



ENERGY EFFICIENCY IMPROVEMENT SCHEME

STAKEHOLDER CONSULTATION REPORT ON
PROPOSED NEW BUSINESS HEATING AND
COOLING ACTIVITIES

AUGUST 2018

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EXECUTIVE SUMMARY

As part of the ongoing process of strengthening the ACT Energy Efficiency Improvement Scheme (EEIS), the ACT Government is proposing to continue expanding the range of [eligible EEIS activities](#). EEIS has previously undertaken stakeholder consultation inviting suggestions for new activities in [2015](#), [2016](#) and [2017](#). This report responds to stakeholder requests for new deemed¹ heating, cooling, ventilation and air conditioning (HVAC) activities in the business sector (See Figure 1), with the following four proposed additions for inclusion in EEIS namely:

- replacing inefficient central spacing heating for business applications²
- replacing inefficient room space heating for business applications³
- replace a central heating and cooling system in a business premises and
- replace a room heating and cooling system in a business premises.

This is a first step. EEIS is interested in your review of these initial deemed business HVAC activities and your ideas of how EEIS could best complement these with additional business HVAC activities.

The consultation paper then explores options to incorporate ‘demand response’ within existing and proposed high efficiency ‘heat pump’ heating and heating and cooling upgrade activities for residential and business premises.

Each section proposes activities and includes [key questions for feedback](#) which will inform the final activity proposal. Please contact the EEIS team at epd-eeis@act.gov.au for more information or updates about proposed new activities.

Other work is underway to develop insulation activities.

Together, these two initiatives address the two highest ranking recommendations for new activities (see Figure 1).

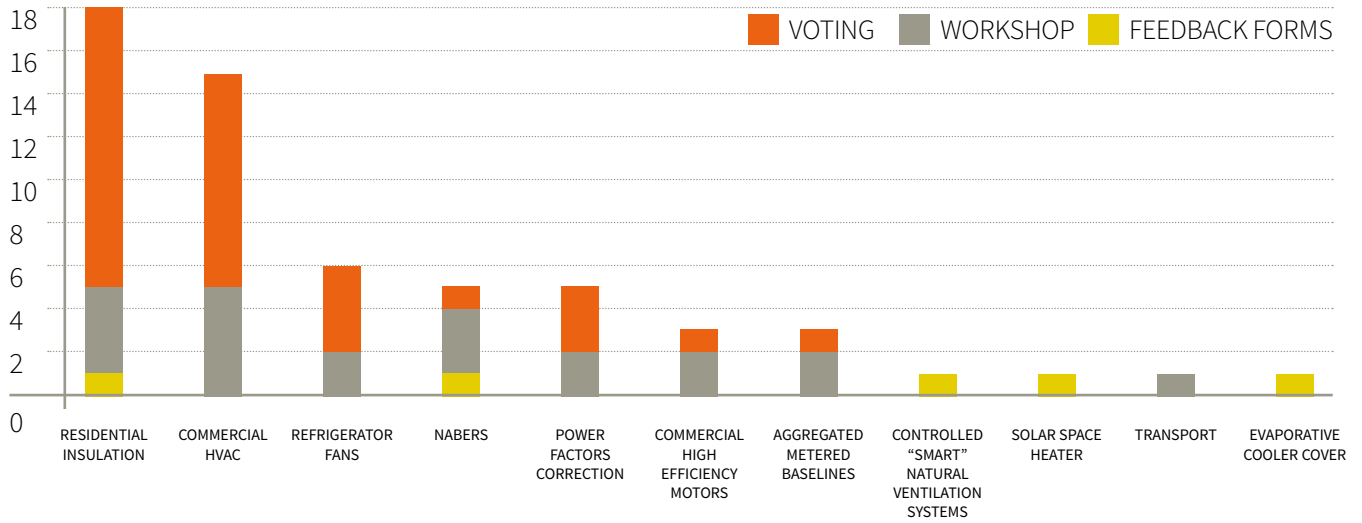
1 Deemed activities are assumed to create a certain amount of energy and emission savings, based on justifications and calculations established when they are approved. They contrast with flexible methods in which savings are calculated on a case by case basis.

2 This is a new element within the existing residential activity 2.1

3 This is a new element within the existing residential activity 2.3

The ACT Government is also continuing to explore other activities including potential integrated methods with the NSW Energy Savings Scheme. This may include business lighting upgrades, Project Impact Assessment with Measurement and Verification (PIAM&V) or other activities as outlined in the 2016 EEIS stakeholder consultation update.⁴

Figure 1: Stakeholder forum (2016) recommendations for new EEIS activities



4 EEIS 2016 Stakeholder Forum - Consultation Update http://www.environment.act.gov.au/__data/assets/pdf_file/0008/857789/ACT-EEIS-Stakeholder-Consultation-on-2016-activities-update-report-2.pdf

BACKGROUND TO THE ENERGY EFFICIENCY IMPROVEMENT SCHEME

The *Energy Efficiency (Cost of Living) Improvement Act 2012* (the Act) establishes the [Energy Efficiency Improvement Scheme \(EEIS\)](#). EEIS commenced in 2013 and requires energy retailers in the ACT to invest in activities that help ACT energy customers save energy. The objects of the Act are to:

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

The Act is supported by legislative instruments establishing Eligible Activities, Energy Savings Targets, Energy Savings Contributions and comprehensive codes of practice for delivering activities and keeping records.

The EEIS commenced in 2013 and, following a legislated review in 2014, was extended until 2020. Further information and background about the EEIS is covered on the EEIS web site.⁵

The EEIS currently offers 23 energy efficiency activities⁶ including building sealing, residential space heating and cooling, hot water service, lighting and appliance activities. This consultation report builds upon these existing activities by proposing new EEIS activities and poses key questions for feedback via an online survey.⁷

5 https://www.environment.act.gov.au/energy/smarter-use-of-energy/energy_efficiency_improvement_scheme_eeis

6 http://www.environment.act.gov.au/energy/smarter-use-of-energy/energy_efficiency_improvement_scheme_eeis/how-the-scheme-works/eeis-activities

7 <https://www.surveymonkey.com/r/CPHPK5J>

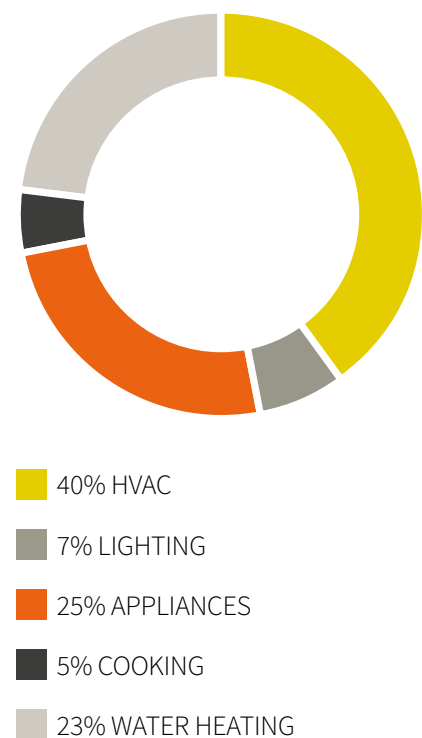
DEEMED EEIS BUSINESS HVAC ACTIVITIES

INTRODUCTION AND RATIONALE

Although energy use is highly variable across the commercial building sector, on average HVAC systems consume 40% of energy use. (Figure 2). According to the Australian Institute of Refrigeration, Air Conditioning and Heating, “Between 2005 and 2015, building energy intensity has only improved by 2 per cent across the commercial sector. There is considerable scope for energy efficiency improvement.”⁸

The proposal in this report will extend existing EEIS Activities 2.1 and 2.3 to business operations. The existing activities provide incentives to install electric heat pump systems to replace old, inefficient heaters. The report also proposes new EEIS activities, 2.5 and 2.6, to provide incentives for installing reverse cycle heat pump systems in businesses that are replacing both an existing inefficient heating and cooling system. Selection of high efficiency items translates into reduced greenhouse gas emissions and energy savings. The deemed savings have been calculated with reference to the type of business activity undertaken and the nature of the business premises. Assumptions and elements that are common to all proposed new business heating and cooling activities are described in Section 3.1. Later sections provide details specific to each activity proposal, including proposed additions to the *Energy Efficiency (Cost of Living) Improvement (Eligible Activities) Determination 2017*.¹⁰

Figure 2: Commercial building energy breakdown by end use (% of total energy consumption). Source (ASBEC 2016⁹)



8 Australian Institute of Refrigeration, Air Conditioning and Heating (AIRAH) (2017) Future of HVAC in a Net Zero World: An industry foresighting perspective on developments in the Australian HVAC market. AIRAH

9 Australian Sustainable Built Environment Council (ASBEC) (2016) Low Carbon, High Performance: How buildings can make a major contribution to Australia's emissions and productivity goals, Prepared for ASBEC by ClimateWorks.

10 <http://www.legislation.act.gov.au/ni/2017-676/default.asp>

BUSINESS HVAC DEEMED METHODS – ASSUMPTIONS AND COMMON ELEMENTS

Deemed activity abatement values are based on thermal performance modelling assumptions. For the business high efficiency heating and cooling activities proposed here, the assumptions draw on the existing EEIS residential deemed HVAC activities, Canberra climate zone (NatHERS 24)¹¹ and an ACT commercial building stock profile. The extension of the residential activities to include these extra factors involved:

- identifying and classifying building types to represent business and community group premises and their operations
- adopting occupancy types to reflect commercial and community group usage patterns based on business classes from the Building Code of Australia
- using these occupancy types to factor in different hours of operation consistent with those used in existing EEIS business lighting activities
- applying suitable assumptions for insulation levels, curtains and blinds, ceiling heights and zoning
- applying additionality principles and assumptions through an assessment of current average market trends and other existing regulatory requirements (such as Minimum Energy Performance Standards) for the business purchase of heating and cooling equipment
- allowing greater flexibility on the previous residential mandatory requirements to simultaneously upgrade duct insulation in recognition that it is not always possible to access duct insulation in commercial buildings to ensure it meets standard
- grouping businesses into high, low and other heat-load classes, as summarised in Table 2.1a¹² and below, to reflect background temperatures related to business activities. The categories are:
 - > **Category 1:** high heat-load class, including food retail such as restaurants. These increased internal heat-loads tend to reduce heating and increase cooling requirements compared to a residential building
 - > **Category 2:** low heat-load class, including warehouses, showrooms and other business types which usually have lower internal heat gain than residential premises and business market average
 - > **Category 3:** business market average class, including any other business not included in Categories 1 or 2.

Some businesses, like bakeries and restaurants, have higher air-conditioning loads and lower heating loads compared to residential properties, but frequently use old, inefficient models of both heating and cooling equipment. Because of this, EEIS has developed two new business HVAC activities to support replacing existing heating and cooling systems with high efficiency reverse cycle heat pumps. These two new proposed business activities are:

- replace a central heating and cooling system in a business premises (proposed new EEIS Activity 2.5)
- replace a room heating and cooling system in a business premises (proposed new EEIS Activity 2.6).

11 ACT has a similar temperature profile to Ballarat but receives significantly more direct solar radiation, particularly during the winter months.

12 Tables are numbered consistently with where they will appear in the Energy Efficiency (Cost of Living) Improvement (Eligible Activities) Determination 2017 NI2017-676

Table 2.1a: Categories of business premises

CATEGORY 1 (HIGH INTERNAL HL)	CATEGORY 2 (LOW INTERNAL HL)	CATEGORY 3 (OTHER)
BCA Class 6 – Food retail sub-set including specifically -Restaurants → Cafes → Fast food stores, → Bakeries	BCA Class 5 – Office based businesses BCA Class 6 – all food retail is eligible except restaurants, cafes, fast food restaurants, bakeries. BCA Class 7 – Wholesale outlets and warehousing businesses BCA Class 8 – Manufacturing premises BCA Class 9a – Health Care building based professional services BCA 9b - Auditoriums, churches, public halls and any assembly buildings used by Not for profits/ Community Groups BCA Class 9c - Aged Care	Any other business premises that is not included in category 1 or 2 Businesses which have a combination of both high internal and low internal HL commercial spaces.

The draft definition for business premises applying to the four proposed deemed business HVAC activities is as follows:

business premises means an existing commercial premises that—

- is not a residential premises and
- qualifies as a National Construction Code class 3, 5, 6, 7, 8, 9, 10 or the common areas of class 2.

Note 1 A business premises may be occupied by a business, notforprofit organisation, community group or other enterprise.

Note 2 A business premises may represent part of a larger building.

In the first two proposed activities, an option is provided allowing for a reduction in the minimum adjusted co-efficient of performance (ACOP) requirement in circumstances where a limited range of high efficiency products are available to service large floor areas. In these cases, energy efficiency requirements are relaxed slightly. Abatement values in these cases take account of the additionality of the specified medium-high efficiency heat pumps, compared with the market average.

The minimum product requirement of an H2 test is kept for heat pump products for these proposed EEIS business HVAC activities to manage the significant potential risk of user dissatisfaction in extreme low temperature conditions unless sufficient heating capacity is provided. It is noted that there is currently a lack of air-conditioning products available in the Greenhouse and Energy Minimum Standards (GEMS) database >22 kW with an H2 test. Hence a range of options in the draft minimum product requirements for the business HVAC activities, listed below, are provided to:

- broaden the allowed types of H2 test evidence for heat pump air-conditioning systems and
- allow an air enthalpy or truncated calorimeter room tests to test H2 performances for heat pump air-conditioning systems >15 kW.



PROPOSED DRAFT H2 TEST REQUIREMENTS

The H2 test result can be evidenced, without need for any additional testing via:

- the product's H2 test result in the GEMS/E3 [air-conditioning database](#)
- an Air-Conditioning, Heating, and Refrigeration Institute (AHRI) certificate, being a certified test certificate from [AHRI](#)
- a Eurovent certificate, being a certified test certificate from the European Association of [Air Handling and Refrigerating Equipment Manufacturers](#).

Where a product does not have an H2 test result, it does need an air enthalpy test or a truncated calorimeter room test spanning three complete defrost cycles.¹³ The use of calorimeter or air enthalpy for H2¹⁴ tests is outlined in the relevant air conditioner type test standards. For instance:

- AS/NZS 3823.1.1:2012 for non-ducted air conditioners
- AS/NZS 3823.1.2:2012 for ducted air conditioners¹⁵
- AS/NZS 3823.1.4:2012 for multi-split air conditioners.

There are many heat pumps products that can perform well at sub-zero temperatures but do not currently have a publicly available H2 test result. Therefore, this consultation process is also seeking to learn from heating and air-conditioning professionals about how well ducted and non-ducted efficient heat pump systems >22 kW heat capacity are performing in BCA climate zone 7 in Australia (i.e. ACT, Tasmania and parts of Victoria) and at sub-zero temperatures overseas during the winter.



CONSULTATION QUESTIONS

1. Do you agree, in principle, with EEIS creating deemed business HVAC activities for small to medium businesses?
2. Is the definition of a business premises adequate?
3. Do you agree with the division of business premises into internal heat-load categories?
4. Do you disagree with any of the thermal performance modelling assumptions outlined above?
5. Based on your professional experience, how well are ducted and non-ducted efficient heat pump systems >22 kW heat capacity performing in BCA climate zone 6 and 7 in Australia and overseas during winter months?
6. Do you agree that EEIS should mandate an H2 test for systems above 22 kW to 65 kW heat capacity, where few H2 tests currently exist?
7. Is there another way to manage risks of poor heat pump product performance in sub-zero temperatures other than evidencing results from a mandatory H2 test as part of minimum product requirements for these proposed EEIS business HVAC activities?

Please add your answers to the [online survey](#).

13 A normal calorimeter room H2 test dictates the test period be the average capacity of 6 hours of operation or 6 complete defrost cycles (whichever comes first). The average capacity doesn't change much after 3 complete defrost cycles, so here just 3 complete defrost cycles are required.

14 Details about relevant H2 test methods are also set out in the following;

- ISO 5151:2017 (non-ducted air conditioners, any VRF multi split and fixed head multi-split outdoor unit greater than 30kW rated standard cooling full capacity or, for heating only products, rated standard heating full capacity);
- ISO 13253:2017 (ducted air conditioners);
- ISO 15042:2017 (multi-split outdoor units).

15 For example, in AS/NZS 3823.1.2, Annex E explains the air enthalpy test method while Annex D explains the calorimeter room test method. Furthermore, Annex N further explains defrost cycles and how they are counted.

EEIS ACTIVITY 2.1 EXTENSION TO BUSINESS – REPLACE AN INEFFICIENT DUCTED CENTRAL SPACE HEATING SYSTEM IN A BUSINESS PREMISE

ACTIVITY DESCRIPTION

In accordance with the prescribed minimum activity performance specifications in section 2 of this Part, this activity involves the replacement of inefficient central ducted heating or fixed slab electric resistance heating with:

- for residential premises—a central ducted reverse cycle air-conditioner
- for business premises—either a ducted efficient electric reverse cycle air-conditioner, or non-ducted reverse cycle room air-conditioners or a non-ducted reverse cycle multi-split system.

ELIGIBILITY REQUIREMENT – AMENDMENT TO ACTIVITY 2.1 DEFINITION

In order that business premises be included within the scope of this activity, the following minor amendment to the activity definition is recommended:

Proposed draft eligibility requirements

To be an eligible activity the activity must—

- a. be undertaken at an eligible residential or business premises that includes one of three categories of pre-existing heater types as described below:
 - i. **Category HC1:** a fixed electric resistance central space heater that is hard wired and services more than 100m² in the residential or business premises, including resistance electric slab heaters, ducted resistance electric heaters or fixed electric resistance panel heaters, and excluding portable or plug-in electric heaters of any description
 - ii. **Category HC2:** a ducted, flued gas heater or flued gas space heater, excluding portable or unflued gas heaters of any description
 - iii. **Category HC3:** any other type of fixed heater not specified above or a premises with no pre-existing form of fixed heater installed. In the case of category 1 business premises, to be eligible, a pre-existing heater must also have a cooling mode (i.e. a reverse cycle heat pump).

Each different pre-condition attracts differing abatement values as specified in Table 2.1 b, c, d or e (as applicable).

Note: In Table 2.1 these categories of pre-condition (i.e. HC1, HC2 and HC3) form the first 3 characters of the code noted in the left hand column of that table.

If the pre-conditions include an existing heater as specified above, the existing heater must be decommissioned. When the new replacement system is installed, it must;

- d. be undertaken using a product or products meeting the installed product requirements in section 3; and
- e. be completed and certified in accordance with the relevant code or codes of practice and other relevant legislation applying to the activity, including any licensing, registration, statutory approval, activity certification, health, safety, environmental or waste disposal requirements and
- f. be recorded in accordance with any relevant code of practice for the activity.

Note: All activities are subject to independent inspection or audit to confirm compliance with prescribed activity requirements.

If installing an efficient ducted heat pump system, unless the ductwork is inaccessible or already $R=1.5$, this activity needs to be undertaken together with the activity in Part 2.4 for the insulation of ductwork, where the new product requires ductwork and where existing ductwork connected to a replaced heater does not meet the installed product requirements in section 3 of Part 2.4. If installing non-ducted efficient heat pumps then this upgrade does not need to be undertaken together with the activity in Part 2.4 for the insulation of ductwork.

INSTALLED PRODUCT REQUIREMENTS

An option is provided in this activity that allows for a reduction in the minimum ACOP requirement in circumstances where a limited range of high efficiency products are available to service large floor areas. In this case, the option applies where the floor area is over 120m². A tested and registered unit with a minimum capacity of 22 kW at condition H1¹⁶ could be supported by EEIS. If products are available with mandatory variable speed compressors, then those would be selected. This reflects current market limitations in large-scale products and the significant potential risk of user dissatisfaction in extreme low temperature conditions unless sufficient heating capacity is provided.

Proposed draft installed product requirements

A specified high efficiency central electric space heater for this activity is a central space heater that meets the following requirements—

- a. Complies with Minimum Energy Performance Standard (MEPS) requirements (AS/NZS 3823.2) and
- b. Achieves a minimum annual coefficient of performance (ACOP) of either:
 - i. 3.7 at condition H1 (AS/NZS 3823.2) or
 - ii. 3.1 at condition H1 (AS/NZS 3823.2) provided that:
 - a. the installation is to replace a pre-existing heater of either type HC1 or HC2 only, as defined in section 2(a),
 - b. the installation is to serve a conditioned floor area of not less than 120m²,
 - c. the unit has been tested and registered for low temperature performance under condition H2 and meets the requirements of Clause 3.7 of AS/NZS3823.2,
 - d. the unit has a minimum heating capacity of 22 kW at H1 condition (AS/NZS 3823.1.1, AS/NZS 3823.1.2 or AS/NZS 3823.1.4 as applicable), and
 - e. the installed unit has mandatory variable speed compressors, where such products are available.
- f. Except as required above in section 3(b)(ii)(d) where applicable, has a minimum rated heating capacity of 10 kW at H1 condition (AS/NZS 3823.1.1, AS/NZS 3823.1.2 or AS/NZS 3823.1.4, as applicable) and
- g. Is a ducted, non-ducted or a multi-split system that is capable of heating an area that is comparable to the system being replaced (where applicable) and

Note: One or more non-ducted space heating units may be installed in a single business space to a maximum combined capacity of 65kW as required to meet the particular load. These may be separate room space heating units or multi-split units provided each unit complies with the eligibility criteria above.

16 Condition H1 is when outside air temperatures are one degree Celsius. H2 refers to two degrees Celsius and so on.

- e. Is listed on the register of products and
- f. Is installed by a person who is familiar with DR AS/NZS 5141:2017 *Residential climate control systems— Minimum applications and requirements for energy efficiency, performance and comfort criteria and the Air Conditioning Residential Best Practice Guideline* published by AIRAH and who undertakes to follow these as far as possible when installing the new product.

Products that have been tested and registered for low temperature performance under condition H2 and meet the requirements of Clause 3.7 of AS/NZS3823.2 earn additional abatement.

Note: Where a gas ducted heater is rated in mega-joules per hour (MJ/h) this may be converted to a kilowatt (kW) rating by dividing the MJ/h rating by 3.6.

CALCULATION OF ACTIVITY ABATEMENT VALUE

Credit calculations for the business sector use the same method as that used in the residential sector¹⁷ and also take account of the thermal performance modelling assumptions listed in section 3.1. Note that the maximum of 65 kW used in the equation for abatement factor aligns with the Victorian Energy Upgrades Program (VEU), previously known as the Victorian Energy Efficiency Target Program (VEET).

Please note that in the case of Business Premises Category 1 (High internal heat-loads), the activity options are effectively limited to new installations or replacement of pre-existing reverse cycle heat pump systems only. This is because where an existing non-reverse-cycle type heater is being replaced (i.e. it is assumed that the premises only has a heating device and no cooling device), the savings in terms of heating mode are very modest and the dis-benefit in terms of the additional energy used in cooling mode (assumed to be a mode not available in the pre-existing system e.g. a resistance electric or gas type heater) would outweigh the benefits achieved in heating mode.

Proposed draft deemed savings formula

The total abatement factor in tonnes of carbon dioxide-equivalent (tCO_{2-e}) of greenhouse gas emissions saved in a premises for the activity is the relevant abatement factor for the specified high efficiency central electric space heater installed, exclusive of any abatement factor calculated for insulation of ductwork under Part 2.4 where required, is determined by using the equations prescribed in this section.

The abatement factor is calculated as—

$$\text{Abatement factor (t CO}_{2\text{-e}}) = [\text{AAV}_{\text{fixed}} + \text{H2} + \text{AAV}_{\text{var}} \times (\text{ACOP} - \text{baseline})] \times \text{Capacity}$$

Where:

AAV_{fixed}, AAV_{var} and *baseline* are the relevant values prescribed in Table 2.1b (residential premises) or Table 2.1c (business premises – category 1) or Table 2.1d (business premises – category 2) or Table 2.1e (business premises – category 3) as applicable for the existing heater type (where applicable) and the new product type.

ACOP is the Annual Coefficient of Performance recorded for the installed model in the Energy Rating database for condition H1

Category 1, 2 and 3 are defined in Table 2.1a above.

¹⁷ http://www.environment.act.gov.au/_data/assets/pdf_file/0008/857789/ACT-EEIS-Stakeholder-Consultation-on-2016-activities-update-report-2.pdf

Capacity is the rated heating capacity of the installed model for condition H1 in kW. For residential premises only, where the capacity is greater than 30kW, the value of 30 is used in the equation for Abatement factor. For business premises any capacity value may be used up to a maximum of 65kW in the equation for Abatement factor.

H2 is a value of 0.04 if the installed model has been tested and registered for low temperature performance under condition H2 and meets the requirements of Clause 3.7 of AS/NZS3823.2 otherwise H2 is a value of 0.0 for all other products.

Note: Where a gas ducted heater is rated in megajoules per hour (MJ/h) this may be converted to a kilowatt (kW) rating by dividing the MJ/h rating by 3.6.

Table 2.1b: Activity abatement values for a specified high efficiency central electric space heater (Residential Premises)

CODE	EXISTING HEATER TYPE	NEW PRODUCT TYPE	BASE EFFICIENCY (BASELINE) ACOP	FIXED EMISSIONS SAVINGS (AAV _{FIXED}) T CO _{2-E}	VARIABLE EMISSIONS SAVINGS (AAV _{VAR}) T CO _{2-E} /KW
HC1A	Qualifying electric resistance - fixed panel heaters	Ducted High Efficiency Central Heat Pump	3.6	1.02	0.15
HC1B	Qualifying electric resistance - fixed panel heaters	Non-ducted High Efficiency Central Heat Pump	3.6	1.12	0.13
HC1C	Qualifying electric resistance - fixed panel heaters	Ducted High Efficiency Central Heat Pump compliant with the provisions of section 3(b)(ii) above	3.1	0.90	0.20
HC1D	Qualifying electric resistance - slab or ducted	Ducted High Efficiency Central Heat Pump	3.6	1.44	0.15
HC1E	Qualifying electric resistance - slab or ducted	Non-ducted High Efficiency Central Heat Pump	3.6	1.55	0.13
HC1F	Qualifying electric resistance - slab or ducted	Ducted High Efficiency Central Heat Pump compliant with the provisions of section 3(b)(ii) above	3.1	1.33	0.20
HC2A	Qualifying gas ducted heater	Ducted High Efficiency Central Heat Pump	3.6	3.77	0.15
HC2B	Qualifying gas ducted heater	Non-ducted High Efficiency Central Heat Pump	3.6	3.88	0.13

CODE	EXISTING HEATER TYPE	NEW PRODUCT TYPE	BASE EFFICIENCY (BASELINE) ACOP	FIXED EMISSIONS SAVINGS (AAV _{FIXED}) T CO _{2-E}	VARIABLE EMISSIONS SAVINGS (AAV _{VAR}) T CO _{2-E} /KW
HC2C	Qualifying gas ducted heater	Ducted High Efficiency Central Heat Pump compliant with the provisions of section 3(b)(ii) above	3.1	3.66	0.20
HC3A	None, any, not specified	Ducted High Efficiency Central Heat Pump	3.6	0.00	0.15
HC3B	None, any, not specified	Non-ducted High Efficiency Central Heat Pump	3.6	0.10	0.13

Table 2.1c: Activity abatement values for a specified high efficiency central electric space heater (Business Premises – Category 1)

CODE	EXISTING HEATER TYPE	NEW PRODUCT TYPE	BASE EFFICIENCY (BASELINE) ACOP	FIXED EMISSIONS SAVINGS (AAV _{FIXED}) T CO _{2-E}	VARIABLE EMISSIONS SAVINGS (AAV _{VAR}) T CO _{2-E} /KW
Code	Existing Heater Type	New product type	Base Efficiency (Baseline) ACOP	Fixed Emissions Savings (AAV _{fixed}) t CO _{2-e}	Variable Emissions Savings (AAV _{var}) t CO _{2-e} /kW
HC3A	None, reverse cycle heat pump	Ducted High Efficiency Central Heat Pump	3.6	0.00	0.16
HC3B	None, reverse cycle heat pump	Non-ducted High Efficiency Central Heat Pump, or One or More Efficient Room Heat Pumps or a Multi-Split Heat Pump System. ¹⁸	3.6	0.11	0.14

¹⁸ One or more non-ducted space heating units may be installed in a single business premises up to a maximum combined capacity of 65kW as required to meet the particular load. These may be separate room spacing heating units or multi-split units provided each unit complies with the eligibility criteria above.

Table 2.1d: Activity abatement values for a specified high efficiency central electric space heater (Business Premises – Category 2)

CODE	EXISTING HEATER TYPE	NEW PRODUCT TYPE	BASE EFFICIENCY (BASELINE) ACOP	FIXED EMISSIONS SAVINGS (AAV _{FIXED}) T CO _{2-E}	VARIABLE EMISSIONS SAVINGS (AAV _{VAR}) T CO _{2-E} /KW
Code	Existing Heater Type	New product type	Base Efficiency (Baseline) ACOP	Fixed Emissions Savings (AAV _{fixed}) t CO _{2-e}	Variable Emissions Savings (AAVvar) t CO _{2-e} /kW
HC1A	Qualifying electric resistance - fixed panel heaters	Ducted High Efficiency Central Heat Pump	3.6	0.80	0.13
HC1B	Qualifying electric resistance - fixed panel heaters	Non-ducted High Efficiency Central Heat Pump, or One or More Efficient Room Heat Pumps or a Multi-Split Heat Pump. ¹⁹	3.6	0.89	0.11
HC1C	Qualifying electric resistance - fixed panel heaters	Ducted High Efficiency Central Heat Pump compliant with the provisions of section 3(b)(ii) above	3.1	0.70	0.17
HC1D	Qualifying electric resistance - slab or ducted	Ducted High Efficiency Central Heat Pump	3.6	1.15	0.13
HC1E	Qualifying electric resistance - slab or ducted	Non-ducted High Efficiency Central Heat Pump, or Two or More Efficient Room Heat Pumps, or a Multi-Split Heat Pump system. ²⁰	3.6	1.24	0.11
HC1F	Qualifying electric resistance - slab or ducted	Ducted High Efficiency Central Heat Pump compliant with the provisions of section 3(b)(ii) above	3.1	1.05	0.17
HC2A	Qualifying gas ducted heater	Ducted High Efficiency Central Heat Pump	3.6	3.06	0.13

¹⁹ Ibid

²⁰ Ibid

CODE	EXISTING HEATER TYPE	NEW PRODUCT TYPE	BASE EFFICIENCY (BASELINE) ACOP	FIXED EMISSIONS SAVINGS (AAV _{FIXED}) T CO _{2-E}	VARIABLE EMISSIONS SAVINGS (AAV _{VAR}) T CO _{2-E} /KW
HC2B	Qualifying gas ducted heater	Non-ducted High Efficiency Central Heat Pump, or One or More Efficient Room Heat Pumps, or a Multi-Split Heat Pump System ²¹	3.6	3.15	0.11
HC2C	Qualifying gas ducted heater	Ducted High Efficiency Central Heat Pump compliant with the provisions of section 3(b)(ii) above	3.1	2.97	0.17
HC3A	None, any, not specified	Ducted High Efficiency Central Heat Pump	3.6	0.00	0.13
HC3B	None, any, not specified	Non-ducted High Efficiency Central Heat Pump, or One or More Efficient Room Heat Pumps, or a Multi-Split Heat Pump System	3.6	0.09	0.11

Table 2.1e: Activity abatement values for a specified high efficiency central electric space heater (Business Premises – Category 3)

CODE	EXISTING HEATER TYPE	NEW PRODUCT TYPE	BASE EFFICIENCY (BASELINE) ACOP	FIXED EMISSIONS SAVINGS (AAV _{FIXED}) T CO _{2-E}	VARIABLE EMISSIONS SAVINGS (AAV _{VAR}) T CO _{2-E} /KW
HC1A	Qualifying electric resistance - fixed panel heaters	Ducted High Efficiency Central Heat Pump	3.6	0.16	0.15
HC1B	Qualifying electric resistance - fixed panel heaters	Non-ducted High Efficiency Central Heat Pump, or One or More Efficient Room Heat Pumps or Multi-Split Heat Pump Systems.	3.6	0.26	0.12

²¹ Ibid

CODE	EXISTING HEATER TYPE	NEW PRODUCT TYPE	BASE EFFICIENCY (BASELINE) ACOP	FIXED EMISSIONS SAVINGS (AAV _{FIXED}) T CO _{2-E}	VARIABLE EMISSIONS SAVINGS (AAV _{VAR}) T CO _{2-E} /KW
HC1C	Qualifying electric resistance - fixed panel heaters	Ducted High Efficiency Central Heat Pump compliant with the provisions of section 3(b)(ii) above	3.1	0.05	0.19
HC1D	Qualifying electric resistance - slab or ducted	Ducted High Efficiency Central Heat Pump	3.6	0.36	0.15
HC1E	Qualifying electric resistance - slab or ducted	Non-ducted High Efficiency Central Heat Pump, or One or More Efficient Room or Multi-Split Heat Pumps	3.6	0.46	0.12
HC1F	Qualifying electric resistance - slab or ducted	Ducted High Efficiency Central Heat Pump compliant with the provisions of section 3(b)(ii) above	3.1	0.25	0.19
HC2A	Qualifying gas ducted heater	Ducted High Efficiency Central Heat Pump	3.6	1.49	0.15
HC2B	Qualifying gas ducted heater	Non-ducted High Efficiency Central Heat Pump, or One or More Efficient Room or Multi-Split Heat Pumps.	3.6	1.59	0.12
HC2C	Qualifying gas ducted heater	Ducted High Efficiency Central Heat Pump compliant with the provisions of section 3(b)(ii) above	3.1	1.38	0.19
HC3A	None, any, not specified	Ducted High Efficiency Central Heat Pump	3.6	0.00	0.15
HC3B	None, any, not specified	Non-ducted High Efficiency Central Heat Pump, or One or More Efficient Room Heat Pumps or a Multi-Split Heat Pump System. ²²	3.6	0.10	0.12

22 Two or more non-ducted space heating units may be installed in a single (large) space up to a maximum combined capacity of 65kW as required to meet the particular load. These may be separate room spacing heating units or multi-split units provided each unit complies with the eligibility criteria above.

CODES OF PRACTICE

The provisions within the current code of practice in relation to this activity for the residential sector are considered to be also appropriate for the business sector. As such, only minor amendments to the code of practice are proposed to explicitly include business premises within the scope of the code.

CONSULTATION QUESTIONS

8. Do you agree, for business premises, products having a heat capacity value limit up to a maximum of 65 kW aligned with VEU?
9. Do the proposed draft installed product requirements unduly limit the scope of eligible products?

Please add your answers to these and the following questions via the associated [online survey](#).

EEIS ACTIVITY 2.3 EXTENSION – REPLACING INEFFICIENT ROOM SPACE HEATING FOR BUSINESS APPLICATIONS

ACTIVITY DESCRIPTION

This builds on EEIS Activity 2.3, which involves the installation of a specified high efficiency electric room heater. The proposal is to extend this activity from the residential sector to include business premises.

ELIGIBILITY REQUIREMENT – AMENDMENT TO EEIS ACTIVITY 2.3 DEFINITION

In order that business premises be included within the scope of the existing EEIS Activity 2.3 the following minor amendment to the activity definition is recommended:

Proposed draft eligibility requirements

To be an eligible activity the activity must—

- a. be undertaken at an eligible residential or business premises that includes one of three categories of pre-existing heater types as described below:
 - i. **Category HR1:** a fixed electric resistance space heater that is hard wired, including resistance electric slab heaters, ducted resistance electric heaters or fixed electric resistance panel heaters, and excluding portable or plug-in electric heaters of any description.
 - ii. **Category HR2:** a ducted, flued gas heater or flued gas heater, excluding portable or un-flued gas heaters of any description.
 - iii. **Category HR3:** any other type of fixed heater not specified above or a premises with no pre-existing form of fixed heater installed. In the case of category 1 business premises, to be eligible, a pre-existing heater must also have a cooling mode (i.e. a reverse cycle heat pump).

Each different pre-condition attracts differing abatement values as specified in Table 2.3 a,b,c, or d (as applicable).

Note: In table 2.3 these categories of pre-condition (i.e. HR1, HR2 and HR3) form the first 3 characters of the code noted in the left hand column of that table.

If the pre-conditions include an existing heater as specified above, the existing heater must be decommissioned. When the new replacement system is installed, it must;

- a. be undertaken using a product or products meeting the installed product requirements in section 3; and
- b. be completed and certified in accordance with the relevant code or codes of practice and other relevant legislation applying to the activity, including any licensing, registration, statutory approval, activity certification, health, safety, environmental or waste disposal requirements; and
- c. be recorded in accordance with any relevant code of practice for the activity.

Note: All activities are subject to independent inspection or audit to confirm compliance with prescribed activity requirements.

INSTALLED PRODUCT REQUIREMENTS

An option is provided in this activity that allows for a reduction in the minimum ACOP requirement in circumstances where a limited range of high efficiency products are available to service large floor areas. In this case, the option applies where the floor area is over 55m². A tested and registered unit with a minimum capacity of 7 kW at condition H1 could be supported by EEIS. Products with mandatory variable speed compressors would be selected if available. This reflects current market limitations in large-scale products and the significant potential risk of user dissatisfaction in extreme low temperature conditions unless sufficient heating capacity is provided.

Proposed draft installed product requirements

A specified high efficiency electric room heater for this activity is a room heater that meets the following requirements—

- a. Is listed in the register of products for the activity and
- b. Complies with Minimum Energy Performance Standards (MEPS) requirements (AS/NZS 3823.2) and
- c. Achieves a minimum annual coefficient of performance (ACOP) of either:
 - i. 4.0 at condition H1 (AS/NZS 3823.2) or
 - ii. 3.8 at condition H1 (AS/NZS 3823.2) provided that:
 - a. the installation is to replace a pre-existing heater of either type HR1 or HR2 only, as defined in section 2(a),
 - b. the installation is to serve a conditioned floor area of not less than 55 m²,
 - c. the unit has been tested and registered for low temperature performance under condition H2 and meets the requirements of Clause 3.7 of AS/NZS3823.2
 - d. the unit has a minimum heating capacity of 7 kW at H1 condition (AS/NZS 3823.1.1, AS/NZS 3823.1.2 or AS/NZS 3823.1.4 as applicable),
 - e. the installed unit has a mandatory variable speed compressors, where such products are available.
- d. Has a rated heating capacity of not more than 65 kW (see note 2) at H1 condition (AS/NZS 3823.1.1, AS/NZS 3823.1.2 or AS/NZS 3823.1.4 as applicable) and, except as required above in section 3(c)(ii)(d) where applicable, has a minimum rated heating capacity of 2 kW at condition H1, and
- e. is installed by a person who is familiar with DR AS/NZS 5141:2017 *Residential climate control systems—Minimum applications and requirements for energy efficiency, performance and comfort criteria and the Air Conditioning Residential Best Practice Guideline* published by AIRAH and who undertakes to follow this guideline as far as possible when installing the new product.

Note 1: Products that have been tested and registered for low temperature performance under condition H2 and meet the requirements of Clause 3.7 of AS/NZS3823.2 earn additional abatement.

Note 2: Multiple units may be installed in a single (large) space up to a maximum combined capacity of 65kW as required to meet the particular load. These may be separate units or multi-split units provided each unit complies with the eligibility criteria above.

CALCULATION OF ACTIVITY ABATEMENT VALUE

Credit calculations for the business sector are undertaken using the same method as that used in the residential sector²³ except that the assumed heating loads (and cooling loads where applicable) vary according to the factors listed in Section 3.1.

Please note that in the case of Business Premises Category 1 (High internal heat-loads), the activity options are limited effectively to new installations or replacement of pre-existing reverse cycle heat pump systems only. This is because where an existing non-reverse-cycle type heater is being replaced (i.e. it is assumed that the premises only has a heating device and no cooling device) the savings in terms of heating mode are very modest and the dis-benefit in terms of additional energy used in cooling mode (assumed to be a mode not available in the pre-existing system e.g. a resistance electric or gas type heater) would outweigh the benefits achieved in heating mode.

Proposed draft deemed savings formula

1. The total abatement factor in tonnes of carbon dioxide-equivalent (tCO_{2-e}) of greenhouse gas emissions saved in a premises for the activity is the relevant abatement factor for the specified high efficiency electric room heater installed, determined by using the equations prescribed in this section.
2. The abatement factor is calculated as—

$$\text{Abatement factor (t CO}_{2\text{-e}}) = [\text{AAV}_{\text{fixed}} + \text{H2} + \text{AAV}_{\text{var}} \times (\text{ACOP} - \text{baseline})] \times \text{Capacity}$$

Where:

AAV_{fixed}, AAV_{var} and *baseline* are the relevant values prescribed in Table 2.3b (residential premises) or Table 2.3c (business premises – category 1) or Table 2.3d (business premises – category 2) or Table 2.3e (business premises – category 3) as applicable for the existing heater type (where applicable) and the new product type.

ACOP is the Annual Coefficient of Performance recorded for the installed model in the Energy Rating database for condition H1

Category 1, 2 and 3 are defined in Table 2.1a above.

Capacity is the rated heating capacity of the installed model for condition H1 in kW.

H2 is a value of 0.04 if the installed model has been tested and registered for low temperature performance under condition H2 and meets the requirements of Clause 3.7 of AS/NZS3823.2 otherwise H2 is a value of 0.0 for all other products.

Note: Where a gas heater is rated in megajoules per hour (MJ/h) this may be converted to a kilowatt (kW) rating by dividing the MJ/h rating by 3.6.

23 http://www.environment.act.gov.au/__data/assets/pdf_file/0008/857789/ACT-EEIS-Stakeholder-Consultation-on-2016-activities-update-report-2.pdf

Table 2.3b: Activity abatement values for a specified high efficiency electric room heater (Residential Premises)

CODE	EXISTING HEATER TYPE	NEW PRODUCT TYPE	BASE EFFICIENCY (BASELINE) ACOP	FIXED EMISSIONS SAVINGS (AAV _{FIXED}) T CO _{2-E}	VARIABLE EMISSIONS SAVINGS (AAV _{VAR}) T CO _{2-E} /KW
HR1A	Any qualifying fixed electric resistance heater	High efficiency room heat pump	3.7	1.22	0.13
HR1B	Any qualifying fixed electric resistance heater	High efficiency room heat pump compliant with the provisions of section 3(c)(ii) above	3.7	1.22	0.13
HR2A	Any qualifying fixed gas room heater	High efficiency room heat pump	3.7	3.26	0.13
HR2B	Any qualifying fixed gas room heater	High efficiency room heat pump compliant with the provisions of section 3(c)(ii) above	3.7	3.26	0.13
HR3	Any other heater type not specified above, no heater	High efficiency room heat pump	3.7	0.00	0.13

Table 2.3c: Activity abatement values for a specified high efficiency electric room heater (Business Premises – Category 1)

CODE	EXISTING HEATER TYPE	NEW PRODUCT TYPE	BASE EFFICIENCY (BASELINE) ACOP	FIXED EMISSIONS SAVINGS (AAV _{FIXED}) T CO _{2-E}	VARIABLE EMISSIONS SAVINGS (AAV _{VAR}) T CO _{2-E} /KW
HR3	No heater, reverse cycle heat pump	High efficiency room heat pump	3.7	0.00	0.12

Table 2.3c: Activity abatement values for a specified high efficiency electric room heater (Business Premises – Category 2)

CODE	EXISTING HEATER TYPE	NEW PRODUCT TYPE	BASE EFFICIENCY (BASELINE) ACOP	FIXED EMISSIONS SAVINGS (AAV _{FIXED}) T CO _{2-E}	VARIABLE EMISSIONS SAVINGS (AAV _{VAR}) T CO _{2-E} /KW
HR1A	Any qualifying fixed electric resistance heater	High efficiency room heat pump	3.7	0.86	0.10
HR1B	Any qualifying fixed electric resistance heater	High efficiency room heat pump compliant with the provisions of section 3(c)(ii) above	3.7	0.86	0.10
HR2A	Any qualifying fixed gas room heater	High efficiency room heat pump	3.7	2.33	0.10
HR2B	Any qualifying fixed gas room heater	High efficiency room heat pump compliant with the provisions of section 3(c)(ii) above	3.7	2.33	0.10
HR3	Any other heater type not specified above, no heater	High efficiency room heat pump	3.7	0.00	0.10

Table 2.3e: Activity abatement values for a specified high efficiency electric room heater (Business Premises – Category 3)

CODE	EXISTING HEATER TYPE	NEW PRODUCT TYPE	BASE EFFICIENCY (BASELINE) ACOP	FIXED EMISSIONS SAVINGS (AAV _{FIXED}) T CO _{2-E}	VARIABLE EMISSIONS SAVINGS (AAV _{VAR}) T CO _{2-E} /KW
Code	Existing Heater Type	New Product Type	Base Efficiency (Baseline) ACOP	Fixed Emissions Savings (AAV _{fixed}) t CO _{2-e}	Variable Emissions Savings (AAV _{var}) t CO _{2-e} /kW
HR1A	Any qualifying fixed electric resistance heater	High efficiency room heat pump	3.7	0.27	0.11
HR1B	Any qualifying fixed electric resistance heater	High efficiency room heat pump compliant with the provisions of section 3(c)(ii) above	3.7	0.27	0.11

CODE	EXISTING HEATER TYPE	NEW PRODUCT TYPE	BASE EFFICIENCY (BASELINE) ACOP	FIXED EMISSIONS SAVINGS (AAV _{FIXED}) T CO _{2-E}	VARIABLE EMISSIONS SAVINGS (AAV _{VAR}) T CO _{2-E} /KW
HR2A	Any qualifying fixed gas room heater	High efficiency room heat pump	3.7	1.13	0.11
HR2B	Any qualifying fixed gas room heater	High efficiency room heat pump compliant with the provisions of section 3(c)(ii) above	3.7	1.13	0.11
HR3	Any other heater type not specified above, no heater	High efficiency room heat pump	3.7	0.00	0.11

HARMONISATION WITH OTHER SCHEMES

At present each of the other jurisdictions takes a different approach in relation to the inclusion of business premises into this type of activity:

- Victorian Energy Upgrades (VUE) has no limitation on the definition of a business premises and provides the same credits for the activity irrespective of the type of building it is being installed within (residential or business). While there is no limitation on the size of the business premises to which the activity could be applied, the reference to AS/NZS 3823.2 effectively limits the activity to units of less than 65 kW capacity (i.e. approximately 500 m² floor area limit).
- For this particular activity, the NSW Energy Savers Scheme (ESS) is silent on the matter of type of building; that is, there is no limitation. In other ESS activities that specifically include ‘(small) business premises’, such applications are limited to building up to a maximum of 200 m².
- The SA Retailer Energy Efficiency Scheme (REES) scheme does not include business premises in relation to this type of activity.

The proposed EEIS approach of adjusting residential activities to take account of business conditions is expected to be a more accurate approach to assigning credits. Please note that following public consultation, the ESS scheme is currently developing a separate set of activity credits tailored to the small business sector in relation to its building shell activities, an approach that could conceivably be extended by NSW to its heating equipment replacement activities in the near future.

CODES OF PRACTICE

The provisions within the current code of practice in relation to this activity for the residential sector²⁴ are considered to be also appropriate to the business sector. As such, only minor amendments to the code of practice are proposed such that business premises are explicitly included within the scope of the code.

²⁴ Energy Efficiency (Cost of Living) Improvement (Eligible Activities) Code of Practice 2017, Section 15.

CONSULTATION QUESTIONS

10. Do you agree with the differentiated minimum product requirements for large (i.e. > 55 m²) and small rooms?

11. Do you agree with the draft installed product requirements for eligible products?

Please add your answers to the [online survey](#).

PROPOSED NEW EEIS ACTIVITY 2.5 – REPLACE A DUCTED CENTRAL HEATING AND COOLING SYSTEM IN A BUSINESS PREMISES

ACTIVITY DESCRIPTION

The proposed new EEIS Activity 2.5 involves the replacement of both a heating and a cooling system (i.e. pre-existing separate heating and cooling systems) within a business premises. This activity is targeted at businesses with pre-existing heating and cooling central space conditioning equipment. This is an important distinction. Where only a pre-existing heater is assumed (e.g. in existing EEIS Activity 2.1 or 2.3 and their proposed extension to business) the assumption is that no pre-existing cooler exists and, as a consequence of replacing a pre-existing heater with a reverse cycle air-conditioner, the additional energy used when the replacement unit is operated in cooling mode is considered to constitute a dis-benefit in terms of energy savings (naturally there is an added benefit in terms of summer comfort conditions). In this proposed EEIS Activity 2.5, a pre-existing cooler does exist and, as such, its replacement (in addition to the heater replacement) constitutes a benefit in terms of energy savings (i.e. newer more efficient heater/cooler replaces older less efficient heater and cooler).

ACTIVITY DEFINITION

The proposed EEIS Activity 2.5 definition is:

In accordance with the prescribed minimum activity performance specifications in section 2 of this Part, replace an eligible pre-existing central heating system and eligible central cooling system for a business premise with either:

- a single high efficiency central electric reverse cycle air-conditioner or
- one or more non-ducted high efficiency electric reverse cycle room air-conditioners or
- multi-split high efficiency electric reverse cycle air-conditioners.

ELIGIBILITY REQUIREMENT

The following eligibility requirements are proposed:

Proposed draft eligibility requirements

To be an eligible activity the activity must—

- a. be undertaken at an eligible business premises that includes one of two categories of pre-existing heater and cooler types as described below (both a heater and cooler must be present to be eligible). Each different pre-condition attracts differing abatement values as specified in Table 2.5 a, b or c (as applicable). These categories of pre-condition are as follows:
 - i. **Category H+CC1:** an electric central space heater plus an electric central space cooler that are hard wired and each service more than 100m². All electric heater types are eligible provided they are not portable or plug-in electric heaters of any description. All electric cooler types are eligible provided they use heat pump technology (evaporative types are ineligible) and also provided they are not portable or plug-in electric coolers of any description.
 - ii. **Category H+CC2:** a ducted, flued gas heater plus a hard wired electric central space cooler that each service more than 100m². Portable or unflued gas heaters of any description are ineligible. All electric cooler types are eligible provided they use heat pump technology (evaporative types are ineligible) and also provided they are not portable or plug-in electric coolers of any description.

Note: In Table 2.5 these categories of pre-condition (i.e. H+CC1, H+CC2) form the first 5 characters of the code noted in the left hand column of that table.

The existing heater and cooler must be decommissioned when the new replacement system is installed; and

- b. be undertaken using a product or products meeting the installed product requirements in section 3; and
- c. if installing an efficient ducted heat pump heating system, unless ductwork insulation is entirely inaccessible, this needs to be undertaken together with the activity in Part 2.4 for the insulation of ductwork, where the new product requires ductwork and where existing ductwork connected to a replaced heater does not meet the installed product requirements in section 3 of Part 2.4; and
- d. if installing one or more non-ducted efficient room space heating heat pumps or a non-ducted multi-split system then this does not need to be undertaken together with the activity in Part 2.4 for the insulation of ductwork.
- e. be completed and certified in accordance with the relevant code or codes of practice and other relevant legislation applying to the activity, including any licensing, registration, statutory approval, activity certification, health, safety, environmental or waste disposal requirements; and
- f. be recorded in accordance with any relevant code of practice for the activity.

Note: All activities are subject to independent inspection or audit to confirm compliance with prescribed activity requirements.

INSTALLED PRODUCT REQUIREMENTS

Installed product requirements are based on those specified in Activity 2.1 except that the replacement unit must be a reverse-cycle type unit.

Proposed draft installed product requirements

A specified high efficiency central electric reverse cycle air-conditioner for this activity is a central electric reverse cycle air-conditioner that meets the following requirements—

- a. Is listed in the register of products for the activity and
- b. Complies with Minimum Energy Performance Standard (MEPS) requirements (AS/NZS 3823.2) and
- c. Achieves a minimum annual coefficient of performance (ACOP) of either:
 - i. 3.7 at condition H1 (AS/NZS 3823.2); or
 - ii. 3.1 at condition H1 (AS/NZS 3823.2) provided that:
 - a. the installation is to serve a conditioned floor area of not less than 120m² and;
 - b. the unit has been tested and registered for low temperature performance under condition H2 and meets the requirements of Clause 3.7 of AS/NZS3823.2; and
 - c. The unit has a mandatory variable speed compressors, where such products are available.
 - d. the unit has a minimum heating capacity of 22 kW at H1 condition (AS/NZS 3823.1.1, AS/NZS 3823.1.2 or AS/NZS 3823.1.4 as applicable);
- d. Except as required above in section 3(b)(ii)(c) where applicable, has a minimum rated heating capacity of 10 kW at H1 condition (AS/NZS 3823.1.1, AS/NZS 3823.1.2 or AS/NZS 3823.1.4 as applicable); and
 - i. is a ducted, non-ducted or a multi-split system that is capable of heating an area that is comparable to the system being replaced (where applicable); and

Note: One or more non-ducted space heating units may be installed in a single business space up to a maximum combined capacity of 65kW as required to meet the particular load. These may be one or more separate room spacing heating units or multi-split units provided each unit complies with the eligibility criteria above.

- ii. is listed on the register of products; and
- iii. is installed by a person who is familiar with DR AS/NZS 5141:2017 Residential climate control systems— Minimum applications and requirements for energy efficiency, performance and comfort criteria and the Air Conditioning Residential Best Practice Guideline published by AIRAH and who undertakes to follow this guideline as far as possible when installing the new product.

Products that have been tested and registered for low temperature performance under condition H2 and meet the requirements of Clause 3.7 of AS/NZS3823.2 earn additional abatement.

CALCULATION OF ACTIVITY ABATEMENT VALUE

Credit calculations for the business sector use the same method as that used in the residential sector²⁵ except the assumed heating and cooling loads vary according to the factors listed in Section 3.1. Also, for this activity, credits are provided for savings in both heating and cooling energy consumption.

Proposed draft deemed savings formula

The total abatement factor in tonnes of carbon dioxide-equivalent (tCO_{2-e}) of greenhouse gas emissions saved in a premises for the activity is the relevant abatement factor for the specified high efficiency central electric space heater installed, exclusive of any abatement factor calculated for insulation of ductwork under Part 2.4 where required, is determined by using the equations prescribed in this section.

The abatement factor is calculated as—

$$\text{Abatement factor (t CO}_{2\text{-e}}) = [AAV_{\text{fixed}} + H2 + AAV_{\text{var}} \times (\text{ACOP} - \text{baseline})] \times \text{Capacity}$$

Where:

AAV_{fixed} , AAV_{var} and *baseline* are the relevant values prescribed in Table 2.5a (business premises – category 1) or Table 2.5b (business premises – category 2) or Table 2.5c (business premises – category 3) as applicable for the existing heater/cooler and the new product type.

ACOP is the Annual Coefficient of Performance recorded for the installed model in the Energy Rating database for condition H1

Category 1,2 and 3 are defined in Table 2.1a above

Capacity is the rated heating capacity of the installed model for condition H1 in kW up to a maximum of 65kW

H2 is a value of 0.04 if the installed model has been tested and registered for low temperature performance under condition H2 and meets the requirements of Clause 3.7 of AS/NZS3823.2 otherwise H2 is a value of 0.0 for all other products.

Note: Where a gas ducted heater is rated in megajoules per hour (MJ/h) this may be converted to a kilowatt (kW) rating by dividing the MJ/h rating by 3.6.

25 http://www.environment.act.gov.au/__data/assets/pdf_file/0008/857789/ACT-EEIS-Stakeholder-Consultation-on-2016-activities-update-report-2.pdf

Table 2.5a: Activity abatement values for replacing a central heating and cooling system with a specified high efficiency central electric air-conditioner (Business Premises – Category 1)

CODE	EXISTING HEATER TYPE	NEW PRODUCT TYPE	BASE EFFICIENCY (BASELINE) ACOP	FIXED EMISSIONS SAVINGS (AAV _{FIXED}) T CO _{2-E}	VARIABLE EMISSIONS SAVINGS (AAV _{VAR}) T CO _{2-E} /KW
H+CC1A	Qualifying Electric	Ducted High Efficiency Central Heat Pump	3.6	0.00	0.161
H+CC1B	Qualifying Electric	Non-ducted High Efficiency Central Heat Pump, or One or More Efficient Room Heat Pumps or a Multi-Split Heat Pump System.9	3.6	0.11	0.137
H+CC1C	Qualifying Electric	Ducted High Efficiency Central Heat Pump compliant with the provisions of section 3(b)(ii) above	3.1	0.00	0.209
H+CC2A	Qualifying Gas	Ducted High Efficiency Central Heat Pump	3.6	0.57	0.161
H+CC2B	Qualifying Gas	Non-ducted High Efficiency Central Heat Pump or One or More Efficient Room Heat Pumps or a Multi-Split Heat Pump System	3.6	0.68	0.137
H+CC2C	Qualifying Gas	Ducted High Efficiency Central Heat Pump compliant with the provisions of section 3(b)(ii) above	3.1	0.55	0.209

Table 2.5b: Activity abatement values for replacing a central heating and cooling system with a specified high efficiency central electric air-conditioner (Business Premises – Category 2)

CODE	EXISTING HEATER TYPE	NEW PRODUCT TYPE	BASE EFFICIENCY (BASELINE) ACOP	FIXED EMISSIONS SAVINGS (AAV _{FIXED}) T CO _{2-E}	VARIABLE EMISSIONS SAVINGS (AAV _{VAR}) T CO _{2-E} /KW
H+CC1A	Qualifying Electric	Ducted High Efficiency Central Heat Pump	3.6	0.00	0.131
H+CC1B	Qualifying Electric	Non-ducted High Efficiency Central Heat Pump or One or More Efficient Room Heat Pumps or a Multi-Split Heat Pump System	3.6	0.09	0.111
H+CC1C	Qualifying Electric	Ducted High Efficiency Central Heat Pump compliant with the provisions of section 3(b)(ii) above	3.1	0.00	0.170
H+CC2A	Qualifying Gas	Ducted High Efficiency Central Heat Pump	3.6	3.17	0.131
H+CC2B	Qualifying Gas	Non-ducted High Efficiency Central Heat Pump or One or More Efficient Room Heat Pumps or a Multi-Split Heat Pump System	3.6	3.26	0.111
H+CC2C	Qualifying Gas	Ducted High Efficiency Central Heat Pump compliant with the provisions of section 3(b)(ii) above	3.1	3.09	0.170

Table 2.5c: Activity abatement values for replacing a central heating and cooling system with a specified high efficiency central electric air-conditioner (Business Premises – Category 3)

CODE	EXISTING HEATER TYPE	NEW PRODUCT TYPE	BASE EFFICIENCY (BASELINE) ACOP	FIXED EMISSIONS SAVINGS (AAV _{FIXED}) T CO _{2-E}	VARIABLE EMISSIONS SAVINGS (AAV _{VAR}) T CO _{2-E} /KW
H+CC1A	Qualifying Electric	Ducted High Efficiency Central Heat Pump	3.6	0.00	0.146
H+CC1B	Qualifying Electric	Non-ducted High Efficiency Central Heat Pump or One or More Efficient Room Heat Pumps or a Multi-Split Heat Pump System	3.6	0.10	0.124
H+CC1C	Qualifying Electric	Ducted High Efficiency Central Heat Pump compliant with the provisions of section 3(b)(ii) above	3.1	0.00	0.190
H+CC2A	Qualifying Gas	Ducted High Efficiency Central Heat Pump	3.6	1.87	0.146
H+CC2B	Qualifying Gas	Non-ducted High Efficiency Central Heat Pump or One or More Efficient Room Heat Pumps or a Multi-Split Heat Pump System	3.6	1.97	0.124
H+CC2C	Qualifying Gas	Ducted High Efficiency Central Heat Pump compliant with the provisions of section 3(b)(ii) above	3.1	1.82	0.190

HARMONISATION WITH OTHER SCHEMES

This specific activity (targeting both heating and cooling equipment in a business premises setting) is not currently covered by any other jurisdiction. However, the NSW and Victorian jurisdictions do allow for replacement of space conditioning equipment in some business premises settings. These other schemes rely on GEMS and testing requirements as detailed in the AS/NZS 3823 series of standards. Effectively this limits the maximum capacity of an installed unit to 65 kW in line with the scope of the GEMS regulations. In this respect the proposed activity under the EEIS scheme harmonises with other jurisdictions.

CODES OF PRACTICE

The provisions within the current code of practice in relation to EEIS Activity 2.1 are considered to be also appropriate for this activity. As such, the codes of practice for this activity shall be identical to those for EEIS Activity 2.1 with minor amendments to ensure the specifics of this particular activity (namely replacement of both a heating and cooling system) are explicitly included within the scope of the code.

CONSULTATION QUESTIONS

12. Do you agree, for business premises, heat pump products should be allowed with a heat capacity value limit up to a maximum of 65 kW aligned with other schemes?
13. Do the proposed draft installed product requirements unduly limit the scope of eligible products?

Please add your answers to the [online survey](#).

PROPOSED NEW EEIS ACTIVITY 2.6 – REPLACING ROOM SPACE HEATING AND COOLING SYSTEMS IN A BUSINESS PREMISES

ACTIVITY DESCRIPTION

The proposed new EEIS Activity 2.6 involves the replacement of both a room heating and a room cooling system (i.e. pre-existing separate room heating and cooling systems) within a business premises. The activity involves providing incentives to install room electric reverse cycle heaters/coolers that have an efficiency significantly better than the market average (i.e. better than the business-as-usual case).

This activity is targeted at businesses with both pre-existing heating and cooling room conditioning equipment. This is an important distinction. Where only a pre-existing heater is assumed (e.g. in EEIS Activities 2.1 or 2.3) the assumption is that no pre-existing cooler exists and that as a consequence of replacing a pre-existing heater with a reverse cycle air-conditioner, the additional energy used when the replacement unit is operated in cooling mode is considered to constitute a dis-benefit in terms of energy savings (naturally there is an added benefit in terms of summer comfort conditions). In this activity, a pre-existing cooler exists and, as such, its replacement (in addition to the heater replacement) constitutes a benefit in terms of energy savings (i.e. newer more efficient heater/cooler replaces older less efficient heater AND cooler).

ACTIVITY DEFINITION

The following activity definition is proposed:

In accordance with the prescribed minimum activity performance specifications in section 2 of this Part, replace an eligible pre-existing room heating system and eligible room cooling system with a single high efficiency room electric reverse cycle air-conditioner for a business premise.

ELIGIBILITY REQUIREMENT

The following eligibility requirements are proposed:

Proposed draft eligibility requirements

To be an eligible activity the activity must—

- a. be undertaken at an eligible business premises that includes one of two categories of pre-existing heater and cooler types as described below (both a heater and cooler must be present to be eligible). Each different pre-condition attracts differing abatement values as specified in Tables 2.6 a, b, or c (as applicable). These categories of pre-condition are as follows:
 - i. **Category H+CR1:** a fixed electric space heater that is hard wired plus a fixed electric space cooler that is hard wired. All electric heater types are eligible provided they are not portable or plug-in electric heaters of any description. All electric cooler types are eligible provided they use heat pump technology (evaporative types are ineligible) and also provided they are not portable or plug-in electric coolers of any description.
 - ii. **Category H+CR2:** a flued gas heater plus a hard wired electric space cooler. Portable or unflued gas heaters of any description are ineligible. All room electric cooler types are eligible provided they use heat pump technology (evaporative types are ineligible) and also provided they are not portable or plug-in electric coolers of any description.

Note: In table 2.6 these categories of pre-condition (i.e. H+CR1 and H+CR2) form the first 5 characters of the code noted in the left hand column of that table.
- b. The existing heater and cooler must be decommissioned. When the new replacement system is installed, it must;
- c. be undertaken using a product or products meeting the installed product requirements in section 3 and
- d. be completed and certified in accordance with the relevant code or codes of practice and other relevant legislation applying to the activity, including any licensing, registration, statutory approval, activity certification, health, safety, environmental or waste disposal requirements and
- e. be recorded in accordance with any relevant code of practice for the activity.

Note: All activities are subject to independent inspection or audit to confirm compliance with prescribed activity requirements.

INSTALLED PRODUCT REQUIREMENTS

Installed product requirements are based on those specified in Activity 2.3 except that the replacement unit must be a reverse-cycle type unit.

Proposed draft installed product requirements

A specified high efficiency room electric reverse cycle air-conditioner for this activity is a room electric reverse cycle air-conditioner (RCAC) that meets the following requirements—

- a. Is listed in the register of products for the activity and
- b. Complies with Minimum Energy Performance Standards (MEPS) requirements (AS/NZS 3823.2) and
- c. Achieves a minimum annual coefficient of performance (ACOP) of either:
 - i. (i) 4.0 at condition H1 (AS/NZS 3823.2) or
 - ii. (ii) 3.8 at condition H1 (AS/NZS 3823.2) provided that:
 - a. The installation is to serve a conditioned floor area of not less than 55m²;
 - b. the unit has been tested and registered for low temperature performance under condition H2 and meets the requirements of Clause 3.7 of AS/NZS3823.2;
 - c. the unit has a minimum heating capacity of 7 kW at H1 condition (AS/NZS 3823.1.1, AS/NZS 3823.1.2 or AS/NZS 3823.1.4 as applicable);
- d. Has a rated heating capacity of not more than 65 kW at H1 condition (AS/NZS 3823.1.1, AS/NZS 3823.1.2 or AS/NZS 3823.1.4 as applicable) and, except as required above in subsection (c)(ii)(c) where applicable, has a minimum rated heating capacity of 2 kW at condition H1;
- e. Has a variable speed compressor, where such products are available; and
- f. Is installed by a person who is familiar with DR AS/NZS 5141:2017 *Residential climate control systems—Minimum applications and requirements for energy efficiency, performance and comfort criteria and the Air Conditioning Residential Best Practice Guideline* published by AIRAH and who undertakes to follow this guideline as far as possible when installing the new product.

Note 1 Products that have been tested and registered for low temperature performance under condition H2 and meet the requirements of Clause 3.7 of AS/NZS3823.2 earn additional abatement.

Note 2 Multiple units may be installed in a single (large) business space up to a maximum combined capacity of 65kW as required to meet the particular load. These may be separate units or multi-split units provided each unit complies with the eligibility criteria above.

Products that have been tested and registered for low temperature performance under condition H2 and meet the requirements of Clause 3.7 of AS/NZS3823.2 earn additional abatement.

Consideration is also currently being given to the possible inclusion of requirements in relation to demand–response capabilities of the installed product. This aspect is dealt with separately in Section 5 of this document.

CALCULATION OF ACTIVITY ABATEMENT VALUE

Credit calculations for the business sector use the same method as that used in the residential sector²⁷ except the assumed heating and cooling loads vary (refer to section 4.1 for details of the factors that influence this variation).

In addition, in this particular activity (as distinct from activity 2.3), credits are provided for savings in both heating and cooling energy consumption.

Proposed draft deemed savings formula

The total abatement factor in tonnes of carbon dioxide-equivalent (tCO_{2-e}) of greenhouse gas emissions saved in a premises for the activity is the relevant abatement factor for the specified high efficiency room electric reverse cycle air-conditioner installed, determined by using the equations prescribed in this section.

The abatement factor is calculated as—

$$\text{Abatement factor (t CO}_{2\text{-e}}\text{)} = [\text{AAV}_{\text{fixed}} + \text{H2} + \text{AAV}_{\text{var}} \times (\text{ACOP} - \text{baseline})] \times \text{Capacity}$$

Where:

AAV_{fixed}, AAV_{var} and *baseline* are the relevant values prescribed in Table 2.6a (business premises – category 1) or Table 2.6b (business premises – category 2) or Table 2.6c (business premises – category 3) as applicable for the existing heater/cooler and the new product type.

ACOP is the Annual Coefficient of Performance recorded for the installed model in the Energy Rating database for condition H1

Category 1, 2 and 3 are defined in Table 2.1a

Capacity is the rated heating capacity of the installed model for condition H1 in kW.

H2 is a value of 0.04 if the installed model has been tested and registered for low temperature performance under condition H2 and meets the requirements of Clause 3.7 of AS/NZS3823.2 otherwise H2 is a value of 0.0 for all other products.

27 Refer to the 2016 EEIS legislation update documentation (EPSDD 2016)

Table 2.6a: Activity abatement values for replacing a room heater and cooler with a specified high efficiency room electric air-conditioner (Business Premises – Category 1)

CODE	EXISTING HEATER TYPE	NEW PRODUCT TYPE	BASE EFFICIENCY (BASELINE) ACOP	FIXED EMISSIONS SAVINGS (AAV _{FIXED}) T CO _{2-E}	VARIABLE EMISSIONS SAVINGS (AAV _{VAR}) T CO _{2-E} /KW
H+CR1A	Qualifying Electric	Non-ducted High Efficiency Heat Pump	3.7	0.00	0.118
H+CR1B	Qualifying Electric	Non-ducted High Efficiency Heat Pump	3.7	0.00	0.118
H+CC2A	Qualifying Gas	Non-ducted High Efficiency Heat Pump	3.7	0.43	0.118
H+CC2B	Qualifying Gas	Non-ducted High Efficiency Heat Pump	3.7	0.43	0.118

Table 2.6b: Activity abatement values for replacing a room heater and cooler with a specified high efficiency room electric air-conditioner (Business Premises – Category 2)

CODE	EXISTING HEATER TYPE	NEW PRODUCT TYPE	BASE EFFICIENCY (BASELINE) ACOP	FIXED EMISSIONS SAVINGS (AAV _{FIXED}) T CO _{2-E}	VARIABLE EMISSIONS SAVINGS (AAV _{VAR}) T CO _{2-E} /KW
H+CC1A	Qualifying Electric	Non-ducted High Efficiency Heat Pump	3.7	0.00	0.099
H+CC1B	Qualifying Electric	Non-ducted High Efficiency Heat Pump	3.7	0.00	0.099
H+CC2A	Qualifying Gas	Non-ducted High Efficiency Heat Pump	3.7	2.41	0.099
H+CC2B	Qualifying Gas	Non-ducted High Efficiency Heat Pump	3.7	2.41	0.099

Table 2.6c: Activity abatement values for replacing a room heater and cooler with a specified high efficiency room electric air-conditioner (Business Premises – Category 3)

CODE	EXISTING HEATER TYPE	NEW PRODUCT TYPE	BASE EFFICIENCY (BASELINE) ACOP	FIXED EMISSIONS SAVINGS (AAV _{FIXED}) T CO _{2-E}	VARIABLE EMISSIONS SAVINGS (AAV _{VAR}) T CO _{2-E} /KW
H+CC1A	Qualifying Electric	Non-ducted High Efficiency Heat Pump	3.7	0.00	0.109
H+CC1B	Qualifying Electric	Non-ducted High Efficiency Heat Pump	3.7	0.00	0.109
H+CC2A	Qualifying Gas	Non-ducted High Efficiency Heat Pump	3.7	1.42	0.109
H+CC2B	Qualifying Gas	Non-ducted High Efficiency Heat Pump	3.7	1.42	0.109

HARMONISATION WITH OTHER SCHEMES

This activity (targeting both heating and cooling equipment in a business premises setting) is not currently covered by any other jurisdiction. However, the NSW and Victorian jurisdictions do allow for replacement of space conditioning equipment in some business premises settings. These other schemes rely on GEMS performance standards and testing requirements as detailed in the AS/NZS 3823 series of standards. In this respect the proposed activity under the EEIS scheme harmonises with other jurisdictions.

CODES OF PRACTICE

The provisions within the current code of practice in relation to activity 2.3 are considered to be also appropriate for this activity. As such, the codes of practice for this activity would be identical to those for activity 2.1, with only minor amendments to ensure the specifics of this particular activity (namely replacement of both a heating and cooling system) are explicitly included within the code.

? CONSULTATION QUESTIONS

14. Do the proposed draft installed product requirements unduly limit the scope of eligible products?

Please add your answers to the [online survey](#).

CONCLUSION

These four proposed EEIS draft business HVAC activities are a first step. Comments on possible additional future business HVAC activities are also welcome.

GENERAL ISSUE TO CONSIDER

15. What other business HVAC activities would you like to see EEIS develop in the future?

16. What methodologies would be most appropriate for them?

Please add your answers to the [online survey](#).

DEMAND- RESPONSE OPTIONS

A key objective of the EEIS is to help residential and business premises reduce energy costs and thereby reduce their cost of living. Activities, like commercial LED lighting upgrades, not only reduce energy costs but reduce peak electricity demand, reducing the need for additional supply side electricity infrastructure investment. This puts downward pressure on electricity prices compared to business-as-usual.

BENEFITS OF DEMAND-RESPONSE CAPABILITY

Demand-response (DR) provides an additional way to reduce peak electricity demand and put downward pressure on electricity prices to further help cut household and business energy costs. During times of peak energy use, pre-approved appliances automatically turn off or, in the case of air conditioning and heating units, cycle on and off to conserve energy.

The International Energy Agency benchmark is that DR can reduce peak electricity demand by up to 15%.²⁸ The *Independent Review into the Future Security of the National Electricity Market*²⁹ concluded that aggregated DR can also moderate electricity price pressures. Sub-national governments like the ACT Government have a role to play to address market and information failures and thereby help create the necessary scale of DR capability to make it worthwhile for private electricity distribution companies and/or DR aggregators to invest in ACT DR programs.

The Australian Energy Market Commission in 2012 found peak electricity demand reduction potential existed via energy efficiency and DR to reduce national peak electricity costs over a decade by \$11.8 billion.³⁰ Customers who participate in DR programs are rewarded through being paid during peak electricity demand events. According to the most recent national survey, four in five Australians said they would like to be involved in DR programs.³¹ DR programs also provide value for electricity distribution companies³¹ by deferring the need to build additional peak electricity supply infrastructure. Quantifying these cost benefits of avoided transmission and distribution (T&D) is complex; estimates vary significantly and are very system specific. In marginal cost studies and interviews with utility engineers, avoided T&D costs typically ranged from \$0 to \$75/kW-yr. While the range is broad, avoided costs of \$20 to \$30/kW-year are the most commonly accepted assumption. For large demand response programs, the value can be higher, at between \$60-100 per kW each year.

28 Re-Powering Markets: Market Design and Regulation during the Transition to Low-Carbon Power Systems” (Paris: International Energy Agency), accessed March 5, 2017, p.155.

29 <https://www.energy.gov.au/publications/independent-review-future-security-national-electricity-market-blueprint-future>

30 Hasham, N (2017) Energy policy: power companies could remotely turn down your appliances in exchange for cash. The Brisbane Times <https://www.brisbanetimes.com.au/politics/federal/energy-policy-power-companies-could-remotely-turn-down-your-appliances-in-exchange-for-cash-20170831-gy8huu.html>

31 Ibid

32 The Australia Institute (2017) Australian’s prefer Demand Response over New Power Stations. Accessed at <http://www.tai.org.au/content/australians-prefer-demand-response-over-new-power-stations-poll>

ADDING DEMAND–RESPONSE CAPACITY INTO EEIS ACTIVITIES

DR capability could be included in EEIS activity minimum product requirements for products like heat pumps³³ and records maintained about which installations have this capacity. EEIS activities where some DR-capable technologies exist include:

- Activity 2.1—Replace inefficient central space heating for residential and business applications¹
- Activity 2.3—High efficiency electric room heating for residential and business applications²
- Activity 2.5—Replace a central heating and cooling system in a business premises and
- Activity 2.6—Replace a room heating and cooling system in a business premises.

For these activities, DR capability is available in reverse cycle air-conditioning heat pump products for room space heating with a heat capacity <15 kW. So, DR could be integrated into activities via the minimum product requirements sub-subsection of the EEIS Determination for these EEIS activities by adding the following draft text:

Reverse cycle room air-conditioning (RCAC) products <15 kW heat capacity must have a DR capability in accordance with AS 4755.3.1 built into the product and such capability must be ready to use as supplied. In either heating or cooling mode, the device must be capable of operating in DR modes 1, plus mode 2 and/or 3 as defined in AS4755.3.1.

The following detailed requirements would also apply for room RCAC heat pump products:

The DR capability must be, in principle, physically able to be activated at the time of installation of the air-conditioner i.e. no additional components shall be required to be installed prior to activation taking place.

CONSULTATION QUESTIONS

17. Do you support 'demand–response capability' being incorporated as a minimum product requirement for reverse cycle room air-conditioning heat pump systems with < 15 kW heat capacity³⁴ as part of EEIS Activities 2.1 and 2.3, 2.5 and 2.6?³⁵

Please add your answers to the [online survey](#).

³³ Lawrence Berkeley National Laboratory (2011) Co-ordinating Energy Efficiency and Demand Response at <https://eetd.lbl.gov/sites/all/files/publications/report-lbnl-3044e.pdf>

³⁴ Please note that in commercial buildings, more than one non-ducted room or multi-split system can be used totalling < 65 kW. Thus, for commercial buildings, 2-3 reverse cycle split room space conditioners can be used with demand response capability.

³⁵ Note, this does not mandate a mandatory demand response capability requirement for ducted reverse cycle heat pump products or multi-split reverse cycle heat pump systems.



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