

SOUTH AUSTRALIAN

RETAILER ENERGY EFFICIENCY

SCHEME -



CONSULTATION
PAPER ON PROPOSED
REES THRESHOLDS,
METRICS & ACTIVITY
SPECIFICATIONS

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sa.gov.au/energy/rees

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ABOUT THE CONSULTATION

The ***Retailer Energy Efficiency Scheme (REES)*** will replace the current Residential Energy Efficiency Scheme, and cover both the residential and business sector, with a continued focus on low income households.

This Consultation Paper invites stakeholder feedback on proposals for a number of key elements of the scheme from 1 January 2015. Specifically:

- The thresholds that, if adopted, will be used by the Essential Services Commission of South Australia (the Commission) to determine if an energy retailer is set REES targets.
- The process that, if adopted, will be used by the Commission to set the level of a retailer's REES target.
- The metric that, if adopted, will be used to describe the overall energy reduction targets and priority group energy reduction targets and will be used to measure the energy savings from approved energy saving activities.
- The Ministerial Protocol that, if adopted, will guide the Minister in determining the range of approved energy saving activities.
- The specifications that, if adopted, will be used to define the conduct of REES audits.
- The list of energy savings activities and specifications for those that, if adopted, will be available for energy retailers to deliver under the REES.

Written submissions on matters raised in this paper are invited by Monday 8 September 2014 and should be marked 'REES Consultation Paper August 2014'. Submissions via email are preferred to DSD.REESReview@sa.gov.au.

Alternatively, submissions can be posted to:
Energy Markets and Programs Division
GPO Box 1264
Adelaide SA 5001

The Department of State Development¹ (DSD) is available to meet with stakeholders in relation to the matters presented in this paper. If you would like to arrange a meeting, please email DSD.REESReview@sa.gov.au.

All submissions will be uploaded on to the REES webpage www.sa.gov.au/energy/rees. DSD is an agency for the purposes of Freedom of Information laws. While we will not publish your submission on our website if you do not want this, we may be required by law to release your submission to a third party. Should such a request be made, you will be contacted prior to any decision to release the material.

¹ Formerly the Department for Manufacturing, Innovation, Trade, Resources and Energy (DMITRE)

Table of Contents

1	Background	4
2	Introduction	5
3	The Proposed REES Thresholds	6
4	The REES Proposed Energy Metric	8
4.1	The Proposed Metric.....	8
4.2	Examples	9
4.3	Consultation Questions	9
5	The Proposed REES Ministerial Protocol	10
5.1	Proposed Protocol	10
5.2	Consultation Questions	11
6	The Proposed Energy Audit changes	12
6.1	Proposed specification	12
6.2	Consultation Questions	14
7	The Proposed REES Activities.....	15
7.1	Overview	15
7.2	General consultation questions for all activities	15
7.3	General Specifications.....	16
7.4	Consultation Question	16
7.5	Installation of insulation in an uninsulated ceiling - BS1A	17
7.6	Installation of (top up) ceiling insulation - BS1B	19
7.7	Installation of insulation to an external wall - BS1C.....	21
7.8	Installation of insulation to floors - BS1D	23
7.9	Building Sealing Activities (Various) - BS2	25
7.10	Replace an inefficient window with a thermal efficient window - BS3A	29
7.11	Secondary glazing retrofit - BS3B	31
7.12	Heating and Cooling Systems.....	33
7.12.1	Install an efficient new gas space heater (Non-Ducted) (existing) - HC1	33
7.12.2	Install an efficient new heating/cooling system (Non-Ducted) (existing) - HC2A.....	33
7.12.3	Install an efficient new heating/cooling system (Ducted) (new) - HC2B.....	33
7.13	Install efficient new ductwork - HC3A	38
7.14	Replace ductwork with an enhanced ductwork system - HC3B	41
7.15	Replace or upgrade water heater - WH1	44
7.16	Replace an inefficient showerhead with an efficient showerhead - WH2	48
7.17	Install CFL or LED general purpose lamp - L1	52
7.18	Install LED down-light Lamp or LED down-light luminaire - L2.....	55
7.19	Replace halogen floodlight luminaire - L3	59
7.20	Replace linear fluorescent luminaire - L4	61
7.21	Standby power controllers	64
7.21.1	Install standby power controllers - Audio Visual (AV) - SPC1.....	64
7.21.2	Install standby power controllers - Information Technology (IT) - SPC2.....	64
7.22	High efficiency appliances	70
7.22.1	Purchase a high efficiency new refrigerator - APP1A	70
7.22.2	Purchase a high efficiency new freezer - APP1B	70
7.22.3	Purchase a high efficiency new clothes dryer - APP1D	70
7.22.4	Purchase a high efficiency new television - APP1F.....	70
7.23	Remove and destroy an unwanted household refrigerator or freezer - APP2	76
7.24	Installation of a high efficiency pool pump - APP3.....	79
7.25	Aggregate Metered Baseline methodology - AMB	82
7.26	Commercial lighting - CL1	92
	Appendix	95

1 Background

In 2012-2013, the Department of State Development undertook a review of the Residential Energy Efficiency Scheme (REES).

On 28 November 2013, the REES Review Report² was tabled in Parliament, and on 29 November 2013, the Minister for Mineral Resources and Energy announced that the scheme would be extended to 2020, and that it would be expanded to include small businesses.

The Department of State Development is working on regulatory and administrative changes to commence the next stage of the REES from 1 January 2015.

The REES Review Report provides recommendations to the Government on the future options for the continuation of the scheme. Specifically, it recommends that an energy saving scheme continue as follows:

- Renamed the scheme the Retailer Energy Efficiency Scheme.
- Have, as its objective 'to reduce household and business energy use, with a focus on low-income households. This will provide associated energy costs and greenhouse gas emission benefits'.
- Retain a particular focus on delivering benefits to low-income households.
- Retain the delivery of energy audits to low-income households.
- Expand the scope of the scheme to allow energy retailers to meet their targets by delivering energy savings to businesses.
- Amend the thresholds through which energy retailers are set obligations, so they are based on energy sales to the sectors covered by the scheme and only require retailers that exceed residential customer thresholds to meet low-income household targets.

This Consultation paper seeks to progress a number of key elements associated with the scheme going forward.

² sa.gov.au/energy/rees

2 Introduction

This Consultation paper is structured as follows:

- Section 3 describes the proposed thresholds for retailers to become a regulated retailer for the scheme and the proposed means by which the Commission will allocate targets to these retailers.
- Section 4 presents a proposal for the energy savings metric for setting the REES targets and for describing the contribution that REES activities make.
- Section 5 proposes a new Ministerial Protocol, which will guide decisions on which energy savings activities are included in the scheme.
- Section 6 describes key changes to the energy audit specification.
- Section 7 lists the proposed energy efficiency activities, describes key features of the new REES activities and proposes specifications and energy saving levels for activities going forward.

Key questions that the Department of State Development is seeking feedback on are contained at the end of Sections 3 to 6. For the proposed activities, general consultation questions are presented in Section 7.2 and 7.4, and specific questions on activity specifications are presented in Section 7.5 to 7.26

As part of work on maintaining the list of energy efficiency activities, the Department of State Development contracted Energy Efficient Strategies, with Common Capital and Beletich Associates (the consultants) to undertake a review of currently approved residential energy efficiency activities under the REES and propose a suite of energy efficiency activities that would apply for the period 1 January 2015 to 31 December 2017.

The scope of this included,

- 1) Review of currently approved residential energy efficiency activities under the REES and where necessary, propose amendments to the activities.
- 2) Advise on the suitability, or otherwise, of activities pending or rejected under the current scheme.
- 3) Advise on the suitability, or otherwise, of activities included in Victorian Energy Efficiency Targets scheme (VEET), the NSW Energy Savings Scheme (ESS) and the ACT Energy Efficiency Improvement Scheme (EEIS).

The activity specifications proposed in Section 7 are based on the consultants' work.

The Appendix provides further details of the activity review undertaken by the consultants. Specifically, the Appendix includes technical assessments and draft specifications for each proposed activity and details of the thermal modelling and water heater modelling used by the consultants.

3 The Proposed REES Thresholds

Currently only energy retailers that serve 5,000 or more residential customers are set a REES obligation. As noted in the REES Review report, such a residential focused threshold arrangement would not be relevant for a scheme expanded to also cover the business sector.

The REES Review report recommended that the scheme thresholds be amended to oblige energy retailers that serve 5000 or more customers and/or retail at least a minimum level of energy. Also, the report recommended, only energy retailers that serve 5000 or more residential customers are set priority group targets and energy audit targets.

3.1 Thresholds

Based on these recommendations, the following REES thresholds are proposed:

- a. Electricity or gas retailers who retail to 5000 or more South Australian residential customers are set a REES energy savings target, a REES priority group target and a REES energy audit target
- b. Other electricity retailers, that purchase, in the preceding year, 27,000 MWh or more of electricity for on-selling to South Australian customers are set a REES energy savings target.
- c. Other gas retailers, that purchase, in the preceding year, 100,000 GJ or more of gas for on-selling to South Australian customers are set a REES energy savings target.

To be consistent with the current REES threshold, the proposed electricity and gas thresholds in items b and c above are based on the amount of energy used by around 5000 average South Australian households³.

The review of the REES included a proposal to expand the scheme to small-to-medium businesses. Such businesses typically face greater barriers to adopting energy saving activities, compared to larger businesses.

To implement this focus, it is proposed that energy retailers be allowed to net out the following sales from their total energy purchases, for the purpose of determining exceedance of a REES threshold:

- Annual sales to individual larger customers⁴ of 30,000 MWh or more of electricity and/or
- Annual sales to individual larger customers of 100,000 GJ or more of gas.

Where this applies, this will lower a retailer's energy purchases for the purpose of determining whether it exceeds a REES threshold. It will also, as discussed below, lower the energy saving target set on the retailer, as it is proposed that the target is based on the energy purchase net of energy sales to larger businesses.

3.2 Targets

Each energy retailer that exceeds REES thresholds, as described above, will be set an energy savings target, and if relevant, a priority group target and a REES energy audit target.

It is proposed that the Commission will set each obliged energy retailer's target(s) based on the following approach:

Energy savings target

An obliged energy retailer's share of the overall energy savings target will be based on the proportion of the retailer's energy purchase to that of total energy purchase by all obliged retailers. Expressed as an equation:

³ The Commission, in its Energy Retail Market Time Series Data (Available at: <http://www.escosa.sa.gov.au/electricity-overview/reporting-and-compliance/annual-performance-reports.aspx>), has reported that in 2011/12, average South Australian residential consumption was 5.4 MWh for electricity and 19.7 GJ for gas. For these levels of average consumption, the proposed thresholds equate to around 5000 electricity customers and 5100 gas customers.

⁴ It is proposed that a customer has the same meaning as in the *Electricity Act 1996* and the *Gas Act 1997*.

Energy retailer's energy saving target =

$$\frac{\text{Total energy saving target (as set by the Minister)} \times \text{This retailer's purchases}}{\text{The sum of energy purchases by all obliged energy retailers}}$$

For the purpose of this calculation:

- As discussed above, an energy retailer's purchase equals its total purchases minus all sales to large energy users.
- To allow for this equation to apply to both electricity and gas, purchases and sales will be normalised using the methods described in Section 4.

Energy retailers would be able to meet their targets by delivering energy saving activities to households and/or businesses irrespective of whether the retailer's customer base is primarily residential or business.

Priority group target

As described above, only energy retailers that retail to 5,000 or more residential customers will be set a priority group target.

An energy retailer that is to be set a priority group target will have this target based on the proportion of the retailer's residential customer base to that of all obliged retailers that will have priority group targets set. Expressed as an equation:

Energy retailer's priority group target =

$$\frac{\text{Total priority group target (as set by the Minister)} \times \text{This retailer's number of residential customers}}{\text{The sum of the number of residential customers for all retailers that will be set a priority group target}}$$

Energy audit target

Similar to the priority group target, only energy retailers that retail to 5,000 or more residential customers will be set an energy audit target.

An energy retailer that is to be set an energy audit target will have this target based on the proportion of the retailer's residential customer base to that of all obliged retailers that will have energy audit targets set. Expressed as an equation:

Energy retailer's energy audit target =

$$\frac{\text{Total energy audit target (as set by the Minister)} \times \text{This retailer's number of residential customers}}{\text{The sum of the number of residential customers for all retailers that will be set an energy audit target}}$$

3.3 Consultation Questions

- Is the proposal to retain 5,000 residential customers as the threshold for a retailer having set energy reduction, priority group and energy audit targets still appropriate?
- Are the energy purchase thresholds an appropriate way of bringing into the REES energy retailers that have significant residential and/or small-medium business energy sales?
- Are the proposed sales levels for individual large customers appropriate?
- Are the proposed means of setting energy saving, priority group and energy audit targets appropriate?
- Are there alternative approaches to threshold and target setting that should be considered?
- Are there any sections of the commercial buildings market that should not be open to delivery of REES activities? Why?
- Are there other loads that should be netted out for the purposes of determining if a retailer exceeds a threshold and for setting retailers' targets? Why?

4 The REES Proposed Energy Metric

4.1 The Proposed Metric

Energy savings that result from REES activities being undertaken are derived from methodologies that either estimate or measure energy savings. These energy savings will occur across one or a number of fuels, such as electricity or reticulated gas. In some situations, a REES activity can lead to substitution between the use of one fuel and another.

To allow for energy savings from REES activities to contribute to an energy retailer's REES obligation, the energy savings need to be expressed in a consistent format. In other words, a common metric is needed to describe energy savings from REES activities.

The following is a description of the proposed REES energy savings metric.

REES energy savings (GJ) =

$$\begin{aligned} & \text{electricity savings (GJ) x REES electricity normalising factor +} \\ & \text{reticulated gas savings (GJ) x REES reticulated gas normalising factor +} \\ & \text{wood savings (GJ) x REES wood normalising factor +} \end{aligned}$$

Where the various normalising factors are as per the following table:

Description	Normalisation Factor
REES electricity normalisation factor	1.00
REES reticulated gas normalisation factor	0.369
REES wood normalisation factor	0.213

The normalisation factor for each fuel is based on the average of:

- The relative purchase cost of each fuel type
- The relative greenhouse gas intensity of each fuel type; and

This approach aligns the metric with the co-benefits of energy costs savings and greenhouse gas reduction as described in the REES objectives⁵.

The following table shows the contribution of these two factors to the normalisation factor.

Fuel	Relative purchase cost ⁶	Relative greenhouse gas intensity ⁷	Normalisation Factor
Electricity	1.00	1.00	1.00
Reticulated gas	0.435	0.303	0.369
Wood	0.419	0.008	0.213

⁵ 'to reduce household and business energy use, with a focus on low-income households. This will provide associated energy costs and greenhouse gas emission benefits'

⁶ Purchase cost values are relative to electricity and based on the following: residential average electricity price of 27.25c/kWh and residential average gas price of 3.29 c/MJ (as published for 2011-12 in http://www.escosa.sa.gov.au/library/130606-APR_2012-13RetailEnergyMarketTimeSeriesData_00-01to12-13.xlsx), and wood cost of \$330 per tonne (Phone survey of suppliers, July 2013 and July 14).

⁷ Greenhouse gas intensity values are relative to SA grid electricity and based on the following: electricity intensity of 0.61 kg CO₂-e/kWh, reticulated gas intensity of 51.33 kg CO₂-e/GJ, and wood intensity of 1.28 kg CO₂-e/GJ as published in <http://www.environment.gov.au/system/files/resources/b24f8db4-e55a-4deb-a0b3-32cf763a5dab/files/national-greenhouse-accounts-factors-2014.pdf>

4.2 Examples

The following example shows that for an activity that affects a single fuel, the REES energy savings are the energy savings times the normalising factor.

Replacing a 42 W non-directional mains voltage halogen lamp with a compact fluorescent (see Section 7.17)

Fuel	Energy (GJ)	Savings	Normalisation factor	REES normalised energy savings (GJ)
Electricity	0.52		1.00	0.52

The following example shows that where an activity saves multiple fuels, the REES energy savings are the sum of the normalised energy savings for each fuel.

Installing 1m² of insulation in a residential ceiling, zone 4 & 5 (see Section 7.5 and Table 5 of page 13 of the Appendix)

Fuel	Energy (GJ)	Savings	Normalisation factor	REES normalised energy savings (GJ)
Electricity	0.54		1.00	0.54
Reticulated gas	0.49		0.369	0.18
Firewood	1.26		0.213	0.27
Total				0.99

The following example shows how the normalising approach can be used for fuel substitution – in this case, the activity substitute's electricity with reticulated gas.

Replacing an electric storage water heater with a 5-star gas water heater, where not required by SA's water heater installation requirements (see Section 7.15 and Table 69 of page 141 of the Appendix)

Fuel	Energy (GJ)	Savings	Normalisation factor	REES normalised energy savings (GJ)
Electricity	98		1	98
Reticulated gas	-131		0.369	-48.34
Total				49.66

4.3 Consultation Questions

- Is the proposal metric appropriate for use in the REES?
- Is the proposal relatively straight forward to understand or unnecessarily complex?
- Are there alternative metrics that should be considered?
- The greenhouse gas intensity of energy use can be described in a number of different ways⁸. For this analysis, scope 2 emission intensity has been used for electricity and reticulated gas. An alternative would be to use scope 3 emissions. Which is the most appropriate to use?

⁸ For more details see Section 1.2 of <http://www.environment.gov.au/system/files/resources/b24f8db4-e55a-4deb-a0b3-32cf763a5dab/files/national-greenhouse-accounts-factors-2014.pdf>

5 The Proposed REES Ministerial Protocol

Ahead of the Residential Energy Efficiency Scheme commencing in 2009, a Ministerial Protocol was published, to guide the selection of activities available for retailers to deliver under the scheme.

5.1 Proposed Protocol

It is proposed that the section of the Ministerial Protocol relating to the REES activities be replaced as follows.

MAINTAINING AND REVIEWING THE LIST OF CALCULATION METHODS, ELIGIBLE ACTIVITIES AND SPECIFICATIONS

The Minister for Mineral Resources and Energy has set the list of calculation methods, eligible activities and specifications for the purposes of the Retailer Energy Efficiency Scheme (REES) by Notice in the Government Gazette on [\[insert date\]](#).

Pursuant to regulation [\[insert reference\]](#), the Minister has the function of maintaining, reviewing and amending this list. This Protocol establishes the key principles which the Minister will have regard to in fulfilling this function.

This Protocol is not intended to be exhaustive. In particular, it is not intended to prescribe the process by which the Minister will maintain the list of calculation methods. The Minister may add new calculation methods, eligible activities and specifications at any time, provided these are consistent with the principles outlined in this document.

The Minister will undertake a review of all approved calculation methods, activities and specifications once every three years. The first of these reviews will be completed prior to 31 December 2017 with changes not taking effect until 1 January 2018.

The purpose of maintaining and reviewing the list is to ensure it contains the most relevant calculation methods, activities and appropriate specifications.

Reviewing Eligible Activities - General Principles

In reviewing eligible activities the Minister will have regard to the following general principles:

- Consider any activities that reduce household or business end-use energy consumption
- Ensure that there are sufficient activities to provide a focus on low-income households, and facilitate increased delivery to remote and regional areas.
- Maximise the number of activities that obligated Retailers can implement to foster competition, innovation and market efficiency.

Reviewing Calculation Methods – General Principles

In reviewing calculation methods the Minister will have regard to the following general principles:

- Calculation methods can include activity-specific default savings factors or formulas, or activity-independent specific measurement approaches.
- Calculation methods using default saving factors or formulas are appropriate for an activity where there is:
 - low or known variability of the activity and its resulting savings
 - robust, independent, empirical data on baseline and post implementation activities and energy consumption
- Calculation methods can deem future energy savings:
 - once the initial savings of an activity have been verified, and
 - if there is robust, independent, empirical data on the likely persistence of savings.

If the above principles cannot be met, calculation methods will be based on empirical measurement and verification of actual delivered savings.

- Measurement and verification based calculation methods may be developed so as to apply at the level of implementation of an activity at an individual site, or based on aggregate measurement across multiple sites.
- Specifications for calculation methods will include, but are not be limited to:
 - the specific activity or categories of activity for which the method can be used
 - the detailed calculation steps to be undertaken, and
 - specifications about how activities are to be conducted and calculations made, including, but not limited to, product and installation requirements, and records kept for audit.

Reviewing Activities and Calculation Methods – Specific Principles

In reviewing activities and calculation methods, the Minister will have regard to the following specific principles:

- Activities and calculation methods should be capable of being defined in ways such that they can be objectively audited simply and cost effectively.
- Activities and calculation methods should align with other schemes as far as possible, where this is consistent with scheme principles.

Activity Principles

- The activity should be capable of uptake by households and/or businesses within South Australia.
- The specification should provide a means for ensuring quality assurance and participant satisfaction, typically through product or installation standards and guidelines.
- Activities should leverage existing, state, national or international standards and accreditation frameworks wherever possible.
- Specifications should require that:
 - activities are undertaken by suitably qualified professionals
 - appropriate levels of training are required for service providers
 - products comply with relevant safety standards
 - installations are be in accordance with relevant installation standards, guidelines and/or manufacturer’s instructions
 - activities are designed and implemented in a way that minimises risks to service providers and participants.
- Activity specifications should offer options to utilise good practice such as recycling and compliance with best practice installation guidelines.

Calculation Methods Principles

- Calculation of energy savings from an activity should be evidence based and applicable to South Australia.
- Calculation methods should provide a credible means of calculating energy savings that balances compliance costs with accuracy of calculations.
- Energy savings should be additional to base case and the calculation method is designed in a way that minimises the scope for free riders⁹ through the use of appropriate baseline assumptions.
- The calculation method should recognise and provide greater rewards for products that deliver higher levels of performance and energy efficiency (for example, scalability of default energy savings to reward products with higher performance to maximise potential saving).
- Calculation methods using default saving factors should:
 - be informed by credible research and a defensible methodology
 - adjust energy savings to account for South Australia’s climate zone/s, typical housing stock and energy use practices
 - adjust energy savings to account for: the extent to which the energy savings will be taken as improved thermal comfort; likelihood of performance changes over time; changing business as usual scenarios; free riders; persistence; or planned future regulation

5.2 Consultation Questions

- Is the proposed Ministerial Protocol appropriate for the purpose in guiding the selection of energy saving activities and calculation methods for the REES?

⁹ Free riders are households that would have undertaken a REES activity even if REES did not exist.

6 The Proposed Energy Audit changes

The REES Review noted a high satisfaction rate with energy audits by households that received them and recommended retaining the delivery of energy audits to low-income households.

The changes proposed to the audit activity incorporate the Review recommendations, such as,

- A fact sheet to be provided to the household on what constitutes the audit process.
- Auditor training requirements have been amended such that the only pathway is via completion of modules of the Certificate IV in Home Sustainability Assessment.

6.1 Proposed specification

Below is the proposed draft energy audit specification. Note: New text underlined.

The specification contained within this document outlines minimum requirements for the purposes of complying with the REES. It is not intended to be exhaustive.

SPECIFICATION:

- (1) The audit must be conducted within the premises with the householder(s) actively involved in the audit.

EXCEPTION – the audit may be conducted by phone or separate interview, provided:

- The premises to which the audit relates is in a regional or remote postcode as defined in Table 1;
- The audit otherwise complies with this specification, including being conducted by a competent auditor; and
- The total value of phone or interview audits conducted does not exceed 10 per cent of the Energy Audit Target of an electricity retailer or gas retailer. For the purposes of the REES, one phone or interview audit is taken to have a value of half of one credit towards the Energy Audit Target of an electricity or gas retailer.

- (2) The audit must include the following as a minimum:

- i. an assessment of the thermal performance of the premises. This will include, but not be limited to, insulation, draught proofing, and shading; and
- ii. an assessment of the major energy consuming appliances and energy use practices within the premises. This will include, but not be limited to, water heating, lighting, space heating and cooling, standby power and any other significant energy uses.

- (3) The auditor must provide the household in writing the name and contact details of the person and entity undertaking the audit.

- (4) The auditor must provide the household, at the start of the audit, a short statement of what the Audit will consist of, including, but not limited to the minimum duration of the audit, how the audit will be conducted and the type of information that will be provided during and after the audit.

- (5) The audit must identify the energy savings opportunities and energy saving practices that may realistically be undertaken or installed in the premises. These should be discussed with the household at the time of the audit.

- (6) The auditor must provide the household with a written record of the assessment and recommendations made.

- ~~(7) The auditor must use best endeavours to complete a follow up visit or phone call to the household within a reasonable time, which time shall not be less than 4 weeks following the date of the audit.~~
- (8) Only one audit may be conducted per premises, unless it is demonstrated that the occupants of that premises have changed.
- (9) The audit must be conducted by a competent person. A competent person is one who is able to demonstrate the following competencies:
- Knowledge and appreciation of the implications of household energy use – including environmental, social, and economic impacts.
 - Knowledge and skills in assessing the main ways in which households use energy. This includes assessing major energy using appliances, practices and behaviours, and identifying matters related to the thermal performance of the dwelling.
 - Understanding of practical and cost-effective ways of reducing household energy use.
 - Skills in identifying and evaluating energy saving opportunities, and communicating these to households in an empowering way, explaining results and recommendations, and motivating household energy efficiency action.
 - Skills in interpreting energy bills.
 - Skills in minimising risk when conducting an audit.
 - Ability to engage sensitively and effectively with low income households or those in hardship, tailoring and prioritising recommendations to suit their particular circumstances.
 - Ability to engage with the householder, during and after this assessment, on the practical and cost-effective ways of reducing household energy use, including behavioural change options to realise energy savings.

For the purposes of demonstrating a person has these competencies, it must be shown that:

- (a) The person has received a qualification commensurate with the Statement of Attainment for the following three units of the Certificate IV in Home Sustainability Assessment;
- CPPHSA4001A *Assess Household Energy Use*; and
 - CPPHSA4005A *Minimise health, safety and security risks when assessing home sustainability*; and
 - CPPHSA4007A *Promote the adoption of home sustainability practices by residents*; or

The person has received a Statement of Attainment for the units CPPHSA4001A and CPPHSA4005A, described above, and these units were delivered in a way that has embedded the core principles of unit CPPHSA4007A to the satisfaction of the Department of State Development; or

~~Prior to 1 January 2012:~~

- ~~i. The person has completed a relevant training course, program or qualification which develops these competencies – i.e.: Energy Friends[®], the Home Sustainability Assessment Course developed by Sustainability Victoria or other relevant training course as approved by the Department for Manufacturing, Innovation, Trade, Resources and Energy or the former Department of Transport, Energy and Infrastructure; AND have applied these competencies in practice within residential premises; or~~
- ~~ii. The person had more than 12 months experience conducting in-home energy audits which are consistent with the specification and with written references~~

from at least two persons/organisations substantiating the competencies of the person undertaking the audit; or

- iii. The person was an accredited Green Loans Assessor for the purposes of the Commonwealth Government's Green Loans Program.

(b) After 1 January 2015

- i. The person has completed a relevant training course, program or qualification which develops competencies of the Home Sustainability Assessment Course developed by Sustainability Victoria or other relevant training course as approved by the Department of State Development; AND have applied these competencies in practice within residential premises.
- ii. The person had more than 12 months experience conducting in home energy audits which are consistent with the specification and with written references from at least two persons/organisations substantiating the competencies of the person undertaking the audit.

Table 1: Metropolitan / near Adelaide, Regional and Remote Areas

All unincorporated areas are regarded as Remote areas, regardless of the post code.

Post Code	Area	Post Code	Area
0872	Remote	5373 – 5374	Regional
5000 – 5202	Metro/near Adelaide	5381	Remote
5203 – 5204	Regional	5400	Metro/near Adelaide
5210 – 5214	Metro/near Adelaide	5401 – 5416	Regional
5220 – 5223	Remote	5417 – 5440	Remote
5231 – 5236	Metro/near Adelaide	5451 – 5453	Regional
5237 – 5238	Regional	5454	Remote
5240 – 5252	Metro/near Adelaide	5455 – 5464	Regional
5253 – 5263	Regional	5470 – 5493	Remote
5264 – 5270	Remote	5495 – 5573	Regional
5271	Regional	5575 – 5583	Remote
5272 – 5276	Remote	5600	Regional
5277 – 5291	Regional	5601 – 5605	Remote
5301 – 5320	Remote	5606	Regional
5321 – 5346	Regional	5607	Remote
5350 – 5352	Metro/near Adelaide	5608 – 5609	Regional
5353 – 5354	Regional	5630 – 5690	Remote
5355	Metro/near Adelaide	5700 – 5710	Regional
5356 – 5357	Regional	5720 – 5734	Remote
5360 – 5372	Metro/near Adelaide	5800 – 5950	Metro/near Adelaide

6.2 Consultation Questions

- Is the proposed Energy audit specification appropriate for use in the REES?
- Are there alternative or additional specifications relating to the conduct of an energy audit that should be considered?
- Should telephone audits continue to be allowed for regional and remote areas, or should this be limited to remote areas?
- What impact would such a limit have on the ability for the REES to deliver energy audits to regional and remote areas?

7 The Proposed REES Activities

7.1 Overview

The suite of activities that were assessed against the proposed Ministerial Protocol as suitable for inclusion into the REES are described in this section.

Key details of each activity are provided, together with specific matters where feedback is sought. Further detailed information regarding the activities is provided in the Appendix, which is from the consultant's work on the review of the energy efficiency activities.

As described in Section 4, a normalising calculation has been undertaken to calculate the energy savings between different fuel sources from the activity. For some activities, where different fuel sources are affected, applying the normalisation factors to the gigajoules of energy savings provide the savings factor as seen in the specifications.

While the specifications in this report include normalisation saving factors, the energy savings shown in the Appendix are not normalised.

The REES review report recommended allowing energy retailers to meet some or all of their REES energy reduction target by purchasing certificates created for business energy efficiency activities through interstate certificate registries, such as those created for the NSW Energy Savings Scheme and the Victorian Energy Efficiency Target.

To ensure benefits to South Australia from this approach, there would be a need to ensure that such certificates related to energy savings delivered in the state.

The Department of State Development has commenced discussions with the New South Wales Government on this. It is understood that certain amendments are needed to the NSW legislation to allow such arrangements. As this is unlikely to occur prior to 1 January 2015, South Australia specific business activities are proposed.

Similar discussions have not yet been held with the Victorian Government given the announcement that the Victorian Energy Efficiency Target scheme will be ending.

Some generic questions are posed for all the proposed activities in this section. Specific questions for some activities are also contained within the discussion of the activity.

7.2 General consultation questions for all activities

Activity Specification

- Is the activity an appropriate activity to deliver through the REES? Is it consistent with the proposed Ministerial Protocol (as described in section 5)?
- Is the proposed specification for the activity appropriate for use in the REES?
- Does the proposed specification allow for the activity to be delivered in an efficient and effective way?
- Are there any energy savings activities that would be suitable for use in the REES that are not proposed?
- Is the set of proposed energy savings activities sufficient to allow the scheme to extend to the business sector?

Use of climate zones

- Is the use of two climate zones for thermal performance, heating and cooling activities appropriate?

- Are the two climate zones used (BCA Zones 4&5 – modelled on NatHERS climate zone Adelaide, and BCA Zone 6 modelled on the NatHERS climate zone for Mount Gambier) the most appropriate for South Australia?

Health and safety

- Are there any health and safety concerns with the delivery of the activity that are not adequately addressed by the specification?

Energy savings

- Are the normalised saving factors for the activity a fair reflection of the energy savings that can be achieved from the activity?
- Are the assumptions used by the consultants to determine the energy saving for the activity (as described in the Appendix) appropriate? If not, what alternate assumptions should be used?
- Are the methods used by the consultants to determine the Activity energy savings (as described in the Appendix) appropriate? If not, what alternate methods should be used?

Uptake of the activity

- Based on the proposed specification and energy saving factors, do you consider that this activity will be delivered through the REES?

7.3 General Specifications

In addition to the specification for each activity, it is proposed that there will be generic specifications that govern conduct of all REES activities. These are as follows:

FOR ALL ACTIVITIES:

The description and specifications for activities contained within this document are minimum requirements for the purposes of complying with the REES. They are not intended to be exhaustive. In particular, in addition to the specifications set out in this document, all activities must be undertaken in accordance with all laws, regulations and codes of practice applicable to that activity.

Where an activity is undertaken in a rental premises, it may be necessary to first obtain the permission of the landlord or landlord's agent.

Any reference to gas within these specifications refers to either natural gas or Liquefied Petroleum Gas (LPG).

For those REES activities that involve an activity occurring at a premises, such as the installation, replacement or removal of items, the REES approved activity may only be performed once in a premises. Note: Where it can be demonstrated that the occupants have changed at premises where standby power controllers were installed for the purposes of REES, a maximum of 3 standby power controllers (IT and AV) may be installed at that premises (*refer Install Standby Power Controllers AV and IT*).

Obligated retailers must be satisfied with the fitness and propriety of any person providing energy efficiency activities in a customer's premises as per the requirements of a REES Code published by the Commission.

Any reference to a standard or code is those in force at the time the activity is undertaken and includes relevant successor legislation and standards.

All reasonable endeavours should be used to recycle components removed from the premises in the course of undertaking the activity.

7.4 Consultation Question

- Are these generic specifications appropriate for REES activities?

7.5 Installation of insulation in an uninsulated ceiling - BS1A

CURRENT REES ACTIVITY

“Installation of insulation in the ceiling area above living or habitable space, which has not been previously insulated”

PROPOSED REES ACTIVITY

“Installation of ceiling insulation in an uninsulated ceiling space above a habitable room”

KEY SPECIFICATION CHANGES

The activity involves installing minimum R3.5 insulation to a ceiling area (or part of a ceiling area) which is “above a living or habitable space”, and which has not been previously insulated. This excludes topping up existing insulation.

- The terms “habitable room”, “ceiling” and “uninsulated ceiling space” are now defined terms
- The ceiling space above all habitable rooms that are practical to insulate should be insulated. The NSW scheme required 95% of the ceiling to be insulated.
- The NSW scheme requires that “There must be no existing roof or ceiling insulation present in the ceiling space”. This provision however would appear to limit the flexibility of the scheme (e.g. a dwelling with only half of its ceiling insulated could not have the remaining half insulated under this provision). In this case the provision used in Victoria and ACT has been adopted i.e. a minimum of 20m² must be insulated under this activity
- Two insulation options are proposed for this activity (R3.5 and R5.0) on the basis that this aligns with the arrangements under the NSW scheme (based on BCA climate zones). R3.5 shall apply to BCA climate zones 4 & 5 and R5.0 shall apply to BCA climate zone 6
- The latest (draft version) of AS3999 (2014) is proposed to be cited as it is assumed it will come into force by the time the new REES specifications are published. In particular this new standard covers off on safety, pre-inspection and risk assessment procedures, electrical safety provisions and provisions for limiting moisture ingress.

ENERGY SAVINGS METHODOLOGY

It is proposed that default energy savings factors be used to determine the energy savings from this activity. These savings factors are based on the normalised energy saved per square metre of installed ceiling insulation.

The Technical Assessment – BS1A (pages 5 to 15 of Appendix 2) outlines the consultant’s approach to determining the energy savings from this activity. Table 4 of this describes the assumptions used and Table 5 presents the energy savings results. The approach used by the consultants involves determining the thermal load reductions associated with an average household with and without the insulation activity provided. This is then translated to estimates of electricity, gas and firewood energy savings, based on the relative mix of the use of these fuel types for heating and cooling in South Australian homes.

These electricity, gas and firewood energy savings are multiplied by the normalisation factors described in Section 4 to determine the proposed savings factors presented in the specification below.

CONSULTATION QUESTIONS SPECIFIC TO THIS ACTIVITY

- **Are the safety provisions in this specification sufficient to minimise risks associated with poor insulation products and installation practices?**

Installation of Insulated in an Uninsulated Ceiling – BS1A	Activity No.
	BS1A

1. Activity Specific Definitions

Habitable Room means any space that can be occupied within a class 1 or class 2 dwelling (as defined by the National Construction Code). This does not include any attached garages, sheds or the like

Ceiling means the uppermost surface of a habitable room that has an exposed roof or the attic space of an exposed roof immediately above. Ceilings do not include ceilings of rooms that have another habitable room above the subject portion of the ceiling

Uninsulated ceiling space means a ceiling space without ceiling insulation installed. For the purposes of this Activity, ceiling spaces with single sheet reflective foil insulation hung below the roofing material are deemed to be uninsulated ceiling spaces.

Insulation Area means the area of ceiling space where by insulation is to be installed by this activity. It is expressed as square metres (**metres x metres**).

2. Activity Description (Summary)

Install ceiling insulation in an uninsulated ceiling space above a habitable room

3. Activity Eligibility Requirements

1. A residential premises subject to this activity must contain at least 20m² of uninsulated ceiling space above a habitable room or rooms that are practical to insulate.
2. All habitable rooms with uninsulated ceiling spaces that are practical to insulate must be insulated as part of this activity.
3. The installation of ceiling insulation must not be otherwise required by law, for example as condition of a development approval under the Development Act 1993.

4. Installed Product Requirements

The installed product must:

1. Comply with the performance requirements of the effective version of AS/NZS 4859.1
2. Achieve a minimum winter R value, when measured in accordance with the effective version of AS/NZS 4859.1 of:
 - a) R3.5 if the Site is in BCA Climate Zone 4 or 5
 - b) R5.0 if the Site is in BCA climate zone 6
3. Comply with any product safety or other product performance requirements in a relevant code of practice or other relevant legislation applying to the activity.
4. Be fit for the purpose for which it is intended to be used.
5. Come with a minimum 5 year product warranty

5. Minimum Installation Requirements

1. The insulation product used must be installed in compliance with the effective version of AS 3999, AS/NZS 3000 (as applicable) and the National Construction Code BCA Section J1.2. In particular the safety, pre-inspection and risk assessment procedures, electrical safety provisions and provisions for limiting moisture ingress of AS 3999 shall be observed.
2. The activity must be completed and certified in accordance with any relevant code or codes of practice and other relevant legislation applying to the activity, including any licensing, registration, statutory approval, activity certification, health, safety, environmental or waste disposal requirements;
3. The undertaking of this activity shall not compromise the condensation management of the building. Reference should be made to the provisions in the Australian Building Codes Board publication "Condensation in buildings – Information handbook"
4. Cut outs around ceiling penetrations such as down-lights must be kept to the minimum permitted by relevant regulations and/or Australian standards.

6. Activity energy savings

The normalised energy saved from undertaking this activity is equal to:

Normalised Energy Savings (GJ) = Savings Factor (as per table below) x Insulation Area (m²*)

Activity	Savings Factor
BCA Zones 4&5 - install R3.5 insulation	0.98956
BCA Zones 6 - Install R5.0 insulation	1.61916

* Where cut-outs are made (e.g. around down-lights) an area equal to the actual cut-out shall be excluded from the calculation of energy savings

7.6 Installation of (top up) ceiling insulation - BS1B

CURRENT REES ACTIVITY

None

PROPOSED REES ACTIVITY

“Install ceiling insulation to a previously under insulated ceiling space above a habitable room”

KEY SPECIFICATION FEATURES

The proposed activity involves the installation of top up ceiling insulation to a ceiling area (or part of a ceiling area) above a habitable space, which has previously been insulated but with a sub optimal level of ceiling insulation.

For the purposes of this activity sub-optimal insulation has been defined as any level of insulation that is less than R1.5 (assumed average level for stock so classified being R1.0 i.e. between R0.5 and R1.5) and the target insulation level meeting or exceeding the requirements of REES activity BS1A (typically R3.5 or R5.0 depending on the BCA climate zone).

ENERGY SAVINGS METHODOLOGY

It is proposed that default energy savings factors be used to determine the energy savings from this activity. These savings factors are based on the normalised energy saved per square metre of installed ceiling insulation.

The Technical Assessment – BS1B (pages 16 to 25 of Appendix 2) outlines the consultant’s approach to determining the energy savings from this activity. Table 9 of this describes the assumptions used and Table 10 presents the energy savings results. The approach used by the consultants involves determining the thermal load reductions associated with an average household with and without the insulation activity provided. This is then translated to estimates of electricity, gas and firewood energy savings, based on the relative mix of the use of these fuel types for heating and cooling in South Australian homes.

These electricity, gas and firewood energy savings are multiplied by the normalisation factors described in Section 4 to determine the proposed savings factors presented in the specification below.

CONSULTATION QUESTIONS SPECIFIC TO THIS ACTIVITY

- **Are the safety provisions in this specification sufficient to minimise risks associated with poor insulation products and installation practices?**

Installation of Top Up Ceiling Insulation	Activity No.
	BS1B

1. Activity Specific Definitions

Habitable Room means any space that can be occupied within a class 1 or class 2 dwelling (as defined by the National Construction Code). This does not include any attached garages, sheds or the like

Ceiling means the uppermost surface of a habitable room that has an exposed roof or the attic space of an exposed roof immediately above. Ceilings do not include ceilings of rooms that have another habitable room above the subject portion of the ceiling

Under insulated ceiling space means a ceiling space with less than optimal levels of pre-existing ceiling insulation installed. For the purposes of this Activity less than optimal insulation is deemed to be any level of insulation with an R value of R1.5 or less.

Insulation Area means the area of ceiling space where by insulation is to be installed by this activity. It is expressed as square metres (**metres × metres**).

2. Activity Description (Summary)

Install ceiling insulation to a previously under insulated ceiling space above a habitable room.

3. Activity Eligibility Requirements

1. A residential premises subject to this activity must contain under insulated ceiling space/s above a habitable room or rooms
2. All habitable rooms with under insulated ceiling spaces that are practical to insulate must be insulated as part of this activity.
3. The installation of top up ceiling insulation must not be otherwise required by law, for example as condition of a development approval under the Development Act 1993.

4. Installed Product Requirements

The installed product must:

1. Comply with the performance requirements of the effective version of AS/NZS 4859.1
2. Achieve a minimum winter R value, when measured in accordance with the effective version of AS/NZS 4859.1 of: a) R3.0 if the Site is in BCA Climate Zone 4 or 5, b) R4.5 if the Site is in BCA climate zone 6
3. Comply with any product safety or other product performance requirements in a relevant code of practice or other relevant legislation applying to the activity.
4. Be fit for the purpose for which it is intended to be used.
5. Come with a minimum 5 year product warranty

5. Minimum Installation Requirements

1. The insulation product used must be installed in compliance with the effective version of AS 3999, AS/NZS 3000 (as applicable) and the National Construction Code BCA Section J1.2. In particular the safety, pre-inspection and risk assessment procedures, electrical safety provisions and provisions for limiting moisture ingress of AS 3999 shall be observed.
2. The activity must be completed and certified in accordance with any relevant code or codes of practice and other relevant legislation applying to the activity, including any licensing, registration, statutory approval, activity certification, health, safety, environmental or waste disposal requirements;
3. The undertaking of this activity shall not compromise the condensation management of the building. Reference should be made to the provisions in the Australian Building Codes Board publication “Condensation in buildings – Information handbook”
4. Cut outs around ceiling penetrations such as down-lights must be kept to the minimum permitted by relevant regulations and/or Australian standards.

6. Activity energy savings

The normalised energy saved from undertaking this activity is equal to: Normalised Energy Savings (GJ) = Savings Factor (as per table below) x Insulation Area (m²*)

Activity	Savings Factor
BCA Zones 4&5 Install R3.0 insulation	0.16645
BCA Zone 6 Install R4.5 insulation	0.30871

* Where cut-outs are made (e.g. around down-lights) an area equal to the actual cut-out shall be excluded from the calculation of energy savings.

7. Guidance Notes (Informative only – not mandatory)

1. As a guide, any bulk ceiling insulation with an uncompressed thickness of less than 75mm can be considered to be less than R1.5 rated

7.7 Installation of insulation to an external wall - BS1C

CURRENT REES ACTIVITY

None

PROPOSED REES ACTIVITY

“Installation of insulation to an uninsulated external wall”

KEY FEATURES OF THIS SPECIFICATION

The activity involves the installation of wall insulation to a previously uninsulated external wall of a habitable room. This activity can take place at times of renovation works to brick veneer or lightweight external walls in circumstances where internal linings are removed. The more common application however is as a pumped in product that can be installed without the need to remove linings.

The level of insulation that can be retrofitted will to some degree be dictated by the particular wall construction of the dwelling. Cavity brick construction will typically permit the pumping in of only 40mm of insulation (R1) whereas brick veneer walls could accept anywhere from an average of R1.5 to R3.0 depending on whether sarking is fitted to the outside of the frame and or if the internal linings are removed.

ENERGY SAVINGS METHODOLOGY

It is proposed that default energy savings factors be used to determine the energy savings from this activity. These savings factors are based on the normalised energy saved per square metre of installed wall insulation.

The Technical Assessment – BS1C (pages 26 to 35 of Appendix 2) outlines the consultant’s approach to determining the energy savings from this activity. Table 14 of this describes the assumptions used and Table 15 presents the energy savings results. The approach used by the consultants involves determining the thermal load reductions associated with an average household with and without the insulation activity provided. This is then translated to estimates of electricity, gas and firewood energy savings, based on the relative mix of the use of these fuel types for heating and cooling in South Australian homes.

These electricity, gas and firewood energy savings are multiplied by the normalisation factors described in Section 4 to determine the proposed savings factors presented in the specification below.

CONSULTATION QUESTIONS SPECIFIC TO THIS ACTIVITY

- **Are the safety provisions in this specification sufficient to minimise risks associated with poor insulation products and installation practices?**

Installation of Insulation to an External Wall	Activity No.
	BS1C

1. Activity Specific Definitions

Habitable Room means any space that can be occupied within a class 1 or class 2 dwelling (as defined by the National Construction Code). This does not include any attached garages, sheds or the like

External wall means any external (perimeter) wall within a residential premises that encloses a habitable room. External walls do not include any common or party walls (as defined by the National Construction Code)

Uninsulated external wall means an external wall without insulation. For the purposes of this Activity, external walls with single sheet reflective foil sarking materials are deemed to be uninsulated external walls.

Insulation Area means the area of wall space where by insulation is to be installed by this activity. It is expressed as square metres (**metres x metres**).

2. Activity Description (Summary)

Installation of insulation to an uninsulated external wall

3. Activity Eligibility Requirements

1. A residential premises subject to this activity must contain uninsulated external walls.
2. The installation of wall insulation must not be otherwise required by law, for example as condition of a development approval under the Development Act 1993.

4. Installed Product Requirements

The installed product must:

1. Comply with the performance requirements of the effective version of AS/NZS 4859.1
2. The insulation material must have a minimum thermal resistance of R1.0 per 45mm thickness.
3. Be fit for the purpose for which it is intended to be used. Where installed in areas that could be subject to dampness (e.g. immediately behind external brick walls) the insulation material must be suitable for installation in wet environments without compromise to the rated performance of the product.
4. Comply with any product safety or other product performance requirements in a relevant code of practice or other relevant legislation applying to the activity.
5. Come with a minimum 5 year product warranty

5. Minimum Installation Requirements

1. The insulation product used must be installed in compliance with the effective version of AS 3999, AS/NZS 3000 (as required) and the National Construction Code BCA Section J1.2. In particular the safety, pre-inspection and risk assessment procedures, electrical safety provisions and provisions for limiting moisture ingress of AS 3999 shall be observed.
2. Available wall cavities should be fully filled as far as is practical, typically between framing members and in cavities behind brickwork as applicable.
3. The activity must be completed and certified in accordance with any relevant code or codes of practice and other relevant legislation applying to the activity, including any licensing, registration, statutory approval, activity certification, health, safety, environmental or waste disposal requirements;
4. The undertaking of this activity shall not compromise the condensation management of the building. Reference should be made to the provisions in the Australian Building Codes Board publication "Condensation in buildings – Information handbook"

6. Activity energy savings

The normalised energy saved from undertaking this activity is equal to:

Normalised Energy Savings (GJ) = Savings Factor (as per table below) x Insulation Area (m²)

Activity	Savings Factor
BCA Zones 4&5	0.30845
BCA Zone 6	0.59529

7. Guidance Notes (Informative only – not mandatory)

1. When insulating brick veneer walls from the top of the wall (using blow or pump in insulation) both the cavity and the space between studwork should be filled where possible. Where sarking is fixed to the outside of the frame the insulation should be injected into the cavity between the brickwork and the sarking and whenever possible and permitted, past the sarking into the top half of the stud framing between each stud down to the noggging level.

7.8 Installation of insulation to floors - BS1D

CURRENT REES ACTIVITY

None

PROPOSED REES ACTIVITY

“Installation of insulation to an uninsulated suspended ground floor”

KEY FEATURES OF THIS SPECIFICATION

The activity involves the installation of insulation to a previously uninsulated suspended timber ground floor of a habitable room. This activity can take place at times of renovation works in circumstances where the ground floor boards are removed and subsequently replaced. The more common application however is an installation from below the floor (in the subfloor “crawl” space) where the insulation can be installed without the need to remove the flooring material.

ENERGY SAVINGS METHODOLOGY

It is proposed that default energy savings factors be used to determine the energy savings from this activity. These savings factors are based on the normalised energy saved per square metre of installed floor insulation.

The Technical Assessment – BS1D (pages 36 to 43 of Appendix 2) outlines the consultant’s approach to determining the energy savings from this activity. Table 19 of this describes the assumptions used and Table 20 presents the energy savings results. The approach used by the consultants involves determining the thermal load reductions associated with an average household with and without the insulation activity provided. This is then translated to estimates of electricity, gas and firewood energy savings, based on the relative mix of the use of these fuel types for heating and cooling in South Australian homes.

These electricity, gas and firewood energy savings are multiplied by the normalisation factors described in Section 4 to determine the proposed savings factors presented in the specification below.

CONSULTATION QUESTIONS SPECIFIC TO THIS ACTIVITY

- **Are the safety provisions in this specification sufficient to minimise risks associated with poor insulation products and installation practices?**

Installation of Insulation to Floors	Activity No.
	BS1D

1. Activity Specific Definitions

Habitable Room means any space that can be occupied within a class 1 or class 2 dwelling (as defined by the National Construction Code). This does not include any attached garages, sheds or the like

Ground floor means the lowest floor of a habitable room within a residential premises that sits immediately above a subfloor space. *Ground floors* do not include concrete floors or floors that separate habitable rooms.

Uninsulated ground floor means a ground floor without insulation. For the purposes of this Activity, ground floors with single sheet reflective foil sarking materials hung beneath the flooring are NOT deemed to be uninsulated ground floors.

Insulation Area means the area of floor space where by insulation is to be installed by this activity. It is expressed as square metres (**metres x metres**).

2. Activity Description (Summary)

Installation of insulation to an uninsulated suspended ground floor

3. Activity Eligibility Requirements

1. A residential premises subject to this activity must contain an uninsulated ground floor or part thereof.
2. Where only part of an uninsulated ground floor is insulated then living areas must be insulated as a priority, followed by bedrooms.
3. The installation of floor insulation must not be otherwise required by law, for example as condition of a development approval under the Development Act 1993.

4. Installed Product Requirements

The installed product must:

1. Comply with the performance requirements of the effective version of AS/NZS 4859.1
2. Have a minimum R value of R2.5
3. Comply with any product safety or other product performance requirements in a relevant code of practice or other relevant legislation applying to the activity.
4. Be fit for the purpose for which it is intended to be used.
5. Come with a minimum 5 year product warranty

5. Minimum Installation Requirements

1. The insulation product used must be installed in compliance with the effective version of AS 3999, AS/NZS 3000 (as required) and the National Construction Code BCA Section J1.2. In particular the safety, pre-inspection and risk assessment procedures, electrical safety provisions and provisions for limiting moisture ingress of AS 3999 shall be observed.
2. The insulation product must be securely fixed in place and adequately supported to ensure that the product will remain in its intended position throughout the life of the product
3. The activity must be completed and certified in accordance with any relevant code or codes of practice and other relevant legislation applying to the activity, including any licensing, registration, statutory approval, activity certification, health, safety, environmental or waste disposal requirements;
4. The undertaking of this activity shall not compromise the condensation management of the building. Reference should be made to the provisions in the Australian Building Codes Board publication "Condensation in buildings – Information handbook"

6. Activity energy savings

The normalised energy saved from undertaking this activity is equal to:

Normalised Energy Savings (GJ) = Savings Factor (as per table below) x Insulation Area (m²)

Activity	Savings Factor
BCA Zones 4&5	0.05609
BCA Zone 6	0.18458

7. Guidance Notes (Informative only – not mandatory)

1. Nil

7.9 Building Sealing Activities (Various) - BS2

CURRENT REES ACTIVITY

“Installation of products to doors, windows, chimneys of open fireplaces or to exhaust fans to restrict or prevent air flow”

The activity involves the installation of draught proofing devices to the following potential sources of air infiltration into a residential premises – doors, windows, open fireplaces and exhaust fans.

PROPOSED REES ACTIVITY

“Installation of products designed to restrict or prevent air flow through doors, windows, chimneys/open fireplaces, exhaust fans or wall vents”

KEY FEATURES OF THIS SPECIFICATION

- The activity now includes for 2 different climate zones (BCA zone 4 &5 and BCA zone 6) each offering different levels of energy savings.
- The activity now includes for the sealing of wall vents
- The activity in relation to the sealing of fireplaces now differentiates between fireplaces that have permanent sealing solutions and ones that have removable sealing solutions (e.g. chimney balloons). Each attracts different levels of savings credit
- The activity in relation to the sealing of windows and doors now differentiates between seals that are mechanically fixed and those that are not mechanically fixed (typically adhesive fixed). Each attracts different levels of savings credit
- Whenever a particular sealing activity is to be undertaken (e.g. windows), all windows within the residential premises must be sealed.
- An enhancement to the sealing of windows and or doors activities is a proposed new requirement that when undertaking these activities, in addition any gaps around the external perimeter of window or door frames/architraves or gaps between suspended timber floors and the underside of skirtings must be caulked with flexible, non-shrinking caulking.
- Warranty periods now apply to each type of sealing product

ENERGY SAVINGS METHODOLOGY

It is proposed that default energy savings factors be used to determine the energy savings from this activity.

The Technical Assessment – BS2 (pages 44 to 57 of Appendix 2) outlines the consultant’s approach to determining the energy savings from this activity. Table 24 of this describes the assumptions used and Table 25 presents the energy savings results. The approach used by the consultants involves determining the thermal load reductions associated with an average household with and without the various building sealing activities provided. This is then translated to estimates of electricity, gas and firewood energy savings, based on the relative mix of the use of these fuel types for heating and cooling in South Australian homes.

These electricity, gas and firewood energy savings are multiplied by the normalisation factors described in Section 4 to determine the proposed savings factors presented in the specification below.

CONSULTATION QUESTIONS SPECIFIC TO THIS ACTIVITY

- **There has been limited uptake of this activity to date in the REES. Are there any specific barriers to increasing its uptake?**
- **Should the activity per house be limited to one of the door sealing, window sealing and fireplace options, or allowed to be mixed?**
- **Is the requirement for caulking gaps, associated with this activity, reasonable?**

Building Sealing Activities (Various)	Activity No.
	BS2

1. Activity Specific Definitions

Habitable Room means any space that can be occupied within a class 1 or class 2 dwelling (as defined by the National Construction Code). This does not include any attached garages, sheds or the like

Permanent fireplace or chimney sealing means a sealing device that is not capable of removal from the chimney or fireplace without the use of tools

Removable fireplace or chimney sealing means a sealing device that is capable of removal from the chimney or fireplace without the use of tools. For the purposes of this activity Removable fireplace or chimney sealing includes chimney balloons

2. Activity Description (Summary)

Installation of products designed to restrict or prevent air flow through doors, windows, chimneys/open fireplaces, exhaust fans or wall vents

3. Activity Eligibility Requirements

- General:** Any individual activity listed below or combination of activities may be undertaken at a residential premises in circumstances where the particular sealing activity has not previously been undertaken. However, the installation of any of the noted building sealing activities must not be otherwise required by law, for example as condition of a development approval under the Development Act 1993.
- Doors:** Doors to be draught proofed must be on external walls of habitable rooms and present with gaps between the door and frame and/or threshold that permit the infiltration of air into or out of the dwelling. All eligible doors at a residential premises must be draught proofed, where practical.
- Windows:** Windows to be draught proofed must be on external walls of habitable rooms and present with gaps between the sash and frame that permit the infiltration of air into or out of the dwelling. All eligible windows at a residential premises must be draught proofed, where practical.
- Chimneys/Fireplaces:** The fireplace must be in a habitable room, be an open fireplace that is unsealed and not have a pre-existing chimney damper. All eligible chimneys/fireplaces at a residential premises must be draught proofed, where practical
- Exhaust Fans:** Exhaust fans to be draught proofed must be located in a habitable room and not fitted with a self-closing sealing device. Note: for this activity either a self-closing damper can be fitted to an existing exhaust fan or alternatively the entire fan assembly can be replaced with a new fan assembly that includes an integral self-closing damper. All eligible exhaust fans at a residential premises must be draught proofed, where practical.
- Wall Vents:** Wall vents to be draught proofed must be located in external walls of habitable rooms and have an open area not less than 50 cm² open to the outside air. External wall openings to underfloor spaces must not be sealed. All eligible wall vents at a residential premises must be draught proofed, where practical.

4. Installed Product Requirements

The installed product must meet the following requirements

Doors and Windows

- The equipment to be applied must be a retail door bottom sealing product or door/window perimeter weather stripping product or a combination of the two as required
- The product's sealing surface must be made of a durable compressible material such as foam, polypropylene pile, flexible plastic, rubber compressible strip, and fibrous seal or similar.
- The product must not impair the proper operation of the door or window
- The product, once applied, must effectively restrict the airflow into or out of the dwelling around the perimeter of the door or window as applicable
- The product must be fit for the purpose for which it is intended to be used,
- The product must come with a minimum 2 year product warranty
- In addition to the fitting of seals to either doors or windows in each habitable room treated, any gaps around the external perimeters of window or door frames/architraves or gaps between suspended timber floors and the underside of skirtings must be caulked with flexible, non-shrinking caulking in ether clear finish or colour matched (as far as practical) to the surrounding surface (caulking colours should be agreed with the property owner before undertaking this work)

Chimneys/Fireplaces

1. The damper must be durable, fit for purpose and capable of effectively sealing the flue or chimney of an open fireplace
2. If the damper is designed to be used in an operable fireplace then it must be of a durable construction such that its operation is not adversely affected by the heat of a fire and when open it must not adversely affect the operation of the fireplace, in particular the chimney/flue's capacity to "draw" smoke out of the firebox
3. The product must come with a minimum 5 year product warranty

Exhaust Fans

The installed product must:

1. Be either a ceiling or wall exhaust fan that is fitted with a self-closing damper, flap or other sealing product that can be closed to seal the exhaust of a fan and is suitable for installation in the location in which it is to be installed, or a product that is a self-closing damper, flap, filter or other sealing product that can be closed to seal the exhaust of a fan and is suitable for installation on the exhaust fan on which it is to be installed
2. Come with a minimum 2 year product warranty

Wall Vents

1. The product must be a robust non shrinking permanent sealing material compatible with the surrounding wall construction and colour matched to the surrounding surface finish.
2. In addition to the fitting of seals to either doors or windows in each habitable room treated, any gaps around the external perimeter of window or door frames/architraves or gaps between suspended timber floors and the underside of skirtings must be caulked with flexible, non-shrinking caulking in ether clear finish or colour matched (as far as practical) to the surrounding surface (caulking colours should be agreed with the property owner before undertaking this work)

General Requirements (all forms of sealing device)

1. All products must be fit for purpose
2. All products must comply with any product safety or other product performance requirements in a relevant code of practice or other relevant legislation applying to the activity.

5. Minimum Installation Requirements

1. All products must be installed in accordance with manufacturer's instructions
2. Works must be carried out in accordance with the National Construction Code BCA Section J3 and any applicable Australian Standards.
3. No building sealing activity must occur in rooms that have an existing flue-less gas space heater or a connection that could be used for a flue-less gas space heater.
4. Any product installed must be tested to ensure it is correctly installed, is operating correctly, and does not interfere with the normal operation of the door, window, fire place or fan to which it is fixed.
5. The person undertaking this activity in a residential customer's premises must satisfy the REES Code mandatory safety training requirements. Registered Plumbers, Gas Fitters, Electricians and Building Work Supervisors are exempt from this requirement notwithstanding that in the case of complete replacement of a ceiling fan assembly, only a suitable licensed tradesperson may undertake this work.
6. The activity must be completed and certified in accordance with any relevant code or codes of practice and other relevant legislation applying to the activity, including any licensing, registration, statutory approval, activity certification, health, safety, environmental or waste disposal requirements;
7. The undertaking of the activity shall not compromise the condensation management of the building. Reference should be made to the provisions in the Australian Building Codes Board publication "Condensation in buildings – Information handbook"

Chimneys/Fireplaces (additional requirements)

8. If the sealing device is not designed to be used in an operable fireplace (i.e. permanent sealing) the fireplace must be sealed such that access to the combustion chamber is also permanently sealed or if the firebox is not to be sealed then the fuel burning device must be clearly tagged as having been sealed.
9. If the sealing device is designed to be used in an operable fireplace (i.e. an operable damper) it must be installed in a manner that ensures that the safe operation of the fireplace is not compromised.

Wall vents (additional requirements)

10. Where a wall vent connects an inside space to the outside via a wall cavity, only the inside face of the wall vent shall be sealed. The wall cavity must remain connected via the opening in the external wall to the outside air.
11. Where a wall vent or vents are the only source of ventilation to a room (i.e. no windows or external doors) they shall not be sealed.

6. Activity energy savings

The total normalised energy saved from undertaking this activity is equal to:

Normalised Energy Savings (GJ) =

For Door sealing = Savings Factor (as per table below) x No. of doors sealed

For Window sealing = Savings Factor (as per table below) x Lineal metres of window perimeter sealed

For fireplace or chimney sealing = Savings Factor (as per table below) x No of f/places/chimneys sealed

For exhaust fan sealing = Savings Factor (as per table below) x No. of exhaust fans sealed

For Wall vent sealing = Savings Factor (as per table below) x No. Wall vents sealed

Savings factors BCA Zones 4 & 5

Activity	Savings Factor
Door Sealing (adhesive fix)	0.79305
Door Sealing (mechanical fix)	1.58300
Window Sealing (adhesive fix)	0.08773
Window Sealing (mechanical fix)	0.15973
Fireplace or chimney Sealing (permanent)	10.00831
Fireplace or chimney Sealing (removable)	5.08036
Exhaust fan sealing	0.30879
Wall vent sealing	0.31888

Savings factors BCA Zone 6

Activity	Savings Factor
Door Sealing (adhesive fix)	1.28309
Door Sealing (mechanical fix)	2.55143
Window Sealing (adhesive fix)	0.12382
Window Sealing (mechanical fix)	0.27075
Fireplace or chimney Sealing (permanent)	15.40351
Fireplace or chimney Sealing (removable)	7.85231
Exhaust fan sealing	0.48608
Wall vent sealing	0.49830

7. Guidance Notes (Informative only – not mandatory)

1. Nil

7.10 Replace an inefficient window with a thermal efficient window - BS3A

CURRENT REES ACTIVITY

None

PROPOSED REES ACTIVITY

“Replace an external single glazed window with a new thermally efficient window”

KEY FEATURES OF THIS SPECIFICATION

The activity involves the replacement of a pre-existing window in the external wall of a residential premises with a new higher thermal performance window.

Eligibility of the pre-existing window is defined differently in different jurisdictions. In the ACT the pre-existing window must have a performance level less than 4 stars under the WERS rating scheme. In NSW the pre-existing window simply needs to be a single glazed window and in Victoria there is no requirement. The simplest and most reliable approach is considered to be the NSW requirement (i.e. pre-existing single glazed window).

The replacement window is generally defined in terms of its WERS rating. Different jurisdictions allow different ratings in the range from 4 stars to 6 stars (or better). For the proposed REES activity ratings of ≥ 4 WERS stars or ≥ 6 WERS stars are proposed. Victoria and the ACT also require a minimum area of window to be replaced in a single residential premises (5m^2). This has not been accepted in the REES specification.

ENERGY SAVINGS METHODOLOGY

It is proposed that default energy savings factors be used to determine the energy savings from this activity.

The Technical Assessment – BS3A (pages 58 to 66 of Appendix 2) outlines the consultant’s approach to determining the energy savings from this activity. Table 29 of this describes the assumptions used and Table 30 presents the energy savings results. The approach used by the consultants involves determining the thermal load reductions associated with an average household with and without the window replacement activity. This is then translated to estimates of electricity, gas and firewood energy savings, based on the relative mix of the use of these fuel types for heating and cooling in South Australian homes.

These electricity, gas and firewood energy savings are multiplied by the normalisation factors described in Section 4 to determine the proposed savings factors presented in the specification below.

CONSULTATION QUESTIONS SPECIFIC TO THIS ACTIVITY

- None

Replace an inefficient window with a thermal efficient window	Activity No.
	BS3A

1. Activity Specific Definitions

Habitable Room means any space that can be occupied within a class 1 or class 2 dwelling (as defined by the National Construction Code). This does not include any attached garages, sheds or the like

Thermally efficient window means a window (including glazing and frame) that meets the requirements of the table below.

WERS means the Window Energy Rating Scheme managed by the Australian Window Association

System U-Value means the thermal transmittance, in W/m^2K , of a window system including glass, sash and frame, as registered under WERS.

Total Window Area means the area of window replaced in square metres (**metres x metres**).

Minimum requirements for a thermally efficient window			
Window	Min. WERS Star Rating Heating Mode	Min. WERS Star Rating Cooling Mode	Maximum System U-Value (W/m^2K)
4 star Window	4 stars	1.5 stars	3.1
6 star Window	6 stars	3.5 stars	2.3

2. Activity Description (Summary)
Replace an external single glazed window with a new thermally efficient window

3. Activity Eligibility Requirements

- Pre-existing windows to be replaced must be single glazed and located in an external wall of a habitable room
- The installation of thermally efficient windows must not be otherwise required by law, for example as condition of a development approval under the Development Act 1993.

4. Installed Product Requirements

The installed product must:

- be a window product (glazing and frame) rated by WERS.
- comply with the effective version of AS 2047 and AS 1288.
- be either a 4 Star Window, or a 6 Star Window in accordance with the minimum requirements for a thermally efficient window as detailed in the table above.
- have a warranty of at least 5 years.
- comply with any product safety or other product performance requirements in a relevant code of practice or other relevant legislation applying to the activity.
- Be fit for the purpose for which it is intended to be used

5. Minimum Installation Requirements

- All products must be installed in accordance with manufacturer's instructions
- The window must be installed in compliance with the effective versions of AS 2047 and AS 1288.
- The window frame must be effectively sealed around its entire perimeter to prevent infiltration of outside air
- The activity must be completed and certified in accordance with any relevant code or codes of practice and other relevant legislation applying to the activity, including any licensing, registration, statutory approval, activity certification, health, safety, and environmental or waste disposal requirements.

6. Activity energy savings

The total normalised energy saved from undertaking this activity is equal to:

Normalised Energy Savings (GJ) = Savings Factor (as per table below) x Total Window Area (m^2)

Activity	Savings Factor
4 Star Window (BCA Zones 4&5)	0.42715
6 Star Window (BCA Zones 4&5)	0.94799
4 Star Window (BCA Zones 6)	0.53279
6 Star Window (BCA Zones 6)	1.36852

7.11 Secondary glazing retrofit - BS3B

CURRENT REES ACTIVITY

None

PROPOSED REES ACTIVITY

“Retrofit secondary glazing to a pre-existing single glazed window in the external wall of a residential premises”

KEY FEATURES OF THIS SPECIFICATION

The activity involves the application of a second sheet of glazing (including air gap) to a pre-existing single glazed window in the external wall of a residential premises. The activity results in a still air gap being created between the single glazed pre-existing window and the applied glazing sheet (effectively creating a double glazed unit) thereby rising the thermal efficiency performance of the window.

Eligibility of the pre-existing window is defined similarly in each jurisdiction that offers this activity. The pre-existing window simply needs to be a single glazed window.

In Victoria and the ACT the applied glazing is simply specified as either a glass/acrylic product or a film. In NSW film products are not permitted, only glass/polycarbonate/acrylic type products are permitted and the final assembly must meet a WERS minimum performance standard in the range from 4 stars to 6 stars (or better).

The use of films, whilst relatively inexpensive, is not recommended. Unlike rigid plastics and glass, film is not robust, can be easily damaged and can suffer seal failure.

The other advantage of rigid products is that a range of these have been rated under the WERS scheme and their performance has therefore been established through recognised test methods.

Finally, in consideration of potential condensation issues that may arise between the two glazing sheets the specification is proposed to permit only secondary glazing that is removable (by the householder)

ENERGY SAVINGS METHODOLOGY

It is proposed that default energy savings factors be used to determine the energy savings from this activity.

The Technical Assessment – BS3B (pages 67 to 77 of Appendix 2) outlines the consultant’s approach to determining the energy savings from this activity. Table 34 of this describes the assumptions used and Table 35 presents the energy savings results. The approach used by the consultants involves determining the thermal load reductions associated with an average household with and without the window replacement activity. This is then translated to estimates of electricity, gas and firewood energy savings, based on the relative mix of the use of these fuel types for heating and cooling in South Australian homes.

These electricity, gas and firewood energy savings are multiplied by the normalisation factors described in Section 4 to determine the proposed savings factors presented in the specification below.

CONSULTATION QUESTIONS SPECIFIC TO THIS ACTIVITY

- None

Secondary Glazing Retrofit	Activity No.
	BS3B

1. Activity Specific Definitions

Habitable Room means any space that can be occupied within a class 1 or class 2 dwelling (as defined by the National Construction Code). This does not include any attached garages, sheds or the like

Secondary Glazing means a removable rigid sheet of glass, acrylic or polycarbonate that is fitted to an existing single glazed window so as to create a still air gap between the sheets. For the purposes of this activity description “secondary glazing” does not include any form of film.

Thermally efficient window means a window (including glazing and frame) that meets the requirements of the table below

WERS means the Window Energy Rating Scheme managed by the Australian Window Association

System U-Value means the thermal transmittance, in W/m^2K , of a window system including glass, sash and frame, as registered under WERS.

Total Window Area means the area of window replaced in square metres (**metres × metres**).

Minimum requirements for a thermally efficient window

Window	Min. WERS Star Rating Heating Mode	Min. WERS Star Rating Cooling Mode	Maximum System U Value (W/m^2K)
4 star Window	4 stars	1.5 stars	3.1
6 star Window	6 stars	3.5 stars	2.3

2. Activity Description (Summary)

Retrofit secondary glazing to a pre-existing single glazed window in the external wall of a residential premises.

3. Activity Eligibility Requirements

- Pre-existing windows to be retrofitted must be single glazed in good condition without rot, or corrosion or other form of material defect and located in an external wall of a habitable room
- The retrofit of secondary glazing must not be otherwise required by law, for example as condition of a development approval under the Development Act 1993.

4. Installed Product Requirements

The installed product must :

- be a window product rated by WERS.
- be either glass, acrylic or polycarbonate (films are not eligible)
- be simply removable by the home owner so as to permit access to the formed air gap for cleaning/drying purposes.
- comply with the effective version of AS 2047 and AS 1288.
- be either a 4 Star Window, or a 6 Star Window in accordance with the minimum requirements for a thermally efficient window as detailed in the table above
- have a warranty of at least 5 years.
- be fit for the purpose for which it is intended to be used
- comply with any product safety or other product performance requirements in a relevant code of practice or other relevant legislation applying to the activity.

6. Minimum Installation Requirements

- All products must be installed in accordance with manufacturer’s instructions
- The window must be installed in compliance with the effective versions of AS 2047 and AS 1288.
- The activity must be completed and certified in accordance with any relevant code or codes of practice and other relevant legislation applying to the activity, including any licensing, registration, statutory approval, activity certification, health, safety, environmental or waste disposal requirements;

6. Activity energy savings

The total normalised energy saved from undertaking this activity is equal to:

Normalised Energy Savings (GJ) = Savings Factor (as per table below) x Total Window Area (m^2)

Activity	Savings Factor
4 Star Window (BCA Zones 4&5)	0.21964
6 Star Window (BCA Zones 4&5)	0.47875
4 Star Window (BCA Zones 6)	0.26533
6 Star Window (BCA Zones 6)	0.68795

7. Guidance Notes (Informative only – not mandatory)

- Nil

7.12 Heating and Cooling Systems

- 7.12.1 Install an efficient new gas space heater (Non-Ducted) (existing) - HC1
- 7.12.2 Install an efficient new heating/cooling system (Non-Ducted) (existing) - HC2A
- 7.12.3 Install an efficient new heating/cooling system (Ducted) (new) - HC2B

CURRENT REES ACTIVITY

“Install upgraded efficient room reverse cycle air conditioner or gas room heater”

This activity covers the installation of any upgraded efficient new ducted air conditioner and/or gas heater in a house.

Currently there are four cases specified:

- Gas heater less than or equal to 6.5 kW (23.4 MJ/hour)
- Gas heater greater than 6.5 kW (23.4 MJ/hour)
- Reverse cycle air conditioner less than or equal to 4 kW
- Reverse cycle air conditioner greater than 4 kW.

Minimum performance specifications are set out for each option. These are effectively 5 stars for gas heaters (AS4553) and 3 stars for reverse cycle air conditioners (AS/NZS3823.2-2013).

PROPOSED REES ACTIVITY

It is proposed that this activity be broken into 3 main parts, depending on the equipment selected:

- (1) “Install an efficient gas room heater”
- (2) “Install an efficient non-ducted reverse cycle air conditioner”
- (3) “Install an efficient ducted reverse cycle air conditioner”

KEY FEATURES OF THIS SPECIFICATION

The first option under this activity covers the installation of an efficient new gas space heater (non-ducted) in a house. This is fully equivalent to the existing REES specification.

The second option under this activity covers the installation of an efficient new non-ducted reverse cycle air conditioner in a house. This is fully equivalent to the existing REES specification.

The third option under this activity covers the installation of an efficient new ducted reverse cycle air conditioner in a house. This is a new activity that is not currently covered by REES.

The first major change for this activity is the inclusion of two climate zones – essentially Adelaide (to cover BCA climate zones 4 and 5, which cover the majority of the state) and a colder climate (Mt Gambier to cover BCA climate zone 6).

The requirements for gas space heaters (non-ducted) remains largely unchanged, except that the distinction between small and large has been eliminated (virtually no products on the market were in the small category). Savings are now calculated based on the fractional star rating of the product (noting that no products in this category currently reach 6 stars – maximum available is 5.5 stars). The default savings factors for BCA climate zone 5 (Adelaide) are somewhat lower than the current values. The default savings factors for BCA climate zone 6 (Mt Gambier) are similar to the current values.

A significant change for air conditioners is that the default savings for all reverse cycle air conditioners now includes values for heating and cooling¹⁰.

The requirements for non-ducted reverse cycle air conditioners are very similar to the previous specification, except that the distinction between small and large has been eliminated. The default savings factors for BCA climate zone 5 (Adelaide) are similar to the current values. The default savings factors for BCA climate zone 6 (Mt Gambier) are somewhat higher than the current values.

The most significant change to this specification is the addition of ducted reverse cycle air conditioners as a new type of eligible product (previously restricted to non-ducted reverse cycle air conditioners). Default savings factors are calculated for ducted systems on the same basis as non-ducted systems except that a larger share of total floor area is assumed to be conditioned.

This revision has been undertaken after a reassessment of building heating and cooling requirements based on the latest building shell simulation data for South Australia. There has also been a reappraisal of the default energy savings calculations based on the latest market data for air conditioners and gas heaters to establish new baseline values.

ENERGY SAVINGS METHODOLOGY

It is proposed that default energy savings factors be used to determine the energy savings from this activity.

The Technical Assessment – HC1 and HC2 (pages 78 to 105 of Appendix 2) outlines the consultant’s approach to determining the energy savings from this set of activities. Table 43 of this describes the assumptions used and Tables 47 to 52 present the energy savings results. The approach used by the consultants involves determining the energy savings from the use of an efficient appliance from that of the market average appliance. For reverse-cycle air conditioners, the results are expressed as electricity savings. For gas space heaters, the results are expressed as gas savings. .

These electricity and gas energy savings are multiplied by the relevant normalisation factors described in Section 4 to determine the proposed savings factors presented in the specification below.

CONSULTATION QUESTIONS SPECIFIC TO THIS ACTIVITY

- **Activity HC2A provides energy saving for the installation of reverse-cycle air conditioners with a star rating of 3 or more or with an ACOP and AEER of 3.75 or more. Are these levels appropriate, or should the REES only allow for the installation of higher efficiency systems?**
- **Activity HC2B provides energy saving for the installation of reverse-cycle air conditioners with an ACOP and AEER of 3.5 or more. Are these levels appropriate, or should the REES only allow for the installation of higher efficiency systems?**

¹⁰ For BCA Climate 5 (Adelaide) cooling makes up about one third of all default savings and largely explains the increase in the revised specification. The heating load in BCA Climate 6 (Mt Gambier) is significantly higher than Adelaide and there is little cooling load.

Install an Efficient New Gas Space Heater (non-ducted)	Activity No.
	HC1

1. Activity Specific Definitions

Gas Space Heater means a gas heating appliance that runs on natural gas or LPG and that is certified and listed in the Directory of Australian Gas Association Certified Products.

2. Activity Description (Summary)

Install efficient new gas space heater

3. Activity Eligibility Requirements

Any residential household in South Australia where the installed product requirements and minimum installation requirements can be met. This can include new or replacement systems.

4. Installed Product Requirements

- Gas space heaters shall be rated at not less than 5.0 stars in accordance with AS4553 and be certified and listed in the Directory of AGA Certified Products.
- The gas heater must be of non-ducted flued type (unflued heaters are not eligible).

5. Minimum Installation Requirements

Any gas heater (non ducted) installed must comply with AS 60335.2.102.

6. Activity energy savings

The total normalised energy saved per appliance from undertaking this activity is equal to:

$$\text{Normalised Energy Savings (GJ)} = \left[(H / 0.75) - \frac{H}{([SRI - 5] \times 0.06 + 0.85)} \right] \times 2.7 \times N_g$$

SRI is the star rating to 1 decimal place in the Directory of AGA Certified Products

Where H is 71.52 GJ/year for BCA climate zone 6 (Mt Gambier)

Where H is 31.40 GJ/year for all other places in South Australia

Where N_g is 0.369 - the normalisation factor for natural gas, as described in Section 4.

Star Rating Index (SRI)	BCA climate 6 - GJ gas saved	All other areas - GJ gas saved	Normalised Energy Savings (GJ) – BCA Climate 6	Normalised Energy Savings (GJ) – BCA others
5.0	30.3	13.3	11.17424	4.90486
5.1	31.9	14.0	11.76429	5.16301
5.2	33.5	14.7	12.35435	5.42116
5.3	35.0	15.4	12.90753	5.67931
5.4	36.5	16.0	13.46071	5.90059
5.5	38.0	16.7	14.01389	6.15874
5.6	39.5	17.4	14.56707	6.41689
5.7	41.0	18.0	15.12025	6.63816
5.8	42.4	18.6	15.63656	6.85943
5.9	43.9	19.3	16.18974	7.11758
6.0	45.3	19.9	16.70604	7.33885

7. Guidance Notes (Informative only – not mandatory)

Persons installing heating/cooling systems should have regard to the “Air Conditioning Residential Best Practice Guideline” (2003) published by the Australian Institute of Refrigeration, Air Conditioning and Heating (AIRAH). All reasonable endeavours should be used to recycle removed systems. Main gas, LPG and other gas systems are permitted under this specification. Directory of Australian Gas Association Certified Products can be found at http://www.aga.asn.au/complete_product_directory Equivalent table to the formula is provided below.

Install an Efficient new Reverse Cycle Air Conditioner (Non-Ducted)	Activity No.
	HC2A

1. Activity Specific Definitions

Reverse cycle air conditioner (non-ducted) means a single phase non ducted air conditioner with both heating and cooling functions that is registered for energy labelling and MEPS under standard AS/NZS3823.2.

ACOP means the annual coefficient of performance as defined in AS/NZS3823.2 in W/W

AEER means the annual energy efficiency ratio as defined in AS/NZS3823.2 in W/W

SRI means Star Rating Index

2. Activity Description (Summary)

Install an efficient new reverse cycle air conditioner (non-ducted)

3. Activity Eligibility Requirements

Any residential household in South Australia where the installed product requirements and minimum installation requirements can be met. This can include new or replacement systems.

4. Installed Product Requirements

1. The reverse cycle air conditioner (non-ducted) must achieve an SRI of ≥ 3.0 stars for both heating and cooling under AS/NZS3823.2 (2013). If it does not have an SRI, then it must meet these efficiency levels, ACOP and AEER at rated capacity of ≥ 3.75 .
2. The reverse cycle air conditioner (non ducted) shall be single phase and have a rated cooling output not exceeding 13kW.
3. Multi-split systems or water source heat pumps are not eligible.

5. Minimum Installation Requirements

Any reverse cycle air conditioner (non-ducted) installed must comply with AS 60335.2.40.

6. Activity energy savings

The total normalised energy saved per appliance from undertaking this this activity is equal to:

$$\text{Normalised Energy Savings (GJ) (BCA climate 6)} = \left[57.8 - \frac{193.1}{MH} - \frac{8.4}{MC} \right]$$

$$\text{Normalised Energy Savings (GJ) (Other places in SA)} = \left[37.9 - \frac{84.8}{MH} - \frac{44.6}{MC} \right]$$

MH is the registered value for rated heating ACOP at rated capacity in accordance with AS/NZS3823.2

MC is the registered value for rated cooling AEER at rated capacity in accordance with AS/NZS3823.2

Note: as the normalisation factor for electricity is 1 (see Section 4), no normalisation factor is included.

7. Guidance Notes (Informative only – not mandatory)

Persons installing heating/cooling systems should have regard to the "Air Conditioning Residential Best Practice Guideline" (2003) published by the Australian Institute of Refrigeration, Air Conditioning and Heating (AIRAH). All reasonable endeavours should be used to recycle removed systems.

Install an Efficient new Reverse Cycle Air Conditioner (Ducted)	Activity No.
	HC2B

1. Activity Specific Definitions

Reverse cycle air conditioner (ducted) means a ducted air conditioner with both heating and cooling functions that is registered for energy labelling and MEPS under standard AS/NZS3823.2.

ACOP means the annual coefficient of performance as defined in AS/NZS3823.2

AEER means the annual energy efficiency ratio as defined in AS/NZS3823.2

2. Activity Description (Summary)

Install an efficient new reverse cycle air conditioner (ducted)

3. Activity Eligibility Requirements

Any residential household in South Australia where the installed product requirements and minimum installation requirements can be met. This can include new or replacement systems.

4. Installed Product Requirements

1. The reverse cycle air conditioner (ducted) must achieve a rated heating ACOP and a rated cooling AEER of ≥ 3.5 at rated capacity under AS/NZS3823.2 (2013).
2. Multi-split systems or water source heat pumps are not eligible.

5. Minimum Installation Requirements

Any reverse cycle air conditioner (ducted) installed must comply with AS 60335.2.40.

6. Activity savings

The total normalised energy saved per appliance from undertaking this activity is equal to:

$$\text{Normalised Energy Savings (GJ) (BCA climate 6)} = \left[140.6 - \frac{450.6}{MH} - \frac{19.6}{MC} \right]$$

$$\text{Normalised Energy Savings (GJ) (Other places in SA)} = \left[91.6 - \frac{197.8}{MH} - \frac{104.0}{MC} \right]$$

MH is the registered value for rated heating ACOP at rated capacity in accordance with AS/NZS3823.2

MC is the registered value for rated cooling AEER at rated capacity in accordance with AS/NZS3823.2

Note: as the normalisation factor for electricity is 1 (see Section 4), no normalisation factor is included.

7. Guidance Notes (Informative only – not mandatory)

Persons installing heating/cooling systems should have regard to the “Air Conditioning Residential Best Practice Guideline” (2003) published by the Australian Institute of Refrigeration, Air Conditioning and Heating (AIRAH). All reasonable endeavours should be used to recycle removed systems.

For the ACOP and AEER, refer to Air Conditioner CSV file http://reg.energyrating.gov.au/comparator/product_types/

7.13 Install efficient new ductwork - HC3A

CURRENT REES ACTIVITY

“Installation of ductwork of higher than standard insulation to a small or large reverse cycle air conditioner or gas central heater”

PROPOSED REES ACTIVITY

“Installation of ductwork of higher than standard insulation R value to a reverse cycle ducted air conditioner or gas ducted central heater”

KEY FEATURES OF THIS SPECIFICATION

This activity is intended to encourage installation of ductwork in either a ceiling or a subfloor space with an insulation value higher than might otherwise occur. It is anticipated that the higher performance ductwork will be installed at the time of installing a heating/cooling system, however, retrofitting is not precluded.

The base case is assumed to be the industry standard. For new dwellings and major renovations this is governed by the BCA.

For South Australia this translates into R1.0 for heating or cooling only systems and for combined heating and cooling systems R1.5. For other installations the minimum standard understood to now be commonly used is R1.0 ducting.

In circumstances where R1.5 is required by the BCA then a residential premises would be ineligible for this activity, consequently the assumed base case is R1.0. Previously this was R0.8¹¹.

The proposed key specification changes from the current REES activity are as follows:

- Default savings factors are calculated based on the output capacity of the space conditioning equipment to which the ductwork is attached.
- Two levels of duct insulation are now options, R1.5 or R2.0 each attracting different levels of default savings.
- The activity now includes for savings based on the actual output capacity of the space conditioner. Default savings are also dependent upon the BCA climate zone location (either zones 4 & 5 or zone 6).
- Installation requirements have been more tightly specified to ensure savings are realised.

ENERGY SAVINGS METHODOLOGY

It is proposed that default energy savings factors be used to determine the energy savings from this activity.

The Technical Assessment – HC3A (pages 106 to 117 of Appendix 2) outlines the consultant’s approach to determining the energy savings from this activity. Table 56 of this describes the assumptions used and Table 57 presents the energy savings results. The approach used by the consultants involves determining the energy savings from using a ducted heating/cooling system with efficient ductwork compared with a system using inefficient ductwork. The results for gas heating systems are expressed as gas energy savings. The results for reverse cycle air conditioners are expressed as electricity savings. The results are expressed as a per unit of output capacity of the heating/cooling system.

These electricity and gas energy savings are multiplied by the relevant normalisation factors described in Section 4 to determine the proposed savings factors presented in the specification below.

CONSULTATION QUESTIONS SPECIFIC TO THIS ACTIVITY

- Are there a range of products currently available that met the installed product requirements?
- Are the installation requirements presented in the specification representative of good installation practices?

¹¹ See Table 35 of <http://www.escosa.sa.gov.au/library/110705-REES-EnergyActivitiesReview-Phase3-EnergyConsult.pdf>

Install Efficient New Ductwork**Activity No.**

HC3A

1. Activity Specific Definitions

Thermally efficient ductwork means flexible ductwork that is insulated using bulk insulation that achieves a minimum R value of R1.5 (option 1) or R2.0 (option 2) when measured in a flat plate test in accordance with AS/NZS 4859.1:2002.

2. Activity Description (Summary)

Installation of ductwork of higher than standard insulation R value to a reverse cycle ducted air conditioner or gas ducted heater. See also guidance notes below

3. Activity Eligibility Requirements

1. The space conditioning unit to which the thermally efficient ductwork is to be attached must be located in a residential premises and must be either a reverse cycle ducted air conditioner or gas ducted central heater.
2. The relevant ductwork must be flexible ductwork and be installed within a roof space or between a floor and the natural ground.
3. The installation of ductwork with an R value that exceeds R1.0 must not be otherwise required by law, for example as condition of a development approval under the Development Act 1993.

4. Installed Product Requirements

The installed product must :

1. be thermally efficient ductwork as defined above.
2. have a thickness of the insulation as installed in the ducting that matches the design insulation thickness as specified by the insulation manufacturer
3. be longitudinally labelled at intervals of not more than 1.5 metres, in characters that are clearly legible and at least 18mm high stating:
 - i. the duct manufacturer's or duct assembler's name; and
 - ii. the diameter of the duct core; and
 - iii. the R-value of the bulk insulation; and
 - iv. whether the ductwork complies with AS 4254.1-2012;
4. use fittings that achieve at least the R-value specified by Table 3.12.5.2 of the Building Code of Australia (BCA2013). All dampers must be positive seal dampers to prevent leakage
5. have a warranty of at least 5years.
6. comply with any product safety or other product performance requirements in a relevant code of practice or other relevant legislation applying to the activity
7. Be fit for the purpose for which it is intended to be used

5. Minimum Installation Requirements

When installing the flexible ductwork system, the installer shall, at a minimum:

1. Undertake the installation in accordance with manufacturer's instructions
2. Install and support the system in accordance with the requirements set out in AS 4254.1-2012;
3. Duct tape the inner liner to the collar and ensure the insulation is pulled up over the collar before the outer is duct taped and mechanically fixed to minimize heat loss at the collar join;
4. Tape any small tears/holes in the outer or inner sleeve using foil tape for the outer sleeve and duct tape for the inner sleeve. Taping of any significant tears of more than one quarter of the circumference of the duct may not last and therefore that section of duct is no longer suitable and should be replaced.
5. Ensure the activity is completed and certified in accordance with any relevant code or codes of practice and other relevant legislation applying to the activity, including any licensing, registration, statutory approval, activity certification, health, safety, environmental or waste disposal requirements;

6. Activity energy savings

The total normalised energy saved from undertaking this activity is equal to:

Normalised Energy Savings (GJ) = (Savings Factor (as per table below) x The rated output of the space conditioning to which the ductwork is attached in kW*)

Climate Zone	Activity	Savings Factor
BCA Zones 4 & 5	Gas ducted heater Fitted with R1.5 minimum ductwork	0.19177
	Gas ducted heater Fitted with R2.0 minimum ductwork	0.31347
	Reverse cycle air-conditioner Fitted with R 1.5 minimum ductwork	0.1700
	Reverse cycle air-conditioner Fitted with R 2.0 minimum ductwork	0.2800
BCA Zone 6	Gas ducted heater Fitted with R1.5 minimum ductwork	0.46098
	Gas ducted heater Fitted with R2.0 minimum ductwork	0.75232
	Reverse cycle air-conditioner Fitted with R 1.5 minimum ductwork	0.2800
	Reverse cycle air-conditioner Fitted with R 2.0 minimum ductwork	0.4600

* In the case of reverse cycle air-conditioners the products rating in heating mode shall be used. Where ratings are in MJ/h, divide this number by 3.6 to derive the equivalent rating in kW

7. Guidance Notes (Informative only – not mandatory)

1. This activity is intended to encourage installation of ductwork with insulation value higher than might otherwise occur. It is anticipated that the ductwork will be installed at the time of installing a heating/cooling system. However, retrofitting is not precluded.

7.14 Replace ductwork with an enhanced ductwork system - HC3B

CURRENT REES ACTIVITY

“Replacement of an existing flexible ductwork system for a reverse cycle air-conditioner with a new flexible ductwork system (including all fittings)”

PROPOSED REES ACTIVITY

“Replacement of an existing flexible ductwork system for a reverse cycle air-conditioner with a new flexible ductwork system (including all fittings)”

KEY FEATURES OF THIS SPECIFICATION

Unlike activity HC3A, this activity is focused on the replacement of pre-existing ductwork (rather than upgrading the specification of ductwork to be newly installed) and is applied exclusively to reverse cycle ducted air conditioner systems. In addition this particular activity features a measurement (before and after) and verification process as a means for ensuring that the benefits obtained match the default savings

Because the assumption is that the higher performance ductwork will replace existing ductwork of a known (measured) performance level the base case is determined through measurement and is not simply an assumed performance level based on market averages.

Duct replacement is an unlikely activity except at the time of the replacement of the space conditioning unit. Industry sources (limited) suggest that duct replacement at the time of space conditioner unit replacement occurs in between 10% to 33% of cases (say 20% on average).

The proposed key specification changes from the current REES activity are as follows:

- Default savings factors are calculated based on the output capacity of the space conditioning equipment to which the ductwork is attached.
- Default savings are now applied according to the particular location of the residential premises (BCA climate zone location zones 4 & 5 or zone 6).

ENERGY SAVINGS METHODOLOGY

It is proposed that default energy savings factors be used to determine the energy savings from this activity.

The Technical Assessment – HC3B (pages 118 to 128 of Appendix 2) outlines the consultant’s approach to determining the energy savings from this activity. Table 61 of this describes the assumptions used and Table 62 presents the energy savings results. The approach used by the consultants involves determining the energy savings from using a ducted heating/cooling system with efficient ductwork compared with a system using inefficient ductwork. For this activity, these are determined using before and after measurements and a verification process. The results are expressed as electricity savings. The results are expressed as a per unit of output capacity of the heating/cooling system.

As the normalisation factor for electricity is 1 (see Section 4), no normalisation of the results is required.

CONSULTATION QUESTIONS SPECIFIC TO THIS ACTIVITY

- None

Replace ductwork with an enhanced ductwork system	Activity No.
	HC3B

1. Activity Specific Definitions

Thermally efficient ductwork means flexible ductwork that is insulated using bulk insulation that achieves a minimum R value of R1.5 when measured in a flat plate test in accordance with AS/NZS 4859.1:2002

2. Activity Description (Summary)

Replacement of an existing flexible ductwork system for a reverse cycle air-conditioner with a new flexible ductwork system (including all fittings)

3. Activity Eligibility Requirements

1. The space conditioning unit to which the thermally efficient ductwork is to be attached must be located in a residential premises and must be a reverse cycle ducted air conditioner.
2. The relevant ductwork must be flexible ductwork and be installed within a roof space or between a floor and the natural ground.
3. The installation of thermally efficient ductwork must not be otherwise required by law, for example as condition of a development approval under the Development Act 1993.
4. Prior to engaging in this activity, the obliged retailer must:
 - a. have provided the Commission with an application for the approval of:
 - i. a software tool to assess the performance of the pre-existing ductwork system and the replacement ductwork system which verifies a specified percentage reduction in duct losses as outlined in Table 1; and
 - ii. the assessment process for which independent testing will be undertaken on the flexible ductwork system to ensure verifiability;
 - b. receive the written approval of the Commission to:
 - i. install the flexible ductwork system.

4. Installed Product Requirements

The installed product must :

1. be thermally efficient ductwork as defined above.
2. have a thickness of the insulation as installed in the ducting that matches the design insulation thickness as specified by the insulation manufacturer
3. be certified by an accredited body or approved laboratory as having an insulation conductivity and thickness such that the TRUE radial R value defined by equation 4 in AS 4508-2009, section 3.2.3, is greater than or equal to 1.3 K/W based on a one metre length of 300 mm internal diameter duct (i.e. $r_i = 0.15$ m). Furthermore, all other duct sizes used in the installation shall use the same insulation (conductivity and thickness) as that used in the 300mm internal diameter ducting
4. be longitudinally labelled at intervals of not more than 1.5 metres, in characters that are clearly legible and at least 18mm high stating:
 - i. the duct manufacturer's or duct assembler's name; and
 - ii. the diameter of the duct core; and
 - iii. the R-value of the bulk insulation; and
 - iv. whether the ductwork complies with AS 4254.1-2012;
5. use fittings that achieve at least the R-value specified by Table 3.12.5.2 of the Building Code of Australia (BCA2013). All dampers must be positive seal dampers to prevent leakage
6. have a warranty of at least 20 years.
7. comply with any product safety or other product performance requirements in a relevant code of practice or other relevant legislation applying to the activity
8. Be fit for the purpose for which it is intended to be used

6. Minimum Installation Requirements

For every installation, the flexible ductwork system must be independently tested using the system and process approved by the Commission prior to the installation being undertaken and again after the installation is completed. This testing must be conducted on site using the actual measurements for the installation and demonstrate a reduction in duct losses of a percentage outlined in Table 1 after the installation is completed compared to before the installation is undertaken.

When installing the flexible ductwork system, the installer shall, at a minimum:

1. Undertake the installation in accordance with manufacturer's instructions
2. Install and support the system in accordance with the requirements set out in AS 4254.1-2012;

3. use silicone to seal around both the supply and return air starters to the indoor fan coil;
4. ensure that the fan noise into the house be minimised with either 6 metres of return air duct or 3 metres of acoustically lined duct from the return air box to the indoor fan coil;
5. mechanically fix the ducting to prevent openings at joins over time;
6. duct tape the inner liner to the collar and ensure the insulation is pulled up over the collar before the outer is duct taped and mechanically fixed to minimize heat loss at the collar join;
7. ensure, where possible, that the air flow is balanced by using similar duct runs and bends after Y pieces. If manual damper blades are to be installed, they should be left in the fully open position and only adjusted where necessary, minimizing pressure loss in the system
8. connect motorised dampers directly to collar Ys with at least 4 screws and duct tape must be placed over the joins, preventing air leakage in the future;
9. where possible, make the duct runs as short as possible to maximise airflow. There should be no kinks in the flexible duct and all duct should be hung by strapping where needed i.e.: over timbers etc.;
10. use curved duct supports such as flexright fittings on all outlets where possible, to minimize pressure losses at outlets as well as maximize throw of air; and
11. tape any small tears/holes in the outer or inner sleeve using foil tape for the outer sleeve and duct tape for the inner sleeve. Taping of any significant tears of more than one quarter of the circumference of the duct may not last and therefore that section of duct is no longer suitable and should be replaced.
12. ensure the activity is completed and certified in accordance with any relevant code or codes of practice and other relevant legislation applying to the activity, including any licensing, registration, statutory approval, activity certification, health, safety, environmental or waste disposal requirements;

6. Activity energy savings

The total normalised energy saved from undertaking this this activity is equal to:

Normalised Energy Savings (GJ)= (Savings Factor (as per table below) x The rated output of the space conditioning to which the ductwork is attached in kW*)

Activity	Savings Factor
BCA Zones 4&5 30% min. reduction in duct losses	1.75
BCA Zone 6 30% min. reduction in duct losses	2.45
BCA Zones 4&5 40% min. reduction in duct losses	2.33
BCA Zone 6 40% min. reduction in duct losses	3.26

* In the case of reverse cycle air-conditioners the products rating in heating mode shall be used.

7. Guidance Notes (Informative only – not mandatory)

1. Nil

7.15 Replace or upgrade water heater - WH1

CURRENT REES ACTIVITY

“Install or replace a water heater”

PROPOSED REES ACTIVITY

“Install or replace a water heater”

This activity covers the installation of any water heater in a new and existing residential dwelling.

KEY FEATURES OF THIS SPECIFICATION

Currently there are a range of cases envisaged under REES:

- WH1 – early replacement of an existing water heater <5 years old
- WH2a – replacement of a failed water heater where a low emission water heater IS NOT required
- WH2b – replacement of a failed water heater where a low emission water heater IS required
- WH2c – installation of a water heater in a new home where a low emission water heater IS NOT required.

Minimum performance specifications are set out for each option of water heater. For gas systems the star rating must be greater than or equal to 5 stars. For solar systems (solar electric, solar gas and heat pump), the system must earn a minimum number of STCs (RECs), depending on tank size.

The SA Water Heater Installation Requirements (as revised) require water heaters installed to service a Class 1 dwelling with a mains gas connection to be low emission types. New class 1 dwellings are also required to have a low emissions water heater (irrespective of gas connection). This complements REES and sets out a base for the calculation of energy savings.

The key changes from the current specification are:

- A simplification of the requirements into two categories –where a low emission water heater IS NOT required under the SA Water Heater Installation Requirements (Case 1) and where a low emission water heater IS required under the SA Water Heater Installation Requirements (Case 2).
- The previous specification requirements regarding the operational state of the water heater have been removed. Waiting until a water heater has failed will almost certainly result in a replacement of like for like and represents a missed opportunity for a system change to a more efficient water heater type.
- The minimum performance requirements for gas water heaters has been upgraded to 6 stars, as the SA Water Heater Installation Requirements 2 mandates a minimum of 5 star gas for low emission systems.
- Performance requirements for solar electric and solar gas systems are largely unchanged, except that for tank sizes >220 litres, the systems must also qualify as medium or large under AS/NZS4234.
- Performance requirements for heat pump systems have been modified by eliminating any requirement for tank size and specifying a minimum STC (REC) requirement in Zone 3 and 4. This is to ensure that heat pump systems maintain good performance in the colder parts of the state that are close to or in Zone 4 and avoids conflicts with SA Water Heater Installation Requirements.
- The savings by fuel have been revised based on the base assumption for Case 1 (80 litre electric water heater¹²) and Case 2 (5 star gas water heater) as set out in the SA Water Heater Installation Requirements. Case 1 has also been used for Class 2 dwellings as these are not covered by the SA Water Heater Installation Requirements.

¹² SA Water Heater Installation Requirements allow up to 250 litre electric for Class 1 dwellings that are not required to install a low emissions water heater. However, smaller electric storage systems will be common in Class 2 dwellings. The smaller system provides a slightly lower energy baseline (reference) for the calculation of default energy savings factors.

- As described in the consultants' report (see section 4, page 337), the assumed hot water demand has been revised to be based on the latest and best available data for hot water demand. This has resulted in an adjustment of energy savings by fuel.

Potential refinements to the activity could be developed around scaling the energy savings based on the size of the product (on the basis that larger systems will usually be installed in larger homes) and scaling the energy savings based on the STCs (RECs) earned (better performing models should save more energy in normal use). It would then be necessary to scale all savings relative to system size (capability) and predicted share of installations by system size to ensure that the overall hot water delivered across all houses approximates the average values expected.

ENERGY SAVINGS METHODOLOGY

It is proposed that default energy savings factors be used to determine the energy savings from this activity.

The Technical Assessment – WH1 (pages 129 to 143 of Appendix 2) outlines the consultant's approach to determining the energy savings from this activity. Table 66 of this describes the assumptions used and Table 69 presents the energy savings results. The approach used by the consultants involves determining energy savings for two cases of water heater installation activities:

- Case 1 involves installing a low-emission water heater where there is no requirement (under South Australia's Water Heater Installation Requirements) to install such a system and
- Case 2, where a low-emission water heater is required under South Australia's Water Heater Installation Requirements.

Energy savings from installing a low-emission water heater are based on the difference in energy use of the low-emission system compared to a base-case system. Where this involves fuel substitution, such as converting from electric to gas, the energy use of both systems is calculated and then normalised, using the normalisation factors described in Section 4 and the resulting normalised energy savings is the difference between the two. Where the comparison is between two systems that use the same fuel (such as an electric storage system and an electric boosted solar), the difference in energy use is normalised.

CONSULTATION QUESTIONS SPECIFIC TO THIS ACTIVITY

- **Does this activity describe the types of water heater installations that are likely to occur under the REES?**

Replace or upgrade water heater	Activity No.
	WH1

1. Activity Specific Definitions

Low emission water heater is NOT required means a situation where certain water heaters other than a low-emission water heater can be installed under SA's Water Heater Installation Requirements

Low emission water heater is required means a situation where only a low-emission water heater can be installed under SA's Water Heater Installation Requirements.

Gas water heater or solar gas means a water heater that has a primary or boost fuel source of natural gas (methane) or LPG.

2. Activity Description (Summary)

Install or replace a water heater

3. Activity Eligibility Requirements

Residential households in South Australia where the installed product requirements and minimum installation requirements can be met. This can include new or replacement systems. The options available under this specification are subject to whether or not the residential premises are required to install a low emission water heater under the SA Water Heater Installation Requirements.

4. Installed Product Requirements

1. Only gas, solar electric, solar gas or heat pump water heaters are included in the specification.
2. Gas water heaters shall be rated at 6 stars in accordance with AS4552 and listed in the Directory of AGA Certified Products.
3. Solar electric and gas boosted solar systems with a tank size ≤ 220 litres shall earn ≥ 17 STCs for Zone 3
4. Solar electric and gas boosted solar systems $220 < \text{tank size} \leq 400$ litres shall earn ≥ 27 STCs.
5. Solar electric and gas boosted solar systems $400 < \text{tank size} \leq 700$ litres shall earn ≥ 38 STCs.
6. Heat pump water heaters shall earn ≥ 27 STCs when assessed under AS/NZS4234 for Zone 3 and shall earn ≥ 26 STCs when assessed under AS/NZS4234 for Zone 4.

5. Minimum Installation Requirements

1. The water heater must be installed in accordance with relevant installation standards including, but not limited, to AS/NZS 3500:2003 (plumbing and drainage standards); AS/NZS3500.4 (Plumbing and drainage - Heated water services), AS 4552:2005 (gas hot water systems); AS/NZS 60335.2.21:2002 (electric storage water heaters); AS/NZS 60335.2.35:2004 (instantaneous water heaters).
2. All products shall be installed in accordance with the manufacturers' installation instructions and specifications.
3. Any replaced water heater must be removed from the premises.
4. The person undertaking this activity in a residential customer's premises must satisfy the REES Code mandatory safety training requirements. Registered Plumbers, Gas Fitters, Electricians and Building Work Supervisors are exempt from this requirement.
5. The activity must be completed and certified in accordance with any relevant code or codes of practice and other relevant legislation applying to the activity, including any licensing, registration, statutory approval, activity certification, health, safety, environmental or waste disposal requirements, issue of a Certificate of Compliance.

6. Activity energy savings

Case 1 default energy savings apply where a low emission water heater is NOT required to be installed under the SA Water Heater Installation Requirements.

Case 2 default energy savings apply where a low emission water heater is required under the SA Water Heater Installation Requirements.

The total normalised energy saved from undertaking this this activity is equal to:

Normalised Energy Savings (GJ)=Savings factor (as described in the table below):

Activity Description – type installed	Savings Factor
Case 1: 5 star gas	49.68895
Case 1: 6 star gas	54.22075
Case 1: Solar electric	113.00000
Case 1: Solar gas	132.51791
Case 1: Heat pump	103.00000
Case 2: 6 star gas	4.53180
Case 2: Solar electric	37.28219
Case 2: Solar gas	56.80009
Case 2: Heat pump	27.28219

7. Guidance Notes (Informative only – not mandatory)

1. This activity is to encourage households to exceed, where applicable, water heater installation requirements. These requirements are given effect by the South Australian Water Heater Installation Requirements document issued as part of the Plumbing Standard published by the Technical Regulator pursuant to sections 66 and 67 of the Water Industry Act 2012. This document is available at <http://sa.gov.au/otrplumbing>.
2. There may be restrictions on the use of roof mounted systems that use ethylene glycol (or other anti-freeze agents) where roof water is collected for human consumption.
3. Products listed by the Clean Energy Regulator can be found on <http://ret.cleanenergyregulator.gov.au/>
4. All reasonable endeavours should be used to recycle removed water heaters
5. Main gas, LPG and other gas systems are permitted under this specification.
6. AGA Directory, refer to http://www.aga.asn.au/product_directory
7. For the solar water heater calculator, refer to Clean Energy Regulator's web site: <https://www.rec-registry.gov.au/swhCalculatorInit.shtml>

7.16 Replace an inefficient showerhead with an efficient showerhead - WH2

CURRENT REES ACTIVITY

“Replace an inefficient showerhead with an efficient showerhead”

PROPOSED REES ACTIVITY

“Remove and dispose of existing inefficient showerheads from a residential premises and replace with efficient showerheads”

KEY FEATURES OF THIS SPECIFICATION

The activity involves the removal from the site and disposal of what is termed an “inefficient shower head” (defined as a shower head with a flow rate greater than 9 litres per minute¹³) with what is termed an “efficient showerhead” (defined as a showerhead with a minimum 3 star water efficiency rating when assessed and labelled against AS/NZS 6400:2005).

Within the current REES specification for an “efficient showerhead” two levels of performance are identified (attracting different deemed abatement values). Those showerheads with a flow rate greater than 6 litres per minute up to a maximum of 9 litres per minute (which shall be referred to for the purposes of this review as “efficient showerheads”) and those with a flow rate of 6 litres per minute or less (which shall be referred to for the purposes of this review as “superefficient showerheads”).

- The terms “inefficient” and “efficient showerheads” are now defined terms
- Only allow replacement showerheads that have a flow rate of no more than 6 litres/minute (previously 9 litres/minute).
- An inefficient showerhead is now defined as either.
 - a showerhead that has a flow rate ≥ 9 litres/minute. This aligns with the in-use findings made in the Yarra Valley Future Water: Residential Water Use Study Volume 1 and 2. (YVW 2011 and YVW 2012) in relation to inefficient showerheads; or
 - a showerhead that has a flow rate ≥ 15 litres per minute (high flow).
- There is now a requirement that the product carries a minimum 2 year warranty (this aligns with the draft ESS scheme).
- The default savings are now expressed in terms of equivalent GJ saved by fuel type.
- The flow rate assessment for the pre-existing showerheads has been revised to require that the hot water tap be open fully and the cold water tap set so as to provide a typical showering temperature. This change better reflects the conditions under which showerheads are rated and avoids the incorrect classification of showerheads as “efficient” (and therefore not requiring upgrade) due to an overly low supply pressure (i.e. hot tap only partially open).

ENERGY SAVINGS METHODOLOGY

It is proposed that default energy savings factors be used to determine the energy savings from this activity.

The Technical Assessment – WH2 (pages 144 to 159 of Appendix 2) outlines the consultant’s approach to determining the energy savings from this activity. The consultants present two methods, one (Option 1) where energy savings are derived for each showerhead installed. With this method, a lower default energy saving is proposed where a home has more than one shower to account for the likely situation that each of these showers are unlikely to be used as much as in a home with a single

¹³ The flow rate of the pre-existing showerhead is measured on-site using a bucket and a watch

shower. The other method (Option 2) proposes energy savings per households, with a requirement that all inefficient showerheads in the home are replaced.

The specification and default energy savings presented here are based on Option 1, as this allows REES activity providers the flexibility in targeting this activity to the most used showers in the home.

Table 73 of this describes the assumptions used to derive the default energy savings and Table 75 presents the energy savings results.

The approach used by the consultants involves determining the different energy use for a hot water system connected to an inefficient compared to an efficient showerhead. This is expressed as electricity and gas energy savings, based on the relative mix of the use of these fuel types for water heating in South Australian homes.

These electricity and gas energy savings are multiplied by the normalisation factors described in Section 4 to determine the proposed savings factors presented in the specification below.

CONSULTATION QUESTIONS SPECIFIC TO THIS ACTIVITY

- **Is Option 1, as described above the most appropriate method for determining the default energy savings from installing an energy efficient showerhead?**

Replace an inefficient showerhead with an efficient showerhead	Activity No.
	WH2

1. Activity Specific Definitions

Inefficient showerhead means a showerhead, in its current use, that has a flow rate greater than 9 litres per minute. (see also section 3 below for details of on-site measurement methods)

Efficient showerhead means a showerhead that achieves a maximum flow rate of 6 litres per minute and a minimum water efficiency rating of 3 stars when assessed and labelled in accordance with AS/NZS 6400

2. Activity Description (Summary)

Remove and dispose of existing inefficient showerhead/s from a residential premises and replace with efficient showerhead/s

3. Activity Eligibility Requirements

1. A residential premises subject to this activity must contain at least one operational pre-existing inefficient showerhead.
2. The flow rate of each pre-existing showerhead shall be measured with a simple bucket test with the hot water tap open fully and the cold water tap set so as to provide a typical showering temperature (approx.. 40C). Hold a bucket under the running shower for 15 seconds. Measure the quantity of water captured and multiply by 4 to ascertain the per minute flow rate.
3. A minimum of one existing inefficient showerheads within a residential premises must be replaced; and credits can only be claimed for a maximum of 3 showerheads replaced per residential premises
4. The installation of an efficient showerhead must not be otherwise required by law, for example as condition of a development approval under the Development Act 1993 or in compliance with requirements under the Water Industry Act 2012

4. Installed Product Requirements

The installed product must be an efficient showerhead, including flow restrictor and any other components integral to and supplied with the fixture that—

1. complies with the requirements of the effective version of AS/NZS 3662; and
2. complies with any product safety or other product performance requirements in a relevant code of practice or other relevant legislation applying to the activity.
3. comes with a minimum 2 year product warranty

5. Minimum Installation Requirements

1. An efficient showerhead which is installed must be tested to ensure it is correctly installed, does not leak, and is operating correctly at a typical showering temperature.
2. An efficient showerhead must not be installed where it would be incompatible with the operation of the hot water service currently installed. Where a replaced showerhead causes the hot water system to no longer operate (i.e. fails to heat water to a standard temperature), the installer must either reinstall the original showerhead at the request of the householder, or install a new showerhead of equivalent flow rate and quality of the original showerhead (where available), where such a request is made within 20 business days of the installation of the efficient showerhead.
3. An inefficient showerhead which is replaced must be removed from the premises.
4. The person undertaking this activity in a residential customer's premises must satisfy the REES Code mandatory safety training requirements. Registered Plumbers, Gas Fitters, Electricians and Building Work Supervisors are exempt from this requirement.
5. The activity must be completed and certified in accordance with any relevant code or codes of practice and other relevant legislation applying to the activity, including any licensing, registration, statutory approval, activity certification, health, safety, environmental or waste disposal requirements;
6. All reasonable endeavours should be used to recycle removed showerheads.

6. Activity energy savings

The total normalised energy saved per showerhead replaced (maximum of 3 per residential premises) from undertaking this activity is equal to:

Normalised Energy Savings (GJ)=Savings factors, as per the table below:

Application	Savings Factor
Residential premises with one shower only with a flow rate >9 litres and < 15 litres per minute	5.20705
Residential premises with one shower only with a flow rate \geq 15 litres per minute	9.48220
Residential premises with more than one shower. Savings per replaced showerhead with a flow rate >9 litres and < 15 litres per minute	3.65387
Residential premises with more than one shower. Savings per replaced showerhead with a flow rate \geq 15 litres per minute	6.58648

7. Guidance Notes (Informative only – not mandatory)

- Information on the measured flow rate for each showerhead should be recorded to facilitate the provision of data to Commission on request.
- Efficient showerheads are typically not compatible with gravity-fed water heaters (most already have low flow rates). They may also not be compatible with older instantaneous gas water heaters (reduced flow can interfere with the water heater operations).

7.17 Install CFL or LED general purpose lamp - L1

CURRENT REES ACTIVITY

“Install CFLs”

PROPOSED REES ACTIVITY

“Install CFL or LED general purpose lamp”

KEY FEATURES OF THIS SPECIFICATION

This activity involves replacing a mains voltage incandescent or halogen lamp (non-directional or directional) with a compact fluorescent integral lamp (CFL) or light emitting diode integral lamp (LED).

There are a number of categories of replacement lamp:

• Non-directional	• Directional ¹⁴
○ CFL integral lamp	○ CFL integral lamp
○ Standard (std) LED integral lamp	○ Standard (std) LED integral lamp
○ HE (high efficiency) LED integral lamp	○ HE (high efficiency) LED integral lamp

Within each of these six categories, the energy savings are based upon the size (power / light output) of the lamp being replaced/installed. The key changes from the current specification are:

- No changes to the current CFL specification except for warranty.
- All installed products must provide a minimum 2 years replacement warranty.
- The following categories and specifications have been added for LED integral lamps:
 - Standard (std) LED integral lamp:
 - Meets current US Energy Star specification.
 - HE (high efficiency) LED integral lamp:
 - Meets current US Energy Star specification, and
 - Efficacy ≥ 80 lm/W.

There is currently no publicly available data regarding how many products available on the Australian market might meet the US Energy Star specification. There are likely to be a small number, and this will increase as the NSW ESS¹⁵ and REES require this specification.

ENERGY SAVINGS METHODOLOGY

It is proposed that default energy savings factors be used to determine the energy savings from this activity.

The Technical Assessment – L1 (pages 160 to 173 of Appendix 2) outlines the consultant’s approach to determining the energy savings from this activity. Table 81 of this describes the assumptions used to derive the default energy savings and Tables 82 and 83 presents the energy savings results for the directional and non-directional lamps.

The approach used by the consultants involves determining the difference in energy use for an efficient lamp and the market average of lamps sold. The resulting electricity savings are also the normalised savings factors presented in the specification, given that the normalisation factor for electricity is 1 (as described in Section 4).

CONSULTATION QUESTIONS SPECIFIC TO THIS ACTIVITY

- Are there sufficient products in the Australian market that will meet the installed product requirements?
- Are the safety provisions in this specification sufficient to minimise risks associated with poor products and installation practices?

¹⁴ Uses reflectors, as part of fixture or lamp, to control beam of light.

¹⁵ Refer list of ESS Accepted Lighting Products: http://www.ess.nsw.gov.au/Projects_and_equipment/Lighting_Technologies

Install CFL or LED general purpose lamp**Activity No.**

L1

1. Activity Specific Definitions

Integral referring to a lamp means that the power supply electronics are integrated into the lamp housing allowing direct connection to the existing power supply (typically using a Bayonet cap or Edison screw fitting).

Standard LED ("Std LED") means an integral LED lamp meeting the US Energy Star specification Integral LED Lamps V1.4 or Energy Star Lamps specification V1.0.

High Efficiency LED ("HE LED") means an integral LED lamp with initial efficacy of not less than 80 lm/W, and meeting the US Energy Star specification Integral LED Lamps V1.4 or Energy Star Lamps specification V1.0.

2. Activity Description (Summary)

Replace a mains voltage incandescent or halogen lamp (non-directional or directional) with a compact fluorescent integral lamp (CFL) or light emitting diode integral lamp (LED).

3. Activity Eligibility Requirements

1. The number of individual replacements in any one premises shall not exceed 20.
2. All equipment that is replaced must be in working order immediately prior to removal.
3. Replaced equipment (lamp) shall have rated power according to Table L1A (non-directional lamps) or Table L1B (directional lamps). Refer column B for tungsten incandescent and column C for halogen lamps. If required, intermediate values of rated power are referenced to the next lower rated power.

4. Installed Product Requirements

The installed product (both CFL and/or LED) shall—

1. Be installed at the time of removal of the existing equipment.
2. Have a rated colour temperature not exceeding 3000 Kelvin, unless otherwise authorised by the occupant of the premises.
3. Have a measured average initial luminous flux (verified by test report - for CFLs test procedure AS/NZS 4847.1 or IEC 60969; for LEDs test procedure as required by the programs described below) of at least the corresponding* value in column D of Table L1A (non-directional lamps) or Table L1B (directional lamps).
*Note that this should correspond to the class of replaced lamp.
4. Provide a minimum 2 years replacement warranty.

The installed product (if CFL) shall:

5. Have a measured median lamp life of 10,000 hours or more, verified by test report (test procedure AS/NZS 4847.1 or IEC 60969).
6. Have a current, approved registration in the MEPS registration system (www.energyrating.gov.au).

The installed product (if LED) shall—

7. Demonstrate compliance with the LED model can be approved by the NSW ESS scheme, or the meet Energy Star specifications (Integral LED Lamps V1.4 or Energy Star Lamps V1.0, and where required has a minimum initial efficacy of not less than 80 lm/W) by providing current proof of program certification.

5. Minimum Installation Requirements

1. A person or entity undertaking this activity shall use best endeavours to ensure that any replacements are targeted at high usage luminaires in the first instance.
2. All equipment replaced shall be removed from the premises and not re-used.
3. Installed equipment shall not be connected to a transformer, dimmer, timer, motion sensor, daylight switch or other automated switch or control (or combination thereof) unless specified by the manufacturer as being compatible with such device or combinations of devices.
4. If connected to a dimmer, the installer shall test the equipment through its full dimming range to ensure that the equipment works to the satisfaction of the customer.
5. Where installed equipment causes sub-optimal operation, the installer shall either reinstall the original equipment (or equivalent replacement) or replace any components of the equipment that are causing the

installation not to operate, at no expense to the resident. Such a request for reinstatement must be acted upon if made within 20 business of the installation of the new equipment.

6. The person undertaking this activity in a residential customer's premises must satisfy the REES Code mandatory safety training requirements. Registered Plumbers, Gas Fitters, Electricians and Building Work Supervisors are exempt from this requirement.

6. Activity energy savings

The total normalised energy saved per lamp installed in a residential premises is equal to:

Normalised Energy Savings (GJ)=Savings factor expressed in column E, F or G of the tables below, as applicable:

Table L1A: Non-Directional Lamps

A	B	C	D	E	F	G
Class	Removed lamp: typical rated incandescent lamp power (W)	Removed lamp: typical rated halogen lamp power (W)	Installed lamp: minimum luminous flux (lumens)	CFL Savings Factor	Std LED Savings Factor	HE LED Savings Factor
1	40	28	350	0.35	0.39	0.53
2	60	42	650	0.52	0.58	0.75
3	75	53	850	0.66	0.74	0.92
4	100	70	1,150	0.89	0.99	1.19
5	150	105	1,800	1.36	1.51	1.73

Table L1B: Directional Lamps

A	B	C	D	E	F	G
Class	Removed lamp: typical rated incandescent lamp power (W)	Removed lamp: typical rated halogen lamp power (W)	Installed lamp: minimum luminous flux (lumens)	CFL Energy Savings (GJ)	Std LED Energy Savings (GJ)	HE LED Energy Savings (GJ)
1	40	28	250	0.84	1.17	1.24
1a	50	35	350	1.03	1.43	1.53
2	60	42	460	1.23	1.69	1.82
3	75	53	600	1.56	2.10	2.26
4	100	70	810	2.12	2.78	3.00
4a	120	84	990	2.55	3.31	3.59
5	150	105	1,260	3.24	4.14	4.48

7. Guidance Notes (Informative only – not mandatory)

All reasonable endeavours should be undertaken to recycle removed equipment.

7.18 Install LED down-light Lamp or LED down-light luminaire - L2

L2A - ELV down-light bulb replacement

L2B - ELV down-light luminaire replacement

L2C - ELV down-light luminaire replacement + ceiling insulation reinstatement

CURRENT REES ACTIVITY

“Install efficient extra low voltage down lights”

PROPOSED REES ACTIVITY

“Install LED Down-light Lamp or LED Down-light Luminaire”

KEY FEATURES OF THIS SPECIFICATION

This activity involves:

- Activity L2A: replacing a 35-50W extra low voltage (ELV) halogen lamp with an integral ELV LED lamp (for clarity, this is a “plug-and-play” lamp which allows the existing transformer and fitting to be retained); or
- Activity L2B: replacing a 35-50W ELV luminaire (remove halogen lamp, remove transformer, removal of fitting is optional) with an integral mains voltage (MV) LED lamp or MV LED down-light luminaire; or
- Activity L2C: if an MV LED down-light luminaire is installed (L2B), there is an option to reinstate the ceiling insulation around the down-light and where permitted by the relevant standards, over the new replacement down-light.

Notes:

- “Integral ELV LED lamp” means a lamp with power supply electronics integrated into the lamp housing allowing direct connection to existing 12V power supply.
- “Integral MV LED lamp” means a lamp with power supply electronics integrated into the lamp housing allowing direct connection to existing mains power supply.

The key changes from the current specification are:

- The option of installing CFL down-lights has been removed, for the following reasons:
 - When used as a down-light in a confined light fixture, CFLs suffer from heat build-up. The result of this is that the design of these CFLs results in them taking a long time to run up.
 - Down-lights in houses are often on a dimmer, and CFLs are inherently un-dimmable.
 - It is difficult for a CFL to be able to produce the quantity of light required for a down-light, given the space restrictions - e.g. halogen down light lamps are 50mm diameter and a CFL of this size cannot produce sufficient light.
 - LEDs do not suffer significantly from these problems, and in recent years have developed sufficiently to allow them to be a viable option for down-lights - both as a lamp-only replacement and as an entire lighting fixture.
- “Option 2” of replacing lamp and magnetic transformer with electronic transformer has been removed. This option was included when a 35W halogen lamp and electronic transformer was the best available option for down-lights. As discussed above, LEDs have recently become a viable option for down-lights. In addition, MEPS has now mandated 35W lamps in place of 50W lamps.
- For LEDs, the majority of performance requirements have been kept but the required specification has been changed to:
 - An integral ELV LED lamp or integral MV LED lamp shall meet current US Energy Star specification for integral lamps.

- An MV LED down-light luminaire shall meet US Energy Star specification for luminaires V1.2¹⁶.
- An additional credit for re-instatement of ceiling insulation around (and where permitted over) the down-light has been incorporated.
- All installed products shall provide a minimum 2 years replacement warranty.

ENERGY SAVINGS METHODOLOGY

It is proposed that default energy savings factors be used to determine the energy savings from this activity.

The Technical Assessment – L2 (pages 174 to 186 of Appendix 2) outlines the consultant’s approach to determining the energy savings from this activity. Table 86 of this describes the assumptions used to derive the default energy savings shown in the specification.

The approach used by the consultants involves determining the difference in energy use between an efficient light and an inefficient unit. For activity L2A, this is a comparison of the energy use of the lamps. For L2B, the comparison includes transformers. L2C is an extension on L2B which includes additional energy savings from reinstating insulation near the downlight.

The resulting electricity savings are also the normalised savings factors presented in the specification, given that the normalisation factor for electricity is 1 (as described in Section 4).

CONSULTATION QUESTIONS SPECIFIC TO THIS ACTIVITY

- **Are there sufficient products in the Australian market that will meet the installed product requirements?**
- **Are the safety provisions in the specification for each of these activities sufficient to minimise risks associated with poor lighting products and installation practices?**
- **Is the reinstating of insulation (Activity L2C) an appropriate activity for the REES?**
- **Are the safety provisions in Activity L2C sufficient to minimise risks associated with poor insulation and/or down light cover products and installation practices?**

¹⁶ http://www.energystar.gov/certified-products/detail/501/partners?fuseaction=products_for_partners.showLightFixRes

Install LED Down-light Lamp or LED Down-light Luminaire	Activity No.
	L2

1. Activity Specific Definitions

Integral ELV LED lamp means a lamp with power supply electronics integrated into the lamp housing allowing direct connection to existing 12V power supply.

Integral MV LED lamp means a lamp with power supply electronics integrated into the lamp housing allowing direct connection to existing mains power supply.

Mains voltage (MV) LED down-light luminaire means a mains voltage LED light fixture incorporating light source, power supply electronics and luminaire housing that does not rely on any existing components of the replaced equipment in order to operate.

ELV means extra low voltage, which in this context means nominal 12V a.c. or d.c.

Luminaire means apparatus which distributes, filters or transforms the light transmitted from one or more lamps and which includes, except the lamps themselves, all the parts necessary for fixing and protecting the lamps and, where necessary, circuit auxiliaries together with the means for connecting them to the electricity supply.

Partial re-installation of insulation means reinstatement of ceiling insulation around the down-light, only maintaining the minimum specified separation distance between the down-light and the surrounding insulation (50mm) as specified in AS/NZS 3000.

Full re-installation of insulation means complete reinstatement of ceiling insulation around and over the down-light (where permitted)

2. Activity Description (Summary)

L2A Replace ELV halogen lamp with an integral ELV LED lamp

L2B Replace ELV halogen lamp and transformer with an integral MV LED lamp or MV LED down-light luminaire.

L2C Optional with L2B - re-instate ceiling insulation.

3. Activity Eligibility Requirements

1. All equipment that is replaced must be in working order immediately prior to removal.

4. Installed Product Requirements

The installed product shall—

1. Be installed at the time of removal of the existing equipment.
2. Have a rated colour temperature not exceeding 3000 Kelvin, unless otherwise authorised by the occupant of the premises.
3. Have a measured average initial luminous flux (verified by test report - test procedure as required by one of the programs described below) of at least 500 lumens.
4. Provide a minimum 2 years replacement warranty.
5. the LED model can be approved by the NSW ESS scheme. Alternatively, Integral ELV LED lamp or integral MV LED lamp shall demonstrate compliance with either Energy Star Integral LED Lamps V1.4 or Energy Star Lamps V1.0 by providing current proof of Energy Star program certification.
6. the LED model can be approved by the NSW ESS scheme. Alternatively, Mains voltage LED down-light luminaire shall meet US Energy Star specification for luminaires V1.2 by demonstrating that the model meets the Energy Star specification by providing current proof of Energy Star program certification.

For Activity L2C

7. Re-installation of ceiling insulation - the activity L2C can only be undertaken in combination with activity L2B.
8. Re-installation of ceiling insulation - where a down-light thermal barrier is used it must comply with AS/NZS 5110.
9. Re-installation of ceiling insulation - different levels of credit are available depending on whether or not the activity involves a partial or a full re-installation of the ceiling insulation
10. Down-light thermal barriers – where used, any barrier that is used around and or over a light fitting must be one that is approved for use with the particular light fitting by the manufacturer in their product literature and must not adversely affect any aspect of the performance of the light fitting or any form of lamp that may be fitted to that fitting.
11. Where the full re-installation of thermal insulation option is used, the down-light or down-light in combination with a down-light thermal barrier must be certified by the manufacturer in accordance with AS/NZS 3000 as being suitable for operation when covered by thermal insulation material.

5. Minimum Installation Requirements

1. A person or entity undertaking this activity shall use best endeavours to ensure that any replacements are targeted at high usage luminaires in the first instance.
2. All equipment replaced shall be removed from the premises and not re-used.
3. Installed equipment shall not be connected to a transformer, dimmer, timer, motion sensor, daylight switch or other automated switch or control (or combination thereof) unless specified by the manufacturer as being compatible with such device or combinations of devices.
4. If connected to a dimmer, the installer shall test the equipment through its full dimming range to ensure that the equipment works to the satisfaction of the customer.
5. Where installed equipment causes sub-optimal operation, the installer shall either reinstall the original equipment (or equivalent replacement) or replace any components of the equipment that are causing the installation not to operate, at no expense to the resident. Such a request for reinstatement must be acted upon if made within 20 business days of the installation of the new equipment.
6. Other than for simple exchange of lamps within an existing fitting, installation is required by a licenced electrician.
7. The person undertaking this activity in a residential customer's premises must satisfy the REES Code mandatory safety training requirements. Registered Plumbers, Gas Fitters, Electricians and Building Work Supervisors are exempt from this requirement.

For Activity L2C

8. Re-instatement of ceiling insulation - the activity is only applicable to ceiling spaces already fitted with ceiling insulation of at least R1.5 and where the insulation around the pre-existing down-light does not already meet the requirements of "partial re-instatement". The insulation used for re-instatement purposes must have an R value equal to or greater than the pre-existing ceiling insulation (minimum = R1.5)
9. Re-instatement of ceiling insulation - the activity can only be undertaken in ceilings that abut roofs (i.e. not internal ceilings such as between a ground floor and an upper floor of a two storey dwelling).

6. Activity energy savings

The total normalised energy saved per activity is equal to:

Normalised Energy Savings (GJ) = The relevant Savings factor in the tables below:

Option	Savings Factor
L2A1: Replacing a 35-50W ELV halogen lamp with an integral ELV LED lamp with rated power $\leq 10W$	1.04000
L2A2: Replacing a 35-50W ELV halogen lamp with an integral ELV LED lamp with rated power 11-15W	0.83000
L2B1: Replacing a 35-50W ELV halogen lamp and transformer with an integral mains voltage LED lamp or mains voltage LED down-light luminaire with rated power $\leq 10W$	1.10000
L2B2: Replacing a 35-50W ELV halogen lamp and transformer with an integral mains voltage LED lamp or mains voltage LED down-light luminaire with rated power 11-15W	0.92000
Option Activity L2C	
L2C1: Partial re-instatement of insulation (BCA Zones 4 & 5) (additional savings, only with L2B1 or L2B2)	0.14160
L2C2: Full re-instatement of insulation (BCA Zones 4 & 5) (additional savings, only with L2B1 or L2B2)	0.24729
L2C3: Partial re-instatement of insulation (BCA Zone 6) (additional savings, only with L2B1 or L2B2)	0.20729
L2C4: Full re-instatement of insulation (BCA Zone 6) (additional savings, only with L2B1 or L2B2)	0.37079

Options L2C1, L2C2, L2C3 & L2C4 are additional space conditioning savings that are added to the applicable lamp replacement Option L2B1 or L2B2 savings. Options L2C1 to L2C4 are NOT available with Options L2A1 or L2A2.

7. Guidance Notes (Informative only – not mandatory)

All reasonable endeavours should be undertaken to recycle removed equipment.

7.19 Replace halogen floodlight luminaire - L3

CURRENT REES ACTIVITY

None

PROPOSED REES ACTIVITY

“Replace halogen floodlight luminaire”

KEY FEATURE OF THIS SPECIFICATION

This activity involves replacing a halogen floodlight luminaire with an LED luminaire. Note that a linear halogen floodlight utilises a linear halogen lamp.

ENERGY SAVINGS METHODOLOGY

It is proposed that default energy savings factors be used to determine the energy savings from this activity.

The Technical Assessment – L3 (pages 187 to 192 of Appendix 2) outlines the consultant’s approach to determining the energy savings from this activity. Table 88 of this describes the assumptions used to derive the default energy savings and Table 89 presents the energy savings results.

The approach used by the consultants involves determining the difference in energy use between an efficient lamp and an inefficient lamp.

The resulting electricity savings are also the normalised savings factors presented in the specification, given that the normalisation factor for electricity is 1 (as described in Section 4).

CONSULTATION QUESTIONS SPECIFIC TO THIS ACTIVITY

- **Are the safety provisions in this specification sufficient to minimise risks associated with poor products and installation practices?**

Replace Halogen Floodlight Luminaire	Activity No.
	L3

1. Activity Specific Definitions

Luminaire means apparatus which distributes, filters or transforms the light transmitted from one or more lamps and which includes, except the lamps themselves, all the parts necessary for fixing and protecting the lamps and, where necessary, circuit auxiliaries together with the means for connecting them to the electric supply

2. Activity Description (Summary)

Replace a halogen floodlight luminaire with an LED luminaire. Note that lamp-only replacements and modifications to existing luminaires are not included.

3. Activity Eligibility Requirements

1. All equipment that is replaced must be in working order immediately prior to removal.
2. Replaced equipment must be a linear halogen floodlight.
3. Replaced equipment must not be a portable floodlight - it shall be hard-wired into the premises.
4. Replaced equipment (lamp) must be rated > 100W.

4. Installed Product Requirements

The installed product shall—

1. Be installed at the time of removal of the existing equipment.
2. Have a measured average initial luminous flux of at least the corresponding* value in column 2 of the table below (verified by test report utilising test procedures as required by one of the programs below). *Note that this should correspond to the class of replaced luminaire.
3. Provide a minimum 2 years replacement warranty.
4. The LED luminaire can be approved by the NSW ESS scheme. Alternatively, meet either US Energy Star specification for luminaires V1.2 or Designlights¹⁷ Technical Requirements Table v2.1 by providing current proof of program certification.

5. Minimum Installation Requirements

1. A person or entity undertaking this activity shall use best endeavours to ensure that any replacements are targeted at high usage luminaires in the first instance.
2. All equipment replaced shall be removed from the premises and not re-used.
3. Installed equipment shall not be connected to a transformer, dimmer, timer, motion sensor, daylight switch or other automated switch or control (or combination thereof) unless specified by the manufacturer as being compatible with such device or combinations of devices.
4. If connected to a dimmer, the installer shall test the equipment through its full dimming range to ensure that the equipment works to the satisfaction of the customer.
5. Where installed equipment causes sub-optimal operation, the installer shall either reinstall the original equipment (or equivalent replacement) or replace any components of the equipment that are causing the installation not to operate, at no expense to the resident. Such a request for reinstatement must be acted upon if made within 20 business of the installation of the new equipment.
6. Installation is required by a licenced electrician.

6. Activity energy savings

The total normalised energy saved per unit installed is equal to:

Normalised Energy Savings (GJ)= The relevant Savings factor in the table below:

P = power of existing luminaire (W)	Replacement luminaire (light output and rated power)					
	Minimum luminaire light output (lm)	≤30W	≤45W	≤60W	≤90W	≤150W
100 < P < 150W	1,500	1.19				
150 ≤ P < 200W	2,500	1.98	1.67			
200 ≤ P < 300W	3,500		2.45	2.20		
300 ≤ P < 500W	5,700			3.78	3.17	
500 ≤ P	10,000				6.30	5.04

7. Guidance Notes (Informative only – not mandatory)

All reasonable endeavours should be undertaken to recycle removed equipment.

¹⁷ <https://www.designlights.org/Content/QPL/ProductSubmit/CategorySpecifications>

7.20 Replace linear fluorescent luminaire - L4

CURRENT REES ACTIVITY

None

PROPOSED REES ACTIVITY

“Replace Linear Fluorescent Luminaire”

KEY FEATURE OF THIS SPECIFICATION

This activity involves replacing a T8 or T12 fluorescent luminaire with a T5 fluorescent luminaire or LED luminaire. Broadly based on ESS (NSW) specification.

ENERGY SAVINGS METHODOLOGY

It is proposed that default energy savings factors be used to determine the energy savings from this activity.

The Technical Assessment – L3 (pages 193 to 199 of Appendix 2) outlines the consultant’s approach to determining the energy savings from this activity. Table 91 of this describes the assumptions used to derive the default energy savings and Tables 92 and 93 presents the energy savings results.

The approach used by the consultants involves determining the difference in energy use for an efficient lamp and an inefficient lamp.

The resulting electricity savings are also the normalised savings factors presented in the specification, given that the normalisation factor for electricity is 1 (as described in Section 4).

CONSULTATION QUESTIONS SPECIFIC TO THIS ACTIVITY

- **Are the safety provisions in this specification sufficient to minimise risks associated with poor products and installation practices?**

Replace Linear Fluorescent Luminaire**Activity No.**

L4

1. Activity Specific Definitions

Luminaire means apparatus which distributes, filters or transforms the light transmitted from one or more lamps and which includes, except the lamps themselves, all the parts necessary for fixing and protecting the lamps and, where necessary, circuit auxiliaries together with the means for connecting them to the electric supply

2. Activity Description (Summary)

Replace a T8 or T12 fluorescent luminaire with a T5 fluorescent luminaire or LED luminaire. Note that lamp-only replacements and modifications to existing luminaires (such as T5 adaptor kits or retrofit T5/LED lamps) are not included.

3. Activity Eligibility Requirements

1. All equipment that is replaced must be in working order immediately prior to removal.
2. Replaced equipment must be a 2-foot or 4-foot T8 or T12 fluorescent luminaire.

4. Installed Product Requirements

The installed product shall—

1. Be installed at the time of removal of the existing equipment.
2. Have a measured average initial luminous flux of at least the corresponding* value in column 2 of the table below (verified by test report utilising test procedures as required by one of the programs below). *Note that this should correspond to the class of replaced luminaire.
3. Provide a minimum 2 years replacement warranty.
4. The LED luminaire can be approved by the NSW ESS scheme. Alternatively, LED luminaires shall meet the Designlights¹⁸ Technical Requirements Table v2.1 or Energy Star requirements by providing current proof of program certification.
5. Fluorescent lamps shall have a rated life of at least 20,000 hours.

5. Minimum Installation Requirements

1. A person or entity undertaking this activity shall use best endeavours to ensure that any replacements are targeted at high usage luminaires in the first instance.
2. All equipment replaced shall be removed from the premises and not re-used.
3. Installed equipment shall not be connected to a transformer, dimmer, timer, motion sensor, daylight switch or other automated switch or control (or combination thereof) unless specified by the manufacturer as being compatible with such device or combinations of devices.
4. If connected to a dimmer, the installer shall test the equipment through its full dimming range to ensure that the equipment works to the satisfaction of the customer.
5. Where installed equipment causes sub-optimal operation, the installer shall either reinstall the original equipment (or equivalent replacement) or replace any components of the equipment that are causing the installation not to operate, at no expense to the resident. Such a request for reinstatement must be acted upon if made within 20 business days of the installation of the new equipment...
6. Installation is required by a licenced electrician.
7. The person undertaking this activity in a residential customer's premises must satisfy the REES Code mandatory safety training requirements.

¹⁸ <https://www.designlights.org/Content/QPL/ProductSubmit/CategorySpecifications>

6. Activity energy savings

The total normalised energy saved per unit installed is equal to:

Normalised Energy Savings (GJ) = The relevant Savings factor in the tables below:

Normalised savings from replacement with T5/LED luminaire (2-foot)

	Replacement luminaire (light output and rated power)						
	Minimum luminaire light output (lm)	≤ 10W	≤ 15W	≤ 20W	≤ 25W	≤ 30W	≤ 35W
Existing 2-foot Luminaire							
Single-lamp T8/T12	1,000	0.58	0.40	-	-	-	-
Twin-lamp T8/T12	2,000	-	1.33	1.15	0.97	0.79	0.61

Normalised savings from replacement with T5/LED luminaire (4-foot)

Existing 4-foot Luminaire	Replacement luminaire (light output and rated power)									
	Minimum luminaire light output (lm)	≤ 20W	≤ 25W	≤ 30W	≤ 35W	≤ 40W	≤ 45W	≤ 50W	≤ 55W	≤ 60W
Single-lamp T8/T12	2,200	0.86	0.68	0.50	-	-	-	-	-	-
Twin-lamp T8/T12	4,400	-	-	2.09	1.91	1.73	1.55	1.37	1.19	1.01

7. Guidance Notes (Informative only – not mandatory)

All reasonable endeavours should be undertaken to recycle removed equipment.

7.21 Standby power controllers

7.21.1 Install standby power controllers - Audio Visual (AV) - SPC1

7.21.2 Install standby power controllers - Information Technology (IT) - SPC2

CURRENT REES ACTIVITY

“Install a standby power controller to automatically reduce the standby energy consumption of residential audio visual equipment (standby power controller (AV))”

“Install a standby power controller to automatically reduce the standby energy consumption of residential information technology equipment (standby power controller (IT))”

PROPOSED REES ACTIVITY

“Install a standby power controller to automatically reduce the standby energy consumption of residential audio visual equipment (standby power controller (AV))”

“Install a standby power controller to automatically reduce the standby energy consumption of residential information technology equipment (standby power controller (IT))”

KEY FEATURES OF THIS SPECIFICATION

For an AV SPC, this activity covers the installation of a standby power controller (SPC) in a situation where two or more audio visual devices can be controlled by the SPC. For an IT SPC, this activity covers the installation of a standby power controller (SPC) in a situation where two or more information technology devices can be controlled by the SPC. This activity covers the installation of new equipment (SPCs) that saves energy in other devices (while consuming some energy itself to do so). So the energy savings are indirect and depend on the characteristics of the devices that are controlled and the associated user interaction with those devices.

Minimum performance specifications cover compliance with relevant Australian Standards (none are specifically referenced), can control up to 4 appliances, can operate for 50,000 switching cycles, consumes less than 1 W of power, automatically disconnects and reconnects power either as master/slave (normal for IT) or on the basis of infra-red signals (normal for advanced AV), works with all remote controls and does not require manual setting of power thresholds.

After detailed analysis and review, some major changes are proposed regarding the specifications for standby power controllers. The most significant change recommended is a revision to the energy savings credits earned through their installation. Most other aspects of the specification remain in place with a few small adjustments.

Many aspects of the specification remain unchanged, specifically:

- Current design and performance specification remain unchanged;
- SPCs must be connected to at least 2 controlled appliances at the time of installation;
- A person or entity undertaking this activity shall use best endeavours to ensure any installations are targeted at high usage applications in the first instance.

Changes are proposed for:

- A maximum of 1 IT SPC may installed in any one premises (previously up to 4 could be installed)
- Not more than 3 SPCs can be installed (under REES) in any one premises (AV and IT SPCs combined) (previously up to 4 could be installed).

The default energy savings factors are significantly reduced from the current levels to reflect more accurately the likely savings in an average household during normal use.

ENERGY SAVINGS METHODOLOGY

It is proposed that default energy savings factors be used to determine the energy savings from this activity.

The Technical Assessment – SPC1 and SPC2 (pages 200 to 225 of Appendix 2) outlines the consultant's approach to determining the energy savings from this activity. Table 98 of this describes the assumptions used to derive the default energy savings and Tables 100-104 presents the energy savings results.

The approach used by the consultants involves determining the energy savings resulting from the operation of a standby power controller controlling a number of AV or IT devices. .

The resulting electricity savings are also the normalised savings factors presented in the specification, given that the normalisation factor for electricity is 1 (as described in Section 4).

CONSULTATION QUESTIONS SPECIFIC TO THIS ACTIVITY

- **Do the revised default energy savings factors fairly describe the likely energy savings that arise from the use of a standby power controller?**
- **If alternate assumptions and/or methods are proposed, please provide specific details.**

Install Standby Power Controllers - Audio Visual (AV)	Activity No. SPC1
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1. Activity Specific Definitions

Approved laboratory test is a test approved by the Commission, and in the absence of the Commission specifying an approved laboratory test is a test that meets the Essential Services Commission of Victoria published testing requirements. The Essential Services Commission of Victoria laboratory testing requirements are provided in the document "Explanatory Note- Laboratory Tests for Standby Power Controllers", Version 1.1 – 29 August 2011, as amended from time to time, available at: <https://www.veet.vic.gov.au/Public/Public.aspx?id=Publications>

Mains power switching device means a relay or other device that switches the power to the controlled appliances on or off

Master/slave arrangement means an arrangement where the standby power controller is connected to an uncontrolled master appliance, which's current or power is solely used to control the electrical input to controlled appliances connected to the standby power controller

Main television means the television indicated by the householder as the one that is most frequently viewed.

Any other equipment means any secondary television or other AV equipment (such as audio) and associated AV equipment that is connected to an AV SPC.

Advanced SPC means a product that meets the installed product requirements; and does not operate solely on the basis of a master/slave arrangement; and has been subjected to a field trial approved by the Essential Services Commission of Victoria.

Simple SPC means a product that meets the installed product requirements.

2. Activity Description (Summary)

Install a standby power controller to automatically reduce the standby energy consumption of residential audio visual equipment (standby power controller (AV))

3. Activity Eligibility Requirements

Any residential household in South Australia where the minimum installation requirements can be met.

4. Installed Product Requirements

The standby power controller (AV) must meet the requirements of any applicable Australian Standard in force in respect of standby power controllers. In the absence of any applicable Australian Standard the standby power controller (AV) must, when tested by an approved laboratory in accordance with an approved laboratory test, be determined to be suitable for use in an audio visual environment and demonstrated to:

1. Be capable of controlling the power of at least 4 appliances (whether directly or indirectly);
2. Be fitted with a mains power switching device that is rated to a minimum of 50,000 switching cycles;
3. Have an electric power consumption of not more than 1 watt when tested in accordance with the laboratory test;
4. Automatically disconnect mains power from controlled appliances: (a) In the case of a product that relies on a master/slave arrangement – when the master appliance is turned off; (b) In the case of a product that relies on sensing infra-red signals from the remote controls of controlled appliances – after a period of time specified in the laboratory test when the product does not detect infra-red signals from those remote controls that are triggered by a user.
5. Automatically reconnect mains power to the controlled appliances only when: (a) in the case of a product that relies on a master/slave arrangement – when the master appliance is turned on; (b) in the case of a product that relies on sensing infra-red signals from the remote controls of controlled appliances – when any of the controlled appliances are operated by a user.
6. Be able, at the time of installation, to disconnect mains power from or reconnect mains power to controlled appliances without having to be set up to have those functions assigned to the operation of an existing appliance remote control; and
7. Not require manual setting of a current or power threshold.

5. Minimum Installation Requirements

1. The standby power controller must be connected to at least 2 controlled appliances at the time of installation.
2. No more than 3 standby power controllers (AV) may be installed in one premises provided that, where more than 1 standby power controller (AV) is or is to be installed at premises at which 1 standby power controller (IT) (refer separate REES activity) is also installed, the total number of installed standby powers controllers (IT and AV) must not exceed 3.

3. Where it can be demonstrated that the occupants have changed at premises where standby power controllers were installed for the purposes of REES, a maximum of 3 further standby power controllers (IT and AV) may be installed at that premises.
4. The Commission must approve the manner of installation, and the form and manner of training (including on-going support) that must be provided to the residential customer, prior to the activity being undertaken.
5. A person or entity undertaking this activity shall use best endeavours to ensure any installations are targeted at high usage applications in the first instance.

6. Activity energy savings

The total normalised energy saved from this activity per residential premises is equal to:

Normalised Energy Savings (GJ)= The relevant Savings factor in the table below:

Activity Description – type installed	Savings Factor
Advanced AV SPC installed on the main television	2.0
Advanced SPC (any type) installed on any other equipment	1.5
Simple SPC installed on any equipment type	1.0

7. Guidance Notes (Informative only – not mandatory)

Abatement levels referenced in 6 are prior to VEET adjustments applied on 7 October 2013.

Install Standby Power Controllers –Information Technology (IT)	Activity No.
	SPC2

1. Activity Specific Definitions

Approved laboratory test is a test approved by the Commission, and in the absence of the Commission specifying an approved laboratory test a test that meets the Essential Services Commission of Victoria published testing requirements. The Essential Services Commission of Victoria laboratory testing requirements are provided in the document “Explanatory Note- Laboratory Tests for Standby Power Controllers”, Version 1.1 – 29 August 2011, as amended from time to time, available at: <https://www.veet.vic.gov.au/Public/Public.aspx?id=Publications>

Mains power switching device means a relay or other device that switches the power to the controlled appliances on or off.

Master/slave arrangement means an arrangement where the standby power controller is connected to an uncontrolled master appliance, who’s current or power is solely used to control the electrical input to controlled appliances connected to the standby power controller.

Active state in relation to a computer, means a state in which the computer is carrying out useful work in response to prior or concurrent (a) user input; or (b) Instruction over a network.

Off mode in relation to a computer, means a low power state that the computer is capable of entering automatically after a period of inactivity or by manual selection.

Main PC means the desktop or laptop indicated by the householder as the one that is most frequently used. It does not include tablets or mobile phones.

Any other equipment means any secondary PC (laptop or desktop) and associated IT equipment that is connected to an IT SPC.

Advanced IT SPC means a product that meets the installed product requirements; and is capable of automatically disconnecting mains power to controlled appliances when the master computer enters Sleep Mode; and has been subjected to a field trial approved by the Essential Services Commission of Victoria.

Simple SPC means a product that meets the installed product requirements.

2. Activity Description (Summary)

Install a standby power controller to automatically reduce the standby energy consumption of residential information technology equipment (standby power controller (IT))

3. Activity Eligibility Requirements

Any residential household in South Australia where the minimum installation requirements can be met.

4. Installed Product Requirements

The standby power controller (IT) must meet the requirements of any applicable Australian Standard in force in respect of standby power controllers. In the absence of any applicable Australian Standard the standby power controller (IT) must, when tested by an approved laboratory in accordance with an approved laboratory test, be determined to be suitable for use in an information technology environment and demonstrated to:

1. Be suitable for use with desktop and notebook computers that are not more than 2 years old;
2. Be capable of controlling the power of at least 4 appliances (whether directly or indirectly);
3. Be fitted with a mains power switching device that is rated to a minimum of 50,000 switching cycles;
4. Have an electric power consumption of not more than 1 watt when tested in accordance with the laboratory test;
5. Automatically disconnect mains power from controlled appliances when the master computer is switched to Off Mode;
6. Automatically reconnect mains power to the controlled appliances when the master computer enters Active State;
7. Not be reliant on a universal serial bus connection to determine the operating mode of the computer;
8. Be able, at the time of installation, to disconnect mains power from or reconnect mains power to controlled appliances without having to be set up to have those functions assigned to the operation of an existing appliance remote control; and
9. Not require manual setting of a current or power threshold.

5. Minimum Installation Requirements

1. The standby power controller must be connected to at least 2 controlled appliances at the time of installation.
2. A maximum of 1 standby power controllers (IT) may be installed in any one household. The total number of installed standby powers controllers (IT and AV) must not exceed 3.

3. Where it can be demonstrated that the occupants have changed at premises where standby power controllers were installed for the purposes of REES, one standby power controller (IT) may be installed with a maximum of 3 standby power controllers (IT and AV) installed at that premises.
4. The Commission must approve the manner of installation, and the form and manner of training (including on-going support) that must be provided to the residential customer, prior to the activity being undertaken.
5. A person or entity undertaking this activity shall use best endeavours to ensure any installations are targeted at high usage applications in the first instance.

6. Activity energy savings

The total normalised energy saved from this activity per residential premises is equal to:

Normalised Energy Savings (GJ)= The relevant Savings factor in the table below:

Activity Description – type installed	Savings Factor
Advanced IT SPC installed on the main PC (laptop or desktop)	2.0
Advanced SPC (any type) installed on any other equipment	1.5
Simple SPC installed on any equipment type	1.0

7. Guidance Notes (Informative only – not mandatory)

Abatement levels referenced are prior to VEET adjustments applied on 7 October 2013.

7.22 High efficiency appliances

- 7.22.1 Purchase a high efficiency new refrigerator - APP1A
- 7.22.2 Purchase a high efficiency new freezer - APP1B
- 7.22.3 Purchase a high efficiency new clothes dryer - APP1D
- 7.22.4 Purchase a high efficiency new television - APP1F

CURRENT REES ACTIVITY

None

PROPOSED REES ACTIVITY

- “Purchase a high efficiency new refrigerator”
- “Purchase a high efficiency new freezer”
- “Purchase a high efficiency new clothes dryer”
- “Purchase a high efficiency new television”

KEY FEATURES OF THIS SPECIFICATION

This activity covers the purchase of any of the specified appliances for use by households or businesses in South Australia.

This activity does not specify the requirements for any existing appliance that may be replaced, the energy savings are calculated on the basis that:

- Appliances installed will be the main appliance, are of a typical size (range) and configuration for that purpose;
- Energy savings are estimated from the difference between the estimate in use energy consumption of an average efficiency product of that size and type and the specified high efficiency product of that size and type.

Default energy savings are specified using the star rating algorithm for each appliance, adjusted for normal conditions of use in South Australia. In general terms, the proposed activity will align with the requirements for ACT and Victoria in terms of qualification and calculation of default energy savings, with the exception of some adjustments to refrigerator, freezer and television energy based on conditions of normal use. Criteria for televisions have been upgraded due rapid market changes in recent years.

This is a new category of activities under REES so all aspects are new. However, it is useful to note the following comparisons with the existing state schemes:

- APP1A Refrigerators – aligned with Victoria and ACT
- APP1B Freezers – aligned with Victoria and ACT
- APP1D Clothes Dryers – aligned with Victoria and ACT
- APP1F Television – the approach is broadly aligned with Victoria and ACT, but the qualification and savings base has been updated to reflect current and likely market trends over the period 2015-2017.

Key elements of the new specifications are

- All specifications include a requirement that products be registered for energy labelling (and MEPS where applicable) and that the registration is valid at the time of sale (this precludes cancelled or contested registrations from claiming credits).
- Credits are available directly to appliance retailers rather than through service providers or end users.
- These energy credits are not restricted to the residential sector. A significant proportion of some appliance sales are to the commercial sector and tracing the ultimate destination of the appliances is very difficult and is not warranted.

- For televisions, the Victorian and ACT conceptual approach is used, but with major adjustments to all the parameters to take into account the latest market trends and data. It needs to be noted that televisions efficiency in particular (and technology evolution in general) have been changing very rapidly since labelling began in 2009 and so a dynamic savings base that changes each year from 2015 to 2017 is proposed, with an annual review well before the commencement of each calendar year.

ENERGY SAVINGS METHODOLOGY

It is proposed that default energy savings factors be used to determine the energy savings from this activity.

The Technical Assessment – APP1 (pages 226 to 271 of Appendix 2) outlines the consultant’s approach to determining the energy savings from this activity. Table 112 of this describes the assumptions used to derive the default energy savings.

The approach used by the consultants involves determining the energy savings resulting from the use of an efficient appliance compared with the use of a market average efficiency appliance.

The resulting electricity savings are also the normalised savings factors presented in the specification, given that the normalisation factor for electricity is 1 (as described in Section 4).

CONSULTATION QUESTIONS SPECIFIC TO THIS ACTIVITY

- **Are the specifications for these activities suitable for use by a range of parties, including appliance retailers?**
- **Are the formula based energy savings calculations suitable for use by those undertaking these activities?**
- **Will those parties undertaking these activities have ready access to the information needed to determine energy savings?**
- **For activity APP1D (purchasing an high efficiency new clothes dryer), should gas powered driers be included?**

Purchase high efficiency new Refrigerator or Refrigerator-freezer	Activity No.
	APP1A

1. Activity Specific Definitions

Refrigerator means a refrigerating appliance registered for energy labelling and MEPS under standard AS/NZS4474.2 classified as Group 1, 4, 5T, 5B or 5S

CEC is the Comparative Energy Consumption shown on the energy label and entered in the product registration in kWh/year

Gross volume is the total gross volume of all compartments as determined in accordance with AS/NZS4474.1 in litres

Adjusted volume (Vadj) is the **adjusted volume** determined in accordance with AS/NZS4474.2 and entered in the product registration in **litres**

2. Activity Description (Summary)

Purchase an efficient new refrigerator or refrigerator-freezer

3. Activity Eligibility Requirements

Any compliant product sold in a retail outlet in South Australia for use in a residential or commercial premises in South Australia.

4. Product Requirements

1. A Group 1 product shall have a total gross volume in the size range 100 to 500 litres and shall achieve a star rating index of not less than 2.0 in accordance with AS/NZS4474.2;
2. A Group 4, 5T, 5B or 5S product shall have a total gross volume in the size range 100 to 700 litres and shall achieve a star rating index of not less than 2.7 in accordance with AS/NZS4474.2.
3. The product shall have a valid registration with the GEMS regulator at the time of sale.
4. The refrigerating appliance shall not have a designation of cooled appliance under AS/NZS4474.1.
5. The refrigerating appliance shall not be a wine storage appliance or have any compartment that is intended exclusively for wine or beverage storage.

5. Minimum Installation Requirements

None.

6. Activity energy savings

The total normalised energy saved per appliance purchased is equal to:

Group 1 Normalised Energy Savings GJ = $\{[0.9126 \times (200 + 4 \times (Vadj)^{0.67})] - CEC\} \times 0.04374$

Group 4, 5T, 5B, 5S Normalised Energy Savings GJ = $\{[0.6954 \times (150 + 8.8 \times (Vadj)^{0.67})] - CEC\} \times 0.04374$

7. Guidance Notes (Informative only – not mandatory)

Information on registration data for current models can be obtained from http://reg.energyrating.gov.au/comparator/product_types/28/search/ - see Download CSV.

A description of refrigerator and freezer Groups is provided at, <http://www.energyrating.gov.au/products-themes/refrigeration/domestic-refrigeration/meps/>

Cooled appliance has the meaning as in AS/NZS4474.1, being an appliance which cannot be classified as a refrigerator, refrigerator/freezer or freezer.

Purchase a high efficiency New Freezer	Activity No.
	APP1B

1. Activity Specific Definitions

Freezer means a refrigerating appliance registered for energy labelling and MEPS under standard AS/NZS4474.2 classified as Group 6C, 6U or 7.

CEC is the Comparative Energy Consumption shown on the energy label and entered in the product registration in kWh/year

Gross volume is the total gross volume of all compartments as determined in accordance with AS/NZS4474.1 in litres

Adjusted volume (Vadj) is the **adjusted volume** determined in accordance with AS/NZS4474.2 and entered in the product registration in litres

2. Activity Description (Summary)

Purchase an efficient new (separate) freezer

3. Activity Eligibility Requirements

Any compliant product sold in a retail outlet in South Australia for use in a residential or commercial premises in South Australia.

4. Installed Product Requirements

1. A Group 6C product shall have a total gross volume in the size range 100 to 700 litres and shall achieve a star rating index of not less than 3.3 in accordance with AS/NZS4474.2;
2. A Group 6U or 7 product shall have a total gross volume in the size range 100 to 400 litres and shall achieve a star rating index of not less than 2.5 in accordance with AS/NZS4474.2.
3. The product shall have a valid registration with GEMS regulator at the time of sale.
4. The refrigerating appliance shall not have a designation of cooled appliance under AS/NZS4474.1.
5. The refrigerating appliance shall not be a wine storage appliance or have any compartment that is intended exclusively for wine or beverage storage.

5. Minimum Installation Requirements

None.

6. Activity energy savings

The total normalised energy saved per appliance purchased is equal to:

Group 6C Normalised Energy Savings GJ = $\{[0.6329 \times (150 + 7.5 \times (Vadj)^{0.67})] - CEC\} \times 0.04131$

Group 6U and 7 Normalised Energy Savings GJ = $\{[0.77 \times (150 + 7.5 \times (Vadj)^{0.67})] - CEC\} \times 0.04131$

7. Guidance Notes (Informative only – not mandatory)

Information on registration data for current models can be obtained from

http://reg.energyrating.gov.au/comparator/product_types/28/search/ - see Download CSV

Purchase an high efficiency New Clothes Dryer	Activity No.
	APP1D

<p>1. Activity Specific Definitions</p> <p>Electric clothes dryer means a rotary clothes dryer (tumble dryer) registered for energy labelling under standard AS/NZS2442.2 and classified as a vented or condensing type.</p> <p>CEC is the Comparative Energy Consumption shown on the energy label and entered in the product registration in kWh/year</p> <p>Rated capacity is the rated capacity of the appliance as determined in accordance with AS/NZS2442.1 and entered in the product registration in kg</p>

<p>2. Activity Description (Summary)</p> <p>Purchase a high efficiency new electric clothes dryer</p>
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<p>3. Activity Eligibility Requirements</p> <p>Any compliant product sold in a retail outlet in South Australia for use in a residential or commercial premises in South Australia.</p>
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<p>4. Installed Product Requirements</p> <ol style="list-style-type: none"> 1. The electric clothes dryer shall achieve a star rating index of not less than 5.0 in accordance with AS/NZS2442.2. 2. The electric clothes dryer shall have a rated capacity of not less than 5.0 kg in accordance with AS/NZS2442.1. 3. The product shall have a valid registration with an Australian or New Zealand energy regulator at the time of sale. 4. The electric clothes dryer shall not be part of a combination washer-dryer.

<p>5. Minimum Installation Requirements</p> <p>None.</p>

<p>6. Activity energy savings</p> <p>The total normalised energy saved per appliance purchased is equal to:</p> <p>Normalised Energy Savings GJ = $(48.08 \times \text{rated capacity} - \text{CEC}) \times 0.0324$</p>

<p>7. Guidance Notes (Informative only – not mandatory)</p> <p>Information on registration data for current models can be obtained from http://reg.energyrating.gov.au/comparator/product_types/35/search/ - see Download CSV</p>

Purchase a high efficiency New Television	Activity No.
	APP1F

1. Activity Specific Definitions

Television means a television registered for energy labelling and MEPS under standard AS/NZS62087.2.2.
CEC is the Comparative Energy Consumption shown on the energy label and entered in the product registration in kWh/year
Screen area is the rated screen area of the appliance as determined in accordance with AS/NZS62087.1 and entered in the product registration in **square centimetres**.

2. Activity Description (Summary)

Purchase an efficient new television

3. Activity Eligibility Requirements

Any compliant product sold in a retail outlet in South Australia for use in a residential or commercial premises in South Australia.

4. Installed Product Requirements

- For appliances sold in calendar year 2015, a television shall achieve a star rating index of not less than 6.5 in accordance with AS/NZS62087.2 (Tier 2 2013) and shall have a CEC of ≤ 270 kWh/y
- For appliances sold in calendar year 2016, a television shall achieve a star rating index of not less than 7.0 in accordance with AS/NZS62087.2 (Tier 2 2013) and shall have a CEC of ≤ 242 kWh/y
- For appliances sold in calendar year 2017, a television shall achieve a star rating index of not less than 7.5 in accordance with AS/NZS62087.2 (Tier 2 2013) and shall have a CEC of ≤ 216 kWh/y
- The product shall have a valid registration with an Australian or New Zealand energy regulator at the time of sale.

5. Minimum Installation Requirements

None.

6. Activity energy savings

The total normalised energy saved per appliance purchased is equal to:

For a product sold in calendar year 2015 with a registered screen area of not more than 7221 cm²
 Normalised Energy Savings GJ = $[0.3664 \times (\text{screen area} \times 0.09344 + 64.41) - \text{CEC}] \times 0.001782$

For a product sold in calendar year 2015 with a registered screen area of 7221 cm² or more
 Normalised Energy Savings GJ = $[270.8 - \text{CEC}] \times 0.001782$

For a product sold in calendar year 2016 with a registered screen area of not more than 7221 cm²
 Normalised Energy Savings GJ = $[0.3277 \times (\text{screen area} \times 0.09344 + 64.41) - \text{CEC}] \times 0.001782$

For a product sold in calendar year 2016 with a registered screen area of 7221 cm² or more
 Normalised Energy Savings GJ = $[242.2 - \text{CEC}] \times 0.001782$

For a product sold in calendar year 2017 with a registered screen area of not more than 7221 cm²
 Normalised Energy Savings GJ = $[0.2931 \times (\text{screen area} \times 0.09344 + 64.41) - \text{CEC}] \times 0.001782$

For a product sold in calendar year 2017 with a registered screen area of 7221 cm² or more
 Normalised Energy Savings GJ = $[216.6 - \text{CEC}] \times 0.001782$

7. Guidance Notes (Informative only – not mandatory)

A screen area of 7221cm² is a nominal diagonal size of 130 cm (approximate size of 52 inches), however, the product registration needs to be checked to ascertain the registered screen area.
 Information on registration data for current models can be obtained from
http://reg.energyrating.gov.au/comparator/product_types/32/search/ - see Download CSV

7.23 Remove and destroy an unwanted household refrigerator or freezer - APP2

CURRENT REES ACTIVITY

“Remove and destroy a secondary refrigerator or freezer”

PROPOSED REES ACTIVITY

“Remove and destroy an unwanted household (style) refrigerator or freezer”

KEY FEATURES OF THIS SPECIFICATION

This activity covers the removal of a primary or secondary household style refrigerator or freezer in a residential premises. The proposed requirements for this activity are:

- A secondary refrigerator or freezer is an additional appliance that is not providing the primary refrigeration or freezer services to the household or business (i.e. a main appliance must remain after removal of the secondary appliance).
- A primary refrigerator or freezer provides the main refrigeration or freezer services to the household or business.
- Products that could be classified as household refrigeration within the scope of AS/NZS4474 or AS1430 are eligible and must operate on mains power.
- Products must be in working order to be eligible.
- There is no size restriction on eligible products.
- The volume of the product, based on the external dimensions, in cubic metres, must be measured and each dimensions for each product recorded in the activity schedule.
- Where possible, the type of refrigerant used in the product shall be established from markings on the product and recorded in the activity schedule.
- The refrigerator or freezer must be removed from the premises and decommissioned. This includes removal and disposal of refrigerants and any other scheduled substances in accordance with the Australian and New Zealand refrigerant handling code of practice as established under the Ozone Protection and Synthetic Greenhouse Gas Management Act 1989.

The requirements in other state schemes (NSW, Victoria and ACT) for this activity have been reviewed and a range of recommendations regarding revisions to this activity for REES in South Australia have been set out. All of the existing state schemes have major shortcomings, in that they do not recognise the impact that the volume of a removed product is likely to have a major impact on its energy consumption. Some elements used in other states have been adapted.

The key changes in this specification are:

- It is recommended that eligibility be limited to household style refrigeration products (no significant change).
- Many of the existing specification requirements have been retained (product must be in working order, refrigerants are disposed of in accordance with legal requirements).
- The previous REES size restriction has been removed and replaced with a variable energy credit calculation based on the size of the product.
- Product size is determined from external dimensions, which can be readily determined on site from simple measurements.
- A new set of cases have been added – removal of a main refrigerator or freezer (as per NSW specification) and differentiation of products with R12 (CFC) refrigerant and those without (or where the refrigerant cannot be ascertained). Products that can be established to have R12 refrigerant will be manufactured prior to 1996 (this was the year where R12 was phased out of local production), so these products will be offered higher savings credits as their energy consumption will be higher than products without R12 refrigerant.
- The overall energy savings have been determined after the application of a range of factors as set out in the following analysis. The savings for key cases is substantially larger than the current REES default value (which itself is much lower than all other states).

ENERGY SAVINGS METHODOLOGY

It is proposed that default energy savings factors be used to determine the energy savings from this activity.

The Technical Assessment – APP2 (pages 272 to 289 of Appendix 2) outlines the consultant's approach to determining the energy savings from this activity. Table 126 of this describes the assumptions used to derive the default energy savings and Tables 128 to 131 presents examples of the energy savings results.

The approach used by the consultants involves determining the energy use of the existing appliance and the expected life remaining of the appliance. The energy savings from early retirement of the appliance is the product of these two factors.

The resulting electricity savings are also the normalised savings factors presented in the specification, given that the normalisation factor for electricity is 1 (as described in Section 4).

CONSULTATION QUESTIONS SPECIFIC TO THIS ACTIVITY

- **How viable will it be for activity providers to determine whether a refrigerator uses R12 refrigerant?**
- **Are there other ways of reliably determining pre1996 refrigerators?**

Remove and dispose of an unwanted Refrigerator or Freezer	Activity No. APP2
<p>1. Activity Specific Definitions</p> <p>Refrigerator means a refrigerating appliance that could be classified as Group 1, 2, 3, 4, 5T, 5B or 5S under standard AS/NZS4474.2 (or under AS1430).</p> <p>Freezer means a refrigerating appliance that could be classified as Group 6C, 6U or 7 under standard AS/NZS4474.2 (or under AS1430).</p> <p>Secondary refrigerator means, after the removal of the target appliance, a main refrigerator remains installed and operating</p> <p>Secondary freezer means, after the removal of the target appliance, a main freezer remains installed and operating</p> <p>Depth means the measured external depth of the refrigerating appliance from the rear plane of the cabinet (excluding any condenser coil) to the front (including the door where applicable) in metres</p> <p>Width means the measured external width of the refrigerating appliance from the left wall of the cabinet to the front right wall of the cabinet in metres</p> <p>Height means the measured external height of the refrigerating appliance from the lowest part of the cabinet wall or door (excluding any clearance or air gap to the floor) to the top of the appliance in metres</p> <p>External volume is the calculated volume in cubic metres of the refrigerating appliance from measured values of $depth \times width \times height = m^3$</p>	
<p>2. Activity Description (Summary)</p> <p>Remove and dispose of an existing refrigerator or freezer from a residential or commercial premises</p>	
<p>3. Activity Eligibility Requirements</p> <p>Any residential or commercial premises in South Australia where the installed product requirements can be met.</p>	
<p>4. Product Requirements</p> <ol style="list-style-type: none"> 1. Products must be in working order. 2. The appliance shall operate on single phase mains power (nominally 230V, 50Hz). 3. The product shall be a household type of refrigeration appliance that could be classified under AS/NZS4474 or AS1430. 4. The refrigerating appliance shall use the vapour compression cycle (absorption and piezoelectric types are not eligible). 5. The refrigerating appliance shall not be a wine storage appliance. 6. Portable, camping or appliances installed in caravans are not eligible. 	
<p>5. Minimum Removal Requirements</p> <ol style="list-style-type: none"> 1. The refrigerator or freezer must be removed from the premises and decommissioned. 2. Removed refrigerators and freezers shall have refrigerants and any other scheduled substances disposed of in accordance with the Australian and New Zealand refrigerant handling code of practice as established under the Ozone Protection and Synthetic Greenhouse Gas Management Act 1989. 3. Where possible, the type of refrigerant used in the product shall be established from markings on the product and recorded in the activity schedule. 4. The measured external dimensions for depth, width and height for each product and the calculated external volume of the product shall be recorded in the activity record. 	
<p>6. Activity energy savings</p> <p>The total normalised energy saved per appliance removed and disposed is equal to:</p> <ul style="list-style-type: none"> • Secondary refrigerator or secondary freezer with R12 (CFC) refrigerant Normalised Energy Savings GJ = $25.6 \times \text{external volume in } m^3$ • Secondary refrigerator or secondary freezer with unknown or other refrigerant Normalised Energy Savings GJ = $14.2 \times \text{external volume in } m^3$ • Other refrigerator or other freezer with R12 (CFC) refrigerant Normalised Energy Savings GJ = $15.1 \times \text{external volume in } m^3$ • Other refrigerator or other freezer with unknown or other refrigerant Normalised Energy Savings GJ = $7.6 \times \text{external volume in } m^3$ 	
<p>7. Guidance Notes (Informative only – not mandatory)</p> <p>There is no size restriction on eligible products. All reasonable endeavours should be used to recycle other components of removed appliances.</p>	

7.24 Installation of a high efficiency pool pump - APP3

CURRENT REES ACTIVITY

“Install upgraded high energy efficient pool pump”

PROPOSED REES ACTIVITY

“Installation of a High Efficiency Pool Pump”

KEY FEATURES IN THIS SPECIFICATION

The activity involves the installation of a high efficiency pool pump. There are a number of requirements for this pump:

- The pool pump must be purchased for the use in a residential pool or spa;
- The pool pump shall be single phase;
- If the installation requires an electrical compliance certificate, one is provided and lodged with the Office of the Technical Regulator;
- The pool pump is required to:
 - Be a single phase pump;
 - Have an input power between 100 Watts and 1500 Watts when tested in accordance with AS 5102.1:2009;
 - Be listed as part of the Equipment Energy Efficiency Committee’s Voluntary Energy Rating Labelling Program for Swimming Pool Pump units;
 - Have a minimum star rating of 3 as determined by AS 5102.1:2009;
 - As a proclaimed product in South Australia, meet the safety requirements of AS/NZS 3350.2.41:1997 or AS/NZS 60335.2.41:2004.

For pool pump installed from calendar year 2016, pool pumps shall comply with:
 AS/NZS 4755.3.2:2012 - *Demand response capabilities and supporting technologies for electrical products - Interaction of demand response enabling devices and electrical products - Operational instructions and connections for devices controlling swimming pool pump-units*

Default savings= $Q \times 0.00009 \times [1622 - CEC]$

Where:

Q is the rated flow rated in litres per minute (as per AS5102)

1622 is the 2 star CEC under the energy labelling scheme AS5102 in kWh/year

CEC is the comparative energy consumption of the product under the voluntary labelling scheme in kWh/year

Default savings are over the product lifetime in GJ of electricity.

The following elements remain unchanged in this specification:

- Products shall be registered for energy labelling and the registration is valid at the time of sale.
- The minimum star rating of qualifying units remains at 3 stars, noting that many units are available which very high star ratings. Current baseline of 2 stars has been maintained.
- Pool pumps are restricted to single phase.
- Electrical safety requirements remain unchanged.
- The calculation of energy savings remains largely unchanged, but the units have been converted to GJ electricity saved.
- Energy savings are restricted to the residential sector.

The following elements have changed in this specification:

- Credits are available directly to retailers rather than through service providers or end users.

- Input power ranges have been adjusted to account for very efficient products and to align with ACT and Victoria (100W to 1500W).
- A requirement to comply with AS/NZS 4755.3.2:2012 (demand response) is recommended after consultation with stakeholders and a suitable sunrise period (from 2016 recommended).

ENERGY SAVINGS METHODOLOGY

It is proposed that default energy savings factors be used to determine the energy savings from this activity.

The Technical Assessment – APP3 (pages 290 to 303 of Appendix 2) outlines the consultant’s approach to determining the energy savings from this activity. Table 135 of this describes the assumptions used to derive the default energy savings. The energy savings are expressed as a formula, with examples on page 301.

The approach used by the consultants involves determining the energy savings from using an efficient pool pump compared with a market average product.

The resulting electricity savings are also the normalised savings factors presented in the specification, given that the normalisation factor for electricity is 1 (as described in Section 4).

CONSULTATION QUESTIONS SPECIFIC TO THIS ACTIVITY

- None

Installation of a High Efficiency Pool Pumps	Activity No.
	APP3

1. Activity Specific Definitions

Pool pump means a circulating pump for use with a residential pool or spa.

Rated flow rate (Q) means the maximum rated flow rated in litres per minute that the pump can achieve under AS5102

2. Activity Description (Summary)

Installation of a high efficiency pool pump

3. Activity Eligibility Requirements

Any residential household in South Australia where the installed product requirements and minimum installation requirements can be met.

4. Installed Product Requirements

1. The pool pump shall be listed as part of the E3 pool pump labelling scheme and shall achieve a star rating of not less than 3 stars.
2. The pool pumps shall be tested and rated in accordance with AS5102.1 and AS5012.2
3. The pool pump shall operate on single phase mains power.
4. The pool pump shall have an input rating of not less than 100W and not more than 1500W.
5. As a proclaimed product in South Australia, any pool pump shall meet the safety requirements of AS/NZS 60335.2.41:2004
6. From 1 January 2016, pool pumps shall be fitted with demand response controllers in accordance with AS/NZS 4755.3.2:2012 Demand response capabilities and supporting technologies for electrical products - Interaction of demand response enabling devices and electrical products - Operational instructions and connections for devices controlling swimming pool pump-units

5. Minimum Installation Requirements

If the installation requires an electrical compliance certificate, one shall be provided and lodged with the Office of Technical Regulator.

6. Activity energy savings

The total normalised energy saved per appliances purchased is equal to:

$$\text{Normalised Energy Savings GJ} = Q \times 0.00009 \times [1622 - CEC]$$

Q is the rated flow rated in litres per minute (measured as per AS5102)

1622 is the 2 star CEC under the energy labelling scheme AS5102 in kWh/year

CEC is the comparative energy consumption of the product under the voluntary labelling scheme in kWh/year

7. Guidance Notes (Informative only – not mandatory)

7.25 Aggregate Metered Baseline methodology - AMB

CURRENT REES ACTIVITY

None

PROPOSED REES ACTIVITY

“Aggregated Metered Baseline”

This method allow for the calculation of energy savings from behaviour change and a range of other activities that are not suitable for default savings factors.

It is adapted from the NSW ESS Aggregated Metered Baseline method. The AMB method can be used for any activity, provided that it is an energy savings activity, consistent with the scheme rules and principles. However, it is particularly designed for energy savings activities where:

- the energy savings are small on a site by site basis; and/or
- the energy savings can vary greatly from site to site; and/or
- there are a large to very large number of potential participants;
- there is insufficient evidence that the energy saving activity will not be reversed.

Examples of the types of activities that may be suitable for the AMB method include:

- “how-to” websites
- direct mail campaigns
- community engagement
- household assessments
- energy bill benchmarking
- innovative pricing structures
- installing in-home displays.

In simple terms, AMB works as follows;

A project proponent must first select a group of households (a “population”). Then the population must be divided in a non-biased way (e.g. random) into a “control group” and a “treatment group”¹⁹. Without intervention, two groups will be statistically equivalent and have the same mean energy consumption over time. The proponent then provides the treatment group access to one or a number of approved activities. If these activities save energy, the treatment group’s average energy consumption will be lower than the control group. The aggregate savings for the treatment will be awarded as energy savings credits. In practice, AMB has three different sub-options for statistically determining the difference in energy consumption between the two groups. It also has rules to prevent gaming and double counting of savings with activities already funded by the scheme.

The calculation steps for each sub-method, and overarching REES code requirements for all sub-methods are set out below.

CONSULTATION QUESTIONS SPECIFIC TO THIS ACTIVITY

- **Is the proposed AMB methodology appropriate for the REES?**
- **What elements of the methodology, if any, have the potential to inhibit the uptake of REES activities that use the AMB method?**
- **What types of activities is the AMB method likely to stimulate under the REES?**

¹⁹The proponent must have the right to access these customers’ energy data. Therefore project proponents would most likely be an energy retailer of distribution network service provider.

Aggregate Metered Baseline Method (AMB)	Activity No.
	FLEX1

Draft Activity Specification

1 Proposed AMB Energy Savings Calculation Method

Energy Savings for eligible activities specified in Clause 2 shall be calculated using the method specified in this Clause. Energy savings shall then be applied in accordance with activity specification set out in Clause 0.

1.1 Calculation of Energy Savings under the Aggregated Metered Baseline method

Step (1) – For each Population, adjust the Control Group and the Treatment Group for Attrition at the end of each Implementation Period, in accordance with clause (a). The number of Sites in the Treatment and Control Groups will be designated N_T and N_C respectively.

Step (2) – Calculate the *Observed Energy Savings*, $ES_{observed}$, in GJ final energy consumption, over the Implementation Period using one of the following methods:

- (a) Option 1 (Time-Aggregated Energy Consumption During the Implementation Period) as detailed in clause 1.2; or
- (b) Option 2 (Time-Aggregated Energy Consumption During the Implementation and Pre-Implementation Periods - Difference in Differences) as detailed in clause 1.3; or
- (c) Option 3 (Regression Modelling) as detailed in clause 1.4.

Step (3) – Calculate Counted Energy Savings, $ES_{counted}$, over the Implementation Period using the Method detailed in clause 1.5.

For Sites with Measured Energy Consumption data for part of an Implementation Period due to Attrition, the date of Attrition is considered the last date of the Implementation Period for those given Sites.

Step (4) - Calculate *final Energy Savings* in GJ of final energy consumption, by subtracting the effect of *Counted Energy Savings* from the *Observed Energy Savings*, ensuring the result is non-negative:

$$\text{Energy Savings} = \max(0, ES_{observed} - ES_{counted})$$

1.2 Step 2 Option 1 Calculation of *Observed Energy Savings* from Time-Aggregated Energy Consumption During the Implementation Period

Step (1) - Calculate the mean daily energy use of the Treatment Group (E_T) over the Implementation Period:

$$E_T = \frac{(\sum_s E_s)}{(\sum_s D_s)}$$

where:

- s indexes over Sites in the Treatment Group
- E_s is the Measured Energy Consumption for Site (s) in the Treatment Group over the Implementation Period, measured in accordance with clause 2.3; and
- D_s is number of days of Measured Energy Consumption at Site (s) in the Treatment Group over the Implementation Period

Step (2) - Calculate the mean daily energy use of the Control Group (E_C) over the Implementation Period:

$$E_C = \frac{(\sum_s E_s)}{(\sum_s D_s)}$$

where:

- s indexes over Sites in the Control Group
- E_s is the Measured Energy Consumption for Site (s) in the Control Group over the Implementation Period, measured in accordance with clause 2.3; and
- D_s is number of days of Measured Energy Consumption at Site (s) in the Control Group over the Implementation Period

Step (3) - Using the Treatment Group measurements, the Control Group measurements and the standard error for the Control Group mean, perform the following hypothesis test:

$$H_0 : E_C \leq E_T$$

$$H_{ait} : E_C > E_T$$

$$\text{Calculate } t = (E_C - E_T) / \left(sd * \sqrt{\frac{fpc_T}{N_T} + \frac{fpc_C}{N_C}} \right)$$

$$\text{Reject } H_0 \text{ (and accept } H_{ait}) \text{ if } t > T_{(p=0.95)}$$

where:

- sd is the standard deviation calculated on the Control Group
- $T_{(p=0.95)}$ is the value from standard T tables with $(N_C - 1)$ degrees of freedom. For degrees of freedom exceeding 2400 use the value of 1.6449. Note that 0.95 values of the T statistic are from the upper 5% points of the distribution;
- fpc_C is an optional finite population correction for estimating the Population mean from the Control Group, where:
 - if used $fpc_C = (N - N_C)/(N - 1)$; or
 - if not used $fpc_C = 1$; and
- fpc_T is an optional finite population correction for estimating the Population mean from the Treatment Group, where:
 - if used $fpc_T = (N - N_T)/(N - 1)$; or
 - if not used $fpc_T = 1$, and
- N is the number of sites in the Population.

If able to reject H_0 , proceed to step (4). Otherwise, E_C is taken to be less than or equal to E_T and $ES_{observed}$ is taken to be zero.

Step (4) - Calculate the *Observed Energy Savings*, $ES_{observed}$, in GJ final energy consumption, over the Implementation Period:

$$ES_{observed} = (E_C - E_T) * \left(\sum_s D_s \right)$$

where:

- s indexes over Sites in the Treatment Group; and
- D_s is number of days of Measured Energy Consumption at Site (s) in the Treatment Group over the Implementation Period

1.3 Step 2 Option 2 - Calculation of Observed Energy Savings from Time-Aggregated Energy Consumption During the Implementation and Pre-Implementation Periods – Difference in Differences

Step (1) - Calculate the change in mean daily energy use (C_s) between the Implementation Period and the Pre-Implementation Period for each Site in the Population:

$$C_s = \frac{E_{s,i}}{D_{s,i}} - \frac{E_{s,p}}{D_{s,p}}$$

where:

- $E_{s,i}$ is the Measured Energy Consumption for each Site (s) over the Implementation Period, measured in accordance with clause 2.3;
- $E_{s,p}$ is the Measured Energy Consumption at each Site (s) over the Pre-Implementation Period, measured in accordance with clause 2.3;
- $D_{s,i}$ is the number of days of Measured Energy Consumption at Site (s) over the Implementation Period; and
- $D_{s,p}$ is the number of days of Measured Energy Consumption across Site (s) over the Pre-Implementation Period and must cover the same period of time in a previous year as $D_{s,i}$.

Step (2) - Calculate the mean change in energy use of the Treatment Group (C_T) between the Implementation Period and the Pre-Implementation Period:

$$C_T = (\sum_s C_s) / N_T$$

where:

- s indexes over Sites in the Treatment Group; and
- N_T is number of Sites in the Treatment Group.

Step (3) - Calculate the mean change in energy use of the Control Group (C_C) between the Implementation Period and the Pre-Implementation Period as follows:

$$C_C = (\sum_s C_s) / N_C$$

where:

- s indexes over Sites in the Control Group; and
- N_C is number of Sites in the Control Group

Step (4) - Using the Treatment Group measurements, the Control Group measurements and the standard error for the Control Group mean difference, perform the following hypothesis test:

$$H_0 : C_C \leq C_T$$

$$H_{ait} : C_C > C_T$$

$$\text{Calculate } t = (C_C - C_T) / \left(sd * \sqrt{\frac{fp_{C_T}}{N_T} + \frac{fp_{C_C}}{N_C}} \right)$$

$$\text{Reject } H_0 \text{ (and accept } H_{ait}) \text{ if } t > T_{(p=0.95)}$$

where:

- sd is the standard deviation calculated on the change in daily energy consumption between the Implementation Period and the Pre-Implementation Period for each Site in the Control Group;

- $T_{(p=0.95)}$ is the value from standard T tables with $(N_C - 1)$ degrees of freedom. For degrees of freedom exceeding 2400 use the value of 1.6449. Note that 0.95 values of the T statistic are from the upper 5% points of the distribution;
- fpc_C is an optional finite population correction for estimating the Population mean from the Control Group, where:
 - if used $fpc_C = (N - N_C)/(N - 1)$; or
 - if not used $fpc_C = 1$; and
- fpc_T is an optional finite population correction for estimating the Population mean from the Treatment Group, where:
 - if used $fpc_T = (N - N_T)/(N - 1)$; or
 - if not used $fpc_T = 1$, and
- N is the number of sites in the Population.

If able to reject H_0 , proceed to step (5). Otherwise, C_C is taken to be less than or equal to C_T and $ES_{observed}$ is taken to be zero

Step (5) – Calculate the *Observed Energy Savings*, $ES_{observed}$, in GJ final energy consumption, over the Implementation Period:

$$ES_{observed} = (C_C - C_T) * \left(\sum_s D_s \right)$$

where:

- s indexes over Sites in the Treatment Group; and
- D_s is the number of days of Measured Energy Consumption at Site (s) in the Treatment Group over the Implementation Period.

1.4 Step 2 Option 3 - Calculation of *Observed Energy Savings* from Regression Modelling

Step (1) - Calculate the mean daily energy use ($DE_{s,i}$) for each Site in the Population for the Implementation Period:

$$DE_{s,i} = E_{s,i}/D_{s,i}$$

where:

- $E_{s,i}$ is the Measured Energy Consumption for Site (s) over the Implementation Period, measured in accordance with clause 2.3; and
- $D_{s,i}$ is the number of days of Measured Energy Consumption at Site (s) over the Implementation Period

Step (2) - Calculate the mean daily energy use ($DE_{s,p}$) for each Site in the Population for the Pre-Implementation Period:

$$DE_{s,p} = E_{s,p}/D_{s,p}$$

where:

- $E_{s,p}$ is the Measured Energy Consumption for each Site (s) over the Pre-Implementation Period, measured in accordance with clause 2.3; and
- $D_{s,p}$ is the number of days of Measured Energy Consumption at Site (s) over the Pre-Implementation Period.

Step (3) - Create the evaluation data set consisting of one observation for each Site in the Population containing $DE_{s,i}$, $DE_{s,p}$, T_s and other appropriate explanatory variables, where:

- T_s is a variable taking the value 1 if a Site (s) is in the Treatment Group and 0 if it is in the Control Group; and
- $OtherVariables_s$ is the vector of other appropriate explanatory variables.

Step (3B) – For cases where there are Sites with Measured Energy Consumption data for part of an Implementation Period due to Attrition, create another variable $W_{s,m}$, where:

- $W_{s,m}$ is a variable taking the value 1 if the Site (s) is still in the Treatment Group during time period m and 0 otherwise. $m = 1 \dots NTP$; and
- NTP is the number of non-overlapping and exhaustive time periods for the implementation.
- The time periods are to be allocated so that each time period has (as close as is possible) the same number of Sites subject to Attrition during that period.

Step (4) - Estimate the average treatment effect per day ($\hat{\beta}$) by estimating the following regression via Weighted Least Squares (WLS) and weighting by $D_{s,i}$:

$$DE_{s,i} = \alpha + \beta T_s + \delta DE_{s,p} + \sum \lambda_m W_{s,m} + \sum \gamma_k OtherVariables_{s,k} + \varepsilon_s$$

where:

- α is the intercept;
- β is the treatment effect;
- δ is the impact of Pre-Implementation Period energy consumption;
- λ_m accounts for time period (m) variation;
- γ_k is the effect of the kth other explanatory variable; and
- ε_s is the error term.

Step (5) – Using the estimated treatment effect (denoted as $\hat{\beta}$) and its standard error perform the following hypothesis test:

$$H_0: \hat{\beta} \geq 0$$

$$H_{ait}: \hat{\beta} < 0$$

$$\text{Calculate } t = \hat{\beta} / se(\hat{\beta})$$

$$\text{Reject } H_0 \text{ (and accept } H_{ait}) \text{ if } t < T_{(p=0.05)}$$

where:

- $se(\hat{\beta})$ is the standard error of $\hat{\beta}$; and
- $T_{(p=0.05)}$ is the value from the standard T table with $(N_T + N_C - 2)$ degrees of freedom. For degrees of freedom exceeding 2400 use the value of -1.6449 . Note that 0.05 values of the T statistic are from the lower 5% points of the distribution.

A negative value for $\hat{\beta}$ indicates a reduction in energy usage. Therefore, if able to reject H_0 , proceed to step (6).

Otherwise, $\hat{\beta}$ is taken to be non-negative and $ES_{observed}$ is taken to be zero.

Step (6) – Calculate the *Observed Energy Savings*, $ES_{observed}$, in GJ final energy consumption, over the Implementation Period:

$$ES_{observed} = -\hat{\beta} * \left(\sum_s D_s \right)$$

where:

- s indexes over Sites in the Treatment Group; and

- D_s is the number of days of Measured Energy Consumption at Site (s) in the Treatment Group over the Implementation Period.

1.5 Estimation of Counted Energy Savings (Step 3)

Step (1) – Estimate the *Lifetime Energy Savings*, $LES_{s,a}$, from each *Other Activity (a)* implemented in each Site (s) in the Population, within the Implementation Period.

Where:

- *Other Activity (a)* means any energy savings activity offered to the population for which REES credits are claimed under another method by the Obligated Retailer in accordance with the provisions of clause 2.2.1(j).

Step (2) – Calculate the Energy Savings, $ES_{s,a}$, for each Site s due to each *Other Activity a* during the Implementation Period:

$$ES_{s,a} = LES_{s,a} * \left(\frac{Overlap_a}{Lifetime_a} \right)$$

where:

- $Lifetime_a$, in years, is the Lifetime of the Energy Savings for each *Other Activity (a)*; and
- $Overlap_a$, in years, is the length of time of the Implementation Period that overlaps with the Lifetime of the Energy Savings for each *Other Activity (a)*.
- If the *Other Activity (a)* had one or more Energy Savings calculated using the Metered Baseline Method, then the Lifetime of the Energy Savings is the length of the Measurement Period of that calculation.
- The calculation of the duration of overlap must take account of Attrition of Sites.

Step (3) - Calculate the average Energy Savings, $ES_{T,all Other Activities}$ and $ES_{C,all Other Activities}$, due to all *Other Activities (a)* for all Sites in the Treatment Group and Control Group respectively, over the Implementation Period:

$$ES_{T,all Other Activities} = \frac{\sum_{s \text{ in Treatment Group}, a} ES_{s,a}}{N_T}$$

and

$$ES_{C,all Other Activities} = \frac{\sum_{s \text{ in Control Group}, a} ES_{s,a}}{N_C}$$

where:

- The summation is over all Sites (s) in the Treatment Group (for $ES_{T,all Other Activities}$) and Control Group (for $ES_{C,all Other Activities}$), respectively, and all Other Activities that overlap with the Implementation Period; and
- The N_T and N_C are the number of Sites in the Treatment Group and Control Group respectively for Implementation Period.

Step (4) - Calculate the *Counted Energy Savings*, $ES_{counted}$, from *Other Activities* due to participation in the program:

$$ES_{counted} = (ES_{T,all Other Activities} - ES_{C,all Other Activities}) * N_T$$

Step (5) – Ensure the *Counted Energy Savings*, $ES_{counted}$, are non-negative:

$$ES_{counted} = \max(0, ES_{counted})$$

2 Proposed AMB Method Specification

Energy Savings for eligible activities shall be calculated using the method specified in Clause 1. Energy savings shall then be applied in accordance with the activity specification set out in this Clause.

2.1 Activities for which savings can be calculated using this method

2.1.1 Energy savings can be determined for Activity or Activities aimed at reducing normalised end-use energy consumption, which meet the following conditions:

- (a) Activity or Activities for which energy savings are to be calculated using this method, known as the Treatment, are to be offered exclusively to sites in a Treatment Group.
- (b) The Treatment cannot include the installation of solar PV or other on-site electricity generation system
- (c) The treatment can include fuel switching that reduces normalised end use energy.

2.2 Selection and management of Sites where activities are offered

2.2.1 A number of Sites must be identified and assigned to a Population, and every Site in that Population must be allocated to either a Treatment Group or a Control Group prior to the Implementation Date. Additionally:

- (a) a Site may choose to join the Population, but once in the Population, must be allocated to the Treatment Group or the Control Group using an Unbiased Selection method;
- (b) An Unbiased Selection Method is any method in which each site has an equal chance of being allocated to either the treatment or control group, including but not limited to random selection;
- (c) persons at Sites must not be informed explicitly that they have been allocated to the Treatment Group or the Control Group;
- (d) once a Site has been allocated to the Treatment Group and the Implementation Date has occurred, energy customers at that Site may be offered a choice as to whether they wish to receive the goods and services component of the Treatment;
- (e) if a Site chooses not to receive the goods and services component of the Treatment, that Site must be retained in the Treatment Group for measurement purposes, except where clauses 2.2.1 (g) and 2.2.1 (h) apply;
- (f) the Population should not be targeted with the offer of goods and services aimed at increasing energy use with the intent of creating a greater difference in Measured Energy Consumption between the Control Group and Treatment Group;
- (g) a Site must be removed from the Population, and hence Treatment Group or Control Group, if no Measured Energy Consumption data are available for that Site during the Implementation Period;
- (h) all Sites with Measured Energy Consumption data for only part of an Implementation Period due to Attrition, must be:
 - (i) removed from the Population; or
 - (ii) included in the Population until the last date Measured Energy Consumption data are available for a given Site; and
- (i) if data for a Pre-Implementation Period are used, the Obligated Retailer must specify prior to the Implementation Date a period for which the data are available for the total Population.
- (j) the treatment group may be offered activities for which credits are claimed under another REES method, only if:
 - (i) Such activities are declared to the Commission; and
 - (ii) The annualised savings from these activities are excluded from savings determined under this method, in accordance with calculation step 3 in Clause 1.1.

2.3 Measured Energy Consumption

2.3.1 Measurement Energy Consumption means the sum of the normalised Measurement Energy Consumption data for electricity consumption and normalised Measurement Energy Consumption data for onsite natural gas consumption for a Site.

Measurement Energy Consumption

$$= \left(\sum_f \text{Measurement Energy Consumption}_f * \text{Normalisation Factor}_f \right)$$

where:

- f indexes over each of the fuel types used by the population (electricity and gas)
- *Measurement Energy Consumption* is the Measurement Energy Consumption for fuel type (f) as described in Clause 2.3.2 and 2.3.3 below.
- *Normalisation Factor_f* is the REES normalisation factor for fuel type (f), which is 1 for electricity and 0.369 for reticulated gas.

2.3.2 Measurement Energy Consumption data for electricity consumption means the metered amount of electricity used by a Site:

- (a) as determined by the metering data held by the Electricity Retailer or Network Service Provider for that Site, pro-rated across the period, as measured and estimated in accordance with the provisions of the National Energy Retail Rules under the National Energy Retail Law, and in accordance with the provisions of the *Electricity (General) Regulations 2012 (SA)*; or
- (b) from a metering arrangement compliant with the accuracy requirements of National Measurement Institute document M6 (Electricity Metres), or another metering benchmark accepted by the Commission, provided that:
 - (i) all metering devices are installed without bias as to whether that Site is in the Treatment Group or Control Group, and by parties who have no knowledge of whether each Site is part of the Treatment Group or Control Group; and
 - (ii) the reading of metering devices and checking, measurement, estimation and pro-rating of data is done without bias as to whether that Site is in the Treatment Group or Control Group, and by parties who have no knowledge of whether each Site is part of the Treatment Group or Control Group.

2.3.3 Measurement Energy Consumption data for onsite natural gas consumption means the metered amount of gas used by a Site:

- (a) as determined by the metering data held by the Energy Retailer or Network for that Site, pro-rated across the period, as measured and estimated in accordance with the provisions of the National Energy Retail Rules under the National Energy Retail Law, and in accordance with the provisions of *Gas Regulations 2012 (SA)*; or
- (b) from a metering arrangement compliant with the accuracy requirements of National Measurement Institute as set out in document R137 (Gas Metres) or another metering benchmark accepted by the Commission provided that:
 - (i) all metering devices are installed without bias as to whether that Site is in the Treatment Group or Control Group, and by parties who have no knowledge of whether each Site is part of the Treatment Group or Control Group; and
 - (ii) the reading of metering devices and checking, measurement, estimation and pro-rating of data is done without bias as to whether that Site is in the Treatment Group or Control Group, and by parties who have no knowledge of whether each Site is part of the Treatment Group or Control Group.

2.3.4 For the purposes of calculating Energy Savings, the Measured Energy Consumption for a given Population must be recorded over one or more Measurement Periods, where:

- (a) Implementation Periods and Pre-Implementation Periods are both Measurement Periods;
- (b) the Implementation Period and the Pre-Implementation Period do not have to be immediately sequential in time;
- (c) Measurement Periods must not overlap; and
- (d) each Implementation Period must be at least 3 months and no more than 15 months in length.

2.4 General Requirements

- 2.4.1 The Obligated Retailer can only modify the methods for subsequent Implementation Periods.
- 2.4.2 The Implementation Date is the start date of the Implementation Period.
- 2.4.3 The activity should, wherever reasonable, offer options to use good practice such as recycling and compliance with best practice installation guidelines
- 2.4.4 Activities should be designed and implemented in a way that minimises risks to service providers and participants, including but not limited to:
- (a) Any equipment offered or installed must comply with appropriate quality and safety standards; and
 - (b) Any installations must be conducted in accordance with relevant installation standards, guidelines and/or manufacturer's instructions.

2.5 Record Keeping

- 2.5.1 The records that must be kept of the method, data and assumptions used to calculate Energy Savings must include:
- (a) the Addresses of the Sites in the Population and whether they are allocated to the Treatment Group or the Control Group;
 - (b) evidence that Sites were assigned to the Population and were allocated to the Treatment Group and Control Group in accordance with clause 2.2.1;
 - (c) evidence that energy consumption was measured in accordance with clause 2.3;
 - (d) details of the Treatment offered to the Treatment Group, and evidence that is a compliant with clause 2.1;
 - (e) Details of explanatory variables; including any interactions between them have been documented (if Calculation method 1.4 regression modelling method is used);
 - (f) Evidence that Measurement Periods, including Implementation Periods and the Pre-Implementation Periods (if applicable) are compliant with these specifications;
 - (g) information on Sites removed from the Population in accordance with clauses 2.2.1 (g) and 2.2.1 (h), including reasoning for each Site's removal;
 - (h) documentation of reproducible steps and log files for the calculations performed; and
 - (i) any additional requirements as may be Published by the Commission from time to time.
- 2.5.2 Energy Savings for each Implementation are taken to have occurred on the last date of that Implementation Period.
- 2.5.3 Where required, the Energy Savings for the Implementation will be the sum of estimated Energy Savings for all Sites in a Treatment Group for each Implementation Period.

7.26 Commercial lighting - CL1

CURRENT REES ACTIVITY

None

PROPOSED REES ACTIVITY

“Commercial Building Lighting Upgrade”

KEY FEATURES OF THIS SPECIFICATION

From 1 January 2015, the REES will be extended to small and medium sized businesses. In similar schemes operating in NSW and Victoria, energy efficiency improvements to commercial lighting have emerged as a popular activity.

The proposed Activity will be available to be undertaken in all commercial/industrial building types, including offices, retail, education, health, hotels, factories and warehouses. It will also be able to be delivered to the common areas of residential apartment blocks. To maintain the focus on small to medium business sectors, the specification limits the energy saving from each eligible Activity to 2000MWh per year over the life of the new lighting equipment.

The specification draws closely on the requirements under the NSW energy saving scheme (ESS). Various energy efficiency upgrade options are eligible covering most of the typical cost effective upgrade options in the commercial lighting sector, including:

- Replacing T8 linear fluorescent luminaires with T5 luminaires or integrated LED luminaires.
- Replacing low voltage dichroic halogen lamps with LED luminaire
- Replacing mercury vapour luminaires with LED luminaire.

Energy savings from upgrading lighting control systems such as occupancy sensors and automatic dimming systems are also eligible under this Activity. Upgrades involving retrofits with T5 adaptor kits and LED linear lamps are explicitly excluded. This is in line with the recommendations made during a review of this Activity under the ESS²⁰.

It is proposed that energy saving from the Activity will be calculated using the ESS lighting calculator, and these calculations will need to be retained by the energy retailer for audit purposes.

It is expected that this Activity will require some co-payment from the recipient, though the incentive expected to be provided by this Activity is likely to significantly reduce the payback period for investing in energy efficiency lighting upgrades, making it an attractive prospect for businesses. In NSW, the Energy Saving Scheme has recently been amended to require a minimum customer co-payment of \$5 per MWh of energy saved as a condition of the scheme. This was introduced to ensure quality of the installations and products, to improve customer buy-in and to promote longevity of the business models of the activity providers.

The specification includes a number of quality and safety requirements, including compliance with AS/NZS 1680. It is also a requirement that the Activity is performed by or under the supervision of a licensed electrician.

CONSULTATION QUESTIONS SPECIFIC TO THIS ACTIVITY

- **Does the specification ensure adequate safety, quality, and customer satisfaction requirements? If not, how can it be improved?**
- **Are there any difficulties in requiring under REES the use of the NSW ESS lighting calculator and approved products lists?**
- **Will the 2000MWh eligibility threshold inhibit possible take-up of this activity?**
- **Should there be a minimum customer co-payment requirement for this activity, per unit of energy saved? What level of co-payment should apply? Should small businesses be exempt from a co-payment requirement?**

²⁰http://www.resourcesandenergy.nsw.gov.au/__data/assets/pdf_file/0020/479000/ess-consultation-paper.pdf

Commercial Building Lighting Upgrade	Reference No.
	CL 1

1. Activity Specific Definitions

Commercial Building Lighting is defined as lighting equipment affixed to a South Australian Commercial/Industrial premises classified under the Building Code of Australia as either Class 3, 5, 6, 7, 8, 9, 10(b) or the Common Areas of Class 2.

Lighting Upgrade means the replacement of existing lighting equipment with new lighting equipment that consumes less electricity.

2. Activity Description (Summary)

The Activity involves an upgrade to the energy efficiency of Commercial Building Lighting.

3. Activity Eligibility Requirements

Eligible Activities are:

- Replacing T8 or T12 fluorescent tubes with fluorescent T5 tubes
- Replacing halogen downlights with LED equivalent lights
- Replacing industrial highbay or lowbay high intensity discharge lights with LED or induction equivalents
- Any other commercial lighting upgrade where the new lighting equipment is listed under the installed product requirements below

The existing lighting equipment must be in working order at time of replacement.

The energy saving for each eligible Activity must be below 2000 MWh a year over the life of the new lighting equipment.

The Activity must have a customer co-payment of \$5 per MWh of energy saved over the life of the Activity (**Note – stakeholder feedback is invited on this proposal – see questions above**)

The following Activities are excluded:

- New lighting installations
- Task lighting installations such as portable lighting or desk lamps
- Retrofitting of T5, T8 or T12 luminaires with LED Linear lamps
- Installing T5 adaptor kits

4. Installed Product Requirements

At the time of installation, the products must be listed under:

- NSW Energy Saving Scheme (ESS) Rule Schedule A Table A9.1 standards equipment classes for lighting upgrades (http://www.resourcesandenergy.nsw.gov.au/_data/assets/pdf_file/0019/518302/ESS-Rule-No-2-High-Quality.pdf) or
- The ESS Lighting technologies 'List of Accepted Products' (http://www.ess.nsw.gov.au/Projects_and_equipment/Lighting_Technologies)

5. Minimum Installation Requirements

The Activity must be:

- performed by a licensed electrical worker under the supervision of a licensed electrical contractor
- completed and certified in accordance with any relevant code or codes of practice and other relevant legislation applying to the Activity, including any licensing, registration, statutory approval, Activity certification, health, safety, environmental or waste disposal requirements

Each space, after implementation of the Lighting Upgrade must achieve:

- the relevant requirements of AS/NZS 1680
- the requirements of the BCA section F4.4, Artificial Lighting
- an Illumination Power Density that equals or is less than the maximum Illumination Power Density for each space, as defined in Part J6 of the BCA

Control gear for linear fluorescent lamps manufactured in, or imported into Australia must comply with the requirements in AS/NZS 4783.2-2002.

6. Completion Date and Reporting Requirements

The Activity is completed when the upgrade has been undertaken according to all relevant requirements in this specification and all required documentation has been submitted to the Commission, including:

- Site Name
- Site Address
- The classification of the commercial premises in accordance with Table A18 of Schedule A of the ESS Rule
- The classification of the Activity
- Date of Activity
- Energy Saved (calculated in accordance with the activity energy saving requirements in this specification)

7. Record Keeping

Retailers will retain the following records in relation to the Activity:

- An output report from the ESS Commercial Lighting Calculation Tool (http://www.ess.nsw.gov.au/Methods_for_calculating_energy_savings/Commercial_Lighting)
- The output report will be produced using the version Calculation Tool that current at the time the Activity is undertaken
- An Electrical Certificate of Compliance
- Lighting levels post installation
- Lighting audit form
- Invoice for supply of replacement light fittings
- Photographs of the lighting in its location (date and location stamped), before and after the upgrades that coincide with the locations within the Commercial Lighting Calculation Tool

8. Activity energy savings

Energy savings for this Activity will be calculated using Equations 6, 9 and either 7 or 8 of the commercial lighting energy savings formula in Section 9 of the NSW 'Energy Savings Scheme (Amendment No.2) Rule 2014.

Calculations will use the factors and values from Schedule A – Default Factors and Classifications of the NSW 'Energy Savings Scheme (Amendment No. 2) Rule 2014.

The normalised energy saving from undertaking this Activity is equal to:

$$\text{Normalised Energy Saving (GJ)} = \text{MWh} \times 3.6$$

9. Guidance Notes (Informative only – not mandatory)

Appendix

The Appendix referenced to in this paper is available at www.sa.gov.au/energy/rees.

The Appendix has been prepared by Energy Efficient Strategies, Common Capital and Beletich Associates. They contain the technical assessment and opinions of the consultants and do not necessary represent the views of the Department of State Development or the South Australia Government.