ELECTRICITY SUPPLY ACT 1995

Notice of Approval of Amendment of Energy Savings Scheme Rule

NSW Energy Savings Scheme Rule (2009)

Notice of Amendment of Energy Savings Scheme Rule by the Minister for Resources and Energy under section 167(4) of the *Electricity Supply Act 1995*.

I, Christopher Hartcher, Minister for Resources and Energy, pursuant to section 167(4) of the *Electricity Supply Act 1995*, hereby give notice of approval of amendment to Energy Savings Scheme Rule 2009. The amended Rule is set out in Schedule 1 of this notice.

The amendment of the Rule takes effect on the day on which it is published in the Gazette.

A copy of the amended Energy Savings Scheme Rule 2009 may also be obtained through the NSW Trade & Investment website at http://www.trade.nsw.gov.au/energy/sustainable/efficiency/scheme

Dated at Sydney, this day of 2014.

The Hon. Christopher Hartcher, MP
Minister for Resources and Energy

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Energy Savings Scheme Rule of 2009

The Hon. Christopher Hartcher, MP
Minister for Resources and Energy

Simplified outline

The following is a simplified outline of this Rule:

- Clauses 1-4 set out the commencement of the Rule, the objects of the Rule, the application of the Rule, and status and operation of the Rule.
- Clause 5 sets out Definitions of Energy Saver and Recognised Energy Savings Activity.
- Clause 6 sets out the conditions and restrictions on the creation of Energy Savings Certificates under the Rule.
- Clause 7 sets out the calculation method for determining Energy Savings under the Project Impact Assessment Method.
- Clause 7A sets out the calculation method for determining Energy Savings under the Project Impact Assessment Method with Measurement and Verification.
- Clause 8 sets out the calculation method for determining Energy Savings under the Metered Baseline Method using one of the following sub-methods:
  - Baseline per unit of output (clause 8.5)
  - Baseline unaffected by output (clause 8.6)
  - Normalised baselines (clause 8.7)
  - NABERS Metered Baseline Method (clause 8.8)
  - Aggregated Metered Baseline Method (clause 8.9).
- Clause 9 sets out the calculation method for determining Energy Savings under the Deemed Energy Savings Method using one of the following sub-methods:
  - Purchase of New Appliances (clause 9.3)
  - Commercial Lighting Energy Savings Formula (clause 9.4)
  - High Efficiency Motor Energy Savings Formula (clause 9.5)
  - Power Factor Correction Energy Savings Formula (clause 9.6)
  - Removal of Old Appliances (clause 9.7)
  - Home Energy Efficiency Retrofits (clause 9.8).
  - Installation of High Efficiency Appliances for Businesses (clause 9.9)
- Clause 10 sets out the definitions and interpretation provisions.

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- Schedule A sets out Default Factors and Classifications
- Schedule B sets out activity definitions for the Purchase of New Appliances (clause 9.3)
- Schedule C sets out activity definitions for the Removal of Old Appliances (clause 9.7)

- Schedule D sets out activity definitions for General Activities for Home Energy Efficiency Retrofits (clause 9.8)
- Schedule E sets out activity definitions for Low Cost Activities for Home Energy Efficiency Retrofits (clause 9.8)
- Schedule F sets out activity definitions for the Installation of High Efficiency Appliances for Businesses (clause 9.9)

1 Name and commencement

1.1 This Rule is the *Energy Savings Scheme Rule of 2009* and commences on DAY MONTH 2014.

1.2 Without limiting the circumstances in which this Rule applies, this Rule applies to:

(a) the accreditation of Accredited Certificate Providers after the commencement of this Rule (regardless of the date of application for accreditation);

(b) the calculation and creation of Energy Savings Certificates registered after the commencement of this Rule (regardless of the date of accreditation of the Accredited Certificate Provider); and

(c) subject to clause 1.3, the ongoing eligibility of a person to remain accredited as an Accredited Certificate Provider accredited for the purpose of the Scheme Administrator exercising its powers under the Act and Regulations, after the commencement of this Rule, to vary, suspend or cancel a person's accreditation as an Accredited Certificate Provider

1.3 Persons may not become accredited or have their current accreditation amended under the Project Impact Assessment Method (clause 7) after this Rule commences, unless the amendment is to transition an accreditation to the Project Impact Assessment with Measurement and Verification Method (clause 7A).

1.4 Persons may not become accredited under clause 9.8 (Home Energy Efficiency Retrofits part of the Deemed Energy Savings Method) until 6 months after the commencement date of this Rule.

1.5 For Prior Accreditations, the following transitional arrangements with respect to that accreditation will apply:

(a) For all Prior Accreditations, the Accredited Certificate Provider may create Energy Savings Certificates for Energy Savings for which they are the Energy Saver in accordance with their Prior Accreditation Conditions, provided that the other conditions of clause 1.5 are met;

(b) For a Prior Accreditation under the Project Impact Assessment Method (clause 7), the accreditation remains valid and:

(i) Energy Savings Certificates may only be created under clause 7.4.4 where the Implementation Date is no more than 12 months after the commencement date of this Rule;

(ii) Energy Savings Certificates may only be created under clause 7.4.5 where the Implementation Date is before the commencement date of this Rule. The Implementation Date used for the initial creation of Energy Savings Certificates under clause 7 shall be used;

(iii) in the Prior Accreditation Conditions, references to Table 16 refer to Table A16 in this Rule; and

(iv) where Energy Savings Certificates were created prior to this version of the Rule, you may create Energy Savings Certificates according to your accreditation under that version of the Rule

(c) For a Prior Accreditation under the Metered Baseline Method (clause 8.1 to 8.7), the accreditation remains valid and:

(i) The Implementation Date used for the initial creation of Energy Savings Certificates under clause 8 may be used

(d) For a Prior Accreditation under the National Australian Built Environment Rating System baseline method (clause 8.8), the accreditation remains valid and, with respect to the Prior Accreditation Conditions:

(i) Both an Existing NABERS Building and a New NABERS Building refer to a NABERS Building;

(ii) Energy Savings calculated under Method 4a or Method 4b may be calculated under Method 4c of this Rule, using either a Baseline NABERS Rating or a default Benchmark NABERS Rating (Table A20);

(iii) If the year that the Baseline Period ends is eligible to be used as the Baseline Ratings Year under this Rule, the NABERS rating corresponding to that Baseline Period may be used as a Baseline NABERS Rating under Method 4c;

(e) For a Prior Accreditation where Prior Accreditation Conditions refer to the Default Savings Factors method (formerly clause 9.3), the accreditation remains valid and:

(i) Energy Savings Certificates may not be created under Tables 1, 2, 3 or 4 in the Prior Accreditation Conditions;

(ii) Energy Savings Certificates may be created for Energy Savings calculated under the Purchase of New Appliances method (clause 9.3) of this Rule, where the Prior Accreditation Conditions allow Energy Savings Certificates to be calculated under Tables 5, 6, 8a, 8b, 8c, 8d of a previous Rule, with references to Tables 5, 6, 8a, 8b, 8c, 8d in the Prior Accreditation Conditions referring to Activity B1, B3, B4, B5, B6 and B6 respectively in this Rule;

(iii) Energy Savings Certificates may be created for Energy Savings calculated under the Removal of Old Appliances method (clause 9.7) of this Rule, where the Prior Accreditation Conditions allow Energy Savings Certificates to be calculated under Table 7 of a previous Rule, with references to Table 7 in the Prior Accreditation Conditions referring to Activity C1 or C2, as appropriate, in this Rule;

(f) For a Prior Accreditation where Prior Accreditation Conditions refer to the Commercial Lighting Energy Savings Formula method (clause 9.4), the accreditation remains valid and, in the Prior Accreditation Conditions:

(i) references to Tables 9 and 10 refer to Table A9 and A10 respectively in this Rule;

(g) For a Prior Accreditation where Prior Accreditation Conditions refer to the High Efficiency Motor Energy Savings Formula method (clause 9.5), the accreditation remains valid and, in the Prior Accreditation Conditions:

(i) references to Tables 11, 12, 13 and 14 refer to Table A11, A12, A13 and A14 respectively in this Rule;

2 Objects of the Rule

The object of this Rule is to provide specific arrangements for the creation and calculation of Energy Savings Certificates where energy is saved through increased efficiency of electricity consumption, or reduction in electricity consumption where there is no negative effect on production or service levels. The Rule aims to save energy through measures that improve electricity end-use efficiency.

3 Application of the Rule

Without limiting the persons to whom this Rule applies, this Rule applies to Accredited Certificate Providers accredited to create Energy Savings Certificates in respect of Recognised Energy Savings Activities in accordance with Part 9 Division 8 of the Act, the Regulations and this Rule.

4 Status and Operation of the Rule

This Rule is an Energy Savings Scheme Rule made under Part 9 Division 13 of the Act.

5 Definitions of Energy Saver and Recognised Energy Savings Activity

5.1 (deleted)

5.2 The Energy Saver with respect to Energy Savings arising from a Recognised Energy Savings Activity, as calculated according to a calculation method in this Rule, is either:

(a) the person defined as the Energy Saver in the relevant calculation method, provided that, effective at the relevant Implementation Date, that person has not nominated another person to be the Energy Saver for those Energy Savings in accordance with clause 5.2 (b); or

(b) the person nominated to be the Energy Saver by the person in clause 5.2 (a), provided that:

(i) the nomination is in a valid form approved by the Scheme Administrator;

(ii) another person has not been previously nominated, effective at the relevant Implementation Date, as the Energy Saver for the same Energy Savings;

5.3 A Recognised Energy Savings Activity:

(a) is an activity that increases the efficiency of electricity consumption, by:

(i) modifying End-User Equipment or usage of End-User Equipment (including installing additional components) resulting in a reduction in the consumption of electricity compared to what would have otherwise been consumed;

(ii) replacing End-User Equipment with other End-User Equipment that consumes less electricity;

(iii) installing New End-User Equipment, or purchasing New End-User Equipment, that consumes less electricity than other End-User Equipment of the same type, function, output or service; or

(iv) removing End-User Equipment that results in reduced electricity consumption,

and where that activity has no negative effect on production or service levels.

(b) must be implemented at a Site or Sites in an ESS Jurisdiction.

(c) that includes the replacement or removal of End-User Equipment, is only valid if the Accredited Certificate Provider:

(i) is aware of their legal obligations for the disposal or recycling of that End-User Equipment, including but not limited to the destruction of refrigerants in accordance with the Commonwealth's *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989*, and the disposal of hazardous waste (such as lighting products that contain mercury) under the *Protection of the Environment Operations Act 1997*; and

(ii) does not refurbish or resell that End-User Equipment.

5.4 Recognised Energy Savings Activities do not include:

(a) any activity undertaken in order to comply with any mandatory legal requirement imposed through a statutory or regulatory instrument of any originating jurisdiction, including, but not limited to, compliance with BASIX and Building Code of Australia requirements;

(b) the supply of electricity by an Electricity Retailer, or purchases from an Electricity Retailer by a customer, from the NSW Electricity Network, under a representation by the Electricity Retailer that there is a reduction in greenhouse gas emissions because the electricity supplied is connected with, or represents an amount equal to, the generation of electricity from a particular energy source. This includes but is not limited to purchases of GreenPower;

Note: This is intended to exclude from this Rule activities involving the purchase of electricity under "Green Power" accredited or similar schemes that are eligible to create certificates or Renewable Energy Certificates at the point of generation.

(c) any activity that reduces electricity consumption by reducing the scope or quantity of goods or services derived from the use of that electricity;

Note: Reduced energy consumption not directly due to specific actions to improve efficiency does not qualify as a Recognised Energy Savings Activity. Mild weather, lower production, closing down part of a Site, or reducing the quality or quantity of service derived from the use of that electricity do not qualify as a Recognised Energy Savings Activity.

Reducing electricity consumption where there is no negative effect on production or service levels (e.g. reduction of excessive lighting, removal of redundant installed capacity or the installation of more energy efficient equipment) is a Recognised Energy Savings Activity and is not excluded by this clause.

(d) any activity that reduces electricity consumption by generating electricity from any source or by converting non-renewable energy to provide equivalent goods or services;

(e) any activity that is eligible to create tradeable certificates under the Commonwealth's *Renewable Energy (Electricity) Act 2000* or a similar scheme.

5.5 A Recognised Energy Savings Activity comprises one or more Implementations; where an Implementation has a single Implementation Date and occurs at a single Site.

6 Creation of Energy Savings Certificates

6.1 Only Accredited Certificate Providers may create Energy Savings Certificates.

6.2 A person may only create Energy Savings Certificates in respect of the Energy Savings from an Implementation:

(a) where they are the Energy Saver for those Energy Savings at the Implementation Date;

(b) where the Accreditation Date is before the Implementation Date; and

(c) where, if the person has been nominated as the Energy Saver, the nomination was made before the Implementation Date.

6.3 (deleted)

6.4 A person may not create Energy Savings Certificates in respect of any Energy Savings if that person or another person has previously validly created Energy Savings Certificates in respect of the same Energy Savings.

6.5 A person may only create a certain Number of Certificates for the Energy Savings arising from a Recognised Energy Savings Activity, calculated in accordance with Equation 1.

Equation 1

$$\textit{Number of Certificates} = \sum_{\text{Implementations}} \textit{Energy Savings} \times \textit{Certificate Conversion Factor}$$

Where:

- *Number of Certificates* is rounded down to a whole number;
- the summation is across the Energy Savings arising from one or more Implementations of the Recognised Energy Savings Activity;
- *Energy Savings,* in MWh, arising from each Implementation have been calculated according to the approved calculation method; and
- *Certificate Conversion Factor* is 1.06, as specified in Schedule 5B of the Act, or as amended by Regulation.

6.5A The Energy Savings in Equation 1 must be calculated using one of the following calculation methods from this Rule:

(a) the Project Impact Assessment Method (clause 7 or 7A);

(b) the Metered Baseline Method (clause 8); or

(c) the Deemed Energy Savings Method (clause 9),

6.5B The calculation method must:

(a) be approved by the Scheme Administrator before any Energy Savings Certificates are created using that method, including any additional conditions imposed by the Scheme Administrator;

(b) produce a result reasonably reflecting, to the satisfaction of the Scheme Administrator, the extent of the Energy Savings;

6.5C Energy Savings may be totalled over a number of Implementations under the same Recognised Energy Savings Activity.

6.6 (deleted)

6.7 New End-User Equipment must, demonstrated to the satisfaction of the Scheme Administrator, consume electricity more efficiently than the market average across all ESS Jurisdictions, or for all of Australia where data for ESS Jurisdictions is not available, for all comparable End-User Equipment of the same type, function, output or service, which may be estimated by reference to:

(a) baseline efficiency for that class of End-User Equipment which may, from time to time, be Published by the Scheme Administrator;

(b) sales-weighted market data for that class of End-User Equipment collected from installers, retailers, distributors or manufacturers in the past 5 years; or

(c) product-weighted averages of Products registered as complying with an Australian Standard that defines how performance is to be measured for that class of End-User Equipment;

6.8 Before applying to register a number of Energy Savings Certificates for one or more Implementations of a Recognised Energy Savings Activity, an Accredited Certificate Provider must provide the following data to the Scheme Administrator in a form determined by the Scheme Administrator:

(a) The Accredited Certificate Provider identifier;

(b) The Recognised Energy Savings Activity identifier;

(c) The Address of the Site where the Implementation took place;

(d) Any other identifiers required to identify the Site where the Implementation took place;

(e) The Implementation Date of the Implementation;

(f) The Energy Savings from the Implementation;

(g) The cost to the Purchaser of the Implementation, excluding GST, if any;

(h) The type of the End-Use Service for which energy was saved, if known, is accordance with Table A17 of Schedule A;

(i) Australian Business Number, where applicable;

(j) The Business Classification of the business utilising the End-Use, if known, in accordance with Table A18 of Schedule A; and

(k) Any other data providing evidence of Energy Savings from the Implementation as specified and required by the Scheme Administrator;

6.9 Before approving an application by an Accredited Certificate Provider to register a certificate, the Scheme Administrator may review data to ensure that it conforms with this Rule and any other conditions of their accreditation.

7 Project Impact Assessment Method

Note: Accredited Certificate Providers (ACPs) can no longer accredit new Recognised Energy Savings Activities (RESAs) under the Project Impact Assessment (PIA) Method (clause 7). New RESAs must be accredited under the Project Impact Assessment with Measurement and Verification Method (clause 7A). If an ACP has an existing RESA under PIA, they may continue to create ESCs for 12 months after the commencement of this Rule. They must then amend accreditation to conform with the PIA with M&V Method if they wish to continue to create ESCs after 12 months.

7.1 Energy Savings under the Project Impact Assessment Method

Using the Project Impact Assessment Method, Energy Savings may be calculated using **Equation 2**.

Equation 2

Energy Savings = *Reduced Electricity Consumption* x *Confidence Factor*

Where:

- *Reduced Electricity Consumption* is the extent to which the electricity consumption of the equipment, process, or system is as a consequence of the Recognised Energy Savings Activity is different to what it otherwise would have been and is to be calculated in accordance with the engineering assessment in clause 7.2.
- *Confidence Factor* depends on the type of engineering assessment performed under clause 7.2 and is assigned to the calculation according to clause 7.3

7.2 Engineering assessment of reduced electricity consumption

Accredited Certificate Providers choosing to use the Project Impact Assessment Method in respect of any Recognised Energy Savings Activity, are to calculate the reduced electricity consumption of only the equipment, process, or system that is the subject of the Recognised Energy Savings Activity using an engineering assessment or model:

(a) that uses reasonable assumptions and generally accepted engineering methods, models, and formulae;

(b) in which the methods, models and formulae used to assess the Recognised Energy Savings Activity are chosen by the Accredited Certificate Provider, but the assessment is assigned a Confidence Factor under clause 7.3 reflecting the accuracy of the engineering assessment conducted;

(c) that takes account of:

(i) the consumption of the existing equipment, systems or processes, or for the purposes of clause 6.7 a typical New End-User Equipment thereof that represents better than recent existing End-User Equipment of that type as described in that section, compared with its replacement;

(ii) the performance of the equipment, systems or processes, including degradation over time;

(iii) the operating characteristics of the equipment, systems or processes, including hours of use, degree of loading, usage, operating patterns and behaviour, ambient conditions and any other relevant factors; and

(iv) any of the factors or constants used in a Deemed Energy Savings method set out in this Rule if the variable that the value represents is relevant to the assessment or, if the Accredited Certificate Provider proposes to use a different value for the same purpose, that value is acceptable to the Scheme Administrator.

7.3 Confidence Factor

The *Confidence Factor* is:

(a) 1.0, if the engineering assessment determines energy consumption to a high level of accuracy based on logged or equivalent data from the End-User Equipment such as:

(i) hours of operation for the End-User Equipment determined from measurements taken over time or other logged data, or a simpler method where this yields an equivalent level of accuracy;

(ii) allowances for any variance in input characteristics and usage, degree of loading, or output characteristics for the End-User Equipment over time determined from measurements or other logged data, or a simpler method where this yields an equivalent level of accuracy;

(iii) operating environment and ambient conditions over time for the End-User Equipment determined from measurements or other logged data, or a simpler method where this yields an equivalent level of accuracy;

(iv) End-User Equipment characteristics using a full performance curve from manufacturers' or measured data, or a simpler method where this yields an equivalent level of accuracy; and

(v) performance degradation of the End-User Equipment over time using detailed calculations and manufacturers' or measured degradation characteristics, or a simpler method where this yields an equivalent level

of accuracy, (including where the engineering assessment relies upon factors or constants used in a Deemed Energy Savings method set out in this Rule),

or,

(b) 0. 9, if the engineering assessment determines energy consumption to a lesser level of accuracy from that described in clause 7.3(a), based on estimations from logged data, records or equivalent data such as:

(i) hours of operation for the End-User Equipment estimated from records, or a simpler method where this yields an equivalent level of accuracy;

(ii) allowances for any variance in input characteristics and usage, degree of loading, or output characteristics for the End-User Equipment over time estimated from records, or a simpler method where this yields an equivalent level of accuracy;

(iii) operating environment and ambient conditions over time estimated for the End-User Equipment from records or average measurements, or a simpler method where this yields an equivalent level of accuracy;

(iv) End-User Equipment characteristics taking account of performance at full and part load or discrete operating modes, or a simpler method where this yields an equivalent level of accuracy; and

(v) estimates of performance degradation of the End-User Equipment over time using manufacturers' or other representative degradation characteristics, or a simpler method where this yields an equivalent level of accuracy,

or,

(c) 0.8, or another value approved by the Scheme Administrator, if the engineering assessment does not meet the level of accuracy set out in clause 7.3 (a) or (b).

7.4 Creation of Certificates able to be brought forward using the Project Impact Assessment Method

7.4.1 For the purposes of section 131 of Division 7 of the Act, the Accredited Certificate Provider may, subject to clause 6.5, elect for the Energy Savings that give rise to the entitlement to create Energy Savings Certificates under the Project Impact Assessment Method determined in accordance with clause 7.4.2 to be deemed to have occurred (for the purpose of the entitlement to create Energy Savings Certificates but not for any other purpose) on a date determined in accordance with clause 7.4.3, and subject to the application of the discount factor in accordance with clause 7.4.4.

7.4.2 The maximum time period for which Energy Savings Certificate creation can be brought forward as a result of future Energy Savings being deemed to have occurred on a date determined under clause 7.4.3 is the lesser of:

(a) 5 years; or

(b) the life of the Recognised Energy Savings Activity (in years) determined by the Accredited Certificate Provider, to the satisfaction of the Scheme Administrator, with reference to:

(i) the number of Energy Savings Certificates that are otherwise eligible to be created over a given period, determined in accordance with this Rule and to the satisfaction of the Scheme Administrator; and

(ii) any likely performance degradation of the End-User Equipment that will tend to result in Energy Savings in one period being lower than Energy Savings in preceding periods of equal duration; and

(iii) the expected lifetime of the End-User Equipment, taking into account its characteristics, its usage, typical frequency of replacement, and the use of the Site and End-User Equipment remaining the same.

7.4.3 The date on which the Energy Savings are deemed to occur under clause 7.4.1 is the later of:

(a) 1 July 2009;

(b) the Implementation Date, where the Implementation Date is the date that the Implementation was first commissioned for operation; or

(c) the first date by which all the Energy Savings previously brought forward under clause 7.4.1 to create Energy Savings Certificates in respect of the same Recognised Energy Savings Activity has actually occurred.

7.4.4 The amount of Energy Savings able to be brought forward must be calculated by applying the Discount Factor to the Energy Savings entitled to be created for each future year as set out in **Equation 3**.

Equation 3

$$\text{Energy Savings} = \sum_{n} \textit{Reduced Electricity Consumption}_n \times \textit{Confidence Factor} \times \textit{Discount Factor}_n$$

Where:

- *Reduced Electricity Consumption* is the extent to which the electricity consumption of the equipment, process, or system is, as a consequence of the Recognised Energy Savings Activity, different to what it otherwise would have been in year n;
- *Confidence Factor* depends on the type of engineering assessment performed under clause 7.2 and is assigned to the calculation according to clause 7.3
- *Discount Factor* is set out in Table 16 of Schedule A of this Rule in year *n*;
- *n* is the year from 1 (the first year of Energy Savings claimed) to 5.

7.4.5 At the end of the maximum time period as determined in clause 7.4.2, the Accredited Certificate Provider may create Energy Savings Certificates from Energy Savings equal to:

(a) the Energy Savings for each year in the maximum time period other than the first year as calculated using **Equation 2**, less

(b) the Energy Savings for each year in the maximum time period other than the first year as calculated for the relevant year in **Equation 3**,

provided the Accredited Certificate Provider establishes, to the satisfaction of the Scheme Administrator, that the Energy Savings calculated in clause 7.4.5(a) have actually occurred.

7.4.6 For the purposes of section 131(4) of Division 7 of the Act, the Energy Savings in respect to the Number of Certificates are to be created in accordance with clause 7.4.5 are deemed to occur on the date on which the maximum time period as determined in clause 7.4.2 ends.

7.4.7 The Energy Saver is the person who Purchases the goods or services that lead to the Energy Savings;

7.4.8 The Lifetime of the Energy Savings is:

(a) Where Energy Savings Certificates have been created under clause 7.4.4, the time period as determined in clause 7.4.2; or

(b) Where Energy Savings Certificates have been created under clause 7.4.5, one year;

7A Project Impact Assessment with Measurement and Verification Method

7A.1 Energy Savings calculation

Using the Project Impact Assessment Method with Measurement and Verification, the Energy Savings may be calculated using **Method 7A.1**, for savings calculated from Implementations including, but not limited to:

a) Implementations where there is no existing End-User Equipment providing the same products or services, by establishing a Baseline Energy Model using Method 7A.5;

b) Implementations where existing End-User Equipment is replaced or modified;

c) Implementations that are part of a larger roll-out of Implementations by using sampling to establish an Energy Model across all Sites using Method 7A.6; and

d) ongoing measurement and verification to identify actual Energy Savings realised in addition to those estimated at the time of initial commissioning, or if it was not possible to estimate savings at the time of initial commissioning.

Method 7A.1 – Expected Lifetime Savings at Implementation

Step 1 – Define Recognised Energy Savings Activity and Boundary

Define the goods and services that will comprised the Recognised Energy Savings Activity that will be undertaken to save energy
Define Measurement Boundary, including End-User Equipment to be measured
Define End-User Equipment outside the measurement boundary whose energy consumption will be affected by the Recognised Energy Savings Activity

Step 2 – Define Variables

Identify and define p Independent Variables, which vary over time under normal operating conditions, and must be measured during measurement periods.
$x_1, x_2, x_3, \ldots x_p$

Identify and define q Site Variables, which don't vary over time for each Site under normal operating conditions, however they could change under extraordinary circumstances (such as unscheduled maintenance), and so must also be monitored and measured during measurement periods.
$x_{p+1}, x_{p+2}, x_{p+3}, \ldots x_{p+q}$

The normal operating values for these Site Variables are constant and are denoted as
$X_{p+1}, X_{p+2}, X_{p+3}, \ldots X_{p+q}$

Optionally, identify and define variables that are neither Independent Variables nor Site Variables (i.e. will not be used in an Energy Model).

Establish the accuracy of measuring each Independent Variable and Site Variables, by assigning a value to either:

$\Delta x_{i,rel}$ for the relative error of measurement,

or

$\Delta x_{i,abs}$ for the absolute error of measurement

for each Independent Variable or Site Variable x_i

Step 3 – Establish Normal Year of operating conditions

Unless full measurement of an Implementation Year is to be used:

Define a Normal Year of operation.

Collect values for Independent Variables over a Normal Year of operation

$x_i = \tilde{x}_i(t)$

where:

i is between 1 and p

t is between 0 and 12 months

Step 4 – Identify Interactive Effects

Identify and define Interactive Effects, including the End-User equipment outside of the Measurement Boundary that will have its energy consumption changed as an effect of the Recognised Energy Savings Activity.

Express interactive energy consumption, E', in MWh, as a function of Independent Variables and Site Variables under both baseline and operating conditions:

Under baseline conditions:

$E'_{Baseline} = E'_{Baseline}(x_1, x_2, x_3, \ldots x_p, x_{p+1}, \ldots, x_{p+q})$

Under operating conditions:

$E'_{Operating} = E'_{Operating}(x_1, x_2, x_3, \ldots x_p, x_{p+1}, \ldots, x_{p+q})$

Step 5 – Establish Baseline Energy Model

Establish Baseline Energy Model:

$E_{Baseline}(x_1, x_2, \ldots x_p)$

or, more completely, including Site Variables (which are constant except if a Sampling method is used):

$E_{Baseline}(x_1, x_2, \ldots x_{p+q})$

using one of the following methods or sets of methods:

1. Method 7A.2 – Measure Energy Performance & Method 7A.3 – Establish Energy Model using Regression (IPMVP Option A or B);
2. Method 7A.2 – Measure Energy Performance & Method 7A.4 – Establish Energy Model using Calibration (IPMVP Option D);
3. Method 7A.5 – Establish Energy Model from Market Average (IPMVP Option A); or
4. Method 7A.6 – Establish Energy Model using Sampling (based on IPMVP Option A, B or D).

Step 6 – Implement and Commission

Record evidence that the Implementation was carried out as specified.

Define and record Implementation Date, being the date that Energy Savings from the Implementation first commenced, or measurement of those Energy Savings first commenced, optionally omitting any time periods corresponding to commissioning and fine tuning the performance of the End-User Equipment.

The Implementation may continue after the Implementation Date, i.e. after Energy Savings first commence.

Define each Implementation Year, y_i, each lasting exactly one year of time, where the first Implementation Year, y_1, starts at the Implementation Date, and each subsequent Implementation Year starts at the corresponding anniversary of the Implementation Date.

Step 7 – Establish Operating Energy Model

Establish Operating Energy Model:

$E_{Operating}(x_1, x_2, \ldots x_p)$

or, more completely, taking into account Site Variables (which are constant except if a Sampling method is used):

$E_{Operating}(x_1, x_2, \ldots x_{p+q})$

using one of the following methods or sequences of methods:

1. Method 7A.2 – Measure Energy Performance over a full Implementation Year (Full Year Measurement) (IPMVP Option C);
2. Method 7A.2 – Measure Energy Performance & Method 7A.3 – Establish Energy Model using Regression (IPMVP Option A or B);
3. Method 7A.2 – Measure Energy Performance & Method 7A.4 – Establish Energy Model using Calibration (IPMVP Option D); or

4. Method 7A.6 – Establish Energy Model using Sampling (IPMVP Option A, B or D).

Step 8 – Calculate Interactive Effects

Refine the functional form of the Interactive Energy Model for energy consumption due to Interactive Effects, E', in MWh, as a function of Independent Variables and Site Variables under both baseline and operating conditions, based on the Energy Models established in Steps 5 & 7:

Under baseline conditions:

$$E'_{Baseline} = E'_{Baseline}(x_1, x_2, x_3, \ldots x_p, x_{p+1}, \ldots, x_{p+q})$$

Under operating conditions:

$$E'_{Operating} = E'_{Operating}(x_1, \ldots . x_p, x_{p+1}, \ldots, x_{p+q})$$

Calculate *Interactive Annual Energy Savings*, in MWh, either from measurement of a full Implementation Year:

$$\textit{Interactive Annual Energy Savings} = \sum_t (E'_{Baseline}(x_1(t), x_2(t), \ldots x_{p+q}(t)) - E'_{Operatine}(x_1(t), x_2(t), \ldots x_{p+q}(t))$$

where:

- The summation is over all measurement time periods t in the Implementation Year;
- $x_i(t)$ is the measured value of the Independent Variable or Site Variable x_i for measurement time t;
- Any time periods t for which all of the measured Independent Variable or Site Variable values $x_1(t), x_2(t), \ldots x_{p+q}(t)$ fall outside of either the Baseline or Operating Interactive Energy Model are excluded from the summation; and
- *Annual Interactive Energy Savings* are determined in Step 8.

or over the Normal Year of values of Independent Variables and Site Variables:

$$\textit{Interactive Annual Energy Savings} = \sum_t (E'_{Baseline}(\tilde{x}_1(t), \tilde{x}_2(t), \ldots \tilde{x}_{p+q}(t)) - E'_{Operatine}(x_1(t), \tilde{x}_2(t), \ldots \tilde{x}_{p+q}(t))$$

Where:

- The summation is over all time periods t in the Normal Year;
- $x_i(t)$ is the measured value of the Independent Variable or Site Variable x_i for measurement time t; and
- Any time periods for which all of $\tilde{x}_1(t), \tilde{x}_2(t), \ldots, \tilde{x}_{p+q}(t)$ fall outside of the Effective Range of either the Baseline or Operating Interactive Energy Model are excluded from the summation.

Step 9 – Calculate Gross Annual Energy Savings

Calculate *Gross Annual Energy Savings*, in MWh, either from measurement of a full Implementation Year:

$$\textit{Gross Annual Energy Savings} = \sum_t (E_{Baseline}(x_1(t), x_2(t), \ldots x_{p+q}(t)) - E_{Operatine}(t)) + \textit{Annual Interactive Energy Savings}$$

where:

- The summation is over all measurement time periods *t* in the Implementation Year;
- $E_{Operatine}(t)$ is the measured energy consumption for measurement time *t*;
- $x_i(t)$ is the measured value of the Independent Variable or Site Variable x_i for measurement time *t*;
- Any time periods *t* for which all of the measured Independent Variable or Site Variable values $x_1(t), x_2(t), \ldots x_{p+q}(t)$ fall outside of the Effective Range of the Baseline Energy Model are excluded from the summation; and
- *Annual Interactive Energy Savings* are determined in Step 8.

or over the Normal Year of values of Independent Variables and Site Variables:

$$\textit{Gross Annual Energy Savings} = \sum_{t} (E_{Baseline}(\tilde{x}_1(t), \tilde{x}_2(t), \ldots \tilde{x}_{p+q}(t)) - E_{Operatine}(\tilde{x}_1(t), \tilde{x}_2(t), \ldots \tilde{x}_{p+q}(t)) + \textit{Annual Interactive Energy Savings}$$

where:

- The summation is over all time periods *t* in either the Normal Year or the Implementation Year (in the case of an Energy Model based on actual measurements);
- Any time periods for which all of $\tilde{x}_1(t), \tilde{x}_2(t), \ldots \tilde{x}_{p+q}(t)$ fall outside of the Effective Range of either the Baseline Energy Model or Operating Energy Model are excluded from the summation; and
- *Annual Interactive Energy Savings* are determined in Step 8.

Step 10 – Assign and Apply Accuracy Factor

Assign an Accuracy Factor, between 0 and 1, in accordance with a process published by the Scheme Administrator, with reference to any number of the following determinants of accuracy:

1. The qualifications and experience of the person confirming that the measurement and verification approach used conforms with this Method.
2. The qualifications and experience of the person confirming that the measurement and verification calculations conform with the confirmed approach.
3. The Relative Error or Absolute Error associated with measurement of each of the Independent Variables and Site Variables.
4. *Interactive Effects* as a proportion of *Gross Annual Energy Savings*.
5. The Non-Routine Adjustment Ratio
6. If regression or simulation used to establish either the baseline or operating energy model, the coefficient of determination (R-squared) of that model.
7. If regression or simulation used to establish either the baseline or operating energy model, the standard error (SE) of that estimate.
8. If regression used to establish either the baseline or operating energy model, the t-statistic for parameters used in the functional form.
9. If sampling used to establish either the baseline or operating energy model, the number of sample Sites used
10. Method used to establish the Effective Range of energy models.
11. The proportion of the Normal Year, or Measured Implementation Year, values for Independent Variables that falls within the Effective Range of each Energy Model.
12. *Gross Annual Energy Savings* as a proportion of *Baseline Annual Energy Consumption*

Apply the Accuracy Factor to the Gross Annual Energy Savings to calculate the Energy Savings that can be attributed to the Implementation based on the determinants of accuracy:

Attributed Annual Energy Savings = Gross Annual Energy Savings x Accuracy Factor

Step 11 – Estimate Savings Lifetime

This step is only necessary if the Operating Energy Model is not based on a full year of Measurement.

Estimate the maximum lifetime of Energy Savings due to the Implementation, either by:

1. Assigning a value of Maximum Lifetime = 10 years, or
2. Assigning a value to Maximum Lifetime from a Persistence Model in accordance with Clause 7A.8 of this Rule

Estimate System Lifetime, if any, being the remaining lifetime of the balance of the system that uses the services of the Activity and is integral to the realisation of Energy Savings.

Calculate:

Lifetime = Minimum (Maximum Lifetime, System Lifetime)

Round down the value of Lifetime to the next highest number of whole years.

Step 12 – Calculate Decay Factor

$Decay\ Factor_i$, is a value between 0 and 1 quantifying the decay of the Discounted Annual Energy Savings in year y_i due to equipment degradation over time.

If the Operating Energy Model is based on a full year of Measurement then:
$Decay\ Factor_i = 1$

Otherwise:
$Decay\ Factor_i$ is a value derived from either:

1. Looking up the corresponding value in Table A16, or
2. Assigning a value for that Implementation Year from a Persistence Model in accordance with Clause 7A.8 of this Rule.

Step 13 – Account for Energy Savings for which Energy Savings Certificates have already been created

If Energy Savings Certificates have previously been created for the same Implementation in any Implementation Year y_i, then the corresponding Energy Savings are denoted as $Counted\ Energy\ Savings_i$.

Step 14 – Calculate Lifetime Energy Savings

This step is only necessary if the Operating Energy Model is not based on a full year of Measurement.

$$Lifetime\ Energy\ Savings = \sum_{Yi} (Attributed\ Annual\ Energy\ Savings \times Decay\ Factor_i - Counted\ Energy\ Savings_i)$$

Where:

- the summation is over each Implementation Year y_i over the *Lifetime* of the Energy Savings in years, or the single Implementation Year over which full measurement was conducted.
- *Attributed Annual Energy Savings*, in MWh, are the Energy Savings attributable from the Implementation from a Normal Year of operation if an Energy Model is used, or the actual conditions over a full Implementation Year, after taking into account the accuracy of the methods used.
- $Decay\ Factor_i$, is determined in Step 12.

Method 7A.2 – Measure Energy Performance

This method records and analyses measurements of Energy Consumption, Independent Variables and Site Variables over a Measurement Period.

Step 1 – Define Measurement Period

The Measurement Period consists of a start date and an end date, and optionally a time of day for each.

The Measurement Period will be either before Implementation (baseline conditions) or after Implementation (operating conditions).

If Energy Savings are to be estimated based on actual conditions, then the Measurement Period must align exactly with a full Implementation Year under operating conditions.

Step 2 – Define Variables

Denote Energy Consumption as E

Denote p Independent Variables as x_i, for i between 1 and p

Denote q Site Variables as x_i, for i between $p+1$ and $p+q$

Denote the constant Normal value for each Site Variable as X_i, for i between $p+1$ and $p+q$

Step 3 – Measure Energy Performance

Measure Energy Consumption $E\ (t_j)$ and Independent Variables and Site Variables $x_i\ (t_j)$

Where:

- t_j represents a measurement time during the Measurement Period
- i is between 1 and $p+q$.
- all variables must be measured for each measurement time.

Denote as $l(t_j)$ the length of time associated with each measurement time t_j.

Step 4 – Remove measurements taken under non-normal Site conditions (non-routine adjustments)

Identify the time periods for which one or more of the Site Variables differs from its constant Normal Value, i.e. time periods t_j where

$x_i(t_j) \neq X_i$

Where:

- $p+1 < i < p+q$

Non-Routine Adjustment Ratio (%) = $\Sigma_{j,\ where\ x(tj)\ not\ normal}\ l(t_j)\ /\ \Sigma_{all\ j}\ l(t_j)$

Remove the measurements taken at those time periods t_j from the set of measurements.

Step 5 – Test for correlation between Independent Variables

Test whether there is correlation between the measured values for the Independent Variables during the Measurement Period at the 95% confidence level.

Step 6 – Calculate the Measurement Range

Calculate the Measurement Range, using one of the following sub-methods:

Submethod 1. The convex hull of all of the measured values of the Independent Variables.

Submethod 2. The bounding box of all of the measured values of the Independent Variables.

$x_{i.max} = max_j(x_i(t_j))$
$x_{i.min} = min_j(x_i(t_j))$

Method 7A.3 - Establish Energy Model from Regression

This method establishes an Energy Model for a system that estimates the Energy Consumption of the system subject to a number of Independent Variables that vary over time.

The Energy Model will be established for either:

a. baseline conditions, before Implementation, or
b. operating conditions, after Implementation.

Step 1 – Define Variables and Measurements

Denote Energy Consumption as E

Denote p Independent Variables as x_i, for i between 1 and p

Measure Energy Consumption $E\ (\ t_j\ )$ and Independent Variables $x_i\ (\ t_j\ )$
Where:

- t_j represents a measurement time during the Measurement Period
- i is between 1 and p.
- all variables must be measured for each measurement time.

Step 2 – Define Energy Model (routine adjustments)

Define Energy Model, by expressing Energy Consumption as a mathematical function of the Independent Variables

$E = E(\ x_1,\ x_2,\ \ldots\ x_p)$

Where:

- E is the measured Energy Consumption
- x_i, for i between 1 and p, are Independent Variables that are to be measured throughout the Measurement Period
- the mathematical function includes a number, s, of unknown functional Parameters $a_1,\ a_2,\ \ldots\ a_s$.

Step 3 – Use regression to estimate Energy Model

Perform a regression analysis to optimise the values of the Parameters.

Step 4 – Calculate accuracy of Energy Model

Calculate the coefficient of determination, R^2, for energy consumption E.

Calculate the standard error, SE.

Calculate the t-statistic, t_i, for each parameter, a_i.

Method 7A.4 - Establish Energy Model from Simulation

This method establishes an Energy Model for a system that estimates the Energy Consumption of the system subject to a number of Independent Variables that vary over time.

The Energy Model will be established for either:

a. baseline conditions, before Implementation, or
b. operating conditions, after Implementation.

Step 1 – Define Variables and Measurements

Denote Energy Consumption as E

Denote p Independent Variables as x_i, for i between 1 and p

Measure Energy Consumption $E\ (\ t_j\ )$ and Independent Variables $x_i\ (\ t_j\ )$
Where:

- t_j represents a measurement time during the Measurement Period
- i is between 1 and p.
- all variables must be measured for each measurement time.

Step 2 – Define Energy Model (routine adjustments)

Define Energy Model, by expressing Energy Consumption as a simulation using the Independent Variables as inputs

$E = E(\ x_1,\ x_2,\ \ldots\ x_p)$

Where:

- E is the measured Energy Consumption
- x_i, for i between 1 and p, are Independent Variables that are to be measured throughout the Measurement Period

Step 3 – Calibrate the Energy Model

Calibrate the simulation to optimise the accuracy of the Energy Model against the measured values.

Step 4 – Calculate accuracy of Energy Model

Calculate the coefficient of determination, R^2, for energy consumption E.

Calculate the standard error, SE.

Method 7A.5 - Establish Energy Model from Market Average

Step 1 – Define Energy Model

This method establishes an Energy Model for a system that estimates the Energy Consumption of the system subject to a number of Independent Variables that vary over time and characterised by a number of Site Variables that are assumed constant but are monitored to verify that assumption.

The Energy Model will be established for either baseline conditions, prior to Implementation, or operating conditions, after Implementation.

Define Energy Model

$E = E(\ x_1,\ x_2,\ \ldots\ x_n)$

Where:

- E is the measured Energy Consumption
- x_i, for i between 1 and n, are Independent or Site Variables

Step 2 – Establish Energy Model

Establish Energy Model

$E(x_1, x_2, \ldots x_n)$

If there is no existing equipment providing the services delivered under the Implementation, then the Energy Model may be based on market average efficiency for equipment providing the same services and engineering calculations.

Step 3 – Calculate the Effective Range of the Energy Model

Calculate the Effective Range of the Energy Model.

Step 4 – Estimate accuracy of Energy Model

Calculate the standard error, SE, of the estimation method.

Method 7A.6 - Establish Energy Model from Sampling

This method establishes an Energy Model for a system that estimates the Energy Consumption of the system subject to a number of Independent Variables that vary over time and a number of Site Variables that vary according to the characteristics of each Implementation.

The Energy Model will be established for either:

a. baseline conditions, before Implementation, or
b. operating conditions, after Implementation.

Step 1 – Define Sampling Method and Sample

Define the method to be used for sampling Implementations to establish the Energy Model.

Demonstrate that the sampling method is unbiased.

List and record the Sites in the sample.

Step 2 – Define Variables and Measurements

Denote Energy Consumption as E

Denote p Independent Variables as x_i, for i between 1 and p

Denote q Site Variables as x_i, for i between 1 and q

Measure Energy Consumption $E (t_j)$ and Independent Variables $x_i (t_j)$

Where:

- t_j represents a measurement time during the Measurement Period
- i is between 1 and $p+q$.
- all variables must be measured for each measurement time.

Each Implementation must be the same apart from the defined Site Variables.

Step 3 – Define Energy Model (Routine Adjustments) and Calculate Accuracy of Energy Model

Either use regression or calibration of a simulation to define an Energy Model and calculate accuracy using Methods 7A.2, 7A.3 and/or 7A.4 as appropriate, where the same Energy Model is used for every Site in the sample.

7A.2 Requirements for calculating Energy Savings

In order to calculate Energy Savings under Method 7A.1 the Accredited Certificate Provider must:

(a) define the Site (or Sites) where the Implementation takes place;

(b) describe the Recognised Energy Savings Activity, including all End-User Equipment affected;

(c) describe the skills required to define the methods and conduct measurement and verification of the Energy Savings, and the key personnel who will conduct that measurement and verification in line with IPMVP;

(d) describe the relevant capabilities, qualifications and experience of the persons who will determine the methods used to comply with the requirements of Methods 7A.1 to 7A.6;

(e) describe the relevant capabilities, qualifications and experience of the persons who will plan, conduct and verify the measurement and calculation of Energy Savings;

(f) define a Measurement Boundary within the Site, with respect to:

(i) the End-User Equipment, inside the Measurement Boundary, which is to be measured;

(ii) the End-User Equipment inside the Measurement Boundary, which is not to be measured;

(iii) the pathways for energy to move across the Measurement Boundary;

(iv) the End-User Equipment outside of the Measurement Boundary whose electricity consumption may be affected by energy flows

across the Measurement Boundary (i.e. giving rise to Interactive Effects);

(g) identifies End-User Equipment outside of the Measurement Boundary that may have its electricity consumption affected by the Recognised Energy Savings Activity;

(h) identifies a number of Independent Variables that vary over time and that determine energy consumption of the End-User Equipment within the Project Boundary;

(i) define how the Independent Variables will be estimated during each Measurement Period, including:

(i) specification of measurement equipment (meters) or other sources of measurements;

(ii) the accuracy and precision of such measurement methods;

(iii) the timing of measurements;

(iv) the methods for recording measurements and retrieving measurements;

(v) formulas for converting measurements to estimates of the Independent Variables; and

(vi) assumptions, and sources of evidence to support those assumptions, used to establish constant terms or factors in the formulas for estimating Independent Variables;

(j) defines a Normal Year that represents the expected operating conditions for the Site over a randomly chosen year within the Lifetime of the Energy Savings;

(k) details a method for estimating a Normal Year of values for each Independent Variable;

(l) identifies a number of Site Variables that may determine energy consumption, but are assumed constant for each particular Implementation and can be used to describe the Implementation;

(m) establishes a Baseline Energy Model that calculates electricity consumption, as a function of the Independent and Site Variables, that would occur if the Implementation had not occurred, based on either:

(i) measurement of pre-existing End-User Equipment providing the same services; and/or

(ii) an estimate of the performance of sales-weighted market average End-User Equipment providing the same services;

(n) establishes an Operational Energy Model that calculates electricity consumption, as a function of the Independent and Site Variables, after the Energy Savings have commenced, based on measurement of the End-User Equipment within the Project Boundary;

(o) defines a sampling methodology if Method 7A.6 is used to calculate Energy Savings;

(p) conforms with the International Performance Measurement and Verification Protocol, using one of the options A, B, C or D;

(q) provides evidence of market average if there is no existing End-User Equipment being replaced as part of the Implementation;

(r) provides empirical evidence and/or technical references for its assumptions, including performance curves for new equipment;

(s) includes routine adjustments to allow annual energy consumption to be calculated based on changes in the Independent Variables;

(t) includes non-routine adjustments to account for unplanned outages or maintenance during the Measurement Period as measured by changes to the Site Variables;

(u) that takes account of the performance curve of the End-Use Equipment according to field measurement, manufacturer specifications adjusted for Site conditions, rated performance under standard test conditions or a mixture of the above;

(v) specifies a Baseline and Operating Measurement Period as appropriate;

(w) optionally includes a plan for ongoing annual measurement of maintained performance;

(x) in the case of any of the above requirements, may comply with a Guide as specified in Clause 7A.3 of this Rule; and

(y) is validated in writing by a Measurement and Verification Professional who is Independent of the Accredited Certificate Provider.

7A.3 Guides

The Scheme Administrator may Publish Guides that detail acceptable approaches for meeting the requirements of Method 7A.1 in general, and for particular End-Uses, Business Classifications and classes of End-Use Equipment, and which may include:

(a) additional requirements for a Measurement & Verification Professional;

(b) acceptable choices for Project Boundary for each type of project;

(c) Independent Variables that either must or may be included in the Energy Model;

(d) acceptable methods for measuring Independent Variables, such as acceptable types of meters;

(e) acceptable methods for estimating Independent Variables where measurement is not cost-effective;

(f) approaches for assigning an Accuracy Factor for particular values of accuracy determinants as outlined in Step ;

(g) acceptable functional forms of Energy Model, where regression is used;

(h) acceptable computer software for use in simulation under Method 7A.5;

(i) market average efficiency of typical End-User Equipment providing particular outputs or services;

(j) a Normal Year of meteorological data for locations in an ESS Jurisdiction;

7A.4 Energy Savings brought forward

For the purpose of section 131 of the Act, future energy savings from the Implementation, as calculated in Method 7A.1, are taken to occur on the last date of the Measurement Period for the Operating Energy Model as defined in Method 7A.2, or on the Implementation Date if a sampling method under Method 7A.6 is used.

7A.5 Implementation Date

The Implementation Date is defined in Step 6 of Method 7A.1

7A.6 Energy Saver

The Energy Saver is the person who Purchases the goods or services that lead to the Energy Savings;

7A.7 Lifetime

The Lifetime of the Energy Savings is either the Lifetime as established in Step 11 of Method 7A.1;

7A.8 Persistence Model

A Persistence Model may be used to calculate the Lifetime of Energy Savings and the Decay Factor for each future year, provided that:

(a) it takes into account:

(i) the industry classification of the Site;

(ii) the End-User Equipment type;

(iii) the operating hours, if different from the default for that industry classification;

(iv) typical ambient conditions for that Site, including temperature, humidity and salinity;

(b) it calculates the Lifetime for the End-User Equipment and the Decay Factor$_y$ for each future year of the Lifetime; and

(c) it is approved by the Scheme Administrator for this purpose.

8 Metered Baseline Method

Note: The Metered Baseline Method uses measurements of electricity consumption "before" the Recognised Energy Savings Activity takes place to establish a "baseline" electricity consumption standard for the Site being considered. The same measurements performed "after" the Recognised Energy Savings Activity has commenced will establish new levels of electricity consumption, with the difference representing the impact of the Recognised Energy Savings Activity.

Energy Savings are adjusted by a confidence factor that is calculated based on the size of the Energy Savings relative to the unexplained variance in the baseline.

The Metered Baseline Method relies on the remainder of the Site operating as it did before the Recognised Energy Savings Activity was implemented. Where changes at the Site, other than those that constitute the Recognised Energy Savings Activity will affect metered consumption per unit of output or service, the results will not reasonably reflect the Energy Savings due to the Recognised Energy Savings Activity, and Energy Savings Certificates cannot be created using the Metered Baseline Method.

Consequently, the Metered Baseline Method should not be used where changes other than the Recognised Energy Savings Activity have taken place during the baseline period, or are anticipated during the life of the Recognised Energy Savings Activity for which Energy Savings Certificates will be claimed.

This also does not prevent additional Recognised Energy Savings Activities at the same Site from being implemented and assessed against the original baseline.

8.1 The Metered Baseline Method in this clause 8 may only be used to calculate Energy Savings if measurements made pursuant to this clause 8 are of a standard and duration enabling the Energy Savings to be determined to a level of accuracy satisfactory to the Scheme Administrator.

8.2 Using the Metered Baseline Method, the Energy Savings are calculated under:

(a) clause 8.5, using a baseline per unit of output;

(b) clause 8.6, using a baseline unaffected by output;

(c) clause 8.7, using a normalised baseline;

(d) clause 8.8, using a baseline normalised by means of a methodology adapted from the National Australian Built Environment Rating System; or

(e) clause 8.9, using the Aggregated Metered Baseline Method,

provided that all Energy Savings can reasonably (to the satisfaction of the Scheme Administrator) be attributed to the corresponding Recognised Energy Savings Activity.

8.3 The time period over which any baseline is determined under this clause 8, using electricity measurements before the Implementation Date of the Recognised Energy Savings Activity, must include one or more time periods preceding the Implementation Date. The time period(s) used to determine the baseline must be acceptable to the Scheme Administrator. The Implementation Date for clauses 8.5, 8.6 and 8.7 is the earlier of the start date of the first

Measurement Period or the date on which Energy Savings from the Implementation first commenced.

8.4 The Accredited Certificate Provider must use utility meters or other metering equipment acceptable to the Scheme Administrator.

Note: Sub-metering may be used to effectively reduce the size of the Site considered for baseline calculations, thereby increasing Energy Savings relative to the baseline and hence the Confidence Factor.

8.5 Baseline per unit of output

Note: This Metered Baseline Method is most appropriate where electricity consumption is strongly linked to output (for example, in aluminium smelting). Where the relationship is non-linear, or there are multiple products or changes in raw materials affecting consumption, another method of normalising the baseline should be used.

The Energy Savings may be calculated using **Method 1**, provided that:

(a) the electricity consumption for the Site is a linear function of output;

(b) fixed electricity consumption, which is the electricity consumption of the Site that does not vary with variations in output, can be measured or estimated;

(c) output has not changed by more than 50% from the average output over the period during which the variable electricity baseline was measured;

(d) the variable electricity baseline is calculated using data from periods immediately preceding the Implementation Date, up to a maximum of 5 years, excluding any periods that are not representative of the long term Site consumption due to factors including plant shutdown or major maintenance. Where this is not possible, due to data unavailability or other reasons, a baseline may be set using other periods acceptable to the Scheme Administrator; and

(e) the Energy Saver is the person who is liable to pay for the energy measured at the Site at the Implementation Date.

Method 1

Step (1) Select a *Measurement Period* acceptable to the Scheme Administrator, that will be the duration of time over which all measurements in this Method will be taken and that is:

(a) a minimum of one day and a maximum of one year; and

(b) if there is a regular cycle to the consumption of electricity on the Site, an integer multiple of the period of that cycle.

Step (2) Determine *Energy Savings* by completing steps (2A) to (2G), and for each time period T_a by reference to which the Accredited Certificate Provider seeks to create Energy Savings Certificates by repeating Steps (2E) to (3) for each such period.

Step (2A)

The *Fixed Electricity Consumption* (in MWh) is the consumption of electricity for the

Site that does not vary with variations in output, and is:

- determined by estimating or extrapolating from measurements taken during plant downtime or estimated or determined mathematically from multiple periods;
- a reasonable reflection of the consumption unaffected by output, and will lead to Energy Savings calculations that are reasonable, and
- over a period T_b before Energy Savings commences and the duration of which is equal to the Measurement Period.

Step (2B)

Calculate *Variable Consumption*$_{Tb}$ (in MWh / unit of output) for n time periods T_b:

Variable Consumption$_{Tb}$ = (*Total Consumption*$_{Tb}$ – *Fixed Electricity Consumption*) / *Output* $_{Tb}$

Where:

- T_b denotes a time period, before the Implementation Date, the duration of which is equal to the Measurement Period, and where each time period is mutually exclusive with each other such time period
- *Total Consumption*$_{Tb}$ (in MWh) is the consumption of electricity for the Site measured by metering that consumption over each time period T_b
- *Output*$_{Tb}$ is the number of units of output during each time period T_b
- n is the number of time periods, T_b, where n must be at least 1

Step (2C) Calculate *Variable Electricity Baseline* (in MWh / unit of output):

$$\textit{Variable Electricity Baseline} = \{\sum_{T=1}^{n} \textit{Variable Consumption}_{Tb}\} / \text{n}$$

Step (2D) Calculate *Baseline Variability* (in MWh / unit of output), which is the unexplained variance in the baseline, as:

If n > 2:

Baseline Variability = (maximum *Variable Consumption*$_{Tb}$ – minimum *Variable Consumption*$_{Tb}$) / 2

Where:

- *m*aximum *Variable Consumption*$_{Tb}$ is the maximum value of *Variable Consumption*$_{Tb}$ over n time periods T_b
- *m*inimum *Variable Consumption*$_{Tb}$ is the least value of *Variable Consumption*$_{Tb}$ over n time periods T_b

If n≤ 2:

Baseline Variability = 10% of *Variable Electricity Baseline*

Step (2E) Calculate *Reduced Electricity Consumption* (in MWh) for each time period T_a (after the Implementation Date) by reference to which the Accredited Certificate Provider seeks to create Energy Savings Certificates:

Reduced Electricity Consumption = (*Output*$_{Ta}$ x *Variable Electricity Baseline*

+ *Fixed Electricity Consumption*) - $Total\ Consumption_{Ta}$

Where:

- T_a denotes a time period, after the Implementation Date, the duration of which is equal to the *Measurement Period*
- $Total\ Consumption_{Ta}$ (in MWh) is the consumption of electricity for the Site measured by metering that consumption over a time period T_a
- $Output_{Ta}$ is the number of units of output during the time period T_a.

Step (2F) Calculate *Confidence Factor*:

Confidence Factor = 1 - (*Baseline Variability* / *Variable Electricity Baseline*)

Step (2G) Calculate *Energy Savings* (in MWh) for each time period T_a by reference to which the Accredited Certificate Provider seeks to create Energy Savings Certificates:

Energy Savings = *Reduced Electricity Consumption* x *Confidence factor*

Step (3) Ensure *Energy Savings* are non-negative.

If *Energy Savings* < 0:

Energy Savings = 0

8.6 Baseline unaffected by output

Note: This Metered Baseline Method is most appropriate where consumption is not linked to output. For example, schools and swimming pools.

The Energy Savings may be calculated using **Method 2**, provided that

(a) the consumption of all energy sources for the Site is independent of output;

(b) the *Electricity Baseline* is calculated using data from periods immediately preceding the Implementation Date, to a maximum duration of 5 years, and excluding any periods that are not representative of long term Site consumption due to factors including plant shutdown or major maintenance. Where this is not possible, due to data unavailability or other reasons, a baseline may be set using other periods acceptable to the Scheme Administrator; and

(c) the Energy Saver is the person who is liable to pay for the energy measured at the Site at the Implementation Date.

Method 2

Step (1) Select a *Measurement Period* acceptable to the Scheme Administrator, that will be the duration of time over which all measurements in this Method will be taken and that is:

(a) a minimum of one day and a maximum of one year; and

(b) if there is a regular cycle to the consumption of electricity on the Site, an integer multiple of the period of that cycle.

Step (2) Determine *Energy Savings* by completing steps (2A) to (2E), and for each time

period T_a by reference to which the Accredited Certificate Provider seeks to create Energy Savings Certificates by repeating Steps (2C) to (3) for each such period.

Step (2A) Calculate *Electricity Baseline* (in MWh):

$$\textit{Electricity Baseline} = \{\sum_{T=1}^{n} \textit{Total Consumption}_{Tb}\} / \text{n}$$

Where:

- T_b denotes a time period, before the Implementation Date, the duration of which is equal to the Measurement Period, and where each time period is mutually exclusive with each other such time period
- *Total Consumption*$_{Tb}$ (in MWh) is the consumption of electricity for the Site measured by metering that consumption over each time periods T_b
- n is the number of time periods, T_b, where n must be at least 1

Step (2B) Calculate *Baseline Variability* (in MWh), which is the variance in the baseline, as:

If n > 1:

Baseline Variability = (maximum *Total Consumption*$_{Tb}$ – minimum *Total Consumption*$_{Tb}$) / 2

Where:

- Maximum *Total Consumption*$_{Tb}$ is the maximum value of *Total Consumption*$_{Tb}$ over n time periods T_b
- Minimum *Total Consumption*$_{Tb}$ is the least value of *Total Consumption*$_{Tb}$ over n time periods T_b

If n =1:

Baseline Variability = 10% of *Electricity Baseline*

Step (2C) Calculate *Reduced Electricity Consumption* (in MWh) for each time period T_a by reference to which the Energy Saver seeks to create Certificates:

Reduced Electricity Consumption = Electricity Baseline – Total Consumption$_{Ta}$

Where:

- T_a denotes a time period, after the Implementation Date of the Energy Saving project, the duration of which is equal to the Measurement Period
- *Total Consumption*$_{Ta}$ (in MWh) is the consumption of electricity for the Site measured by metering that consumption over a time period T_a

Step (2D) Calculate *Confidence Factor*:

Confidence Factor = 1 - (*Baseline Variability* / *Electricity Baseline*)

Step (2E) Calculate *Energy Savings* (in MWh) for each time period T_a by reference to which the Accredited Certificate Provider seeks to create Energy Savings

Certificates:

- *Energy Savings = Reduced Electricity Consumption* x *Confidence Factor*

Step (3) Ensure *Energy Savings* are non-negative.

If *Energy Savings* < 0:

Energy Savings = 0

8.7 Normalised baselines

Note: This Metered Baseline Method normalises energy consumption for a Site to remove explainable variation from the baseline, for example, adjusting for variations in ambient conditions or variations in input characteristics. The factors chosen for the normalisation must cause the variability (that is the subject of removal) and not be the result of spurious correlations.

Option C of the International Performance Measurement and Verification Protocol can be used for guidance as to the normalisation of baselines, particularly for complex cases.

The Energy Savings may be calculated using **Method 3**, provided that:

(a) the *Normalisation Variables* in respect of which the *Total Consumption* is normalised are variables corresponding to the specific activities that are a reason for change in *Total Consumption*;

(b) the *Normalised Energy Baseline* is calculated using data from periods immediately preceding the Implementation Date, to a maximum duration of 5 years, and excluding any periods that are not representative of long term Site consumption due to circumstances such as plant shutdown or major maintenance. Where this is not possible, due to data unavailability or other reasons, a baseline may be set using other periods acceptable to the Scheme Administrator; and

(c) the Energy Saver is the person who is liable to pay for the energy measured at the Site at the Implementation Date.

Method 3

Step (1) Select a *Measurement Period* acceptable to the Scheme Administrator, that will be the duration of time over which all measurements in this Method will be taken and that is:

(a) a minimum of one day and a maximum of one year; and

(b) if there is a regular cycle to the consumption of electricity on the Site, an integer multiple of the period of that cycle.

Step (2) Determine Energy Savings resulting from the Recognised Energy Savings Activity by completing Steps (2A) to (2F) for each time period T_a by reference to which the Accredited Certificate Provider seeks to create Energy Savings Certificates by repeating Steps (2D) to (3) for each such period.

Step (2A) Calculate *Normalised Consumption*$_{Tb}$ (in MWh) for n time periods T_b by normalising the *Total Consumption*$_{Tb}$ to determine the consumption that would have

occurred for period T_b had the conditions at time T_a existed, using:

(a) a set of normalisation coefficients, which are one or more coefficients calculated to account for the variation in *Total Consumption*$_{Tb}$ per unit of change for each corresponding normalisation variable used in Step(2A)(b); and

(b) a set of values, which are the difference between the values of the normalisation variables for each time period T_b, and the values of the normalisation variables for one time period T_a, determined by measurements or other data sources.

Where:

- T_b denotes a time period, before the Implementation Date, the duration of which is equal to the Measurement Period, and where each time period is mutually exclusive with each other such time period
- T_a denotes a time period, after the Implementation Date, the duration of which is equal to the Measurement Period
- *Total Consumption*$_{Tb}$ (in MWh) is the consumption of electricity for the Site measured by metering that consumption over each time period T_b
- *n* is the number of time periods, T_b, where *n* must be at least 1
- *Normalisation Variables* are the variables in respect of which the *Total Consumption*$_{Tb}$ is normalised and must correspond to factors that are a reason for change in *Total Consumption*$_{Tb}$

Step (2B) Calculate *Normalised Energy Baseline* (in MWh):

$$\textit{Normalised Energy Baseline} = \{\sum_{T=1}^{n} \textit{Normalised Consumption}_{Tb}\} / \text{n}$$

Step (2C) Calculate *Baseline Variability* (in MWh), which is the unexplained variance in the baseline, as:

If n > 1:

Baseline Variability = (maximum *Normalised Consumption*$_{Tb}$ – minimum *Normalised Consumption*$_{Tb}$) / 2

Where:

- maximum *Normalised Consumption*$_{Tb}$ is the maximum value of *Normalised Consumption*$_{Tb}$ over *n* time periods *Tb*
- minimum *Normalised Consumption*$_{Tb}$ is the least value of *Normalised Consumption*$_{Tb}$ over *n* time periods *Tb*

If n =1:

Baseline Variability = 10% of *Normalised Energy Baseline*

Step (2D) Calculate *Reduced Electricity Consumption* (in MWh for each time period T_a by reference to which the Energy Saver seeks to create Certificates:

Reduced Electricity Consumption = *Normalised Electricity Baseline* – *Total Consumption*$_{Ta}$

Where:

- *Ta* denotes a time period, after the Implementation Date, the duration of which is equal to the Measurement Period
- *Total Consumption*$_{Ta}$ (in MWh) is the consumption of electricity for the Site measured by metering that consumption over a time period *Ta*

Step (2E) Calculate *Confidence Factor*:

Confidence Factor = 1 - (*Baseline Variability* / *Normalised Electricity Baseline*)

Step (2F) Calculate *Energy Savings* (in MWh) for each time period T_a by reference to which the Accredited Certificate Provider seeks to create Energy Savings Certificates:

Energy Savings = Reduced Electricity Consumption x *Confidence Factor*

Step (3) Ensure *Energy Savings* are non-negative:

If *Energy Savings* < 0:

Energy Savings = 0

8.8 National Australian Built Environment Rating System baseline

8.8.1 The Energy Savings may be calculated using **Method 4c** for a NABERS Building, provided that:

(a) the NABERS Rating is calculated using one of the following NABERS tools:

(i) NABERS for Offices;

(ii) NABERS for Hotels;

(iii) NABERS for Shopping Centres; or

(iv) NABERS for Data Centres; and

(b) the NABERS Rating Period is the time over which measurements were taken to establish the current NABERS Rating for the NABERS Building;

(c) the Current Rating Year is the year that the NABERS Rating Period ended;

(d) the NABERS Rating equals or exceeds the Threshold NABERS Rating from **Table A21** of Schedule A corresponding to the year of the NABERS Rating End Date and the relevant NABERS Rating Tool; and

(e) all sources of on-site electricity generation have been identified; and

(f) all electricity generated from sources of On-site Unaccounted Electricity, as defined in Method 4c, has been metered and recorded over the NABERS Rating Period.

Method 4c – NABERS Benchmark

Step 1 – Calculate Measured Electricity Consumption

Using the measurements taken to establish the NABERS Rating, and other measurements taken as necessary, calculate total energy consumption for the NABERS Building:

Measured Electricity Consumption (MWh)

= NABERS Electricity + On-site Unaccounted Electricity

Where:

- *NABERS Electricity*, in MWh, is the electricity purchased or imported from the NSW Electricity Network and accounted for in the NABERS Rating, including electricity purchased as GreenPower; and

- *On-site Unaccounted Electricity*, in MWh, is electricity generated on-site from energy sources which have not been accounted for in the NABERS Rating, including for example electricity generated from photovoltaic cells or gas generators fed from on-site biogas sources, but excluding for example gas generators where the imported gas has been accounted for in the NABERS Rating;

Step 2 – Calculate Benchmark NABERS Rating

Calculate the Benchmark NABERS Rating Index, either by:

1. Looking up the *Benchmark NABERS Rating Index* from **Table A20** of Schedule A corresponding to the *Current Rating Year*, the NABERS Rating Tool and the building category; or

2. Calculating the Benchmark NABERS Rating Index based on an historical Baseline NABERS Rating:

   Benchmark NABERS Rating Index = Baseline NABERS Rating + Annual Rating Adjustment x (Current Rating Year – Baseline Rating Year)

   Where:

- *Baseline NABERS Rating* is a previous NABERS Rating for the same NABERS Building and similar configuration, as determined by the Scheme Administrator, provided that the *Baseline Rating Year* is not more than 3 years prior to the *Current Rating Year*;

- *Annual Rating Adjustment* is the amount by which average NABERS ratings increase each year and is the value in **Table A22** corresponding to the NABERS

Rating Tool and the building category;

- *Baseline Rating Year* is the year in which the measurements corresponding to the *Baseline NABERS Rating* were completed;

Step 3 – Calculate Benchmark Electricity Consumption

If necessary for use with the relevant NABERS Reverse Calculator, round down the *Benchmark NABERS Rating Index* to the nearest next highest 0.5.

Benchmark Electricity Consumption is the electricity consumption that would be required for that same NABERS Building to achieve the *Benchmark NABERS Rating Index* over the NABERS Rating Period, assuming the same breakdown of energy consumption.

The *Benchmark Electricity Consumption* is the electricity component of maximum allowable electricity consumption, converted to MWh, calculated by using the NABERS Reverse Calculator for the relevant NABERS method, setting the target star rating to the *Benchmark NABERS Rating Index*, and all other input parameters have the same value as for the actual NABERS Rating over that Rating Period, including:

- Rating type;
- Building information;
- Percentage breakdown of energy consumption (on an energy content (e.g. GJ) basis).

Step 4 – Calculate Energy Savings

Calculate *Energy Savings*, in MWh:

If *Benchmark Electricity Consumption* < *Measured Electricity Consumption*:

Energy Savings = 0

otherwise:

Energy Savings = Benchmark Electricity Consumption - Measured Electricity Consumption

8.8.2 The Energy Saver is the person who is the customer, as determined by the NABERS National Administrator, in respect of the NABERS Rating.

8.8.3 The Implementation Date is the earlier of either the start date of the NABERS Rating Period or the date that the Energy Savings first commenced.

8.8.4 For the purposes of section 131(4) of Division 7 of the Act, the Energy Savings are deemed to have occurred at the date that the Scheme Administrator determines that the relevant NABERS Rating was completed.

8.9 Aggregated Metered Baseline Method

Note: The Aggregated Metered Baseline Method allows for Energy Savings Certificates to be calculated on the basis of measured savings across a group of electricity customers, using statistical techniques.

This method may be used for any Recognised Energy Savings Activity, but it is best suited to those activities where:

- Energy Savings are small on a Site by Site basis, relative to the cost of measurement and verification; and/or
- Energy Savings can vary greatly from Site to Site; and/or
- there is insufficient evidence that the Recognised Energy Savings Activity will not be reversed.

Under this method Energy Savings are measured based on the difference between the estimated baseline energy consumption of a Treatment Group of Sites participating in a Recognised Energy Savings Activity less the measured energy consumption of that Treatment Group. The baseline energy consumption of the Treatment Group is calculated by using an unbiased selection of Sites "*Control Group*" who are otherwise eligible for membership of the Treatment Group but are excluded from the Recognised Energy Savings Activity.

8.9.1 Using the Aggregated Metered Baseline Method, the Energy Savings may be calculated using **Method 5** provided that all of the conditions in clauses 8.9.2 to 8.9.10 are met.

8.9.2 For each Implementation, a number of Sites must be identified and assigned to a Population and then every Site in that Population must be allocated to either a Treatment Group or a Control Group, and:

(a) The Population, Treatment Group and Control Group may be of any size, provided the Treatment Group and Control Group comprise of at least one Site each;

(b) Sites must be assigned to the Population and allocated to the Treatment Group or the Control Group prior to the Start Date of the first Measurement Period for that Implementation;

(c) Sites must be allocated to the Treatment Group and the Control Group using an unbiased selection method, which gives every Site in the Population an equal chance of being selected into the Treatment Group;

(d) A Site may choose to join the Population, but must not be able to choose to join the Treatment Group;

(e) Persons at Sites must not be informed of which group they have been allocated to

(f) Once a site has been allocated to the Treatment Group, persons managing End-Use Equipment at each Site may be offered a choice as to whether they wish to receive each of the goods and services that form the Implementation;

(g) If Sites choose to opt out of receiving any or all of the goods and services that form the Implementation, they must be retained in the Treatment Group for measurement purposes, with the exceptions of conditions set out in clause 8.9.2 (h);

(h) A Site must be removed, and may only be removed, from the Population, and hence Treatment or Control Groups, for a Measurement Period and all future Measurement Periods if the Accredited Certificate Provider is not able to obtain Measured Energy Consumption data for that Site for the duration of the Measurement Period for any reason.

8.9.3 Measurements of electricity consumption under this method must use Measured Electricity Consumption data for each Site in the Population, where the Measured Electricity Consumption for a Measurement Period 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 Supply (General) Regulation 2001 (NSW); or

(b) from a metering arrangement approved by the Scheme Administrator, 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.

8.9.4 For the purposes of calculating Energy Savings, the Measured Energy Consumption for a given population must be recorded over one or more contiguous Measurement Periods, each commencing with a Start Date and finishing with an End Date, where:

(a) the Start Date of the first Measurement Period must occur before the Implementation first commences;

(b) the Start Date for each subsequent Measurement Period must be the day after the End Date for the previous Measurement Period; and

(c) each Measurement Period must be at least 3 months and no more than 15 months in length.

8.9.5 Apart from the goods and services offered or provided to the Treatment Group as part of the Implementation, any other goods and services offered or provided to Sites in the Population must be done so without bias as to whether that Site is in the Treatment Group or Control Group.

8.9.6 For the purposes of section 131(4) of Division 7 of the Act, the Energy Savings for each Measurement Period are taken to have occurred on the End Date of that Measurement Period.

8.9.7 The Implementation Date is the start date of the first Measurement Period.

8.9.8 The Energy Saver is the person who holds the Measured Electricity Consumption data for all Sites in a Population in accordance with clause 8.9.3

8.9.9 Where required, the Energy Savings for a Population will be attributed equally to each Site in a Treatment Group for each Measurement Period.

8.9.10 The records that must be kept of the methodology, data and assumptions used to calculate Energy Savings under Method 5 must include:

(a) The Addresses of the Sites in the Population and whether they are allocated to the Treatment Group or the Control Groups;

(b) Evidence that Sites were assigned to the Population and allocated to the Treatment and Control Group in accordance with clause 8.9.2.

(c) Verification in writing from an Accredited Statistician that the method used to allocate Sites from the Population into the Control Group and the Treatment Groups was unbiased;

(d) Verification in writing from an Accredited Statistician that the statistical test used to calculate the confidence interval in Step 4 of Method 5 was valid, along with any conditions to be met to ensure that the test is valid;

(e) Verification in writing from an Accredited Statistician that calculations of Energy Savings have been made in accordance with Steps 1 to 12 of Method 5 of this Rule;

(f) A description of the method to be used to estimate the lifetime Energy Savings from Other Activities in Step 6 and, if any form of sampling is used, verification in writing from an Accredited Statistician that the method for establishing confidence intervals is valid;

(g) The data was used to calculate Energy Savings, and evidence that this was done so in accordance with clauses 8.9.2 to 8.9.10 and Method 5 of this Rule;

(h) Any additional requirements as may be Published by the Scheme Administrator from time to time.

Method 5

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 *Measurement Period*, in accordance with clause 8.9.5. The number of Sites in the Treatment and Control Groups will be designated N_t and N_c respectively.

Step (2) - Calculate the mean energy use of the *Treatment Group* (E_t) over the *Measurement Period*:

$E_t = \Sigma_{h \text{ in Treatment Group}} E_h / N_t$, where:

- E_h is the *Measured Energy Consumption* (E) for each Site (h) in the Treatment Group (t) over the Measurement Period, measured in accordance with Clause 8.9.3

N_t is number of Sites in the *Treatment Group* in Measurement Period

Step (3) - Calculate the mean energy use of the *Control Group* (E_c) over the *Measurement Period*:

$E_C = \Sigma_{h \text{ in Control Group}} E_h / N_C$, where:

- E_h is the *Measured Energy Consumption* (E) for each Site (h) in the Control Group (c) over the *Measurement Period* , measured in accordance with Clause 8.9.3
- N_C is number of Sites in the *Control Group* in Measurement Period

Step (4) - Using the Control Group measurements, estimate the lower bound of the upper single-sided 95% confidence interval, CI_{05}, for E_C:

$CI_{05} = E_C + (T_{(p=0.05)} * sd)/\sqrt{N_c}$ where:

- sd is the standard deviation calculated on the *Control Group*;
- $T_{(p=0.05)}$ is the value from standard T tables with $(N_C - 1)$ degrees of freedom. For degrees of freedom exceeding 2400 use the value of -1.645. Note that 0.05 values of the T statistic have negative values so that $CI_{05} < E_C$.

Step (5) - Calculate the observed energy savings $ES_{observed}$, in MWh, over the Measurement Period, ensuring that the savings are non-negative:

$ES_{observed} = \max(0, (CI_{05} - E_t) * N_t)$

Step (6) – Estimate the lifetime Energy Savings, $ES'_{h,a,lifetime}$, from each Other Activity, *a*, implemented in each Site, *h*, in the Population, with an Implementation Date after the Start Condition is met and before the End Date of the Measurement Period, using one of the following methods:

1. Estimates by the Scheme Administrator corresponding to the Address of the Site and the Measurement Period; and/or
2. Another method accepted by the Scheme Administrator;

Where:

- Other Activity means any other Recognised Energy Savings Activity, apart from the Recognised Energy Savings Activity that is the subject of this calculation, or an activity excluded under clauses 5.4(d) or 5.4(e) of this Rule; provided that
- If the rate of increased uptake of the Treatment Group over the Control Group, with a 95% one-sided confidence interval, for any of the excluded activities under clauses 5.4(d) or 5.4(e) of this Rule is found to be less than 1 in 1,000 Sites per year, then the Energy Savings in all Sites from all such excluded activities may be taken to be 0 and excluded from this calculation.

Step (7) – Calculate the Energy Savings, $ES'_{h,a,m}$, for each Site *h* due to each Other Activity *a* during the Measurement Period *m*:

$$ES'_{h,a,m} = ES'_{h,a,lifetime} \text{ x } \text{Overlap}_{a,m} / \text{Lifetime}_a$$

Where:

- $Lifetime_a$, in years, is the Lifetime of the Energy Savings for each Other Activity *a*, or 10 years if it is not defined in this Rule;
- $Overlap_{a,m}$, in years, is the length of time of the Measurement Period *m* that overlaps with the life of the Energy Savings for each Recognised Energy Savings Activity *a*, commencing on the Implementation Date and ending Lifetime years after the Implementation Date.
- If the Other Activity *a* had one or more Energy Savings calculated using the Metered Baseline Method, then the Lifetime of the savings was the length of the measurement period of that calculation, and the Implementation Date was the start of that measurement period.

Step (8) - Calculate the average *Energy Savings*, $ES'_{t,m}$ and $ES'_{c,m}$, due to all Other Activities for all Sites in the Treatment Group and Control Group respectively, over the Measurement Period *m*:

$$ES'_{t,m} = \sum_{\text{h in Treatment Group, Activity a}} ES'_{h,a,m} / \text{N}_\text{t}$$

and

$$ES'_{c,m} = \sum_{\text{h in Control Group, Activity a}} ES'_{h,a,m} / \text{N}_\text{c}$$

where

- the summation is over all Sites *h* in the Treatment Group and Control Group, respectively, and all Other Activities *a* that overlap with the Measurement Period *m*.
- N_t and N_c are the number of Sites in the Treatment Group and Control Group respectively for Measurement Period *m*.

Step (9) - Calculate the *Uplift Energy Savings*, ES_{uplift}, from Other Activities due to participation in the program:

$$ES_{uplift} = (ES'_{t,m} - ES'_{c,m}) \text{ x } \text{N}_\text{t}$$

Where:

- If a survey method was used to estimate ES_{uplift} then its value must represent the upper bound of a 95% one-sided confidence interval for

that value.

Step (10) – Ensure the Uplift *Energy* Savings are non-negative:

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

Step (11) - Calculate *Population Energy Savings*, $ES_{population}$, in MWh, by subtracting the effect of *Uplift Energy Savings* from the *Observed Energy Savings*, ensuring the result is non-negative:

$$ES_{population} = \max(0, ES_{observed} - ES_{uplift})$$

Step (12) – Calculate total *Energy Savings* across all Populations for that Measurement Period:

$$Energy\ Savings = \sum_{\text{Populations}} ES_{population}$$

9 Deemed Energy Savings Method

Note: The Deemed Energy Savings Method can be used for the replacement, installation and delivery of common End-User Equipment such as lighting, refrigerators and electric motors.

9.1 Using the Deemed Energy Savings Method, Energy Savings may be calculated on the basis of either:

(a) clause 9.3 using Purchase of New Appliances, for Activity Definitions set out in Schedule B;

(b) clause 9.4 using the Commercial Lighting Energy Savings Formula;

(c) clause 9.5 using the High Efficiency Motor Energy Savings Formula;

(d) clause 9.6 using the Power Factor Correction Energy Savings Formula;

(e) clause 9.7 using Removal of Old Appliances, for Activity Definitions set out in Schedule C;

(f) clause 9.8 using Home Energy Efficiency Retrofits, for Activity Definitions set out in Schedules D and E; or

(g) clause 9.9 using the Installation of High Efficiency Appliances for Businesses, for Activity Definitions set out in Schedule F.

9.2 For the purposes of Section 131 of the Act, where the Energy Savings are calculated using the Deemed Energy Savings Method in this clause 9, the *Energy Savings* that are the subject of that calculation are taken to have occurred on the Implementation Date.

9.2A Acceptable End-User Equipment

9.2A.1 In addition to any requirements, such as Equipment Requirements, set out in clause 9, the Scheme Administrator may publish additional requirements for End-User Equipment to be used in any method under clause 9.

9.2A.2 The Scheme Administrator may Publish, from time to time, a list of Products that it is satisfied to meet the Equipment Requirements to be used in any method under clause 9, by:

(a) Publishing a detailed list identifying each Product;

(b) Publishing a reference to a list from a certifying body, along with any restrictions on that list; and/or

(c) Publishing a requirement for labelling in accordance with a labelling scheme, along with any restrictions on that labelling.

9.2A.3 Any person, including an Accredited Certificate Provider, may apply to the Scheme Administrator to have a Product accepted as meeting the Equipment Requirements, provided that they:

(a) apply in a form required by the Scheme Administrator;

(b) pay any fee required by the Scheme Administrator to recover their costs of evaluating the application;

(c) identify the Product; and

(d) provide evidence that the Product meets all of the Equipment Requirements.

9.2A.4 The Scheme Administrator may, at any time, no longer accept a Product as meeting the Equipment Requirements, provided that they:

(a) notify all Accredited Certificate Providers accredited under the relevant method of the change and the reason for the change, prior to the Product being removed; and

(b) ensure all Published lists reflect the change in a timely manner.

9.3 Purchase of New Appliances

The Energy Savings may be calculated using **Equation 5**, provided that:

(a) each item of End-User Equipment meets the Equipment Requirements in one of the Activity Definitions B1, B2, B3, B4, B5, B6, or B7 of Schedule B;

(b) each item of End-User Equipment must have been new at the time it was purchased;

(c) each item of End-User Equipment must have been purchased from an Appliance Retailer;

(d) each item of End-User Equipment was delivered to an Address or purchased by a person with a recorded Address;

(e) evidence of provisions (a) to (d) above will be an extract from the Appliance Retailer's Sales Ledger or other business system, or other evidence accepted by the Scheme Administrator;

(f) the Implementation Date is the date that the End-User Equipment was Purchased; and

(g) the Energy Saver is the Appliance Retailer who has sold the End-User Equipment.

Equation 5

Energy Savings = $\sum$ (Equipment Energy Savings)

Where:

- the summation is over all items of End-User Equipment that have been purchased; and
- *Equipment Energy Savings*, in MWh, for each item of End-User Equipment are calculated according to the respective Activity Definition **B1, B2,B3, B4, B5, B6, B7** of Schedule B of this Rule

9.4 Commercial Lighting Energy Savings Formula

The Energy Savings must be calculated using **Equations 6, 7** and **10** and either **8** or **9**, provided that:

(a) it involves a Lighting Upgrade of:

(i) Lighting for Roads and Public Spaces,

(ii) Traffic signals, or

(iii) Building Lighting;

That meets or exceeds the relevant lighting standards for each upgrade, to the satisfaction of the Scheme Administrator

(b) If the Lighting Upgrade is of Building Lighting, then each space, after implementation of the Lighting Upgrade must, to the satisfaction of the Scheme Administrator, achieve:

(i) the relevant requirements of AS/NZS 1680, specifically including but not limited to: maintained illuminance accounting for lumen depreciation; control of glare; and uniformity of illuminance;

(ii) the requirements of the Building Code of Australia section F4.4 (as updated from time to time);

(iii) the required minimum illumination power density (IPD) for each space, as defined in Part J6 of the Building Code of Australia (as updated from time to time), and

(iv) any other benchmarks as Published by the Scheme Administrator;

(c) the Lighting Upgrade is performed by appropriately trained persons, according to requirements Published by the Scheme Administrator;

(d) the Purchaser pays a net amount of at least $5, excluding GST, per MWh of Energy Savings, for the goods or services making up the Implementation, as evidenced by a copy of the legal tax invoice or other evidence acceptable to the Scheme Administrator;

(e) the Implementation is undertaken by or under the supervision of a licensed electrician;

(f) the Implementation Date is the date when the Lighting Upgrade was completed;

(g) the Energy Saver is the Purchaser of the Lighting Upgrade;

(h) all End-User Equipment must meet the Equipment Requirements for one of the classes of equipment set out in **Table A9.1**; and

(i) the Lifetime of the Energy Savings is the Asset Lifetime as set out in **Table A10.1** of **Schedule A**.

Equation 7

Energy Savings = *Baseline Energy Consumption* - *Upgrade Energy Consumption*

Where:

- *Baseline Energy Consumption*, in MWh, is calculated:
  - using **Equation 8**, if the lighting upgrade is part of a refurbishment that would not have been required to comply with the Building Code of Australia Part J6, had the lighting upgrade component of the refurbishment not occurred,
  - using **Equation 8** if the lighting upgrade is part of a refurbishment that would have been required to comply with the Building Code of Australia Part J6, had the lighting upgrade component of the refurbishment not occurred and where the existing lighting meets or exceeds the minimum Illumination Power Density requirements of the Building Code of Australia Part J6, or
  - using **Equation 9** if the lighting upgrade is part of a refurbishment that would have been required to comply with the Building Code of Australia Part J6, had the lighting upgrade component of the refurbishment not occurred, and where the existing lighting does not meet or exceed the minimum Illumination Power Density requirements of the Building Code of Australia Part J6
- *Upgrade Energy Consumption*, in MWh, is calculated using **Equation 10**

Equation 8

Baseline Energy Consumption (MWh) =

$$\sum_{Each\ Incumbent\ Lamp} \left(LCP \times Asset\ Lifetime \times Annual\ Operating\ Hours \times CM \times AM \right) \div 10^6$$

Where:

- *Each Incumbent Lamp* means each lamp and control gear in the pre-existing lighting system.
- *LCP*, in Watts, is the default lamp circuit power corresponding to that type of Lamp and Control Gear for that End-User Equipment as in **Table A9.2** of Schedule A to this Rule, representing the power drawn by the lamp, plus the losses of its control gear.
- *Asset Lifetime*, in years, is the default lifetime of the lighting upgrade for the relevant End-User Equipment as in **Table A10.1** of Schedule A to this Rule, or another value accepted by the Scheme Administrator.
- *Annual Operating Hours*, in hours/year, is the time per year that the upgraded lighting system is expected to operate for the relevant building type as in **Table A10.2** of Schedule A to this Rule
- *CM* is the control multiplier. If the lamp is connected to a control system, the factor for the control multiplier shall be applied for the relevant End-User Equipment or activity as in **Table A10.3** of Schedule A to this Rule, otherwise CM = 1.0.
- *AM* is the air-conditioning multiplier for the space as set out in **Table A10.4** of Schedule A to this Rule.

Equation 9

Baseline Energy Consumption (MWh)=

$$\sum_{Each\ Space} \left(IPD \times Area \times Asset\ Lifetime \times Annual\ Operating\ Hours \times CM \times AM \right) \div 10^6$$

Where:

- *Each Space* means each portion of space within the Site requiring a different illumination power density (IPD) as defined in Part J6 of the Building Code of Australia.
- *IPD*, in Watts/m^2, is the maximum allowable illumination power density for each space, as required by Table J6.2b of the Building Code of Australia. For simplicity, the Scheme Administrator may aggregate similar IPDs in the Commercial Lighting Energy Savings Formula. The IPD should not be adjusted by the adjustment factors tabled in Table 6.2c of the Building Code of Australia.
- *Area*, in m^2, is the area of Each Space.
- *Asset Lifetime*, in years, is the default lifetime of the lighting upgrade for the relevant End-User Equipment as in **Table A10.1** of Schedule A to this Rule, or another value accepted by the Scheme Administrator.
- *Annual Operating Hours*, in hours/year, is the default number of hours per annum that the upgraded lighting system is expected to operate for the relevant building type as in **Table A10.2** of Schedule A to this Rule.
- *CM* is the control multiplier. If the lamp is connected to a control system, the factor for the control multiplier shall be applied for the relevant End-User Equipment or activity as in **Table A10.3** of Schedule A to this Rule, otherwise CM = 1.0.
- *AM* is the air-conditioning multiplier for the space as set out in **Table A10.4** of

Schedule A to this Rule.

Equation 10

Upgrade Energy Consumption (MWh) =

$$\sum_{Each\ Upgrade\ Lamp} \left(LCP \times Asset\ Lifetime \times Annual\ Operating\ Hours \times CM \times AM \right) \div 10^6$$

Where:

- *Each Upgrade Lamp* means each lamp and control gear in the upgraded lighting system.
- *LCP*, in Watts, is the default lamp circuit power corresponding to that type of Lamp and Control Gear for that End-User Equipment as in **Table A9.2** of Schedule A to this Rule, representing the power drawn by the lamp, plus the losses of its control gear.
- *Asset Lifetime*, in years, is the default lifetime of the lighting upgrade for the relevant End-User Equipment as in **Table A10.1** of Schedule A to this Rule, or another value accepted by the Scheme Administrator.
- *Annual Operating Hours*, in hours/year, is the default the number of hours per annum that the upgraded lighting system is expected to operate for the relevant building type as in **Table A10.2** of Schedule A to this Rule.
- *CM* is the control multiplier. If the lamp is connected to a control system, the factor for the control multiplier shall be applied for the relevant End-User Equipment or activity as in **Table A10.3** of Schedule A to this Rule, otherwise CM = 1.0.
- *AM* is the air-conditioning multiplier for the space as set out in **Table A10.4** of Schedule A to this Rule.

9.5 High Efficiency Motor Energy Savings Formula

The Energy Savings may be calculated using **Equation 12**, provided that:

(a) the motor is installed in an ESS Jurisdiction;

(b) the motor is a High Efficiency Motor;

(c) the Energy Saver is the Purchaser of the High Efficiency Motor installation; and

(d) the Implementation Date is the date that the High Efficiency Motor was installed.

Equation 12

Energy Savings = P x LUF x DEI x Lifetime x 8766 ÷ 1000

Where:

- *P*, in kW, is the rated output of the High Efficiency Motor
- *LUF* is the combined load and utilisation factors (including confidence factors) for the relevant High Efficiency Motor as in **Table A12** of Schedule A to this Rule, if the Business Classification and End-Use Service relevant to the Energy Savings is known, or **Table A13** of Schedule A to this Rule otherwise.
- *DEI* is the default efficiency improvement (as a fraction, not as a percentage) for the relevant High Efficiency Motor as in **Table A11** of Schedule A to this Rule
- *Lifetime*, in years, of the High Efficiency Motor is set out in **Table A14** of Schedule A to this Rule for the corresponding Rated Output of the High Efficiency Motor.

9.6 Power Factor Correction Energy Savings Formula

The Energy Savings created may be calculated using **Equation 14**, provided that:

(a) the capacitors to provide the power factor correction services are installed at a Low Voltage Site;

(b) the capacitors improve the power factor of the Site from a minimum of 0.9 lagging up to a maximum of 0.98 lagging.

(c) the capacitors are not installed as part of a mandatory program of installation;

(d) the capacitors are installed at the main switchboard, where the Site is connected to the NSW Electricity Network;

(e) the capacitors are new;

(f) the capacitors are not replacing existing capacitors;

(g) the Energy Saver is the Purchaser of the capacitor installation; and

(h) the Implementation Date is the date on which the capacitors were installed.

Equation 14

Energy Savings (MWh) = (Power Savings) / 1000 x (Annual operating hours) x (Lifetime)

Where:

- *Power Savings*, in kW, is the line loss power savings, less capacitor losses, during operating hours, and is calculated according to **Equation 14A**
- *Annual operating hours*, in hours/year, is the number of hours per year that the Site is operating and equals 1750
- *Lifetime*, in years, is the expected remaining lifetime of the Site and the capacitors and equals 10

Equation 14A

Power Savings (kW) = Real Power x 0.7 x (DLF - 1) x (1 – (Initial power factor)^2 / (Final power factor)^2) – 0.0039 x (Rating of installed capacitors)

Where:

- *Real Power*, in kW, is the real power component of the average Site load during operating hours;
- *DLF* is the distribution loss factor for the Distribution District that the Site is connected to, as detailed in Table A19 of Schedule A;
- *Initial power factor* is the power factor of the load before the capacitors are installed, or 0.9, whichever is greater;
- *Final power factor* is the power factor of the load after the capacitors have been installed, or 0.98, whichever is lesser; and
- *Rating of installed capacitors*, in kvar, is the rated reactive power of the installed capacitors.

9.7 Removal of Old Appliances

The Energy Savings may be calculated using **Equation 15**, provided that:

(a) the Site is a Residential Building, Small Business Building or Non-Habitable Building;

(b) each item of End-User Equipment meets one of the Equipment Requirements in Activity Definition C1 or C2 of Schedule C, and any additional requirements Published by the Scheme Administrator, noting that the Scheme Administrator may Publish, from time to time, lists of Products that they are satisfied meet those Requirements;

(c) each item of End-User Equipment was removed from the Site; and

(d) the Energy Saver is the person who removed the End-User Equipment; and

(e) the Implementation Date is the date that the End-User Equipment was removed from the Site;

Equation 15

$$\text{Energy Savings} = \sum \text{(Equipment Energy Savings)}$$

Where:

- the summation is over all items of End-User Equipment that have been removed; and
- *Equipment Energy Savings*, in MWh, are calculated according to **Activity Definition C1 or C2** of Schedule C to this Rule.

9.8 Home Energy Efficiency Retrofits

The Energy Savings for an Implementation may be calculated using **Equation 16**, provided that:

(a) the Site is a Residential Building, Small Business Building or Non-Habitable Building;

(b) each Implementation must fit an Activity Definition listed in Schedule D or Schedule E;

(c) prior to the Implementation Date, the Implementations later implemented at the Site were identified and recorded using a Home Energy Assessment Tool approved by the Scheme Administrator;

(d) the Eligibility Requirements for each Activity Definition must be met prior to the Implementation Date;

(e) installed End-User Equipment or products that modify End-User Equipment must meet: all of the Equipment Requirements for the relevant Activity Definition, and any additional requirements Published by the Scheme Administrator, noting that the Scheme Administrator may Publish, from time to time, lists of Products that it is satisfied meet those Requirements;

(f) the completed Implementation satisfies all of the relevant Implementation Requirements;

(g) of the Schedule E Implementations identified as meeting the Eligibility Requirements for that Site, and recorded in the Home Energy Assessment Tool, the Schedule E Implementations resulted in Energy Savings equal to or greater than a percentage of the eligible energy savings identified in the Home Energy Assessment Tool for that Site; that minimum percentage being:

(i) 0% if the NSW Government funded the Implementation;

(ii) 25% if one or more Implementations from Schedule D have been implemented;

(iii) 75% if no Implementations from Schedule D have been implemented; or

(iv) Another percentage, subject to any conditions, Published by the Scheme Administrator;

(h) the Purchaser has paid an amount of at least $150, excluding GST, for all activities implemented at that Site, as evidenced by entries from a corporate Sales Ledger or equivalent, unless the NSW Government funded the activities;

(i) the Energy Saver is the Purchaser of the goods or services that lead to the Energy Savings; and

(j) the Implementation Date is the first date that all of the Equipment Requirements and Implementation Requirements are met, as well as all other conditions of this clause;

Equation 16

Energy Savings = $\sum$ (Activity Energy Savings)

Where:

- the summation is over all Implementations at the Site in accordance with this clause; and
- *Activity Energy Savings*, in MWh, are calculated according to **Activity Definition D1 to D9** of Schedule D or **Activity Definition E1 to E11** of Schedule E for each Implementation at

the Site.

9.9 Installation of High Efficiency Appliances for Businesses

The Energy Savings may be calculated using **Equation 17**, provided that:

(a) each item of End-User Equipment meets the Equipment Requirements in one of the Activity Definitions F1, F2, F3, or F4 of Schedule F;

(b) each item of End-User Equipment must meet the installation requirements as specified in the corresponding Activity Definition;

(c) each item of End-User Equipment was installed at an Address in an ESS Jurisdiction;

(d) the Energy Saver is the Purchaser of the End-User Equipment; and

(e) the Implementation Date is the date that the End-User Equipment was installed.

Equation 17

Energy Savings = $\sum$ (Equipment Energy Savings)

Where:

- the summation is over all items of End-User Equipment that have been installed; and
- *Equipment Energy Savings*, in MWh, for each item of End-User Equipment are calculated according to the respective **Activity Definition F1, F2, F3 or F4** of **Schedule F** of this Rule

10 Definitions and Interpretation

10.1 In this Rule:

"Accreditation Date" with respect to each Recognised Energy Savings Activity means the date on which the Scheme Administrator approved an Accredited Certificate Provider's application:

(a) for accreditation with respect to that activity, or

(b) to amend its existing accreditation to add that activity.

"Accredited Certificate Provider" has the same definition as in the Act.

"Accredited Statistician" means a person

(a) accredited by the Statistical Society of Australia Inc. as an Accredited Statistician; and

(b) accepted by the Scheme Administrator for the purposes of this Rule.

"Act" means the *Electricity Supply Act 1995*.

"Address" means a street address within an ESS Jurisdiction, in a format approved by the Scheme Administrator.

"Appliance Retailer" means a person who has sold End-User Equipment defined in Tables B1 to B8 of Schedule B, in new condition, to a Purchaser.

"Approved Corresponding Scheme" has the same meaning as defined in section 127 of the Act.

"**AS/NZS"** means an Australian/New Zealand Standard as Published by Standards Australia and identified by its number and part.

"Ballast EEI" means the ballast energy efficiency index as defined in AS/NZS 4783.2.

"BCA" means the Building Code of Australia, forming part of the National Construction Code.

"Billed Electricity Consumption" for energy consumption over a period of time means the metered amount of electricity for which a residential customer is billed by their Electricity Retailer, pro-rated across the period, as measured and estimated in accordance with the provisions of the National Energy Rules under the National Energy Retail Law, and in accordance with the provisions of the *Electricity Supply (General) Regulation 2001 (NSW).*

"Building Lighting" is defined as lighting End-User-Equipment affixed to a Commercial/Industrial premises classified under the Building Code of Australia as either Class 3, 5, 6, 7, 8, 9, 10(b) buildings or the Common Areas of Class 2 buildings.

"Business Classification" is the primary classification of the business making use of the End-Use for which energy was saved; valid classifications being detailed in Table A18 of Schedule A.

"Calendar Year" means the period of 1 January to 31 December.

"Certificate Conversion Factor" is defined in section 130 of the Act.

"CFL" means compact fluorescent lamp.

"CFLi" means a compact fluorescent lamp with integral ballast.

"CFLn" means a compact fluorescent lamp with non-integral ballast.

"Common Areas" means:

(a) for buildings owned under strata title, the common property as defined in either the NSW *Strata Schemes (Freehold Development) Act 1973*, or NSW *Strata Schemes (Leasehold Development) Act 1986*; or

(b) for buildings not owned under strata title (e.g. under company title), the non-residential property of class 2 buildings.

"Control Gear" means the lighting ballast, transformer or driver.

"Control Group", in relation to the Aggregated Metered Baseline Method, means the group of Sites selected to not receive the goods, services or information that Sites in the Treatment Group receive to help them save energy.

"Control System" means a system for controlling the light output of a Luminaire, including:

(a) Occupancy Sensor;

(b) Daylight-Linked Control;

(c) Programmable Dimming; or

(d) Manual Dimming.

"Daylight-Linked Control" means Luminaire light output varied automatically by a photoelectric cell to compensate for the availability of daylight. The Luminaire must be located close to a significant source of daylight.

"Default Load Utilisation Factor" is a composite of a deemed load factor and a deemed utilisation factor for HEMs, as set out in Table A12 or Table A13 of this Rule.

"Deemed Energy Savings Method" means the method in clause 9.

"Distribution District" has the same meaning as it has in the Act.

"Distribution System" has the same meaning as it has in the *National Electricity (NSW) Law*.

"Downward Light Output" means the luminous flux (measured in lumens) emitted in the downwards direction, equivalent to the Light Output from a Lamp or Luminaire when installed flush with a ceiling.

"**Electricity Retailer**" has the same meaning as "retailer" in the *National Energy Retail Law (NSW)*.

"**Electronic Transformer**" means an electronic step-down convertor as defined in AS/NZS 4879.1.

"ELV" means extra low voltage, not exceeding 50 volts alternating current (AC) or 120 volts direct current (DC), as defined in *AS/NZS 3000 Wiring rules*.

"End-Use Service" is the primary service provided by End-User Equipment, valid services being detailed in Table A17 of Schedule A.

"End-User Equipment" means electricity consuming equipment, processes, or systems, including the equipment directly consuming electricity, and other equipment that causes, controls or influences the consumption of electricity, and includes (in the context of clause 8.8) a New NABERS Building.

"Energy Saver" is the person who has the right to create Energy Savings Certificates for particular Energy Savings arising from an Implementation of a Recognised Energy Savings Activity at a Site.

"Energy Savings" means the amount of electricity consumption reduction arising from the undertaking of a Recognised Energy Savings Activity as calculated by the approved calculation method in clauses 7, 7A, 8 or 9 of this Rule.

"Energy Savings Certificate" is a transferable Certificate under part 9 of the Act, which is created in accordance with this Rule.

"Energy Star Rating" means an Energy Star Rating as defined in the relevant Australian Standard.

"ESS Jurisdiction" means the state of New South Wales, or a jurisdiction in which an Approved Corresponding Scheme is in operation in accordance with Section 127 of the Act.

"GEMS Registry" means a published registry of products registered under either Greenhouse and Energy Minimum Standards or published Minimum Energy Performance Standards (MEPS).

"GreenPower" means renewable electrical energy purchased under the NSW Government-accredited GreenPower scheme.

"GST" is the Commonwealth's Goods and Services Tax.

"High Efficiency Motor" (HEM) is an electric motor meeting the high efficiency requirements of AS/NZS 1359.5 (0.73 to <185kW).

"Home Energy Assessment Tool" is a documented method, such as a computer program or website, that:

(a) identifies opportunities to save energy in a home;

(b) estimates energy savings from each opportunity;

(c) records all data required to create Energy Savings Certificates based on implementation of those opportunities; and

(d) has been approved by the Scheme Administrator.

"Implementation" means the implementation of a Recognised Energy Savings Activity on a particular Site.

"Implementation Date" means the date on which Energy Savings commence at a Site due to a Recognised Energy Savings Activity as defined in the relevant calculation method of this Rule.

"Integrated Luminaire" means a Luminaire that integrates Lamp and Control Gear into a single item of End-User Equipment.

"IPD" means the illumination power density as defined in the Building Code of Australia part J6.

"IPMVP" means the International Performance Measurement and Verification Protocol, Published by the Efficiency Valuation Organization.

"kV" means a kilovolt of electrical potential.

"kW" means a kilowatt of electrical power.

"Lamp" means an artificial source of visible light.

"Lamp Life" means the expected operating lifetime of a Lamp, in hours, measured in accordance with Table A9.3.

"LCP" means lamp circuit power, which is the power drawn by a single Lamp and its associated Control Gear. If the Control Gear supplies multiple Lamps, then the Control Gear losses are assigned pro rata to each Lamp, according to power drawn by each Lamp.

"LED" means light emitting diode.

"Lifetime" means the time period over which Energy Savings will be delivered.

"Light Output" means the luminous flux (measured in lumens) emitted by a Lamp or Luminaire.

"Lighting for Roads and Public Spaces" means lighting covered by *AS/NZS 1158: Lighting for roads and public space*s.

"Lighting Upgrade" means the replacement of existing general lighting End-User Equipment with new general lighting End-User Equipment that consumes less electricity, or the modification of existing general lighting End-User Equipment resulting in a reduction in the consumption of electricity compared to what would have otherwise been consumed.

"Linear LED Adaptor Kit" means a fitting that will modify a T5, T8 or T12 Luminaire to suit a Linear LED Lamp by making use of the existing Luminaire for physical support, with or without the need for internal re-wiring of the Luminaire and whether or not the Adaptor relies on electrical supply from the Luminaire connectors or has a separate electrical supply.

"Linear LED Lamp" means an LED Lamp that can be fitted to a T8 or T12 Luminaire.

"Low Voltage Site" means a Site where electricity is supplied from the NSW Electricity Network at less than 50 kilovolts (kV).

"LUF" means load utilisation factor.

"Lumen Maintenance" means the ratio of maintained Light Output (measured after 2000 hours of operation) to initial Light Output (measured after 100 hours of operation). Note that in the case of recessed Luminaires, such as those for 50W ELV halogen reflector lamps, Light Output refers only to Downward Light Output.

"Luminaire" means the apparatus that distributes, filters or transforms the light emitted from a light source, including Lamps, Control Gear and all components necessary for fixing and protecting the Lamps, including the troffer.

"Magnetic Transformer" means a magnetic isolating transformer as defined in AS/NZS 4879.1.

"Manual Dimming" means Luminaire light output controlled by a knob, slider or other mechanism or where pre-selected light levels (scenes) are manually selected.

"Measured Electricity Consumption" the electricity consumption for a Site or Population is the electricity consumption as determined in accordance with clause 8.9.3.

"Measurement and Verification Professional" means a person:

(a) recognised under the Efficiency Valuation Organization's Certified Measurement & Verification Professional program;

(b) with demonstrated experience conducting measurement and verification for projects under the IPMVP;

(c) who holds professional indemnity insurance to a level of at least $1 million per incident; and

(d) accepted by the Scheme Administrator for the purposes of this Rule.

"**Measurement Period**" means the duration of time over which measurement of energy consumption will be taken for the purposes of calculating the Energy Savings under clause 7, 7A or 8, and defined therein.

"**Metered Baseline Method**" means the method in clause 8.

"MWh" means a megawatt-hour of electrical energy.

"NABERS" means the National Australian Built Environment Rating System, administered by the NABERS National Administrator.

"NABERS Building" means a building that has been rated under NABERS, as determined by the NABERS National Administrator.

"NABERS Rating" means a rating, expressed as a number, for a NABERS Building.

"National Energy Retail Law" means the *National Energy Retail Law (NSW)*.

"Network Service Provider" has the same meaning as it has in the *National Electricity (NSW) Law*.

"New End-User Equipment" means End-User Equipment where no End-User Equipment of the same type, function, output or service was previously in its place (but does not include additional components installed in the course of modifying existing End-User Equipment).

"NLP" means Nominal Lamp Power.

"Nominal Lamp Power" means the manufacturer's rated value for power drawn by a single lamp.

"Non-Habitable Building" means a building built as a BCA Class 10a or Class 10b building.

"NSW Electricity Network" means all electricity Transmission Systems and Distribution Systems located in New South Wales.

"Number of Certificates" means the number of Energy Savings Certificates to be created by an Accredited Certificate Provider for Energy Savings calculated in accordance with the methods set out in clause 7, 7A, 8 or 9.

"Occupancy Sensor" means a motion sensor that detects the presence of occupants and switches Luminaires on and off. Each Occupancy Sensor must control a maximum of 6 Luminaires.

"PAR Lamp" is a parabolic aluminised reflector Lamp.

"Prior Accreditation" means an accreditation with respect to a Recognised Energy Savings Activity where the Accreditation Date is earlier than the commencement date of this Rule and that accreditation has not been cancelled.

"Prior Accreditation Conditions" means any conditions of accreditation imposed by the Scheme Administrator and issued earlier than the commencement date of this Rule, and those conditions have not been rescinded or replaced.

"Product" means a class of End-User Equipment identified uniquely by its manufacturer identifier and manufacturer's model identifier and, in some cases, model year or year of manufacture.

"Programmable Dimming" means Luminaire light output controlled by pre-selected light levels (scenes) which are automatically selected according to time of day, photoelectric cell and/or Occupancy Sensor. Scenes must reduce lighting power.

"Project Impact Assessment Method" means the method in clause 7.

"Project Impact Assessment with Measurement and Verification Method" means the method in clause 7A.

"Publish" means to document and make publicly available, on the Energy Savings Scheme website, www.ess.nsw.gov.au.

"Purchaser" means the person who pays for the goods or services that comprise an Implementation of a Recognised Energy Savings Activity, for the purpose of end-use;

"Recognised Energy Savings Activity" has the same meaning as it has in the Act.

"Regulations" means regulations made pursuant to Part 9 of the Act.

"Residential Building" means a building built as a BCA Class 1, Class 2, Class 3 or Class 4 building.

"Sales Ledger" means the place where official corporate sales transactions are recorded, or an extract from it.

"Scheme Administrator" is defined in Part 9 Division 11 of the Act.

"Site" means the location of the End-User Equipment affected by a Recognised Energy Savings Activity, as defined by:

a) an Address in an ESS Jurisdiction; and

b) optionally, a unique identifier, as specified for the respective Recognised Energy Savings Activity, that identifies the particular End-User Equipment affected by the Recognised Energy Savings Activity.

"Small Business Building" means a building built as a BCA Class 6 building.

"Solar Heat Gain Coefficient" is a measure of the solar heat transfer of a glazing product, as registered under WERS.

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

"T5 Adaptor Kit" is a fitting that will modify a T8 or T12 Luminaire to suit a T5 lamp by making use of the existing Luminaire for physical support, with or without the need for internal re-wiring of the Luminaire and whether or not the Adaptor relies on electrical supply from the Luminaire connectors or has a separate electrical supply.

"Transmission System" has the same meaning as it has in the *National Electricity (NSW) Law*.

"Treatment Group", in relation to the Aggregated Metered Baseline Method, means the group of households selected to receive the goods, services or information to help them save energy.

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

10.2 Simplified outlines and notes in this Rule do not form part of this Rule.

10.3 (deleted)

10.4 For the purpose of this Rule the terms and expressions used in this Rule have the same meaning as in the Act or as defined in Part 9 of the Act, except the terms that are expressly defined in this Rule.

10.5 A reference to accreditation in respect of a Recognised Energy Savings Activity means accreditation in respect of Energy Savings from that Recognised Energy Savings Activity.

Schedule A – Default Factors and Classifications

Table 1: Replacement of 50W ELV halogen lamp with a 35W ELV halogen lamp (deleted – see Activity Definition E1)

Table 2: Replacement of 50W ELV halogen lamp and magnetic transformer with a 35W ELV halogen lamp and electronic transformer (deleted – see Activity Definition E1)

Table 3: Replacement of 50W ELV halogen lamp and transformer with CFL, CCFL, LED or CMH lamp with lifetime ≥ 10,000 hours (deleted – see Activity Definition E1)

Table 4: Showerhead replacement (deleted – see Activity Definition E2)

Table 5: Purchase of a new high efficiency Clothes Washer (deleted – see Activity Definition B1)

Table 6: Purchase of a new high efficiency Dishwasher (deleted – see Activity Definition B3)

Table 7: Destruction of refrigerator or freezer (deleted – see Activity Definitions C1 & C2)

Table 8a: Purchase of a new high efficiency 1 door refrigerator (deleted – see Activity Definition B4)

Table 8b: Purchase of a new high efficiency 2 door refrigerator (deleted – see Activity Definition B5)

Table 8c: Purchase of new high efficiency chest freezer (deleted – see Activity Definition B6)

Table 8d: Purchase of new high efficiency upright freezer (deleted – see Activity Definition B6)

Table A9.1: Equipment Classes and Equipment Requirements for Commercial Lighting Energy Savings Formula

Equipment Class	Equipment Requirement
Lighting for Roads and Public Spaces or traffic signals	As defined in AS/NZS 1158.6
LED Lamps	1. Must meet safety requirements as Published by the Scheme Administrator, and 2. Must meet product and performance (including Lamp Life and LCP) specifications as evidenced by: a) Certification under: - US Energy Star - DesignLights - any other certification scheme accepted by the Scheme Administrator Or b) Test reports from a National Association of Testing Authorities (NATA) accredited laboratory, in accordance with the requirements of one of the above certification schemes or other product and performance specifications as Published by the Scheme Administrator Or c) Compliance with an Australian Standard for LED Lamps
Emerging lighting technologies not listed in Table A9.2	1. Must meet safety requirements as Published by the Scheme Administrator, and 2. Must meet product and performance (including Lamp Life and LCP) specifications as evidenced by: a) Certification under a third party certification scheme accepted by the Scheme Administrator Or b) Test reports from a National Association of Testing Authorities (NATA) accredited laboratory, in accordance with the requirements of product and performance specifications as Published by the Scheme Administrator Or c) Compliance with an Australian Standard for that technology

Table A9.2: Default Lamp Circuit Power (LCP) for Commercial Lighting Energy Savings Formula

<table>
<tr><th>Type of Lamp and Control Gear</th><th>LCP (Watts)</th></tr>
<tr><td>Linear fluorescent Lamp, circular fluorescent Lamp and CFLn</td><td>
<table>
<tr><th>Ballast EEI:</th><th>A1</th><th>A2</th><th>A3</th><th>B1</th><th>B2</th><th>C</th><th>D</th></tr>
<tr><td>T8 and T12 Lamps</td><td>NLP + 2</td><td>NLP</td><td>NLP + 2</td><td>NLP + 6</td><td>NLP + 8</td><td>NLP + 10</td><td>NLP + 12</td></tr>
<tr><td>T5 Lamps</td><td>1.13 x NLP + 2.5</td><td>1.08 x NLP + 1.5</td><td>1.13 x NLP + 2.5</td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
<tr><td>CFLn Lamps</td><td>NLP + 3</td><td>NLP + 1</td><td>NLP + 3</td><td>NLP + 5</td><td>NLP + 7</td><td>NLP + 9</td><td>NLP + 11</td></tr>
</table>
Where NLP = nominal lamp power
If the Ballast EEI is not marked on a magnetic ballast, it is assumed to be C. If the Ballast EEI is not marked on an electronic ballast, it is assumed to be A3.</td></tr>
<tr><td>CFLi</td><td>NLP</td></tr>
<tr><td>Tungsten halogen Lamp (mains voltage)</td><td>NLP</td></tr>
<tr><td>Tungsten halogen Lamp (extra low voltage)</td><td>• Where connected to Magnetic Transformer, NLP ÷ 80%
• Where connected to Electronic Transformer, NLP ÷ 93%.
• Maximum NLP of removed Lamp = 35W</td></tr>
<tr><td>Infra Red Coated halogen Lamp (extra low voltage)</td><td>• Where connected to Magnetic Transformer, NLP ÷ 80%
• Where connected to Electronic Transformer, NLP ÷ 93%.</td></tr>
<tr><td>Metal halide Lamp with magnetic ballast (reactor type)</td><td>1.0456 x NLP + 14</td></tr>
<tr><td>Metal halide Lamp with magnetic ballast (constant wattage type)</td><td>1.071 x NLP + 22</td></tr>
<tr><td>Metal halide Lamp with electronic ballast</td><td>1.096 x NLP + 0.9</td></tr>
<tr><td>Mercury vapour Lamp with magnetic ballast</td><td>1.033 x NLP + 11</td></tr>
<tr><td>High pressure sodium (HPS) Lamp with magnetic ballast</td><td>1.051 x NLP + 13</td></tr>
<tr><td>Lighting for Roads and Public Spaces or traffic signals</td><td>Lighting Load Table Published by AEMO or relevant regulator.
Note that, unlike other Lamps, an entire traffic signal unit or Integrated Luminaire is used as the basis for calculation, rather than individual Lamps.</td></tr>
<tr><td>LED Lamps</td><td>As Published by the Scheme Administrator.</td></tr>
<tr><td>Emerging lighting technologies not listed above</td><td>As Published by the Scheme Administrator.</td></tr>
</table>

Table A9.3: Default Lamp Life for Commercial Lighting Energy Savings Formula

Type of Lamp	Lamp Life (hours)
Linear fluorescent Lamp, circular fluorescent Lamp and CFLn	As per product labelling.
CFLi	As per product labelling.
Tungsten halogen Lamp (mains voltage)	As per product labelling.
Tungsten halogen Lamp (extra low voltage)	As per product labelling.
Infra Red Coated halogen Lamp (extra low voltage)	As per product labelling.
Metal halide Lamp	As per product labelling.
Mercury vapour Lamp	As per product labelling.
High pressure sodium (HPS) Lamp	As per product labelling.
Lighting for Roads and Public Spaces or traffic signals	As per product labelling.
LED Lamps	As Published by the Scheme Administrator.
Emerging lighting technologies not listed above	As Published by the Scheme Administrator.

Table A10.1: Asset Lifetimes for the Commercial Lighting Energy Savings Formula

Activity	Asset Lifetime (years)
Replacement of : • Luminaire, or • Control Gear (not integrated into Lamp) where the Lamp cannot be later replaced with a higher power Lamp	Lighting for Roads and Public Spaces or traffic signals: 12 years All other lighting: 10 years
Replacement of Lamp only, or replacement of Luminaire or Control Gear where the Lamp can be later replaced with a higher power Lamp	Lamp Life ÷ Annual Operating Hours (Where Lamp Life is measured in accordance with Table A9.3 and is a maximum of 30,000 hours) Maximum Asset Lifetime = 10 years
Any technology that does not meet the safety and performance requirements in Table A9.1.	0 years (not eligible)

Table A10.2: Operating Hours for the Commercial Lighting Energy Savings Formula

Building type	Annual Operating Hours (hours per annum)
BCA Class 2 buildings (Common Areas)	7,000
BCA Class 3 buildings (Common Areas)	7,000
BCA Class 3 buildings (other than Common Areas)	3,000
BCA Class 4 buildings	3,000
BCA Class 5 buildings	3,000
BCA Class 6 buildings	5,000
BCA Class 7 buildings	5,000
BCA Class 7 (a) buildings (car parks)	7,000
BCA Class 8 buildings (other than ANZIC Code C, Manufacturing)	3,000
BCA Class 8 buildings (ANZIC Code C, Manufacturing)	5,000
BCA Class 9a and 9c buildings	6,000
BCA Class 9b buildings	2,000
BCA Class 10b buildings	1,000

Table A10.3: Control Multipliers for the Commercial Lighting Energy Savings Formula

Control system	Control Multiplier (CM)
No control system	1
Occupancy Sensor	0.7
Daylight-Linked Control	0.7
Programmable Dimming	0.85
Manual Dimming	0.9
Voltage reduction unit (not eligible)	1.0
Minimum Control Multiplier (a maximum of 2 control multipliers can be multiplied together if multiple control systems are present)	0.6

Table A10.4: Air-conditioning Multipliers for the Commercial Lighting Energy Savings Formula

Air-conditioning system	Air-conditioning Multiplier (AM)
Air-conditioned	1.3
Not air-conditioned	1

Table A11: Default Efficiency Improvement (DEI) for High Efficiency Motors

Rated output (kW)	DEI by number of Poles			
	2 pole	4 pole	6 pole	8 pole
0.73 to < 2.6	0.033	0.030	0.039	0.047
2.6 to < 9.2	0.021	0.020	0.024	0.027
9.2 to < 41	0.014	0.014	0.016	0.017
41 to <100	0.010	0.009	0.010	0.010
100 to < 180	0.008	0.007	0.008	0.008

Table A12: Default Load Utilisation Factor for High Efficiency Motors – Where Business Classification and End-Use Service are known

Load Utilisation Factor	Refrigeration and freezing	Water/liquid pumping	Air compression	Air handling, fans, ventilation	Process Drives	Milling, mixing, grinding	Material handling/ conveying
Division A Agriculture, Forestry and Fishing	0.14	0.32	0.27	0.28	0.32	0.2	0.2
Division B Mining	0.09	0.36	0.32	0.41	0.32	0.32	0.28
Division C Manufacturing	0.28	0.32	0.27	0.32	0.27	0.24	0.28
Division D Electricity, Gas, Water and Waste Services	0.11	0.32	0.24	0.28	0.28	0.12	0.17
Division E Construction	0.09	0.24	0.15	0.15	0.17	0.14	0.2
Division F Wholesale Trade	0.2	0.14	0.07	0.13	0.13	0.03	0.11
Division G Retail Trade	0.17	0.09	0.07	0.13	0.13	0.03	0.07
Division H Accommodation and Food Services	0.24	0.11	0.04	0.14	0.13	0.09	0.11
Division I Transport, Postal and Warehousing	0.17	0.11	0.08	0.13	0.17	0.03	0.16
Division J Information Media and Telecommunications	0.11	0.09	0.04	0.1	0.11	0.03	0.03
Division K Financial and Insurance Services	0.09	0.05	0.04	0.06	0.06	0.03	0.03
Division L Rental, Hiring and Real Estate Services	0.09	0.05	0.04	0.06	0.06	0.03	0.03
Division M Professional, Scientific and Technical Services	0.17	0.07	0.05	0.08	0.08	0.04	0.03
Division N Administrative and Support Services	0.11	0.05	0.04	0.06	0.04	0.03	0.03
Division O Public Administration and Safety	0.09	0.05	0.04	0.06	0.04	0.03	0.03
Division P Education and Training	0.11	0.05	0.04	0.06	0.04	0.03	0.03
Division Q Health Care and Social Assistance	0.11	0.08	0.11	0.06	0.06	0.03	0.03
Division R Arts and Recreation Services	0.09	0.05	0.04	0.06	0.04	0.03	0.03
Division S Other Services	0.07	0.05	0.04	0.06	0.04	0.03	0.03

Table A13: Default Load Utilisation Factor for High Efficiency Motors – Where Business Classification and End-use are not known

Rated output (kW)	LUF
0.73 to < 2.6	0.09
2.6 to < 9.2	0.10
9.2 to < 41	0.11
41 to < 100	0.13
100 to < 180	0.15

Table A14: Asset Life for High Efficiency Motors (t)

Rated output (kW) of High Efficiency Motor	t (Asset life (years))
0.73 to < 2.6	12
2.6 to < 9.2	15
9.2 to < 41	20
41 to < 100	22
100 to < 180	25

Table 15: Default Efficiencies (deleted)

Table A16: Decay Factors for calculating future Energy Savings under the Project Impact Assessment Method (Clause 7) or the Project Impact Assessment with Measurement and Verification Method (Clause 7A)

Year	Decay Factor		
	Energy Savings Calculated using Clause 7	Energy Savings calculated using Clause 7A	
		Default	Persistence Model
1	1.00	1.00	The Scheme Administrator may accept the use of Site-specific Decay Factors assigned to the equipment, process or system that is the subject of the Recognised Energy Savings Activity by a publicly accessible persistence model accepted for use by the Scheme Administrator
2	0.80	0.80	
3	0.60	0.64	
4	0.40	0.51	
5	0.20	0.41	
6	Not applicable	0.33	
7	Not applicable	0.26	
8	Not applicable	0.21	
9	Not applicable	0.17	
10	Not applicable	0.13	

Table A17: End-Use Services

End-Use Services
Air heating and cooling
Air handling, fans, ventilation
Water heating
Water/liquid pumping
Refrigeration and freezing
Lighting
Cooking
Home entertainment
Computers, office equipment
Communications
Cleaning, washing
Process heat
Air compression
Process drives
Milling, mixing, grinding
Transport
People movement, lifts, escalators
Materials handling, conveying
Other machines
Electricity supply
Unknown

Table A18: Business Classifications

Business Classification	Economic Sector
A Agriculture, Forestry and Fishing	Industrial
B Mining	Industrial
C Manufacturing	Industrial
D Electricity, Gas, Water and Waste Services	Industrial
E Construction	Industrial
F Wholesale Trade	Commercial
G Retail Trade	Commercial
H Accommodation and Food Services	Commercial
I Transport, Postal and Warehousing	Industrial
J Information Media and Telecommunications	Commercial
K Financial and Insurance Services	Commercial
L Rental, Hiring and Real Estate Services	Commercial
M Professional, Scientific and Technical Services	Commercial
N Administrative and Support Services	Commercial
O Public Administration and Safety	Commercial
P Education and Training	Commercial
Q Health Care and Social Assistance	Commercial
R Arts and Recreation Services	Commercial
S Other Services	Commercial
Residential	Residential
Unknown	Unknown

Table A19: Distribution Loss Factors (DLF) for losses between the Subtransmission network and Low Voltage connection points

Distribution Network Service Provider	Distribution District	DLF
Endeavour Energy	Integral Energy Australia	1.054
Essential Energy	Country Energy	1.074
AusGrid	EnergyAustralia	1.043

Table A20: NABERS Ratings Benchmark Index

NABERS Rating tool	Building category	Year of NABERS Rating End Date							
		2013	2014	2015	2016	2017	2018	2019	2020
Offices	All	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7
Hotels	All	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7
Shopping Centres	All	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7
Data Centres	All	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7

Table A21: NABERS Ratings Thresholds

NABERS Rating tool	Building category	Year of NABERS Rating End Date							
		2013	2014	2015	2016	2017	2018	2019	2020
Offices	All	4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5
Hotels	All	4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5
Shopping Centres	All	4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5
Data Centres	All	4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5

Table A22: NABERS Annual Ratings Adjustment

NABERS Rating tool	Building category	Annual Ratings Adjustment
Offices	All	0.1
Hotels	All	0.1
Shopping Centres	All	0.1
Data Centres	All	0.1

Schedule B – Activity Definitions for the Purchase of New Appliances (clause 9.3)

Activity Definition B1

Name of Activity

PURCHASE A HIGH EFFICIENCY CLOTHES WASHING MACHINE

Equipment Requirements

1. The End-User Equipment must be a Clothes Washing Machine as defined in *AS/NZS 2040:2005 Performance of household electrical appliances—Clothes washing machines*
2. The Clothes Washing Machine must be registered for energy labelling.
   The Clothes Washing Machine must be either a top loader or a front loader.

Equipment Energy Savings

Energy Star Rating	Equipment Energy Savings (MWh)	
	Rated capacity > 4kg < 8kg	Rated capacity ≤ 8kg
3.5	0.4	0.9
4.0	1.1	1.7
4.5	1.6	2.5
5.0	2.1	3.1
5.5	2.6	3.6
6.0	2.9	4.1

Persistence

Lifetime = 10 years.

Activity Definition B2

Name of Activity

PURCHASE A HIGH EFFICIENCY CLOTHES DRYER

Equipment Requirements

1. The End-User Equipment must be a Clothes Dryer as defined by "Rotary clothes dryer" in *AS/NZS 2442.1:1996 and 2442.2:2000 Performance of household electrical appliances—Rotary clothes dryers*
2. The Clothes Dryer must be registered for energy labelling.
3. The Clothes Dryer must not form part of a combination washer/dryer.

Equipment Energy Savings

Energy Star Rating	Equipment Energy Savings (MWh)		
	Rated capacity < 5kg	Rated capacity ≥ 5kg < 7kg	Rated capacity ≥ 7kg
2.0	0.1	0.0	0.0
2.5	0.3	0.2	0.0
3.0	0.4	0.4	0.0
3.5	0.5	0.5	0.4
4.0	0.6	0.7	0.6
4.5	0.7	0.8	0.7
5.0	0.8	1.0	0.9
5.5	0.9	1.1	1.1
6.0	1.0	1.2	1.2

Persistence

Lifetime = 10 years.

Activity Definition B3

Name of Activity

PURCHASE A HIGH EFFICIENCY DISHWASHER

Equipment Requirements

1. The End-User Equipment must be a Dishwasher as defined in *AS/NZS 2007:2005 Performance of household electrical appliances—Dishwashers.*
2. The Dishwasher must be registered for energy labelling.
3. The Dishwasher must have a Number of Place Settings written on the energy label

Equipment Energy Savings

Energy Star Rating	Equipment Energy Savings (MWh)		
	< 9 place settings	≥ 9 place settings < 13 place settings	≥ 13 place settings
3.0	0.1	0.4	0.0
3.5	0.4	0.9	0.1
4.0	0.6	1.3	0.6
4.5	0.8	1.6	0.9
5.0	1.0	1.9	1.2
5.5	1.1	2.1	1.5
6.0	1.2	2.3	1.7

Persistence

Lifetime = 10 years.

Activity Definition B4

Name of Activity

PURCHASE A HIGH EFFICIENCY 1-DOOR REFRIGERATOR

Equipment Requirements

1. The End-User Equipment must be a 1-door Refrigerator of Groups 1, 2, or 3 as defined in *AS/NZS 4474.1:2007 and 4474.2:2009 Performance of household electrical appliances—Refrigerating appliances.*
2. The Refrigerator must be registered for energy labelling.

Equipment Energy Savings

Energy Star Rating	Equipment Energy Savings (MWh)	
	Rated capacity < 300 litres	Rated capacity ≥ 300 litres
2.0	0.2	0.1
2.5	0.6	0.5
3.0	0.9	1.0
3.5	1.2	1.3
4.0	1.5	1.7
4.5	1.8	2.0
5.0	2.0	2.2

Persistence

Lifetime = 12 years.

Activity Definition B5

Name of Activity

PURCHASE A HIGH EFFICIENCY 2-DOOR REFRIGERATOR

Equipment Requirements

1. The End-User Equipment must be a 2-door Refrigerator of Groups 4, 5B, 5T or 5S as defined in *AS/NZS 4474.1:2007 and 4474.2:2009 Performance of household electrical appliances—Refrigerating appliances.*
2. The Refrigerator must be registered for energy labelling.

Equipment Energy Savings

Energy Star Rating	Equipment Energy Savings (MWh)		
	Rated capacity < 300 litres	Rated capacity ≥ 300 litres < 500 litres	Rated capacity ≥ 500 litres
2.5	0.6	0.3	0.6
3.0	1.1	1.0	1.5
3.5	1.6	1.6	2.2
4.0	2.0	2.1	2.9
4.5	2.4	2.6	3.4
5.0	2.7	3.0	3.9

Persistence

Lifetime = 12 years.

Activity Definition B6

Name of Activity

PURCHASE A HIGH EFFICIENCY CHEST FREEZER OR UPRIGHT FREEZER

Equipment Requirements

1. The End-User Equipment must be a Chest Freezer or Upright Freezer of Groups 6C, 6U or 7 as defined in *AS/NZS 4474.1:2007 and 4474.2:2009 Performance of household electrical appliances—Refrigerating appliances.*
2. The Freezer must be registered for energy labelling.

Equipment Energy Savings

Energy Star Rating	Equipment Energy Savings (MWh)		
	Rated capacity < 300 litres	**Rated capacity ≥ 300 litres < 500 litres**	**Rated capacity ≥ 500 litres**
2.5	0.2	0.7	0.0
3.0	0.7	1.4	0.8
3.5	1.0	2.0	1.6
4.0	1.4	2.5	2.3
4.5	1.7	2.9	2.9
5.0	2.0	3.3	3.5

Persistence

Lifetime = 12 years.

Activity Definition B7

Name of Activity

PURCHASE A HIGH EFFICIENCY TELEVISION

Equipment Requirements

1. The End-User Equipment must be a Television as defined in *AS/NZS 62087.1:2010 Power consumption of audio, video and related equipment; and 62087.2.2:2011 Power consumption of audio, video and related equipment—Minimum energy performance standards (MEPS) and energy rating label requirements for Television Sets.*
2. The Television must be registered for energy labelling under the Greenhouse and Energy Minimum Standards (Television) Determination 2012 or Greenhouse and Energy Minimum Standards (Television) Determination 2013 (No.2).

Equipment Energy Savings

Energy Star Rating	Equipment Energy Savings (MWh)		
	Diagonal screen size > 40cm ≤ 80cm	**Diagonal screen size > 80cm ≤ 120cm**	**Diagonal screen size > 120cm**
Tier 1 MEPS: 7 Tier 2 MEPS: 4	0.4	0.6	0.8
Tier 2 MEPS: 4.5	0.5	0.8	1.3
Tier 1 MEPS: 8 Tier 2 MEPS: 5	0.6	1.0	1.7
Tier 2 MEPS: 5.5	0.7	1.2	2.1
Tier 1 MEPS: 9 Tier 2 MEPS: 6	0.7	1.4	2.4
Tier 1 MEPS: 10 Tier 2 MEPS: 7	0.9	1.6	2.9

Persistence

Lifetime = 10 years.

Schedule C – Activity Definitions for the Removal of Old Appliances (clause 9.7)

Activity Definition C1

Name of Activity

REMOVE A SPARE REFRIGERATOR OR FREEZER

Equipment Requirements

1. The Site where the End-User Equipment is located must be a Residential Building.
2. The End-User Equipment must be a Refrigerator or Freezer (or combination) that may be classified as Group 1, 2, 3, 4, 5T, 5B, 5S, 6C, 6U or 7 according to *AS/NZS 4474.1:2007 and 4474.2:2009 Performance of household electrical appliances—Refrigerating appliances.*
3. The Capacity of the Refrigerator or Freezer (as defined in AS/NZS 4474) must be 200 litres or more.
4. The Refrigerator or Freezer must be in working order.
5. There must be another Refrigerator or Freezer (as appropriate) at the Site that provides primary refrigeration or freezing services, located in, or closer to, the kitchen.
6. The activity must not be carried out in combination with the delivery of a new refrigerator or freezer, unless the removal of a primary refrigerator or freezer, as defined in Activity C2, is carried out at the same time.

Equipment Energy Savings

Equipment Energy Savings = 5.7 MWh

Persistence

Lifetime = 7 years.

Activity Definition C2

Name of Activity

REMOVE A PRIMARY REFRIGERATOR OR FREEZER

Equipment Requirements

1. The Site where the End-User Equipment is located must be a Residential Building, Small Business Building or Non-habitable Building.
2. The End-User Equipment must be a Refrigerator or Freezer (or combination) that may be classified as Group 1, 2, 3, 4, 5T, 5B, 5S, 6C, 6U or 7 according to *AS/NZS 4474.1:2007 and 4474.2:2009 Performance of household electrical appliances—Refrigerating appliances.*
3. The Capacity of the Refrigerator or Freezer (as defined in AS/NZS 4474) must be 200 litres or more.
4. The Refrigerator or Freezer must be in working order.
5. The activity may be carried out in combination with the delivery of a new refrigerator or freezer.

Equipment Energy Savings

Equipment Energy Savings = 2.4 MWh

Persistence

Lifetime = 7 years.

Schedule D – Activity Definitions for General Activities for Home Energy Efficiency Retrofits (clause 9.8)

Activity Definition D1

Name of Activity

REPLACE AN EXTERNAL SINGLE-GLAZED WINDOW WITH A THERMALLY EFFICIENT WINDOW

Eligibility Requirements

1. The existing window must be single glazed.
2. The existing window must be an external window of a habitable area of a Residential Building or Small Business Building.

Equipment Requirements

1. The new End-Use Equipment shall be a window product (glazing and frame) rated by WERS.
2. The window must comply with AS 2047 – 1999 and AS 1288 – 2006.
3. The window must 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 Table D1.1.
4. The window must have a warranty of at least 5 years.

Table D1.1 – Minimum requirements for a thermally efficient window

Window rating	Minimum WERS star rating in heating mode	Minimum WERS rating in cooling mode	Minimum System U-Value (W/m^2K)
4 Star Window	4 stars	1.5 stars	3.1
6 Star Window	6 stars	3 stars	2.3

Implementation Requirements

1. The window must be installed in compliance with AS 2047 – 1999 and AS 1288 – 2006.

Activity Energy Savings

Activity Energy Savings = Savings Factor x Window Area

Where:

- *Savings Factor*, in MWh/m^2, is the value from Table D1.2 corresponding to the type of window and the Site's location; and
- *Window Area*, in m^2, is the total window area of the thermally efficient window installed.

Table D1.2 – Savings Factor for thermally efficient glazing (MWh per m^2 of window)

Window rating	BCA Climate Zones 2 and 3	BCA Climate Zones 4	BCA Climate Zones 5 and 6	BCA Climate Zones 7 and 8
4 Star Window	0.27	0.46	0.25	0.56
6 Star Window	0.50	0.98	0.54	1.3

Persistence

Lifetime = 30 years.

Activity Definition D2

Name of Activity

MODIFY AN EXTERNAL WINDOW BY INSTALLING SECONDARY GLAZING

Eligibility Requirements

1. The existing window must be single glazed.
2. The existing window must be an external window of a habitable area of a Residential Building or Small Business Building.

Equipment Requirements

1. The End-User Equipment shall be a secondary glazing product that retrofits a second glazing sheet (e.g. glass or acrylic or polycarbonate) to an existing single glazed window so as to form a still air gap between the specified product and the existing glazing.
2. The secondary glazing product when retrofitted must produce a window that is either a 4 Star Window or a 6 Star Window in accordance with the minimum requirements for a thermally efficient window as detailed in Table D2.1.
3. The secondary glazing product must have a warranty of at least 5 years.

Table D2.1 – Minimum requirements for a thermally efficient window fitted with secondary glazing

Window rating	Minimum WERS star rating in heating mode	Minimum WERS rating in cooling mode	Minimum System U-Value (W/m^2K)
4 Star Window	4 stars	1.5 stars	3.1
6 Star Window	6 stars	3 stars	2.3

Implementation Requirements

1. The secondary glazing product must be fitted in compliance with AS 2047 – 1999 and AS 1288 – 2006.

Activity Energy Savings

Activity Energy Savings = Savings Factor x Window Area

Where:

- *Savings Factor*, in MWh/m^2, is the value from Table D2.2 corresponding to the type of window and the Site's location; and
- *Window Area*, in m^2, is the total window area of the thermally efficient window installed.

Table D2.2 – Savings Factor for secondary glazing products (MWh per m^2 of window)

Window rating	BCA Climate Zones 2 and 3	BCA Climate Zones 4	BCA Climate Zones 5 and 6	BCA Climate Zones 7 and 8
4 Star Window	0.09	0.15	0.08	0.19
6 Star Window	0.17	0.33	0.18	0.43

Persistence

Lifetime = 10 years.

Activity Definition D3

Name of Activity

REPLACE AN EXISTING AIR CONDITIONER WITH A HIGH EFFICIENCY AIR CONDITIONER

Eligibility Requirements

1. The existing air conditioner must be in working order at time of replacement.

Equipment Requirements

1. The new End-User Equipment must be an air conditioner or evaporative cooler as defined in AS/NZS 3823.2:2011
2. The unit must be assigned a minimum star rating for cooling, as outlined in Table D3.1, and heating, if relevant under Table D3.2, under AS/NZS 3823.2:2011.
3. The replacement unit must have a cooling capacity the same as or smaller than the unit that it replaces.
4. Where the unit being replaced has a star rating, the replacement unit must be assessed under the AS/NZS 3823.2:2011 as having a higher star energy rating than the unit it replaces.
5. The new End-User Equipment must have a warranty of at least 5 years.

Implementation Requirements

1. The new air-conditioner must be installed.

Activity Energy Savings

Activity Energy Savings = Cooling Capacity x Cooling Energy Savings Factor + Heating Capacity x Heating Energy Savings Factor

Where:

- *Cooling Capacity*, in kW, is the rated cooling capacity of the system from the GEMS Registry;
- *Cooling Energy Savings Factor*, in MWh/kW, is the lifetime energy savings per unit of capacity in cooling mode, as specified in Table D3.1 below, according to the type of system, climate zone, and rated cooling capacity (kW);
- *Heating Capacity*, in kW, is the rated heating capacity of the system from the GEMS Registry; and
- *Heating Energy Savings Factor*, in MWh/kW, is the lifetime energy savings per unit of capacity in heating mode as calculated in Table D3.2 below according to the type of system, climate zone, and rated heating capacity (kW).

Table D3.1 – Cooling Energy Savings Factor (MWh/kW)

Product category	Star Rating	BCA Climate Zones 2 & 3	BCA Climate Zone 4	BCA Climate Zones 5 & 6	BCA Climate Zones 7 & 8
Non ducted split systems – all types, <4kW, all phases	4.0 Stars	0.30	0.18	0.16	0.14
	4.5 Stars	0.36	0.22	0.19	0.17
	5.0 Stars	0.42	0.25	0.22	0.19
	5.5 Stars	0.47	0.28	0.25	0.21
	6.0 Stars	0.51	0.31	0.27	0.23
	7.0 Stars	0.59	0.36	0.32	0.27
	8.0 Stars	0.65	0.40	0.35	0.30
	9.0 Stars	0.71	0.43	0.38	0.32
	10.0 Stars	0.76	0.46	0.41	0.34
Non ducted split systems – all types 4kW to <10kW all phases	3.0 Stars	0.35	0.21	0.19	0.16
	3.5 Stars	0.43	0.26	0.23	0.19
	4.0 Stars	0.49	0.30	0.26	0.22
	4.5 Stars	0.55	0.34	0.30	0.25
	5.0 Stars	0.61	0.37	0.33	0.28
	5.5 Stars	0.66	0.40	0.35	0.30
	6.0 Stars	0.70	0.43	0.38	0.32
	7.0 Stars	0.78	0.47	0.42	0.35
	8.0 Stars	0.84	0.51	0.45	0.38
	9.0 Stars	0.90	0.55	0.48	0.41
	10.0 Stars	0.95	0.58	0.51	0.43

All other configurations / capacities up to 65kW, all types, all phases	2.5 Stars	0.36	0.22	0.19	0.16
	3.0 Stars	0.45	0.27	0.24	0.21
	3.5 Stars	0.53	0.32	0.28	0.24
	4.0 Stars	0.60	0.36	0.32	0.27
	4.5 Stars	0.66	0.40	0.35	0.30
	5.0 Stars	0.71	0.43	0.38	0.32
	5.5 Stars	0.76	0.46	0.41	0.35
	6.0 Stars	0.81	0.49	0.43	0.37
	7.0 Stars	0.88	0.54	0.47	0.40
	8.0 Stars	0.95	0.58	0.51	0.43
	9.0 Stars	1.00	0.61	0.54	0.46
	10.0 Stars	1.05	0.64	0.56	0.48
Evaporative cooler	EER above 14	n/a	0.69	n/a	0.48
	EER above 20	n/a	0.74	n/a	0.53
	EER above 30	n/a	0.78	n/a	0.57
	EER above 40	n/a	0.79	n/a	0.58

Table D3.2 – Heating Energy Savings Factor (MWh/kW)

Product category	**Star Rating**	**BCA Climate Zones 2 & 3**	**BCA Climate Zone 4**	**BCA Climate Zones 5 & 6**	**BCA Climate Zones 7 & 8**
Non ducted split systems – all types, <4kW, all phases	4.0 Stars	0.10	0.45	0.16	1.37
	4.5 Stars	0.13	0.54	0.19	1.64
	5.0 Stars	0.14	0.62	0.22	1.89
	5.5 Stars	0.16	0.69	0.24	2.11
	6.0 Stars	0.18	0.76	0.27	2.31
	7.0 Stars	0.20	0.88	0.31	2.66
	8.0 Stars	0.23	0.97	0.34	2.95
	9.0 Stars	0.24	1.05	0.37	3.20
	10.0 Stars	0.26	1.12	0.39	3.41
Non ducted split systems – all types 4kW to <10kW all phases	3.0 Stars	0.12	0.52	0.18	1.57
	3.5 Stars	0.15	0.63	0.22	1.92
	4.0 Stars	0.17	0.73	0.26	2.23
	4.5 Stars	0.19	0.82	0.29	2.50
	5.0 Stars	0.21	0.91	0.32	2.75
	5.5 Stars	0.23	0.98	0.34	2.97
	6.0 Stars	0.24	1.04	0.37	3.17
	7.0 Stars	0.27	1.16	0.41	3.52
	8.0 Stars	0.29	1.26	0.44	3.81
	9.0 Stars	0.31	1.34	0.47	4.06
	10.0 Stars	0.33	1.41	0.49	4.27
All configurations, all types, <65kW, all phases	2.5 Stars	0.13	0.54	0.19	1.64
	3.0 Stars	0.16	0.67	0.24	2.04
	3.5 Stars	0.18	0.79	0.28	2.39
	4.0 Stars	0.21	0.89	0.31	2.70
	4.5 Stars	0.23	0.98	0.34	2.97
	5.0 Stars	0.25	1.06	0.37	3.22

	5.5 Stars	0.26	1.13	0.40	3.44
	6.0 Stars	0.28	1.20	0.42	3.64
	7.0 Stars	0.30	1.31	0.46	3.99
	8.0 Stars	0.33	1.41	0.49	4.28
	9.0 Stars	0.35	1.49	0.52	4.53
	10.0 Stars	0.36	1.56	0.55	4.74

Persistence

Lifetime = 10 years.

Activity Definition D4

Name of Activity

INSTALL A HIGH EFFICIENCY AIR CONDITIONER

Eligibility Requirements

1. No existing air conditioner or evaporative cooler is fixed in place that provides cooling to the conditioned space.

Equipment Requirements

1. The new End-User Equipment must be an air conditioner or evaporative cooler as defined in AS/NZS 3823.2:2011.
2. The unit must be assigned a minimum star rating for cooling, as outlined in Table D4.1, and heating, if relevant under Table D4.2, under AS/NZS 3823.2:2011.
3. The unit must have a warranty of at least 5 years.

Implementation Requirements

1. The unit must be installed.

Activity Energy Savings

Activity Energy Savings = Cooling Capacity x Cooling Energy Savings Factor + Heating Capacity x Heating Energy Savings Factor

Where:

- *Cooling Capacity*, in kW, is the rated cooling capacity of the system from the GEMS Registry;
- *Cooling Energy Savings Factor*, in MWh/kW, is the lifetime energy savings per unit of capacity in cooling mode, as specified in Table D4.1 below, according to the type of system, climate zone, and rated cooling capacity (kW);
- *Heating Capacity*, in kW, is the rated heating capacity of the system from the GEMS Registry; and
- *Heating Energy Savings Factor*, in MWh/kW, is the lifetime energy savings per unit of capacity in heating mode as calculated in Table D4.2 below according to the type of system, climate zone, and rated heating capacity (kW).

Table D4.1 – Cooling Energy Savings Factor (MWh/kW)

Product category	Star Rating	BCA Climate Zones 2 & 3	BCA Climate Zone 4	BCA Climate Zones 5 & 6	BCA Climate Zones 7 & 8
Non ducted split systems – all types, <4kW, all phases	4.0 Stars	0.08	0.05	0.04	0.04
	4.5 Stars	0.14	0.08	0.07	0.06
	5.0 Stars	0.19	0.12	0.10	0.09
	5.5 Stars	0.24	0.15	0.13	0.11
	6.0 Stars	0.29	0.17	0.15	0.13
	7.0 Stars	0.36	0.22	0.19	0.16
	8.0 Stars	0.43	0.26	0.23	0.19
	9.0 Stars	0.48	0.29	0.26	0.22
	10.0 Stars	0.53	0.32	0.28	0.24
Non ducted split systems – all types 4kW to <10kW all phases	3.0 Stars	0.11	0.07	0.06	0.05
	3.5 Stars	0.19	0.11	0.10	0.08
	4.0 Stars	0.25	0.15	0.14	0.12
	4.5 Stars	0.31	0.19	0.17	0.14
	5.0 Stars	0.37	0.22	0.20	0.17
	5.5 Stars	0.42	0.25	0.22	0.19
	6.0 Stars	0.46	0.28	0.25	0.21
	7.0 Stars	0.54	0.33	0.29	0.25
	8.0 Stars	0.60	0.37	0.32	0.27

	9.0 Stars	0.66	0.40	0.35	0.30
	10.0 Stars	0.71	0.43	0.38	0.32
All configurations, all types, <65kW, all phases	2.5 Stars	0.12	0.08	0.07	0.06
	3.0 Stars	0.21	0.13	0.11	0.10
	3.5 Stars	0.29	0.18	0.16	0.13
	4.0 Stars	0.36	0.22	0.19	0.16
	4.5 Stars	0.42	0.26	0.23	0.19
	5.0 Stars	0.47	0.29	0.25	0.22
	5.5 Stars	0.52	0.32	0.28	0.24
	6.0 Stars	0.57	0.35	0.30	0.26
	7.0 Stars	0.65	0.39	0.35	0.29
	8.0 Stars	0.71	0.43	0.38	0.32
	9.0 Stars	0.77	0.47	0.41	0.35
	10.0 Stars	0.81	0.49	0.44	0.37
Evaporative cooler	EER above 14	n/a	0.55	n/a	0.38
	EER above 20	n/a	0.60	n/a	0.43
	EER above 30	n/a	0.64	n/a	0.46
	EER above 40	n/a	0.66	n/a	0.48

Table D4.2 – Heating Energy Savings Factor (MWh/kW)

Product category	Star Rating	BCA Climate Zones 2 & 3	BCA Climate Zone 4	BCA Climate Zones 5 & 6	BCA Climate Zones 7 & 8
Non ducted split systems – all types, <4kW, all phases	4.0 Stars	0.27	1.16	0.40	0.55
	4.5 Stars	0.29	1.25	0.44	0.83
	5.0 Stars	0.31	1.33	0.46	1.07
	5.5 Stars	0.32	1.40	0.49	1.29
	6.0 Stars	0.34	1.47	0.51	1.49
	7.0 Stars	0.37	1.58	0.55	1.84
	8.0 Stars	0.39	1.68	0.59	2.13
	9.0 Stars	0.41	1.76	0.62	2.38
	10.0 Stars	0.42	1.83	0.64	2.60
Non ducted split systems – all types 4kW to <10kW all phases	3.0 Stars	0.29	1.27	0.44	0.54
	3.5 Stars	0.32	1.38	0.48	0.89
	4.0 Stars	0.34	1.48	0.52	1.19
	4.5 Stars	0.36	1.57	0.55	1.47
	5.0 Stars	0.38	1.65	0.58	1.72
	5.5 Stars	0.40	1.73	0.60	1.94
	6.0 Stars	0.42	1.79	0.63	2.14
	7.0 Stars	0.44	1.91	0.67	2.48
	8.0 Stars	0.46	2.00	0.70	2.78
	9.0 Stars	0.48	2.09	0.73	3.03
	10.0 Stars	0.50	2.16	0.76	3.24
All configurations, all types, <65kW, all phases	2.5 Stars	0.31	1.32	0.46	0.50
	3.0 Stars	0.34	1.45	0.51	0.90
	3.5 Stars	0.36	1.57	0.55	1.25
	4.0 Stars	0.39	1.67	0.58	1.56
	4.5 Stars	0.41	1.76	0.62	1.83

	5.0 Stars	0.43	1.84	0.64	2.08
	5.5 Stars	0.44	1.91	0.67	2.30
	6.0 Stars	0.46	1.98	0.69	2.50
	7.0 Stars	0.49	2.09	0.73	2.85
	8.0 Stars	0.51	2.19	0.77	3.14
	9.0 Stars	0.53	2.27	0.80	3.39
	10.0 Stars	0.54	2.34	0.82	3.61

Persistence

Lifetime = 10 years.

Activity Definition D5

Name of Activity

REPLACE AN EXISTING POOL PUMP WITH A HIGH EFFICIENCY POOL PUMP

Eligibility Requirements

1. The existing pool pump must be in working order at time of replacement.

Equipment Requirements

1. The End-User Equipment must be a product for use with a domestic pool or spa that is a single phase, single speed, dual speed, multiple speed or variable speed pump unit with an input power of not less than 300W and not more than 2500W when tested in accordance with AS 5102.1–2009.
2. The End-User Equipment must be listed as part of a labelling scheme determined in accordance with the Equipment Energy Efficiency (E3) Committee's Voluntary Energy Rating Labelling Program for Swimming Pool Pump-units: Rules for Participation, April 2010, and achieves a minimum 6 star rating when determined in accordance with AS 5102.2–2009.
3. The unit must have a warranty of at least 5 years.

Implementation Requirements

1. The pool pump must be installed in line with relevant safety standards and legislation, and consider AS/NZS 3000:2007 where applicable.
2. The decommissioned pool pump must be removed in accordance to relevant safety standards and legislation.

Activity Energy Savings

Activity Energy Savings = Savings Factor

Where:

- *Savings Factor*, in MWh, is the value from Table D5.1 corresponding to the pool pump's flow rate (in L/min) and energy star rating

Table D5.1 – Savings Factor (MWh)

Energy Star Rating	Savings Factor (MWh) by pump flow rate		
	> 120 < 200 L/min	**≥ 200 < 280** L/min	**≥ 270 < 350** L/min
5.5	0.7	1.1	1.4
6	1.4	2.1	2.7
7	2.4	3.6	4.7
8	3.2	4.7	6.2
9	3.7	5.6	7.4
10	4.2	6.3	8.2

Persistence

Lifetime = 12 years.

Activity Definition D6

Name of Activity

INSTALL CEILING INSULATION IN AN UNINSULATED CEILING SPACE

Eligibility Requirements

1. There must be no existing roof or ceiling insulation present in the ceiling space.
2. 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.

Equipment Requirements

1. The insulation product used must comply with the performance requirements of AS/NZS 4859.1:2002.
2. The insulation product must achieve a minimum winter R-value, when measured in accordance with AS/NZS 4859.1:2002, of:
   a. R3.0 if the Site is in BCA Climate Zone 2 or 3;
   b. R3.5 if the Site is in BCA Climate Zone 4, 5 or 6;
   c. R5.0 if the Site is in BCA Climate Zone 7 or 8.
3. The insulation product must have a Warranty of at least 5 years.
4. Foil insulation products are not to eligible to be used in this activity.

Implementation Requirements

1. The insulation product used must be installed in compliance with Australian Standards AS 3999:1992 and the National Construction Code BCA Section J1.
2. Installers are required to have completed training courses CPCCOHS1001A; CPCCCM2010A; CPCCOHS2001A; CPCCPB3027A; and other training requirements as Published by the Scheme Administrator.
3. Insulation must only be installed in ceiling spaces with an exposed roof.
4. Insulation must not be installed above garages, sheds or other non-inhabitable areas of the property.
5. Insulation must be installed in at least 95% of the ceiling area able to have insulation installed.
6. Cut outs around ceiling penetrations such as downlights must be kept to the minimum permitted by regulation.

Activity Energy Savings

Activity Energy Savings = Savings Factor x Insulation Area

Where:

- *Savings Factor*, in MWh/m^2, is the value from Table D6.1 corresponding to the Site's building construction and location; and
- *Insulation Area*, in m^2, is the total ceiling area that has had insulation product installed.

Table D6.1 – Savings Factor (MWh per m^2 of insulation)

Main external wall construction	BCA Climate Zones 2 and 3 Minimum R3.0	BCA Climate Zones 4 Minimum R3.5	BCA Climate Zones 5 and 6 Minimum R3.5	BCA Climate Zones 7 and 8 Minimum R5.0
Double brick wall construction	0.157	0.296	0.198	0.477
Lightweight wall construction	0.194	0.351	0.220	0.505
Brick veneer wall construction	0.169	0.336	0.201	0.515
Apartment	n/a	n/a	n/a	n/a

Persistence

Lifetime = 25 years.

Activity Definition D7

Name of Activity

INSTALL CEILING INSULATION IN AN UNDER-INSULATED CEILING SPACE

Eligibility Requirements

1. There must be no existing roof or ceiling insulation present in the ceiling space.
2. 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.
3. The R-value of existing roof or ceiling insulation must be below 3.5 when measured in accordance with AS/NZS 4859.1:2002.

Equipment Requirements

1. The insulation product used must comply with the performance requirements of AS/NZS 4859.1:2002.
2. The insulation product must achieve a minimum winter R-value, when measured in accordance with AS/NZS 4859.1:2002, of:
   a. R3.0 if the Site is in BCA Climate Zone 2 or 3;
   b. R3.5 if the Site is in BCA Climate Zone 4, 5 or 6;
   c. R5.0 if the Site is in BCA Climate Zone 7 or 8.
3. The insulation product must have a Warranty of at least 5 years.
4. Foil insulation products are not to eligible to be used in this activity.

Implementation Requirements

1. The insulation product used must be installed in compliance with Australian Standards AS 3999:1992 and the National Construction Code BCA Section J1.
2. Installers are required to have completed training courses CPCCOHS1001A; CPCCCM2010A; CPCCOHS2001A; CPCCPB3027A; and other training requirements as Published by the Scheme Administrator.
3. Insulation must only be installed in ceiling spaces with an exposed roof.
4. Insulation must not be installed above garages, sheds or other non-inhabitable areas of the property.
5. Insulation must be installed in at least 95% of the ceiling area able to have insulation installed.
6. Cut outs around ceiling penetrations such as downlights must be kept to the minimum permitted by regulation.

Activity Energy Savings

Activity Energy Savings = Savings Factor x Insulation Area

Where:

- *Savings Factor*, in MWh/m^2, is the value from Table D7.1 corresponding to the Site's building construction and location; and
- *Insulation Area*, in m^2, is the total ceiling area that has had insulation product installed.

Table D7.1 – Savings Factor (MWh per m^2 of insulation)

Main external wall construction	BCA Climate Zones 2 and 3	BCA Climate Zones 4	BCA Climate Zones 5 and 6	BCA Climate Zones 7 and 8
Double brick wall construction	0.015	0.030	0.019	0.049
Lightweight wall construction	0.019	0.034	0.021	0.049
Brick veneer wall construction	0.015	0.034	0.018	0.052
Apartment	n/a	n/a	n/a	n/a

Persistence

Lifetime = 25 years.

Activity Definition D8

Name of Activity

INSTALL UNDER-FLOOR INSULATION

Eligibility Requirements

1. There must be no existing ground floor insulation present.
2. The dwelling must have a suspended timber floor.

Equipment Requirements

1. The insulation product used must comply with the performance requirements of AS/NZS 4859.1:2002 and achieve a minimum winter R-value of R2.5 when measured in accordance with AS/NZS 4859.1:2002.
2. The insulation product must have a Warranty of at least 5 years.
3. Foil insulation products are not to eligible to be used in this activity.

Implementation Requirements

1. The Activity is restricted to ground floor suspended timber floor spaces.
2. Installers are required to have completed training courses CPCCOHS1001A; CPCCCM2010A; CPCCOHS2001A; CPCCPB3014A; and other training requirements as Published by the Scheme Administrator.
3. The insulation product must be installed in accordance with AS 3999:1992 and the National Construction Code BCA Section J1.
4. Insulation must be installed in at least 95% of the ground floor area able to have insulation insulated.
5. Insulation may only be applied to areas that have not been previously insulated.

Activity Energy Savings

Activity Energy Savings = Savings Factor x Insulation Area

Where:

- *Savings Factor*, in MWh/m^2, is the value from Table D8.1 corresponding to the Site's building construction and location; and
- *Insulation Area*, in m^2, is the total ceiling area that has had insulation product installed.

Table D8.1 – Savings Factor (MWh per m^2 of insulation) – installation of under floor insulation

Main external wall construction	BCA Climate Zones 2 and 3	BCA Climate Zones 4	BCA Climate Zones 5 and 6	BCA Climate Zones 7 and 8
Double brick wall construction	n/a	0.020	0.009	0.048
Lightweight wall construction	n/a	0.032	0.015	0.069
Brick veneer wall construction	n/a	0.020	0.009	0.048
Apartment	n/a	n/a	n/a	n/a

Persistence

Lifetime = 25 years.

Activity Definition D9

Name of Activity

INSTALL WALL INSULATION

Eligibility Requirements

1. There must be no existing wall insulation present.
2. For the purposes of this Activity, wall cavities that contain reflective foil sarking only shall be deemed to be uninsulated spaces.

Equipment Requirements

1. The insulation product used must comply with the performance requirements of AS/NZS 4859.1:2002 and achieve a minimum winter R-value of 2.0 when measured in accordance with AS/NZS 4859.1:2002.
2. The insulation product used must have a Warranty of at least 5 years.
3. Foil insulation products are not eligible to be used in this activity.

Implementation Requirements

1. The insulation product used must be installed in accordance with AS 3999:1992 and the National Construction Code BCA Section J1.
2. Installers are required to have completed training courses CPCCOHS1001A; CPCCCM2010A; CPCCOHS2001A; CPCCPB3014A; and other training requirements as Published by the Scheme Administrator.
3. The insulation product must be installed in an external wall space (or part of an external wall space) but not in any common walls (as defined by the National Construction Code).
4. Insulation must be installed in at least 95% of the wall area able to have insulation installed.

Activity Energy Savings

Activity Energy Savings = Savings Factor x Insulation Area

Where:

- *Savings Factor*, in MWh/m^2, is the value from Table D9.1 corresponding to the Site's building construction and location; and
- *Insulation Area*, in m^2, is the total ceiling area that has had insulation product installed.

Table D9.1 – Savings Factor (MWh per m^2 of insulation) - installation of wall insulation

Main external wall construction	BCA Climate Zones 2 and 3	BCA Climate Zones 4	BCA Climate Zones 5 and 6	BCA Climate Zones 7 and 8
Double brick wall construction	0.057	0.113	0.067	0.186
Lightweight wall construction	0.117	0.218	0.121	0.310
Brick veneer wall construction	0.046	0.118	0.059	0.192
Apartment	0.052	0.132	0.068	0.221

Persistence

Lifetime = 25 years.

Schedule E – Activity Definitions for Low Cost Activities for Home Energy Efficiency Retrofits (clause 9.8)

Activity Definition E1

Name of Activity

REPLACE HALOGEN DOWNLIGHT WITH EFFICIENT LUMINAIRE AND/OR LAMP

Eligibility Requirements

1. There must be an existing Lamp that is a halogen downlight.
2. The existing Lamp must be either ELV or 240V.
3. The existing Lamp must be rated at either 35W or 50W.
4. The existing Lamp and Luminaire must be in working order.

Equipment Requirements

1. All LED Lamps must meet the Equipment Requirements for LED Lamps in Table A9.1 of Schedule A.
2. The new Luminaire and Lamp must have an initial Downward Light Output of ≥500 lumens.
3. CFLs must have a Lamp Life of at least 10,000 hours when measured in accordance with Table A9.3 of Schedule A.

Implementation Requirements

1. The activity must be performed or supervised by a licensed electrician.
2. May be carried out in combination with a transformer replacement (Activity E5).

Activity Energy Savings

Activity Energy Savings = Savings Factor

Where:

- *Savings Factor*, in MWh, is the value from Table E1.1 corresponding to the lighting retrofit activity and the Lamp Circuit Power of the replacement lamp being installed (in Watts)

Table E1.1 Savings Factors (MWh) – halogen downlight replacements

Existing Lamp and/or Luminaire	New Lamp and/or Luminaire	New Lamp Circuit Power (Watts)					
		≤10	≤15	≤20	≤25	≤30	≤35
50W ELV Halogen Lamp	ELV LED Lamp or CFL	0.34	0.29	0.24	0.19	0.14	0.09
50W ELV Halogen Lamp and Luminaire	LED Lamp or CFL and Luminaire	0.34	0.29	0.24	0.19	0.14	0.09
35W ELV Halogen Lamp	ELV LED Lamp or CFL	0.29	0.24	0.19	0.14	0.09	
35W ELV Halogen Lamp and Luminaire	LED Lamp or CFL and Luminaire	0.29	0.24	0.19	0.14	0.09	
50W 240V Halogen Reflector Lamp	240V LED Lamp or CFL	0.40	0.35	0.30	0.25	0.20	0.15
50W 240V Halogen Reflector Lamp and Luminaire	240V LED Lamp or CFL and Luminaire	0.40	0.35	0.30	0.25	0.20	0.15

Persistence

Lifetime = 10 years.

Activity Definition E2

Name of Activity

REPLACE A LINEAR HALOGEN FLOODLIGHT WITH A HIGH EFFICIENCY LAMP

Eligibility Requirements

1. The existing Lamp must be an existing linear halogen floodlight.
2. The existing Lamp must be rated at more than 100W.
3. Existing equipment must be in working order at time of replacement.

Equipment Requirements

1. All LED Lamps must meet the Equipment Requirements for LED Lamps in Table A9.1 of Schedule A.
2. CFLs must have a Lamp Life of at least 10,000 hours when measured in accordance with Table A9.3 of Schedule A.
3. Lamp Circuit Power will be measured in accordance with Table A9.2 of Schedule A.

Implementation Requirements

1. The activity must be performed or supervised by a licensed electrician.

Activity Energy Savings

Activity Energy Savings = Savings Factor

Where:

- *Savings Factor*, in MWh, is the value from Table E2.1 corresponding to the Lamp Circuit Power of the existing lamp and the replacement lamp being installed (in Watts).

Table E2.1 – Savings Factors (MWh) – linear halogen floodlight replacements

Lamp Circuit Power of existing Lamp	**Lamp Circuit Power of replacement Lamp (W)**				
	≤30 W	**≤45 W**	**≤60 W**	**≤90 W**	**≤150 W**
100W ≤ LCP < 150W	0.26				
150W ≤ LCP < 200W		0.38			
200W ≤ LCP < 300W			0.51		
300W ≤ LCP < 500W				0.77	
500W ≤ LCP					1.28

Persistence

Lifetime = 10 years.

Activity Definition E3

Name of Activity

REPLACE PARABOLIC ALUMINIZED REFLECTOR (PAR) LAMP WITH EFFICIENT LUMINAIRE AND/OR LAMP

Eligibility Requirements

1. There must be an existing PAR Lamp.
2. The existing Lamp must be rated at between 80W and 150W.
3. Existing lighting equipment must be in working order at time of replacement.

Equipment Requirements

1. All LED Lamps must meet the definitions and testing requirements for 'LED Lamps and other emerging Lighting Technologies' in Table A9 of Schedule A.
2. CFL Lamps must demonstrate proof of product lifetime in excess of 10,000 hours.

Implementation Requirements

1. The activity must be performed or supervised by a licensed electrician.

Activity Energy Savings

Activity Energy Savings = Savings Factor

Where:

- *Savings Factor*, in MWh, is the value from Table E3.1 corresponding to the lighting retrofit activity and the Lamp Circuit Power of the replacement lamp being installed (in Watts)

Table E3.1 Savings Factors (MWh) – PAR lamp replacements

		Lamp Circuit Power of the replacement lamp (Watts)					
Existing Lamp and/or Luminaire	**New Lamp and/or Luminaire**	**≤15 W**	**≤20 W**	**≤25 W**	**≤30 W**	**≤35 W**	**≤40W**
80-150W 240V PAR Lamp	240V LED or CFL reflector Lamp	0.24	0.22	0.20	0.18	0.16	0.15

Persistence

Lifetime = 10 years.

Activity Definition E4

Name of Activity

REPLACE A T8 OR T12 LUMINAIRE AND LAMP WITH A T5 LUMINAIRE AND LAMP

Eligibility Requirements

1. Must be an existing 2 foot or 4 foot T8 or T12 Luminaire and Lamp.
2. Existing lighting equipment must be in working order at time of replacement.

Equipment Requirements

1. New Lamp must be a T5 linear fluorescent Lamp.
2. New Luminaire must be designed for a T5 Lamp.
3. Lamp Life must be at least 20,000 hours when measured in accordance with Table A9.3.

Implementation Requirements

1. The activity must be performed or supervised by a licensed electrician.

Activity Energy Savings

Activity Energy Savings = Savings Factor

Where:

- *Savings Factor*, in MWh, is the value from Table E4.1 corresponding to the lighting retrofit activity and the Lamp Life of the replacement lamp being installed (in hours).

Table E4.1 – Savings Factors (MWh) – T8 or T12 to T5 replacements

Luminaire and lamp size	**Savings Factor (MWh)**
4-foot Luminaire and Lamp	0.14
2-foot Luminaire and Lamp	0.10

Persistence

Lifetime = 10 years.

Activity Definition E5

Name of Activity

REPLACE A T8 OR T12 LUMINAIRE AND LAMP WITH A LINEAR LED LAMP AND LUMINAIRE

Eligibility Requirements

1. Must be an existing 2 foot, 3 foot, 4 foot or 5 foot T8 or T12 Luminaire and Lamp.
2. Existing lighting equipment must be in working order at time of replacement.

Equipment Requirements

1. New Luminaire and Lamp must either be:
    a. a linear Luminaire integrated with LEDs; or
    b. a Linear LED Lamp and a Luminaire designed for a Linear LED Lamp.
2. Luminaire and Lamp must meet or exceed the corresponding minimum Light Output from Table E5.1.
3. Lamp Life must be at least 20,000 hours when measured in accordance with Table A9.3.

Table E5.1 – Minimum Light Output

Lamp type	**Minimum Light Output**
2 foot (600mm)	800 lumens
3 foot (900mm)	1200 lumens
4 foot (1200mm)	1600 lumens
5 foot (1500mm)	2000 lumens

Implementation Requirements

1. The activity must be performed or supervised by a licensed electrician.

Activity Energy Savings

Activity Energy Savings = Savings Factor x Number of Lamps

Where:

- *Savings Factor*, in MWh, is the value from Table E5.2 corresponding to the Lamp's initial luminous efficacy for each Lamp in the replacement Luminaire.

Table E5.2 – Savings Factors (MWh)

Lamp type	**Lamp Luminous Efficacy (lumens/Watt)**		
	> 60 lm/W	> **80 lm/W**	**>100 lm/W**
2 foot (600mm)	0.08	0.12	0.14
3 foot (900mm)	0.13	0.18	0.21
4 foot (1200mm)	0.17	0.24	0.28
5 foot (1500mm)		0.30	0.35

Persistence

Lifetime = 10 years.

Activity Definition E6

Name of Activity

REPLACE A CIRCULAR FLUORESCENT LAMP AND LUMINAIRE WITH A CIRCULAR LED LAMP AND LUMINAIRE

Eligibility Requirements

1. Existing lighting equipment must be a circular fluorescent Luminaire and Lamp.
2. Existing lighting equipment must be in working order at time of replacement.

Equipment Requirements

1. New Luminaire and Lamp must either be:
    a. a circular Luminaire integrated with LEDs; or
    b. a circular LED Lamp and a Luminaire designed for a circular LED Lamp.
2. Lamp and Luminaire must have a light output of at least 1000 lumens.
3. Lamp Life must be at least 20,000 hours when measured in accordance with Table A9.3.

Implementation Requirements

1. The activity must be performed or supervised by a licensed electrician.

Activity Energy Savings

Activity Energy Savings = Savings Factor

Where:

- *Savings Factor*, in MWh, is the value from Table E6.1 corresponding to the lighting retrofit activity and the Lamp Life of the replacement lamp being installed (in hours).

Table E6.1 – Savings Factors (MWh)

Lamp type	**Lamp Luminous Efficacy (lumens/Watt)**		
	> 60 lm/W	**> 80 lm/W**	**>100 lm/W**
Circular LED Lamp and Luminaire	0.08	0.12	0.14

Persistence

Lifetime = 10 years.

Activity Definition E7

Name of Activity

REPLACE MAGNETIC TRANSFORMER WITH ELECTRONIC TRANSFORMER

Eligibility Requirements

1. Existing End-User Equipment to be replaced must be a Magnetic Transformer.
2. Existing lighting equipment must be in working order.

Equipment Requirements

1. New End-User Equipment must be an Electronic Transformer.
2. The Electronic Transformer must be registered in the GEMS Registry, and tested against AS/NZS 4879.2.
3. The efficiency of the Electronic Transformer must be greater than or equal to 91% when tested against AS/NZS 4879.2 and as recorded in the GEMS Registry.

Implementation Requirements

1. The activity must be performed or supervised by a licensed electrician.
2. May be carried out in combination with a Lamp replacement activity for the same Luminaire.

Activity Energy Savings

Activity Energy Savings = 0.06 MWh

Persistence

Lifetime = 10 years.

Activity Definition E8

Name of Activity

REPLACE MAGNETIC BALLAST WITH ELECTRONIC BALLAST

Eligibility Requirements

1. Existing End-User Equipment to be replaced must be magnetic ballast.
2. Magnetic ballast must be connected to a circular fluorescent Lamp or CFL Lamp with non-integrated ballast.
3. Existing lighting equipment must be in working order.

Equipment Requirements

1. New End-User Equipment must be electronic ballast with a Ballast EEI of A1, A2 or A3 when tested against AS/NZS 4783.1.

Implementation Requirements

1. Evidence of the original equipment being replaced and the newly installed equipment must be collected and retained by the ACP.
2. The activity must be performed or supervised by a licensed electrician.

Activity Energy Savings

Activity Energy Savings = 0.07 MWh

Persistence

Lifetime = 10 years.

Activity Definition E9

Name of Activity

REPLACE AN EXISTING SHOWERHEAD WITH AN ULTRA LOW FLOW SHOWERHEAD

Eligibility Requirements

1. The hot water service supplying the shower must be provided by an electric resistance water heater, an electrically boosted solar water heater or an electric heat pump water heater.
2. There must be an existing showerhead on each shower.

Equipment Requirements

1. The End-User Equipment must be a showerhead as defined in *AS/NZS 3662:2005 – Performance of showers for bathing*.
2. The showerhead must be assigned a minimum 3 Star WELS Rating with a nominal flow rate of ≤ 6 litres/minute when tested according to *AS/NZS 6400:2005 – Water efficient products*.
3. The showerhead must have a warranty of at least 2 years.

Implementation Requirements

1. The replacement of the showerhead must be performed or supervised by a licensed plumber, as required by law.
2. A maximum of one showerhead per shower can be replaced.

Activity Energy Savings

Activity Energy Savings = Savings Factor x $N_{showerheads}$

Where:

- *Savings Factor*, in MWh per showerhead, is the value from Table E9.1 corresponding to the type of water heating system servicing the shower; and
- $N_{showerheads}$ is the number of showerheads replaced.

Table E9.1 – Savings Factor (MWh per showerhead)

Type of water heating system	Savings Factor (MWh)
Electric resistance water heater	1.9
Electrically boosted solar water heater	1.1
Electric heat pump water heater	1.1

Persistence

Lifetime = 7 years.

RS18	all	29.92
RS19	all	29.57
HC1	M1	7.86
HC1	M2	8.50
HC4	M1	10.47
HC4	M2	11.40
HF4	L1	19.50
HF4	L2	19.50
HF6	L1	5.90
HF6	L2	5.46
VC1	M1	24.24
VC1	M2	14.22
VC2	M1	15.97
VC2	M2	14.72
VC4 (a) - Solid Door	M1	5.37
VC4 (a) - Solid Door	M2	7.30
VC4 (b) - Glass Door	M1	8.37
VC4 (b) - Glass Door	M2	9.70
VF4 (b) - Solid Door	L1	32.40
VF4 (b) - Solid Door	L2	28.70
VF4 (b) - Glass Door	L1	23.94
VF4 (b) - Glass Door	L2	28.70

Persistence

The Energy Savings from the installation of a new Refrigerated Display Cabinet are assumed to persist at a constant level for the expected lifetime of the RDC. The Lifetime, in years, is the figure corresponding to the display type and temperature class in Table F1.2 below.

Table F1.2

Refrigerated Display Cabinet Type	Temperature class	Lifetime (years)
all	all	8

Activity Definition F2

Name of Activity

INSTALL A NEW HIGH EFFICIENCY LIQUID CHILLING PACKAGE

Equipment Requirements

1. The End-User Equipment must be a Liquid Chilling Package (LCP) that meets minimum energy performance standards (MEPS) in accordance with AS/NZS4776.2:2008, when tested in accordance with AS/NZS 4776.1.1:2008 and AS/NZS 4776.1.2:2008
2. The LCP must be a registered product under GEMS and comply with the Greenhouse and Energy Minimum Standards (Liquid-chilling Packages Using the Vapour Compression Cycle) Determination 2012
3. The LCP must have an IPLV at least 10% greater than the *Baseline* for the corresponding figure for the type and cooling capacity in Table F2.1

Installation Requirements

1. The LCP must be installed.

Equipment Energy savings

Equipment Energy Savings = (Capacity ÷ Baseline - Capacity ÷ IPLV) x EFLH x Lifetime / 1000

Where:

- *Capacity*, in kWR, is the total rated cooling capacity of the new Liquid Chilling Package as determined using AS/NZS 4776 Series of Standards and recorded in the GEMS Registry.
- *Baseline* is the corresponding figure for the cooling capacity class and type of the new Liquid Chilling Package as determined by AS/NZS 4776 Series of Standards in Table F2.1 below. The *Baseline* has been determined using the lower value of either the minimum standard using AS/NZS 4776 or the average efficiency of registered products on the GEMS Register.
- IPLV is the Integrated Part Load Value of the new Liquid Chilling Package as determined using AS/NZS 4776 and recorded in the GEMS Registry
- *EFLH* is the Equivalent Full Load Hours and is the corresponding figure for the cooling capacity class and type of the new Liquid Chilling Package. The EFLH has been estimated using the low estimate of operating hours in the *Decision Regulation Impact Statement: Minimum Energy Performance Standards and Alternative Strategies for Chillers, July 2008.*
- *Lifetime*, in years, is the corresponding figure for the cooling capacity class and type of the new Liquid Chilling Package as determined by AS/NZS 4776 in the Table F2.2 below.

Table F2.1

LCP type	Cooling capacity	Baseline (IPLV)	EFLH (hours)
Air cooled	350 to 499 kWR	4.6	1200
Air cooled	500 to 699 kWR	4.7	1200
Air cooled	700 to 999 kWR	4.7	1200
Air cooled	1000 to 1499 kWR	4.5	1200
Air cooled	Greater than 1500 kWR	4.1	1200
Water cooled	350 to 499 kWR	9.0	1200
Water cooled	500 to 699 kWR	8.6	1200
Water cooled	700 to 999 kWR	9.7	1200
Water cooled	1000 to 1499 kWR	9.0	1200
Water cooled	Greater than 1500 kWR	9.9	1200

Persistence

The Energy Savings from the installation of a new Liquid Chilling Package are assumed to persist at a constant level for the expected lifetime of the LCP. The Lifetime, in years, is the figure corresponding to the type and capacity class in Table F2.2.

Table F2.2

LCP Type	Capacity class	Lifetime (years)
all	all	10

Activity Definition F3

Name of Activity

INSTALL A NEW HIGH EFFICIENCY CLOSE CONTROL AIR CONDITIONER

Equipment Requirements

1. The End-User Equipment must be a Close Control Air Conditioner (CCAC) that meets minimum energy performance standards (MEPS) in accordance with AS/NZS4965.2:2008, when tested in accordance with AS/NZS 4965.1:2008
2. The CCAC must be a registered product under GEMS and comply with the Greenhouse and Energy Minimum Standards (Close Control Air Conditioner) Determination 2012
3. The CCAC must have an EER at least 20% greater than the *Baseline* for the corresponding figure for the type and cooling capacity in Table F3.1

Installation Requirements

1. The CCAC must be installed.

Equipment Energy savings

Equipment Energy Savings = (Capacity ÷ Baseline - Capacity ÷ EER) x Hours x Lifetime / 1000

Where:

- *Capacity*, in kW, is the total cooling capacity of the new CCAC as determined using AS/NZS 4965.1:2008 and recorded in the GEMS Registry.
- *Baseline* is the corresponding figure for the cooling capacity class of the new CCAC as determined by AS/NZS 4965.1:2008 in Table F3.1 below. The *Baseline* has been determined using the lower value of either the minimum standard using AS/NZS 4965.2:2008 or the average efficiency of registered products on the GEMS registered products for sale in Australia.
- *EER* is the Energy Efficiency Ratio as determined using AS/NZS 4965.1:2008 and recorded in the GEMS Registry.
- *Hours* is the annual operating hours corresponding figure for the cooling capacity class of the new CCAC. The *Hours* has been estimated using the estimate of operating hours in the *Decision Regulation Impact Statement: Minimum Energy Performance Standards and Alternative Strategies for Close Control Air Conditioners, December 2008.*
- *Lifetime*, in years, is the corresponding figure for the cooling capacity class of the new CCAC as determined by AS/NZS 4965.1:2008 in Table F3.2 below.

Table F3.1

CCAC cooling capacity class	Baseline (EER)	Hours (hours p.a.)
Less than 19.05 kW	3.21	5694
19.05 to 39.5 kW	3.18	5694
39.5 to 70.0 kW	3.20	5694
Greater than 70.0 kW	3.18	5694

Persistence

The Energy Savings from the installation of a new CCAC are assumed to persist at a constant level for the expected lifetime of the CCAC. The Lifetime, in years, is the figure corresponding to the type and capacity class in Table F3.2 below.

Table F3.2

CCAC capacity class	Capacity class	Lifetime (years)
all	all	10

Activity Definition F4

Name of Activity

INSTALL A NEW HIGH EFFICIENCY AIR CONDITIONER

Equipment Requirements

1. The End-User Equipment must be an Air to Air Heat Pump or Air Conditioner (AC) as defined in AS/NZS 3823.1.1:2012, AS/NZS 3823.1.2:2012, or AS/NZS 3823.1.4:2012.
2. The AC must be a registered product under GEMS and comply with the Greenhouse and Energy Minimum Standards (Air to Air Heat Pump or Air Conditioner) Determination 2012
3. The AC must have an AEER at least 20% greater than the *Baseline Cooling AEER* for the corresponding figure for the type and cooling capacity in Table F4.1.
4. If the AC has a Heating Capacity registered in the GEMS Registry, the AC must have an AEER at least 20% greater than the *Baseline Heating AEER* for the corresponding figure for the type and heating capacity in Table F4.2.

Installation Requirements

1. The AC must not be installed in a Residential Building, Small Business Building or Non Habitable Building.

Equipment Energy savings

Equation F4.1

Equipment Energy Savings = Cooling Energy Savings + Heating Energy Savings

Where:

- *Cooling Energy Savings Capacity*, in MWh, is the lifetime energy savings in cooling mode, as calculated in Equation F4.2 below; and
- *Heating Energy Savings Capacity*, in MWh, is the lifetime energy savings in heating mode:
  - as calculated in Equation F4.3 below; or
  - is 0 MWh if the AC does not have a Heating Capacity registered in the GEMS Registry.

Equation F4.2

Cooling Energy Savings = (Cooling Capacity ÷ Baseline Cooling AEER – Cooling Capacity ÷ AEER) x Cooling Hours x Lifetime / 1000

Where:

- *Cooling Capacity*, in kW, is the total cooling capacity of the new AC as determined using AS/NZS 3823.1.1:2012, AS/NZS 3823.1.2:2012, or AS/NZS 3823.1.4:2012 and recorded in the GEMS Registry;
- *Baseline Cooling AEER* is the corresponding figure for the cooling capacity of the new AC as determined by AS/NZS 3823.1.1:2012, AS/NZS 3823.1.2:2012, or AS/NZS 3823.1.4:2012 in Table F4.1 or F4.2 below. The *Baseline Cooling AEER* has been determined using the lower value of either the minimum standard using AS/NZS 3823.2:2013 or the average efficiency of GEMS registered products for sale in Australia.
- *AEER* is the Annual Energy Efficiency Ratio for cooling as determined using AS/NZS 3823.1.1:2012, AS/NZS 3823.1.2:2012, or AS/NZS 3823.1.4:2012 and recorded in the GEMS Registry
- *Cooling Hours*, in hours per annum, is the annual operating hours and is the corresponding figure for the cooling capacity of the new AC. *Cooling Hours* has been estimated using the estimate of operating hours in the *Decision Regulation Impact Statement: Minimum Energy Performance Standards for Air Conditioners, December 2010.*
- *Lifetime*, in years, is the corresponding figure for the Cooling Capacity of the new AC as determined by AS/NZS 3823.1.1:2012, AS/NZS 3823.1.2:2012, or AS/NZS 3823.1.4:2012 in Table F4.3 below.

Table F4.1

AC type	Cooling Capacity (kW)	Baseline Cooling AEER	Cooling Hours (hours p.a.)
Non ducted unitary	Less than 10kW	3.2	175
Non ducted unitary	10kW to <19kW	3.1	175
Non ducted split systems	Less than 4kW	3.7	175
Non ducted split systems	4kW to 10kW	3.2	175
Non ducted split systems	10kW to 19kW	3.1	175
Ducted systems	Less than 10kW	3.1	175

Ducted systems,	10kW to 19kW	3.1	175
All configurations,	19kW to 39kW	3.1	175
All configurations	39kW to 65kW	3.0	175

Equation F4.3

Heating Energy Savings = (Heating Capacity ÷ Baseline Heating AEER – Heating Capacity ÷ AEER) x Heating Hours x Lifetime / 1000

Where:

- *Heating Capacity*, in kW, is the total heating capacity of the new AC as determined using AS/NZS 3823.1.1:2012, AS/NZS 3823.1.2:2012, or AS/NZS 3823.1.4:2012 and recorded in the GEMS Registry;
- *Baseline Heating AEER* is the corresponding figure for the heating capacity of the new AC as determined by AS/NZS 3823.1.1:2012, AS/NZS 3823.1.2:2012, or AS/NZS 3823.1.4:2012 in Table F4.1 or F4.2 below. The *Baseline Heating AEER* has been determined using the lower value of either the minimum standard using AS/NZS 3823.2:2013 or the average efficiency of GEMS registered products for sale in Australia.
- *AEER* is the Annual Energy Efficiency Ratio for heating as determined using AS/NZS 3823.1.1:2012, AS/NZS 3823.1.2:2012, or AS/NZS 3823.1.4:2012 and recorded in the GEMS Registry
- *Heating Hours*, in hours per annum, is the annual operating hours and is the corresponding figure for the heating capacity of the new AC. *Heating Hours* has been estimated using the estimate of operating hours in the *Decision Regulation Impact Statement: Minimum Energy Performance Standards for Air Conditioners, December 2010.*
- *Lifetime*, in years, is the corresponding figure for the Heating Capacity of the new AC as determined by AS/NZS 3823.1.1:2012, AS/NZS 3823.1.2:2012, or AS/NZS 3823.1.4:2012 in Table F4.3 below.

Table F4.2

AC type	Heating Capacity (kW)	Baseline Heating AEER	Heating Hours (hours p.a.)
Non ducted unitary	Less than 10kW	3.2	88
Non ducted unitary	10kW to <19kW	3.1	88
Non ducted split systems	Less than 4kW	3.7	88
Non ducted split systems	4kW to 10kW	3.2	88
Non ducted split systems	10kW to 19kW	3.1	88
Ducted systems	Less than 10kW	3.1	88
Ducted systems,	10kW to 19kW	3.1	88
All configurations,	19kW to 39kW	3.1	88
All configurations	39kW to 65kW	3.0	88

Persistence

The Energy Savings from the installation of a new AC are assumed to persist at a constant level for the expected lifetime of the AC. The Lifetime, in years, is the figure corresponding to the phase and capacity class in Table F4.3 below.

Table F4.3

Phase	Cooling Capacity or Heating Capacity	Lifetime (years)
all	all	10