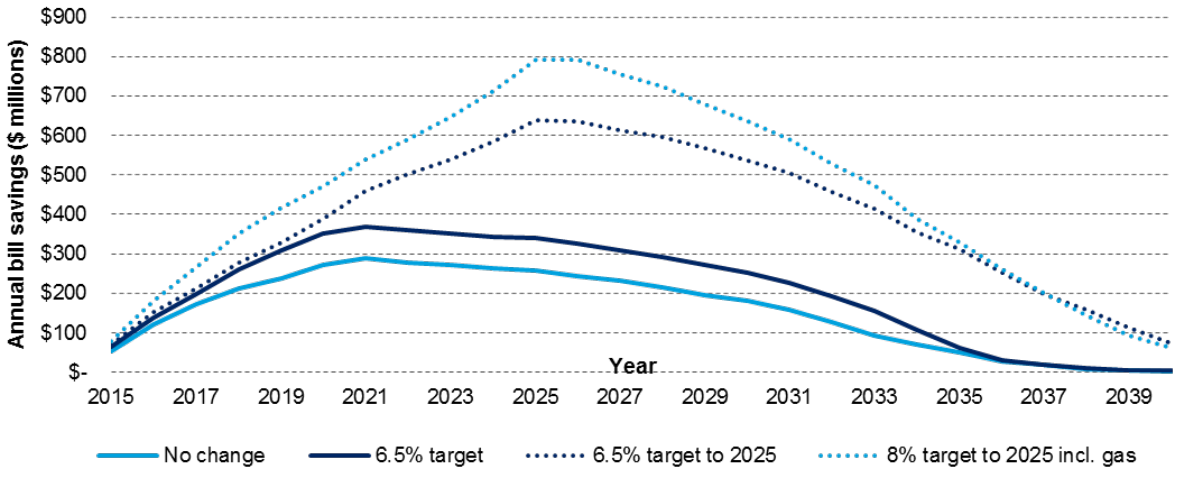

Figure 32 Annual bill savings under different ESS options[240]

[240] Bill savings based on retail fuel price projections in Australian Energy Regulator, 2013, *State of the energy market 2013*, accessed at http://www.aer.gov.au/sites/default/files/Complete%20report%20A4.pdf

Figure 33 shows different ESS options also shift the distribution of bill savings between the residential, commercial and industrial sectors. As the scheme increases targets, extends and includes gas options, a greater share of benefits accrue to households through direct electricity and gas bill savings. All three sectors are forecast to have higher bill savings under the preferred options than under a business as usual scenario.

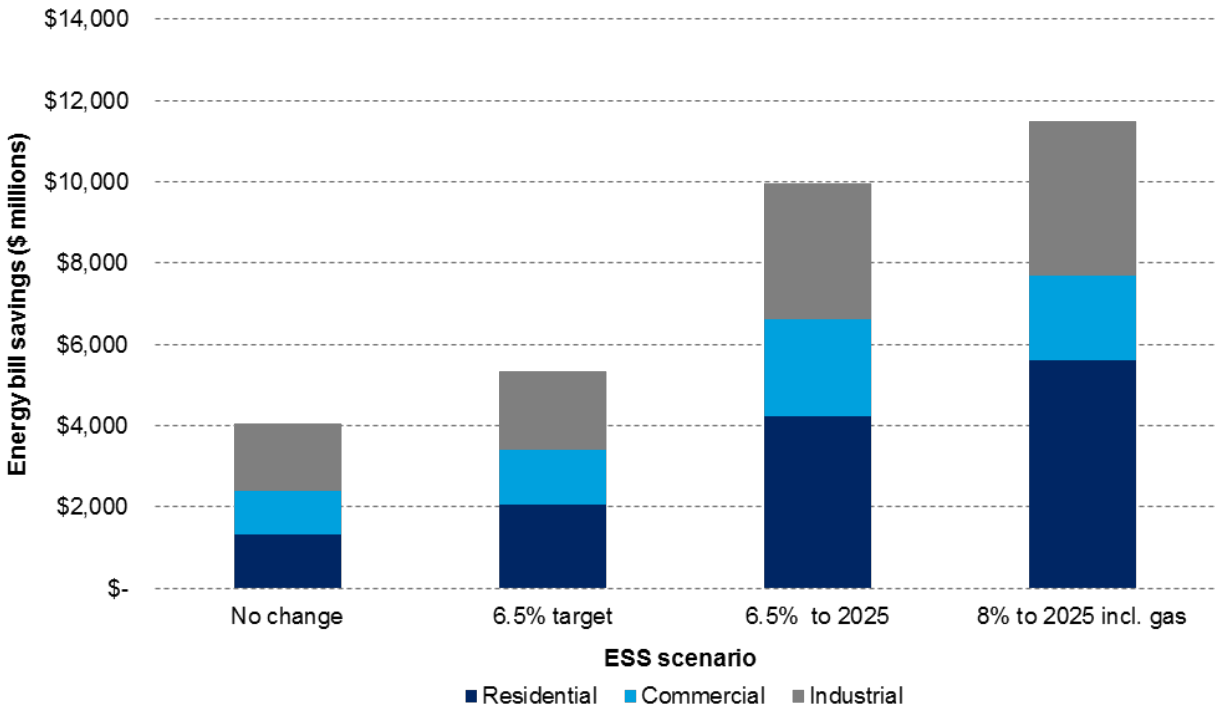

Figure 33 Distribution of bill savings under selected scenarios

Household bill reductions are calculated from reduced consumption attributable to increased energy efficiency uptake in the household sector, and based on Australian Energy Regulator retail price forecasts. Price impacts are based on the assumption that retailers will pass on the cost of purchasing certificates to customers.

Table 33 and **Figure 34** show the average annual household bill reductions and price impacts over the lifetime of the scheme across all households not just those who participate. Bill reductions are significantly larger than the estimated impact of certificate pass through costs in all scenarios. The highest bill impacts are under the Exemption Option 2 to apply a discount factor to energy savings at sites with exempt load. Including gas in the scheme also reduces the total and electricity price impact borne by households.

Under the combined preferred option (shown below in **Table 33**), the ESS is predicted to have the potential to ensure that all households can participate directly. Under this scenario it is estimated that there will be 1.5 times more household activities delivered through the ESS than there will be houses by 2025. The ESS could deliver lighting upgrades and bill savings to 40 per cent of NSW households by 2025.

Table 33 Bill savings, certificate pass through, average household bill savings and average household bill impacts for selected scenarios

Parameter	Targets Option 1 (5% to 2020)	Targets Option 3 (6.5% to 2020)	Scheme duration (6.5% to 2025)	Option 3 for gas (gas certificate)	Option 1 for gas (6.5% elec and 6.5% gas to 2020)	Option 2 for gas (8% to 2020)	Combined preferred option (8% to 2025)	Exemptions Option 2 (60% discount factor)
Total bill savings to 2040 ($ mill)	$4,054	$5,345	$9,935	$1,361	$6,583	$6,583	$11,694	$13,044
Electricity certificate pass through from 2016 to 2020 ($/MWh)	$0.5	$1.7	$2.2	n/a	$1.3	$1.4	$1.6	$2.0
Gas certificate pass through 2016 to 2020 ($/GJ)	n/a	n/a	n/a	$0.24	$0.1	n/a	n/a	n/a
Average household electricity bill savings from 2016 to 2020 ($ p.a.)	$23.1	$29.6	$31.3	n/a	$29.8	$29.8	$31.5	$37.9
Average household electricity bill impact from 2016 to 2020 ($ p.a.)	-$3.1	-$9.9	-$12.6	n/a	-$7.8	-$9.3	-$10.1	-$13.0
Gas connected household gas bill savings from 2016 to 2020 ($ p.a.)	n/a	n/a	n/a	$13.0	$33.4	$33.4	$32.3	$26.8
Gas connected household gas bill impact from 2016 to 2020 ($ p.a.)	n/a	n/a	n/a	-$5.5	-$2.4	n/a	n/a	n/a

Figure 34 below shows the average bill reduction and bill impact of certificate pass through on household bills from 2016 to 2020. It shows that the certificate pass through costs are small relative to the bill reductions. It also shows that the inclusion of gas into the scheme results in large gas savings and a lower impact of certificate pass through. This indicates that the reduction in average certificate prices compensates for the increase in targets and results in a net reduction in costs to consumers who do not participate in the scheme compared to an extended 'electricity only' scheme.

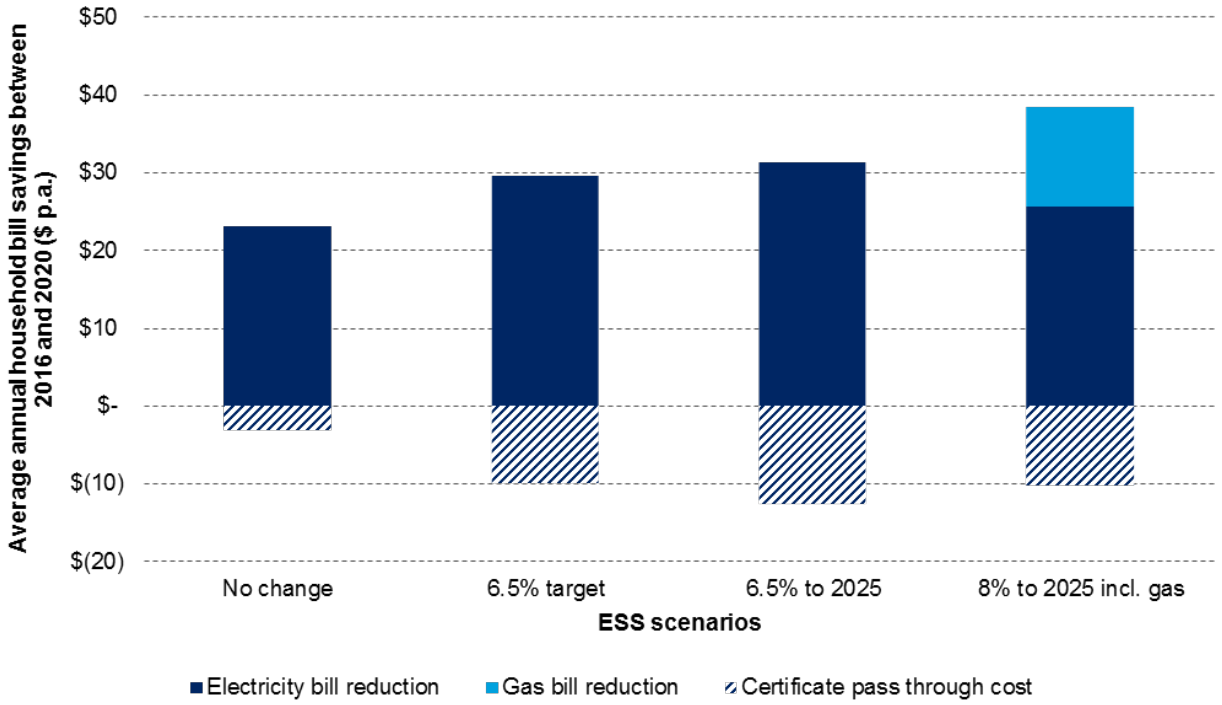

Figure 34 Average household bill reductions and certificate pass through costs between 2016 and 2020 for selected scenarios

It should be noted that the ESS is also likely to place downward pressure on wholesale electricity prices, network charges and wholesale gas prices which would benefit all energy users.

The combination of all preferred options is expected to save around 5.2 petajoules of gas in 2020, freeing up this gas supply for large gas users. This would improve energy security and may place downward pressure on wholesale gas prices should there be a shortfall in supply.

The ESS is also expected to reduce peak demand for electricity by around 261 megawatts in 2020 which would place downward pressure on wholesale electricity prices. The NSW Government has not conducted analysis of the wholesale electricity price impacts of the ESS, but existing analysis of similar schemes in Australia indicates the impact could negate the costs of the scheme.

Energy market modelling prepared for the Commonwealth Government's investigation into a National Energy Savings Initiative found that a national version of the ESS would decrease wholesale electricity prices by between $1 and $2 per megawatt hour.[241] This is consistent with recent analysis of the Victorian equivalent of the ESS which found that it would decrease wholesale electricity prices by between $1.05 and $1.72 per megawatt hour on average between 2015 and 2030.[242] If this downward pressure were to occur in NSW it may partially or completely absorb the impacts on consumers of the certificate pass through cost.

Under the combination of all preferred options, the ESS is also expected to defer $372 million of investment in network infrastructure in present value terms. These savings would be passed through to all energy users in downward pressure on network charges.

[241] SKM-MMA, 2013, Assessment of *Economic Benefits of a National Energy Savings Initiative*, prepared for the Commonwealth Department of Industry, accessed at http://www.industry.gov.au/Energy/IndustrialEnergyEfficiency/NationalEnergySavingsInitiative/Documents/Economic-benefits-from-NESI.pdf

[242] Oakley Greenwood, 2013, *Energy Market Modelling of the Continuation of the Victorian Energy Efficiency Target (VEET) Scheme , 2015 through 2017*, prepared for the Victorian Department of State Development Business and Innovation, accessed at http://www.energyandresources.vic.gov.au/__data/assets/word_doc/0008/211103/Appendix-8.5-Energy-Market-Modelling.doc

Economic appraisal

Table 34 below shows the results of the cost benefits analysis for selected scenarios. The economic costs and benefits here are presented in absolute terms, rather than relative to current policy (see **Table 35** below).

Table 34 Overall economic costs and benefits in present value terms (FY13$ millions)

Parameter	Targets Option 1 (5% to 2020)	Targets Option 3 (6.5% to 2020)	Targets Option 2 (24% to 2020)	Scheme duration (5% to 2025)	Scheme duration (6.5% to 2025)	Option 3 for gas (gas certificate)	Option 1 for gas (6.5% elec and 6.5% gas to 2020)	Option 2 for gas (8% to 2020)	Combined preferred option (8% to 2025)	Exemptions Option 2 (60% discount factor)
Government costs	$60	$61	$68	$95	$96	$61	$61	$61	$97	$97
Compliance costs	$115	$380	$6289	$290	$787	$495	$344	$342	$721	$905
Total costs	**$175**	**$441**	**$6,357**	**$385**	**$883**	**$556**	**$405**	**$404**	**$721**	**$905**
Avoided electricity generation	$548	$728	$2,190	$904	$1,283	$728	$702	$702	$1,275	$1,468
Deferred network investment	$171	$223	$598	$267	$368	$223	$218	$218	$372	$429
Avoided gas supply	n/a	n/a	n/a	n/a	n/a	$288	$251	$251	$285	$262
Cost of carbon[243]	$36	$46	$121	$40	$51	$72	$71	$71	$77	$81
Health cost of air pollution	$135	$176	$497	$201	$279	1$76	$170	$170	$274	$314
Total benefits	**$890**	**$1,172**	**$3,484**	**$1,412**	**$1,981**	**$1,487**	**$1,411**	**$1,411**	**$2,283**	**$2,554**
Net benefits	**$715**	**$731**	**-$2,873**	**$1,027**	**$1,098**	**$913**	**$1,007**	**$1,008**	**$1,562**	**$1,649**
BCR	**5.1**	**2.7**	**0.5**	**3.7**	**2.2**	**2.7**	**3.5**	**3.5**	**3.2**	**2.8**

Figure 35 below shows the economic costs and benefits from the combined preferred options for targets, scheme duration and gas. It shows that the economic benefits are dominated by avoided electricity generation. The benefits from avoiding carbon emission diminish significantly after 2021 as the wholesale electricity price forecast used in this study assumes that carbon emissions are priced into electricity from that year on.

[243] Note that the wholesale electricity price forecast is assumed to include a carbon price from 2021 onwards. The social cost of carbon from electricity savings is only from the period of 2015 to 2020.

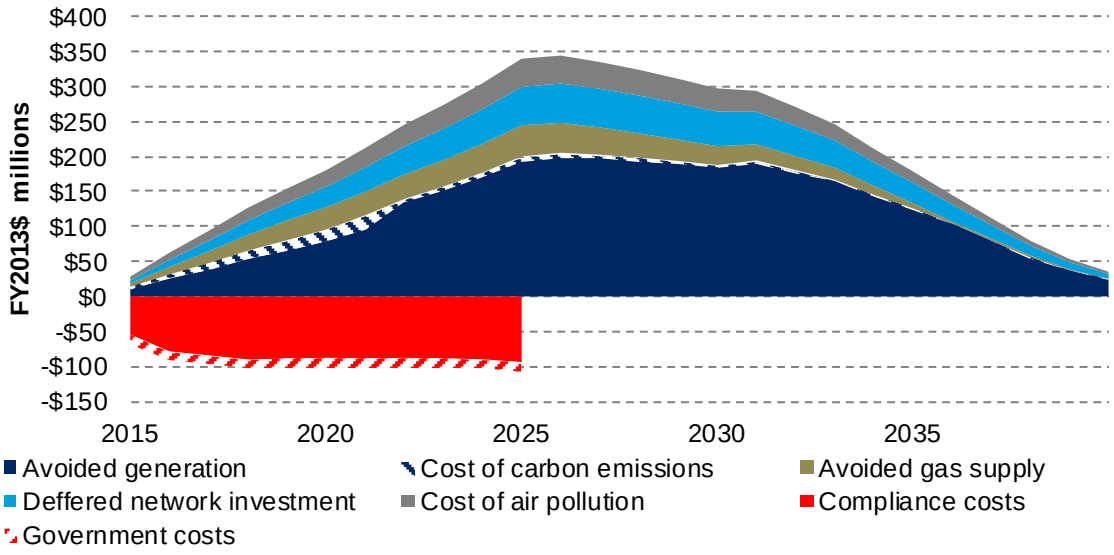

Figure 35 Economic costs and benefits of the combined preferred option for targets, scheme duration and gas

Table 35 below shows the incremental costs and benefits of enhancing the ESS. It shows that the combined preferred option has the highest benefit cost ratio of all reforms considered.

Table 35 Economic costs and benefits above current policy settings in present value terms (FY13$ millions)

Parameter	Target Option 3 (6.5% to 2020)	Target Option 2 (24% to 2020)	Scheme duration (5% to 2025)	Scheme duration (6.5% to 2025)	Option 3 for gas (gas certificate)	Option 1 for gas (6.5% elec and 6.5% gas to 2020)	Option 2 for gas (8% to 2020)	Combined preferred option (8% to 2025)	Exemptions Option 2 (60% discount factor to 2025)
Government costs	$1	$8	$35	$36	$1	$1	$1	$37	$37
Compliance costs	$266	$6175	$175	$672	$380	$229	$228	$509	$693
Total costs	**$266**	**$6,182**	**$210**	**$708**	**$381**	**$230**	**$229**	**$546**	**$730**
Avoided electricity generation	$179	$1,642	$356	$735	$179	$153	$153	$726	$920
Deferred network investment	$52	$428	$97	$197	$52	$48	$48	$202	$258
Avoided gas supply	n/a	n/a	n/a	n/a	$288	$251	$251	$285	$262
Cost of carbon[244]	$9	$84	$3	$15	$36	$34	$34	$41	$45
Cost of air pollution	$41	$362	$66	$144	$41	$35	$35	$139	$179
Total benefits	**$282**	**$2,516**	**$522**	**$1,091**	**$597**	**$521**	**$521**	**$1,393**	**$1,664**
Net benefits	**$16**	**-$3,666**	**$312**	**$383**	**$216**	**$291**	**$292**	**$847**	**$934**
Benefit Cost Ratio	**1.1**	**0.4**	**2.5**	**1.5**	**1.6**	**2.3**	**2.3**	**2.6**	**2.3**

[244] Note that the wholesale electricity price forecast is assumed to include a carbon price from 2021 onwards. The social cost of carbon from electricity savings is only from the period of 2015 to 2020.

Appendix B Submissions to the Issues Paper

The consultation period for the *Review of the Energy Savings Scheme - Issues Paper* commenced on 23 December 2013 and closed on 10 March 2014. The following stakeholders made submissions:

1. AGL
2. Australian Institute of Refrigeration, Air Conditioning and Heating (AIRAH)
3. Alinta Energy
4. APA Group
5. Australian Paper
6. AvEnergy
7. Bureau of Steel Manufacturing of Australia (BOSMA)
8. City of Sydney
9. Clean Energy Council (CEC)
10. Council of Social Service of NSW (NCOSS)
11. CSR Limited
12. Embertec Pty Ltd
13. Energy Conversation
14. Energy Efficiency Certificate Creators Association (EECCA)
15. Energy Efficiency Council (EEC)
16. Energy Makeovers Pty Ltd
17. Energy Supply Association of Australia (ESAA)
18. EnergyAustralia
19. ERM Power
20. Ethnic Communities Council (ECC)
21. Green Building Council Australia (GBCA)
22. Green Energy Trading
23. Independent Pricing and Regulatory Tribunal (IPART)
24. Insulation Council of Australia and New Zealand (ICANZ)
25. Knauf Insulation
26. Minus 40
27. National Generators Forum
28. Next Energy
29. Norske Skog Paper Mills (Australia) Limited
30. Office of the Small Business Commissioner
31. Opower
32. Origin Energy

33. Orora
34. Property Council of Australia (PCA)
35. Simply Energy
36. Sydney Water
37. The Green Guys Group
38. Tomago Aluminium
39. Woolworths Limited