



REES

Bulletin



REES Bulletin No. 20

REES Commercial Lighting Upgrade Activities

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Key messages

- ▶ All products installed under the Retailer Energy Efficiency Scheme (**REES**) commercial lighting upgrade must be approved under the NSW Energy Savings Scheme (**ESS**), or for LED linear tube products, the Victorian Energy Efficiency Target (**VEET**) Scheme.
- ▶ The commercial lighting upgrade minimum specification and the REES Code (particularly Schedule 3), set out the minimum requirements for commercial lighting upgrade activities.
- ▶ REES reporting and evidence requirements for commercial lighting upgrades can be found in this REES Bulletin.

1 Introduction

The Essential Services Commission (**Commission**) as the administrator of the Residential Energy Efficiency Scheme (**REES**), administers the scheme within the parameters defined by the policy framework to ensure that energy retailers comply with REES.

This Bulletin relates to REES commercial lighting upgrade activities and outlines the minimum reporting and evidence requirements.

The specifications for approved REES Energy Efficiency Activities (**Activities**) under REES, as set by the Minister for Mineral Resources and Energy (**Minister**), include various requirements that must be complied with to enable an energy efficiency activity to be counted in fulfilment of a REES target. The REES Energy Efficiency Activity General Specifications (**General Specifications**) that apply to all Activities, and minimum specification for commercial lighting upgrade activities, can be found at: <http://www.dpc.sa.gov.au/what-we-do/services-for-business-and-the-community/energy-efficiency/retailer-energy-efficiency-scheme>.

Note: This REES Bulletin provides guidance and clarification only and must be read in conjunction with the minimum specification for commercial lighting upgrades, the general specifications and the REES Code.¹ While the ESS Commercial Lighting Calculation Tool is utilised for calculating energy savings under REES, the associated requirements outlined in this Bulletin relate to REES only.

1.1 Before undertaking a commercial lighting upgrade activity

1.1.1 Product eligibility

At the time of installation, the new lighting equipment to be installed must:

- ▶ be on the list of products accepted for installation under the ESS, as published by the ESS Administrator, or
- ▶ for LED linear tube products - be listed on the VEET Scheme Product Register and comply with all requirements of Australian/New Zealand Standards (**AS/NZS**) 60598.2.1:2014 – Luminaires – Particular Requirements – Fixed general purpose luminaires (including amendments), with specific regard to the requirements for LED tubes.

¹ The Commission's, *Retailer Energy Efficiency Scheme Code (REESC/08)*, January 2015; available at <http://www.escosa.sa.gov.au/residential-energy-efficiency-scheme-rees/rees-code.aspx>.

1.1.2 Australian Standards

Particular regard should be given to the Australian Standards listed in Table 1, to ensure installations comply with the minimum specification for commercial lighting activities.

Table 1 – Australian Standards

Standard number	Standard name
AS/NZS 1158	Lighting for roads and public spaces
AS/NZS 1680	Interior lighting
AS 2144	Traffic signal lanterns
AS 2293.1	Emergency escape lighting and exit signs for buildings
AS/NZS 3000	Wiring Rules - Electrical installations
AS/NZS 3820	Essential safety requirements for electrical equipment
AS/NZS 4783.2	Performance of electrical lighting equipment - Ballasts for fluorescent lamps - Part 2: Energy labelling and minimum energy performance standards requirements
AS/NZS 60598.1	Luminaires - General requirements and tests
AS/NZS 60598.2.1	Luminaires – Fixed general purpose luminaires

1.1.3 Eligible address

Commercial lighting activities undertaken in buildings or relating to assets owned by the South Australian Government are not eligible activities under REES.

The General Specifications state that a REES-approved activity may only be performed once at a premises.

The reporting system established by the Commission under the REES Code requires obliged retailers to record legitimate addresses by reference to a Delivery Point Identifier (**DPID**) issued by Australia Post. Eligibility for a premises is based on this unique DPID. A commercial lighting activity can only be delivered once at a unique address (DPID), except in cases where multiple businesses share an address with one DPID (for example, a group of shops in a shopping centre). In these cases, an obliged retailer must demonstrate that each customer has a unique Australian Business Number or Australian Company Number.

Where a DPID spans multiple sites (for example 1-10 Smith Street), and only one business (one ABN) occupies that site, only one commercial lighting upgrade activity may be delivered. Where there are multiple National Meter Identifiers (**NMI**) for that business, refer to section 1.1.6 for details on determination of customer size.

In the absence of a DPID, please refer to [REES Bulletin 7 – Addresses without a Delivery Point Identifier](#).

If the address does not meet the criteria listed in REES Bulletin 7, an application can be made to the Commission to use a compliance declaration. Types of evidence that are required to be submitted to the Commission to help identify the premises' eligibility include the following:

- ▶ energy bills
- ▶ council rates
- ▶ business listings (google, white pages, business cards, etc)
- ▶ photos of the premise, and/or
- ▶ any other evidence gathered.

The matrix in Table 2 may be useful in determining the eligibility of a premises and required action.

Table 2: Determining eligibility of premises' for a Compliance Declaration*

No. of businesses	No. of premises	No. of NMIs	General action
1	1	1	One install, address declaration if no DPID
1	>1	1	One install, address declaration if no DPID
1	1	>1	One install, usage from highest NMI used to determine customer size
1	>1	>1	One install per NMI <u>per DPID</u> . Where no DPID is available, evidence of premises must be collected as per above. If one install - address declaration if no DPID If multiple premises evidenced, with separate NMIs per premises – compliance declaration may be required
>1	1	1	One install per business with evidence of usage split. Compliance declaration approval required
>1	>1	1	One install per business with evidence of usage split. Compliance declaration approval required
>1	1	>1	One install per business with evidence of usage split. Compliance declaration approval required
>1	>1	>1	One install per NMI, per DPID. Address declaration only if no DPID

* Please note this matrix is a guide only. For further clarification please contact the Commission.

1.1.4 Calculation of energy savings

Energy savings from commercial lighting activities must be calculated using the ESS Commercial Lighting Calculation Tool, available at:

http://www.ess.nsw.gov.au/Methods_for_calculating_energy_savings/Commercial_Lighting.

For lamp-only replacements of fluorescent tubes with LED tube products, energy savings will be calculated using the ESS Commercial Lighting Calculation Tool and the lighting category 'LED Lamp Only 240V – Self Ballasted' (refer Table 4).

The output unit of the ESS Commercial Lighting Calculation Tool is Megawatt hours (**MWh**) which, for reporting purposes, must be converted to gigajoules (**GJ**) by multiplying the MWh savings by 3.6 (up to a maximum of 900 GJ).

Appendix D of the [ESS Commercial Lighting Method Guide](#) contains the possible inputs to the ESS Commercial Lighting Calculation Tool from the relevant tables from Schedule A of the ESS Rule.

1.1.5 Maximum claimable energy savings

For commercial lighting upgrades, the minimum specification limits the energy saving that can be claimed for each eligible address to 900 GJ. Activity providers may elect to deliver lighting upgrades to a business that would result in greater than 900 GJ of energy savings; however, only 900 GJ of the total savings may be claimed for the purposes of REES.

For each activity reported, both the claimable energy savings (up to 900 GJ per address) and gross energy savings (total delivered through the REES) must be reported in the REES-R reporting template. The figure reported in the 'quantity' column of the REES-R reporting template must relate to the total gross number of lights delivered for that activity as relates to the 'gross energy savings' column (refer Table 3).

This limit is the total maximum amount of energy savings that can be claimed at an individual address. If an individual address/DPID has more than one NMI, activity providers are still only able to claim a maximum energy saving of 900 GJ at that address.

1.1.6 Determination of customer size

A small energy consuming customer is one that consumed less than 160 MWh of electricity per NMI in the 12 months prior to the completion of the commercial lighting upgrade activity.

A large energy consuming customer is one that consumed 160 MWh or more of electricity per NMI in the 12 months prior to the completion of the commercial lighting upgrade activity.

Where a business has multiple NMIs at an address/DPID, the NMI with the highest consumption should be used for determining if the customer is large or small.

Retailers may use an electricity bill (minimum of one) detailing consumption for the installation address/DPID from the 12 months prior to the upgrade to determine customer size. Where an individual bill is not available (for example, where an NMI is shared, inset networks, and so on), split meter readings, individual charges and customer declarations can be used as evidence for determination of customer size.

1.2 During a commercial lighting upgrade activity

This section explains the evidence that should be collected during a commercial lighting upgrade activity.

1.2.1 Evidence requirements

The minimum requirements are set out in the commercial lighting upgrade minimum specification published by the Minister. In addition, Schedule 3 of the REES Code outlines the minimum requirements for REES activity records.² The following documents should be retained to assist in satisfying those requirements.

² Refer REES Code – available at: <http://www.escosa.sa.gov.au/library/20141218%20-%20REES%20-%20REESCode08.pdf>.

1.2.1.1 General

The following evidence should be retained for all commercial lighting upgrade activities (refer Appendix One for specific document requirements):

- ▶ activity Record in accordance with Schedule 3 of the REES Code and the minimum specification for commercial lighting upgrades
- ▶ evidence of National Construction Code (NCC)³ classification to support: space type, building classification, and annual operating hours
- ▶ evidence of the lighting in its location, before and after the upgrade
- ▶ evidence of customer size
- ▶ evidence of lamp type and quantity
- ▶ evidence of control gear
- ▶ evidence of control systems
- ▶ evidence of air conditioning in each space
- ▶ electrical Certificate of Compliance (COC) (where applicable)
- ▶ proof that all removed lighting equipment (including lamps and control gear) has been properly decommissioned, in the form of a decommissioning certificate (bulk certificates are acceptable)
- ▶ an electronic copy of the generated report from the ESS Commercial Lighting Calculation Tool in Portable Document Format (PDF)
- ▶ evidence of occupational licensing for installers (identification of licence number)
- ▶ evidence that the installed products are accepted under the ESS, or VEET for linear LED products (registry extract or approval letter matching the brand and model number to that installed)
- ▶ for LED tube retrofits (without modification), evidence of the true power factor measurement, assessment approach and results of measurements made (before and after installation)
- ▶ for modified LED luminaires, evidence that the recipient has received, and acknowledged receipt of, written information that the modification work will likely void the original luminaire manufacturer's warranty, and
- ▶ evidence that each space, after implementation of the lighting upgrade achieves:
 - the relevant requirements of AS/NZS 1680
 - the requirements of the NCC section F4.4, artificial lighting, and
 - an Illumination Power Density (IPD) that equals or is less than the maximum IPD for each space, as defined in Part J6 of the NCC.

³ The National Construction Code (also referred to as Building Code of Australia (BCA)).

1.2.1.2 Small customers

In addition to the general requirements, the following evidence should be retained for commercial lighting upgrade activities delivered to small customers:

- ▶ Evidence that the recipient has received, and acknowledges receipt of, written information on:
 - the details of the new lighting equipment, including colour temperature, colour rendering and illumination levels, and
 - the steps the recipient can take should the new lighting equipment be sub-optimal or unsatisfactory.

1.2.1.3 Large customers

In addition to the general requirements, the following evidence should be retained for commercial lighting upgrade activities delivered to large customers:

- ▶ A **professionally drawn lighting diagram**⁴ which includes the post-installation lighting levels, showing the location and type of each luminaire or lamp, control gear/control system/air conditioning before and after the upgrade.
- ▶ A valid tax invoice clearly showing the completion date, the address, the name and contact details of the person billed for the installation, and the amount charged for the installation (minimum \$1.40/GJ including GST).⁵

Refer Appendix One for details on the minimum requirements for demonstrating compliance in this area.

1.3 After undertaking a commercial lighting upgrade activity

This section explains the reporting requirements following a commercial lighting upgrade activity.

1.3.1 REES-R reporting template inputs

The naming convention for files to be validated in REES-R must conform to 'RETAILER ID_DATE_CommercialLighting'. For example - TES_180101_CommercialLighting.

The reporting template for commercial lighting activities can be accessed from the 'Downloads'- 'Templates' menu in REES-R (Example 1).

Example 1: Reporting for commercial lighting activities

A	B	C	D	E	F	G	H	I	J	K	L	M
Customer Type (Residential or Commercial)	Customer Size (Small or Large)	Site Name	Activity	Classification	Quantity	UOM	Address	Transaction Date	Transaction ID	Energy Saving	Gross Energy Saving	Declaration Type
Commercial	Small	Test	LEDDownLampOnly	G	1	Qty (Units)	1 Test Street, Test, SA 5000	170101	12345	900	1500	

The header rows of the template are set with the required input fields. See for a description of each field and the required input.

Only one data line should be reported per activity type (REES-R Reporting File Input - lamp or luminaire) at an address. Data lines should not be split by area (for example, kitchen, office and storage) or ballast type in the REES-R reporting file (even if split in the ESS Commercial Lighting Calculation Tool).

⁴ Professionally drawn lighting diagram – diagrams of plans drafted using accepted industry conventions, symbols, perspectives, units of measurements and notations systems which are usually generated by a professional draftsman or with the aid of a Computer Aided Design system.

⁵ The minimum specification for commercial lighting upgrades sets a minimum payment requirement of \$1.40 per GJ for large energy consuming customers.

Table 3: Commercial lighting reporting template data requirements

Field name	Required input
Customer type (residential or commercial)	Input is equal to 'Commercial' for all commercial lighting activities.
Customer size	The customer size as defined in the Commercial Lighting Upgrade minimum specification. Input is 'Small' for Small Energy Consuming Customers or 'Large' for Large Energy Consuming Customers.
Site name	The business name of the receiving business.
Activity	The appropriate activity abbreviation as set out in the Activities definition file download available from REES-R and listed in Table 4 (under REES-R Reporting File Input) of this Bulletin.
Classification	The ANZSIC code for the building where the activity took place. A single letter from A-S or 'Unknown'. Refer Table A18 of the ESS Commercial Lighting Method Guide.
Quantity	The gross total quantity of globes installed for the activity type (as relates to the Gross Energy Savings column).
UOM (unit of measure)	Input is equal to 'Qty (units)' for all commercial lighting activities.
Address	The unique address for the premises where the activity took place.
Transaction date	The date on which the activity was completed at the premises as YYMMDD.
Transaction ID	A unique identifying number allocated by the activity provider or obliged retailer.
Energy savings (claimed)	The total claimed energy savings for the activity delivered. The output from the ESS Commercial Lighting Calculation Tool x 3.6 up to a maximum of 900 GJ total.
Gross energy savings	The gross total energy savings for the activity delivered. The output from the ESS Commercial Lighting Calculation Tool x 3.6 including amounts above 900GJ.
Declaration type	'Address' (only applicable for legitimate addresses with no DPID (refer REES Bulletin 7)) or 'Compliance' (written approval required from the Commission).

1.3.2 REES-R activity reporting categories

The REES-R reporting categories identified in Table 4 should be used in the reporting file for commercial lighting activities for the corresponding ESS Commercial Lighting Calculation Tool products. REES-R reporting file inputs can be downloaded for all activities from the 'Downloads'- 'Definition Files' menu in REES-R.

Table 3 : REES-R activity reporting categories

REES–R reporting title	REES–R reporting file input (activity)	ESS Calculation Tool product
LED Downlight - Lamp Only	LEDDownLampOnly	LED Lamp Only – ELV LED Lamp Only - 240V Self Ballasted
LED Downlight - Luminaire	LEDDownLuminaire	LED Lamp and Driver LED Luminaire (Recessed)
Induction Lamps	Induction Lamps	Induction Luminaire
Linear LED – Lamp Only	LinearLEDLampOnly	LED Lamp Only - 240V Self Ballasted
Linear LED - Luminaire	LinearLEDLuminaire	LED Luminaire (Linear Lamp) Modified Luminaire (LED Linear Lamp)
LED Floodlight	LED Floodlight	LED Luminaire (Floodlight)
LED High/Low Bay	LED High/Low Bay	LED Luminaire (High/Low Bay)
(VRU) Voltage Reduction Unit	VRU	(VRU) Voltage Reduction Unit
Other LED	OtherLED	LED Luminaire (Fixed Type) LED Luminaire (Streetlight) LED Luminaire (Hospital Use)
Other Emerging Lighting Technology	Other Emerging Lighting Technology	Other Emerging Lighting Technology
Other Commercial Lighting	OtherCommLighting	T8 or T12 T5 CFLn Circular Fluorescent Metal Halide Mercury Vapour High Pressure Sodium Tungsten Halogen 240v Infra Red Coated Halogen (ELV) Specific LCP request

1.4 Additional information for linear tube products

For linear LED lamp-only replacements, the 'Lamp Only - 240v Self Ballasted' category must be selected from the ESS Commercial Lighting Calculation Tool and reported to the Commission using the REES-R reporting file input 'LinearLEDLampOnly' as specified in Table 4.

For linear LED installations where the luminaire is modified, the selections outlined in Table 5 must be made in the ESS Commercial Lighting Calculation Tool.

Table 4 : Modified luminaire selections in the ESS Commercial Lighting Calculation Tool

ESS Commercial Lighting Calculation Tool section	Input/selection
Upgraded lighting equipment – lamp type	Modified Luminaire (LED Linear Lamp)
Annual operating hours – lifetime specification	1) Replacement of: - Luminaire; or - Control Gear (not integrated in Lamp).

Modified luminaires must be reported to the Commission using the REES-R reporting file input 'LinearLEDLuminaire' as specified in Table 4.

To 'modify' a luminaire means to change its componentry, beyond the starter. This could include re-wiring, removing/bypassing the capacitor, or removing/bypassing the ballast.

For complete luminaire replacements with Linear LEDs, the 'LED Luminaire (Linear Lamp)' category must be selected from the ESS Commercial Lighting Calculation Tool and reported to the Commission using the REES-R reporting file input 'LinearLEDLuminaire' as specified in Table 4.

1.4.1 Modification of fluorescent luminaires (removal or bypassing of T8 and T12 ballasts and capacitors)

There is no specific requirement under the minimum specification for commercial lighting upgrades to bypass the ballast or capacitor for tube upgrades to LED products. The ballast/capacitor must be bypassed where the installation instructions for the product installed require this to occur, for the purposes of complying AS/NZS 60598.2.1:2014 (including amendments), or where required under any other applicable standards, codes or law.

1.4.1.1 Compliance with AS/NZS 60598 for LED tubes and new luminaires

All LED tubes and new luminaires should comply with AS/NZS 60598.1:2014 and any applicable sections of part two of that series of safety standards. Part one covers safety requirements for luminaires. Part two covers essential safety requirements for fixed general purpose luminaires, and for double-capped LED lamps. This standard is to be read in conjunction with AS/NZS 60598.1. The applicable requirements of AS/NZS 60598 include, but are not limited to:

- ▶ classification of lamps
- ▶ markings for lamp, luminaire and components
- ▶ information to be supplied with the lamp
- ▶ construction for reliability, safety and protection for users, and
- ▶ protection against electric shock and live parts.

Further information about each of these requirements can be found in AS/NZS 60598.

Compliance with the requirements of AS/NZS 60598 for LED tubes and new luminaires can be evidenced through geotagged photographs, installer declarations and information or instructions provided with modified luminaires (may be included on the COC).

1.4.1.2 For modified LED luminaires

Where linear florescent luminaires are modified to accept linear LED tubes, a COC must be provided and retained for verification purposes. The COC must:

- ▶ define the modification work for each type of linear fluorescent luminaire
- ▶ specify that the modification work includes electrical isolation of the legacy ballast (and capacitor if one was present), and
- ▶ specify that the work was performed in accordance with the safety requirements of AS/NZS 60598.2.1:2014, including amendments.

Where linear florescent luminaires are modified to accept linear LED tubes, written evidence that the recipient has received, and acknowledged receipt of, written information that the modification work will likely void the original luminaire manufacturer's warranty. This acknowledgment can form part of a signed statement included in the REES activity record (refer to Section 5.2 of the REES Code).

1.4.1.3 For LED tube retrofits (without modification)

Where linear LED tubes are installed in accordance with the instructions provided with the LED tube, but without removal of legacy ballasts and/or capacitors, installers must:

- ▶ Measure and assess the true power factor of the upgraded lighting circuit, with the aim that the upgrade should not have a detrimental impact on the customer's compliance with:
 - Section 6.5.3 of SA Power Networks Service and Installation Rules, 2016.⁶ This requirement can be met by any reasonably verifiable and technically sound means proposed by the installer, and
 - AS/NZS 3000 Wiring Rules.
- ▶ Obtain approval from the Commission for the proposed power factor measurement and assessment methodology prior to proceeding with the installation. An approved methodology can be used across multiple installations, providing the methodology does not change. Evidence that a methodology is approved by the Essential Services Commission of Victoria for the purposes of the VEET Scheme will be sufficient to meet this installation requirement.

1.5 AS/NZS 1680 compliance

Building lighting upgrades must meet or exceed the relevant requirements of AS/NZS 1680. To verify that a lighting upgrade complies with the standard, one of the following methods must be used:

Method A – Design and verification approach

This involves developing an AS/NZS 1680 compliant upgrade model using lighting design software, and then showing that the lighting upgrade was installed as designed.

Method B – Illumination measurements approach

This involves taking measurements showing that the lighting upgrade complies with AS/NZS 1680 and confirming that glare control and illumination uniformity has been assessed.

The evidence requirements for each method are outlined in Appendix One.

⁶ SA Power Networks, *Service and Installation Rules*, February 2016; available at http://www.sapowernetworks.com.au/centric/industry/contractors_and_designers/service_and_installation_rules.jsp.

Appendix One – Evidence requirements

Evidence collection should meet the minimum document requirements identified below. For the avoidance of doubt, greater than the minimum number of documents specified may be collected for each evidence type.

Table A1: Minimum evidence requirements

Evidence type	Minimum document requirement	Evidence requirement
Evidence of NCC ⁷ classification to support: <ul style="list-style-type: none"> ▶ space type ▶ building classification, and ▶ annual operating hours. 	One document from Category A and one document from Category B	Category A Geo-tagged photos of the outside part of the premises and interior photos of the upgraded areas Category B Refer Table 4.16 and 4.17 of the ESS Commercial Lighting Evidence Manual for evidence options for this category
Lighting in its location	One pre-upgrade document and one post-upgrade document (note: the same document type must be provided for pre and post-upgrade)	Pre-upgrade Geo-tagged photos Lighting diagram Post-upgrade Geo-tagged photos Lighting diagram
Evidence of customer size	One document	Customer energy bill from previous 12 months prior to the completion of the lighting upgrade activity

⁷ National Construction Code (also referred to as Building Code of Australia (BCA)).

Evidence type	Minimum document requirement	Evidence requirement	
Lamp type and quantity	One pre-upgrade document and one post-upgrade document	Pre-upgrade Geo-tagged photos Lighting diagram Electrical certificate of compliance	Post-upgrade Geo-tagged photos Lighting diagram Manufacturer's data sheet Electrical certificate of compliance Itemised tax invoice
Control gear (ballasts/transformers)	1 pre-upgrade document and 1 post-upgrade document	Pre-upgrade Geo-tagged photos Lighting diagram Electrical certificate of compliance	Post-upgrade Geo-tagged photos Lighting diagram Manufacturer's data sheet Electrical certificate of compliance Itemised tax invoice
Lighting control system	One document	Lighting diagram Geo-tagged photos Electrical certificate of compliance Manufacturer's data sheet	
Air conditioning	One document	Lighting diagram Geo-tagged photos	
Removed lighting decommissioning	One document	Decommissioning/recycling certificate (reconciling number or weight) of equipment removed	
Occupational licensing	One document	REES activity record - Identification of electrical contractor and electrical worker licence number	

Evidence type	Minimum document requirement	Evidence requirement
Product approval	One document	Registry extract or approval letter from the relevant authority (IPART or ESC Victoria) evidencing that the installed products are accepted under the ESS, or VEET for linear LED at the time of installation.
Power factor measurement and verification (Only required for LED tube retrofits without modification)	Two documents	True power factor measurements of affected lighting circuits made (before and after installation). Details of approved power factor assessment approach.
Modified luminaries special requirements	Two documents	REES activity record - Acknowledgement by customer of written information that the modification work will likely void the original luminaire manufacturer's warranty Electrical certificate of compliance detailing: <ul style="list-style-type: none"> ▶ the modification work for each type of linear fluorescent luminaire; ▶ specify that the modification work includes electrical isolation of the legacy ballast (and capacitor if one was present), and ▶ specify that the work was performed in accordance with the safety requirements of the AS/NZS 60598.2.1: 2014, including amendments.

Evidence type	Minimum document requirement	Evidence requirement		
AS/NZS 1680 compliance	One document from category A and two documents from category B of the relevant measurement approach	<p>Category A</p> <p>AS/NZS 1680 declaration from section three of the ESS evidence pack for commercial lighting (available at www.ess.nsw.gov.au).</p> <p>Declaration from installing electrician declaring that the installation meets or exceeds the minimum requirements of AS/NZS 1680.</p>	<p>Category B</p> <p>Design and verification approach</p> <p>A model generated by the lighting upgrade solution provider (using a specialised computer lighting design software) showing that the lighting upgrade complies with the relevant AS/NZS 1680 requirements. The model must be accurate in accounting for lumen depreciation, control of glare and illuminance uniformity (mandatory). A commissioning declaration from the installer, licensed electrician or project manager who performed or supervised the lighting upgrade, stating that the lighting upgrade was commissioned and implemented as designed (mandatory).</p>	<p>Illumination measurements approach</p> <p>Illumination measurements carried out in accordance with Appendix B of AS/NZS 1680 by the person responsible for the lighting upgrade (mandatory).</p> <p>A lighting diagram showing the locations where the lux measurements were taken (mandatory).</p>

Evidence type	Minimum document requirement	Evidence requirement	
BCA/NCC compliance: <ul style="list-style-type: none"> ▶ IPD requirements (Part J6), and ▶ Safe movement (section F4.4) 	One document from Category A and one document from Category B	Category A Documented achieved IPD calculations for each space showing that it is equal to or less than the maximum IPD specified in Part J6 of the BCA/NCC (may be detailed on a lighting diagram or separate document). BCA declaration from section three of the ESS evidence pack for commercial lighting (available at www.ess.nsw.gov.au).	Category B Declaration from installing electrician declaring that: <ul style="list-style-type: none"> – The IPD achieved in each space is equal or less than the maximum IPD specified in Part J6 of the BCA/NCC. – The requirements of section F4.4 of the BCA/NCC were considered throughout the design and installation of the lighting upgrade.
Energy savings calculations	One document	Electronic copy of the generated report from the ESS Commercial Lighting Calculation Tool in PDF (Example 2)	

Example 2 – Generated report from the ESS Commercial Lighting Calculation Tool

I declare that

1. I have collected and retained all documentation required to support this ESC calculation
2. I have acceptance from the Scheme Administrator for the emerging lighting technology entered into this calculator (If appropriate)
3. the RESA has been implemented in accordance with legislative requirements, including safety legislation.

Accredited Certificate Provider:	Example
Name:	Example
Position:	Example
Resa ID:	Example
Date:	Example
Date of Report Generation:	20/10/2016

End Use Application:	BUILDING LIGHTING
Site Name:	Example
Site Address:	Example, Example, Example, 5000

Original Energy Saver (Purchaser):

Site Contact:	Example
Phone:	Example
E-mail:	Example

Total Energy Savings (MWh)	216.22
Total ESCs (Indicative)	229

No.	Location Name	Original Lighting Equipment							Upgraded Lighting Equipment							Date of Implementation	Savings (MWh)	ESCs
		No. lamps	Lamp type	Nominal lamp power (W)	Ballast/ transformer type	Control system-1	Control system-2	Air conditioning	No. lamps	Lamp type	Nominal lamp power (W)	Ballast/ transformer type	Control system-1	Control system-2	Air conditioning			
1	Example 1	66	T8 or T12	36	C	none	none	Yes	66	Modified Luminaire	18	Built in	none	none	Yes	30/08/2016	72.07	78.40
2	Example 2	66	T8 or T12	36	C	none	none	Yes	66	Modified Luminaire	18	Built in	none	none	Yes	30/08/2016	72.07	78.40
3	Example 3	66	T8 or T12	36	C	none	none	Yes	66	Modified Luminaire	18	Built in	none	none	Yes	30/08/2016	72.07	78.40

Definitions for evidence requirements

The evidence type provided as identified in Table A1 must conform to the minimum requirements identified below.

Photographic requirements

- ▶ Photographs must:
 - be clear and in focus
 - include a date stamp showing the date they were taken
 - include the GPS derived latitude and longitude coordinates. This should be stored in the metadata and generated automatically by the device used to take the photos, and
 - be labelled with the name of the upgraded area corresponding to the activity record and/or location stated in the ESS Commercial Lighting Calculator and evidence the requirements the photo is being used to satisfy.
- ▶ For evidencing lamp quantity - A photo of all original lamps, and a photo of all new lamps (the globes may be photographed removed and lined up to allow for counting or photographed lined up in groups by lamp/ballast type or other).
- ▶ For evidencing control gear - A photo of all control gear and a photo of all new control gear (may be photographed removed and lined up to allow for counting or photographed lined up in groups by ballast type or other).

Lighting diagram requirements

- ▶ Lighting diagrams must be clear and legible showing the location and type of each luminaire or lamp, control gear/control system/air conditioning before and after the upgrade.
- ▶ The diagram must show accurate dimensions to allow calculation of the room area.
- ▶ Each item can be shown on the diagram or through the use of a legend.
- ▶ Lighting diagrams for large customers must be professionally drawn. A professionally drawn lighting diagram refers to diagrams of plans drafted using accepted industry conventions, symbols, perspectives, units of measurements and notations systems which are usually generated by a professional draftsman or with the aid of a Computer Aided Design (CAD) system.

Electrical certificate of compliance requirements

- ▶ Must be signed and dated in accordance with the minimum requirements set by the Office of the Technical Regulator.
- ▶ Must clearly identify the type and number of lamps/control gear and lighting control system that was removed/installed.
- ▶ For modified LED luminaires - must:
 - define the modification work for each type of linear fluorescent luminaire
 - specify that the modification work includes electrical isolation of the legacy ballast (and capacitor if one was present), and
 - specify that the work was performed in accordance with the safety requirements of AS/NZS 60598.2.1:2014, including amendments.

Manufacturer's data sheet requirements

- ▶ An official specification or data sheet from the manufacturer showing the lamp type/control gear/control system.

Tax invoice requirements

A signed and dated tax invoice showing the details and quantity of the lamps/control gear purchased.

Tax invoice requirements for large energy consuming customers

- ▶ A valid tax invoice clearly showing the completion date, the address, the name and contact details of the person billed for the installation and the amount charged for the installation (minimum \$1.40/GJ including GST).

Enquiries concerning this Bulletin should be addressed to:

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