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Independent Pricing and Regulatory Tribunal

Method Guide
Commercial Lighting Energy Savings Formula

Deemed Energy Savings Method

Energy Savings Scheme
August 2015

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1 About this guide

This guide explains the Commercial Lighting Energy Savings Formula method (the method) of the NSW Energy Savings Scheme (ESS).

1.1 Who should use the guide

You should use this guide if you are:

- Seeking accreditation for a Recognised Energy Saving Activity (RESA) and plan to use the method to calculate energy savings. It will assist you in completing one of the required application forms.[1]
- Already accredited for a RESA that uses the method to calculated energy savings. It will help you to calculate the energy savings accurately

1.2 The guide's purpose

The guide's purpose is to provide general guidance on the method. It does not replace the provisions of:

- the Electricity Supply Act 1995 (Act)
- the Electricity Supply (General) Regulation 2014 (Regulation), or
- the Energy Savings Scheme Rule of 2009 (ESS Rule).

If there is any inconsistency between these provisions and the guide, the provisions prevail.

As an Accredited Certificate Provider (ACP), you are responsible for ensuring that all the ESCs you create from a RESA are created in accordance with the provisions of the Act, the Regulation and the ESS Rule.

1.3 The guide's contents

The guide provides an overview of:

- what energy savings activities the method can be applied to
- what requirements you must meet to create ESCs using the method
- how you calculate energy savings using the method
- how you create ESCs for these energy savings

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1 The *Application Form: Part B – Method Details - Commercial Lighting Energy Savings Formula* can be found on the ESS website at: http://www.ess.nsw.gov.au/How_to_apply_for_accreditation/Apply_now_-_guides_and_application_forms

- how you apply for accreditation to create ESCs using the method, and
- where you can find further information on the method.

2 What energy savings activities can the method be applied to?

The method can be used to calculate the energy savings and create ESCs from the following activities:

- upgrades of building lighting
- upgrades of lighting for roads and public spaces, and
- upgrades of lighting for traffic signals.

This guide covers upgrades of building lighting and lighting for roads and public spaces only. If you plan to apply for accreditation for upgrades of lighting for traffic signals, please contact the Scheme Administrator.

2.1 Building lighting

Building lighting is defined as lighting equipment affixed to commercial/industrial premises that are classified under the Building Code of Australia (BCA)[2] as:

- Class 3, 5, 6, 7, 8, 9 or 10(b) buildings, or
- the common areas of a Class 2 building.

(Appendix A provides further information on these building classifications.)

Effectively, this means the method can be applied to lighting upgrades at most non-residential premises – including industrial facilities, public facilities (such as schools and health centres), office buildings, and shopping centres.

2.2 Lighting for roads and public spaces

Lighting for roads and public spaces is defined as lighting equipment covered by the *AS/NZS 1158: Lighting for Roads and Public Spaces* series. Effectively, this means the method can be applied to lighting upgrades on roads located between the boundaries of adjoining properties (ie, outside the boundaries of any private property) and in outdoor spaces of a public nature (eg, public squares, parks, beaches, etc).

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2 The Building Code of Australia (BCA) is also referred to as the National Construction Code (NCC).

The AS/NZS 1158 series defines two main categories of lighting for roads and public spaces:

- **Category V Lighting (Vehicular traffic).** This is lighting for roads where the visual requirements of motorists are dominant – eg, traffic routes. This category includes subcategories ranging from V1 to V5, which relate to the level of traffic on the road.
- **Category P Lighting (Pedestrian Areas).** This is lighting for roads and other outdoor public spaces where the visual requirements of pedestrians are dominant – eg, local roads, outdoor shopping precincts, or outdoor carparks.[3]

The appropriate lighting category, subcategory and requirements for the particular road or public space your RESA relates to must be determined by (or in consultation with) the appropriate authority concerned (eg, road and traffic authorities, local councils, etc).

The lighting equipment installed as part of the lighting upgrade must comply with all parts of the AS/NZS 1158 series that are applicable to the road or public space where the upgrade will take place.[4]

3 What requirements must be met to create ESCs using the method?

To create ESCs using the method, you must meet the range of requirements outlined below.

3.1 Energy saver

You must be an ACP who is also an energy saver. You can be either:

- **the original energy saver** – which, under the method, is the purchaser of the relevant lighting equipment (as defined in section 3.2), or
- **the nominated energy saver** – which is someone the purchaser has nominated as the energy saver by completing a form generated from the method-specific Nomination Form Template.[5]

If you are the nominated energy saver for multiple purchasers, you must also document your procedure for engaging with these purchasers to obtain their energy saver nominations.

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3 Please refer to AS/NZS 1158 Standard for the complete listing of all subcategories.

4 Clause 9.4.1 (b) requires that the lighting upgrade meets or exceed the relevant lighting standard for each upgrade, to the satisfaction of the Scheme Administrator.

5 The Nomination Form Template can be found on the ESS website at: www.ess.nsw.gov.au/Methods_for_calculating_energy_savings/Commercial_Lighting.

3.2 Purchaser

As noted above, to be the original energy saver you must be the purchaser. To be the purchaser, you must:

- purchase or lease the lighting equipment or service that results in the energy savings
- directly benefit from the end-use services provided by this lighting equipment (see section 3.2.1 for more information), and
- contribute a net amount of **at least** $5 (excluding GST) per megawatt hour (MWh) of energy savings towards cost of the lighting upgrade (see section 3.2.2), and have evidence to support this.

3.2.1 Directly benefit from the end-use services provided by the lighting upgrade

The purchaser must directly benefit from the end-use services provided by the upgraded building lighting or upgraded lighting for roads and public spaces.

For upgrades to building lighting, this generally means that the purchaser must be someone who regularly uses the lighting equipment, such as the occupier of the premises. It may also be:

- The landlord of the premises, who may directly benefit by "making available lighting at leased premises". The Scheme Administrator has specified this service to be an end-use service for the purposes of Table A.17 of the ESS Rule.[6]
- The body corporate responsible for the lighting in the common areas of a building. In this case, the body corporate may directly benefit as its members regularly use the lighting system in the common areas.

For upgrades to lighting for roads and public spaces, it generally means that the purchaser must be the authority that determined the appropriate lighting requirements for the particular road or public space (or was consulted in determining these requirements).

3.2.2 Contribute a net amount of at least $5 per MWh towards the cost of the lighting upgrade

The purchaser must contribute a net amount of **at least** $5 (excluding GST) per MWh of energy savings towards the cost of the lighting upgrade. For example, if

6 *Scheme Administrator Notice 1/2014:* www.ess.nsw.gov.au/Notices_Events_and_Updates/ESS_Notices/Scheme_Administrator_Notice_012014_Additional_End-Use_Services

the upgrade creates 50 MWh of energy savings, the purchaser must contribute **a minimum** of $250 (excluding GST) (ie, $5 x 50 MWh).[7]

3.3 Implementation and implementation date

Under the method:

- **an implementation** is delivery of a lighting upgrade at a site,
- **the implementation date** is the date the lighting upgrade is completed as supported by evidence.

If you are the original energy saver, to create ESCs you must be registered as an ACP **before** the implementation date.[8]

If you are the nominated energy saver, you must obtain the nomination from the original energy saver/purchaser **before** the implementation date.

3.4 Lighting equipment

You must replace or modify lighting equipment that is classed as 'standard' equipment for lighting upgrades under the ESS. The standard equipment classes are listed and defined in Appendix D, Table A9.1 of this guide. Each class has a default Lamp Circuit Power (LCP) value, listed in Appendix D, Table A9.2. The LCP values are used to calculate the energy savings.

Alternatively, you may replace or modify certain 'other' lighting equipment, provided it is eligible and meets specified equipment requirements. The other equipment classes and their LCP values and requirements are listed and defined in Appendix D, Table A9.3 and Table A9.4. If you plan to use any of these other equipment classes, you should first read the *Lighting Equipment Requirements – LED Lighting, Induction Lamps and Emerging Lighting Technologies Guide*.[9]

You must not replace lighting equipment with T5 Adaptor Kits or Retrofitted Luminaires – LED Linear Lamps, as these equipment classes are ineligible under the method.

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7 Where you are the nominated energy saver and the lighting upgrade costs more than $5 per MWh of energy savings, you may require the purchaser to make more than this minimum contribution, or you may choose to absorb the additional costs.

8 The ESS website provides information on applying to become an ACP at: www.ess.nsw.gov.au/How_to_apply_for_accreditation.

9 The *Lighting Equipment Requirements – LED Lighting, Induction Lamps and Emerging Lighting Technologies Guide* can be found on the ESS website at: www.ess.nsw.gov.au/Projects_and_equipment/Lighting_Technologies/Using_Lighting_Technologies_for_Commercial_Lighting.

3.4.1 Additional equipment requirements for lighting for roads and public spaces

If you replace and modify lighting for roads and public spaces, you must also meet additional equipment requirements.

If you use equipment in the class **"LED Luminaire – Street light"** (listed in Table A9.3), this equipment must meet the requirements of either:

- *IEC 60598.2.3 – Particular Requirements – Luminaires for road and street lighting*, or
- *AS/NZS 60598.1.1* and *AS/NZS 1158.6 – Luminaires*.[10]

The equipment must also be accepted under our current Emerging Lighting Technology Process.[11]

If you use equipment in the class "**Lighting for Roads and Public Spaces or traffic signals (other than LED lighting)"** (listed in Table A9.1),[12] the equipment must comply with *AS/NZS 1158.6 – Luminaires*.

3.5 Electrical work

You must ensure that all electrical work involved in the lighting upgrade is performed by appropriately trained persons and undertaken or completed under the supervision of a licensed electrician. This requirement applies even when the lighting upgrade does not require any wiring work to be conducted.

3.6 Minimum training requirements

You must comply with *ESS Notice 01/2013 - Minimum requirements for conduct of persons acting on behalf of Accredited Certificate Providers – v2.0 July 2014*.[13] We may publish additional training requirements for installers of building lighting or lighting for roads and public spaces from time to time.

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10 *AS/NZS 1158.6* is in the process of being reviewed and currently does not include explicit requirements for LEDs. However, the general requirements such as weather proofing and vandalism resistance are relevant and apply.

11 Please find more information on how to apply for an ELT to be accepted for use under the ESS here: www.ess.nsw.gov.au/Projects_and_equipment/Lighting_Technologies

12 As defined by *AS 1158 – Lighting for roads and public spaces*, this class may include any of the standard equipment classes in this table and the "Induction Luminaire" equipment class listed in Table A9.3.

13 The *ESS Notice 01/2013 - Minimum requirements for conduct of persons acting on behalf of Accredited Certificate Providers – v2.0 July 2014* is available on the ESS website at: www.ess.nsw.gov.au/Events_and_Updates/ESS_Notices.

3.7 Service levels

You must only create ESCs from lighting upgrades that reduce electricity consumption **without** reducing service levels (including safety levels) below the pre-upgrade levels.[14] For example, you cannot create ESCs from activities that reduce electricity only by the de-lamping of a particular area as this would also reduce service levels.

3.7.1 Performance requirements

You must satisfy the minimum performance requirements for upgrades of building lighting and upgrades of roads and public spaces (outlined below), to the satisfaction of the Scheme Administrator. We may publish additional minimum performance requirements for these upgrades from time to time.

3.7.2 Performance requirements for upgrades of building lighting

For upgrades of building lighting:

- the lighting for each space must satisfy the relevant requirements of AS/NZS 1680 or, where this standard is not applicable, another benchmark agreed by the Scheme Administrator, and
- you must provide the energy saver with a completed and signed Building Lighting Information Sheet.

It is also a good idea to understand the Building Code of Australia (BCA) requirements that apply to lighting.

AS/NZS 1680 – building lighting

Upgrades of building lighting must achieve the relevant requirements of AS/NZS 1680. These may include, but are not limited to, the requirements related:

- maintained illuminance accounting for lumen depreciation
- control of glare, and
- uniformity of illuminance.

Further information about each of these requirements can be found in AS/NZS 1680.

In addition, AS/NZS 1680 includes specific requirements for a range of lighting upgrades. At a minimum, you must satisfy the requirements related to:

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14 Clause 5.3(b) of the ESS Rule.

- Correlated Colour Temperature[15] and matching existing lighting
- Colour Rendering Index[16] in order to accurately portray colour
- glare, in order to avoid 'disability glare' and 'discomfort glare'
- reflectance off surfaces, and
- daylight effects.

Compliance with the relevant requirements may be checked at the time of audit, so it is advisable to involve the person responsible for designing the lighting upgrade in:

- assessing how these requirements apply to the lighting upgrade, and
- ensuring that the lighting upgrade satisfies the requirements.

Other benchmarks where AS/NZS 1680 does not apply

Where the lighting upgrade is outside the scope of AS/NZS 1680, you may apply to the Scheme Administrator to use another performance benchmark. Your application must include:

- the nature of the lighting upgrade
- why AS/NZS 1680 does not apply
- what benchmark or alternative standard you propose to use to ensure service levels are appropriate, and
- how each space will meet, as a minimum, the requirements of BCA Section F4.4, 'Safe Movement'.

Compliance with the performance requirements of the agreed benchmark may be checked at the time of audit, so it is advisable to prepare your application in consultation with the person responsible for the design of the lighting upgrade.

Building Lighting Information Sheet

As an ACP, you must provide the energy saver with the Building Lighting Information Sheet,[17] completed with your contact details. This sheet is developed by us and is available on the ESS website.

Once the lighting upgrade is implemented, you also need to sign the Lighting Quality Statement (statement) that is attached to the Building Lighting Information Sheet. The statement confirms that relevant lighting requirements

15 Correlated Colour Temperature is a measurement of the apparent colour of the light source.

16 Colour Rendering Index is a measurement of how accurately a light source can portray the colour of an object in comparison to a reference light source.

17 The Building Lighting Information Sheet is available on the ESS website at: www.ess.nsw.gov.au/Methods_for_calculating_energy_savings/Commercial_Lighting.

have been satisfied in the design of the lighting upgrade. The statement must then be co-signed by the purchaser. You also need to complete the Recommended Maintenance Schedule that is attached to the statement.

You must keep the signed statement and maintenance schedule as evidence supporting your ESC claim. Both will be checked at audit and may also be checked by us.

Building Code of Australia requirements

To calculate energy savings from building lighting upgrades, you need to understand the Building Code of Australia (BCA) requirements that apply to lighting – particularly the requirements described in Part J6 and Section F4.4.

After implementation, the lighting upgrade must achieve an Illumination Power Density (IPD) that is less than or equal to the maximum IPD for each space, as defined in Part J6 of the BCA. In addition, each space must meet the BCA Section F4.4, 'Safe Movement' requirements. These may be updated from time to time.

Further information about how BCA requirements apply to the calculation of energy savings is provided in the *Evidence Manual Commercial Lighting Energy Savings Formula* (Evidence Manual).[18]

3.7.3 Performance requirements for upgrades of lighting for roads and public spaces

The performance requirements for upgrades of lighting for roads and public space may relate to any or all of the three basic aims of such lighting, which are to:

- facilitate safe movement
- discourage illegal acts, and
- contribute to the amenity of an area through increased aesthetic appeal.

However, in all circumstances, the lighting upgrade must meet all requirements related to safe movement of vehicles and pedestrians.

Upgrades of lighting for roads and public spaces must meet the requirements of the relevant parts of AS/NZS 1158 or, where no parts of this standard are applicable, another benchmark as agreed with the Scheme Administrator.

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18 The *Evidence Manual Commercial Lighting Energy Savings Formula (Evidence Manual)* is available on the ESS website at: http://www.ess.nsw.gov.au/Methods_for_calculating_energy_savings/Commercial_Lighting

Relevant parts of AS/NZS 1158

The parts of the AS/NZ 1158 that are applicable to the lighting upgrade will depend on the lighting category, subcategory and performance requirements of the particular road or public space involved. As noted above, these are a matter that must be determined by or in consultation with the relevant appropriate authority.

These parts may include:

- *AS/NZS 1158.0 – Introduction*
- *AS/NZS 1158.1.1 – Vehicular Traffic (Category V) lighting – Performance and design requirements*
- *AS/NZS 1158.1.2 – Vehicular Traffic (Category V) lighting – Guide to design, installation, operation and maintenance*
- *AS/NZS 1158.2 – Computer procedures for the calculation of light technical parameters for Category V and Category P lighting*
- *AS/NZS 1158.3.1 – Pedestrian Area (Category P) lighting – Performance and design requirements*
- *AS/NZS 1158.4 – Lighting for pedestrian crossings*
- *AS/NZS 1158.5 – Tunnels and underpasses*
- *AS/NZS 1158.6 – Luminaires*

The documentation required for demonstrating compliance with the AS/NZS 1158 series is specified in an appendix of the relevant standard. In particular, the documentation related to:

- vehicular lighting (category V lighting) is specified in Appendix D of AS/NZS 1158.1.1
- pedestrian lighting (category P lighting) is specified in Appendix E of AS/NZS 1158.3.1
- pedestrian crossing lighting (category PX) is specified in Appendix D of AS/NZS 1158.4.

ACPs are required to collect and retain the documentation described in the appendices applicable to each lighting upgrade to demonstrate that the upgrade is compliant with the requirements laid out in the AS/NZS 1158 series. This documentation will be checked at audit.

Other benchmark where AS/NZS 1158 does not apply

Where the lighting upgrade is outside the scope of AS/NZS 1158, you may apply to the Scheme Administrator to use another benchmark. Your application must include:

- the nature of the lighting upgrade
- why AS/NZS 1158 does not apply
- what benchmark or alternative standard you propose to use to ensure service and safety levels are appropriate, and
- how the lighting upgrade will meet, at minimum, the performance and safety requirements for pedestrian areas, pedestrian crossings and vehicular traffic.

Compliance with the other benchmark may be checked at the time of audit, so it is advisable to prepare your application in consultation with the person responsible for the design of the lighting upgrade.

3.8 Relationships to representatives

As an ACP, you are responsible for all lighting upgrade activities conducted on your behalf by your representatives, which includes third parties. You must meet requirements outlined below to ensure that you have control over all aspects of the lighting upgrade.

3.8.1 Representatives

Your representative is any person conducting any aspect of a lighting upgrade for which ESCs will be created, who is also:

- your employee or direct contractor
- an employee or direct contractor of another company or business that has a legally binding contract with you, or
- a volunteer who has a direct, documented and legally binding agreement with you.

A representative must be aged 18 years or over.

Where a customer wants its own staff or contractors to undertake the activity, or part of the activity (eg, the customer has a qualified electrician on staff who will install the lighting equipment), you must conduct a site brief prior to the activity taking place. At a minimum, the site brief must inform the customer's staff of any requirements that they must address.

3.8.2 Contracts

You are required to have a formal, documented and enforceable contract or agreement with all your representatives (as defined above).[19]

[19] As per the *ESS Notice 01/2013 "Minimum requirements for conduct of persons acting on behalf of Accredited Certificate Providers"* stipulated in clause 13 of the Accreditation Notice.

This contract or agreement must include requirements relevant to the role performed by the representative, and must be signed before the representative conducts activities on your behalf.

You must be able to provide evidence of any contract or agreement during an audit.

3.8.3 Registers

You must maintain a register of all representatives conducting ESS related activities on your behalf, or on behalf of the purchaser who has nominated you as the energy saver. The register must include:

- name
- contact details
- date of birth
- training and qualifications
- electrician's licence number (where applicable)
- relationship to the ACP or the purchaser (ie, employee or other representative)
- date of employment or commencement of contract, and
- responsibility for the representative to sign off on documents that will be kept as records for the lighting upgrade project.

3.9 Engaging with customers

You must ensure that any representative engaging with customers on your behalf is aware of their responsibilities under the ESS. For the purposes of this requirement, a 'customer' refers to the energy saver, or a potential energy saver.

Engaging with customers includes any aspect of the lighting upgrade where your employee or representative is discussing the ESS or your RESA with the customer.

3.9.1 Training for representatives

To ensure awareness, you must provide all your representatives with the following information:

- an overview of the ESS
- an overview of your RESA
- any of your internal procedures relevant to the representative's role in your RESA, and
- relevant legislative or regulatory requirements that your representative may need to address in performing their role (ie, provisions for telemarketing and door-to-door sales, occupational work health & safety, etc).

Where a customer wants its own staff or contractors to undertake the activity, or part of the activity (eg, the customer has a qualified electrician on staff who will install the lighting equipment), you must conduct a site brief prior to the activity taking place. At a minimum, this site brief must inform the customer's staff of any requirements that they must address.

3.9.2 Customer complaints

You must have a documented procedure for handling customer complaints. It must include:

- how complaints are received
- where the complaints will be recorded
- who will address the complaints, and
- how the progress of the complaint will be tracked.

3.10 Insurance

You (and any agents/subcontractors involved in the delivery of your RESA) must each hold Public Liability Insurance cover of at least $5 million. Insurance cover of this amount must be maintained for the life of the RESA. Public Liability Insurance must, at a minimum, cover the replacement and/or rectification of customer property damaged as a result of work performed by you and/or your subcontractors or agents.

Either you or your agents/subcontractors must also hold Product Liability Insurance of at least $5 million that covers all products used in your RESA.

As an ACP, you must also:

- obtain current certificates of your and your subcontractors'/agents' Public Liability and Product Liability Insurances, within seven days of each renewal, reissue or change of policy, and
- maintain a register of subcontractors/agents that contains copies of their Public Liability Insurance and, if relevant, their Product Liability Insurance.

These will all be checked at the time of audit.

4 How are energy savings calculated under the method?

The energy savings resulting from an upgrade of building lighting or lighting for roads and public spaces are calculated using:

- equations 6, 9 and either equation 7 or equation 8 from the ESS Rule, and

- the relevant tables from Schedule A of the ESS Rule.

You can find the equations and the relevant tables from Schedule A of the ESS Rule in Appendices C and D of this guide.

4.1 Inputs to the equations

All inputs to the equations are provided in Appendix C of this guide, and are explained in detail in the Evidence Manual for the method.[20]

4.2 Calculation Tools

Three 'ready-to-use' calculation tools are available on the ESS website to assist you in calculating energy savings under the method:

- the *Commercial Lighting Calculation Tool*[21]
- the *Commercial Lighting Calculation Tool DA,*[22] and
- the *Commercial Lighting Calculation Tool – Lighting for roads and public spaces*.[23]

These tools use different equations, and are appropriate for different types of lighting upgrades. You should:

- **Use the Commercial Lighting Calculation Tool if:**
  - the lighting upgrade is part of a refurbishment that would **not** have been required to comply with the BCA Part J6, or
  - the lighting upgrade is part of a refurbishment that **would** have been required to comply with the BCA Part J6, and the existing lighting meets, **or** is below the maximum IPD requirements of the BCA Part J6.
- **Use the Commercial Lighting Calculation Tool DA if:**
  - the lighting upgrade is part of a refurbishment that **would** have been required to comply with the BCA Part J6, **and**
  - the existing lighting exceeds the maximum allowable IPD requirements of the BCA Part J6.

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20 The Evidence Manual is available on the ESS website at: http://www.ess.nsw.gov.au/Methods_for_calculating_energy_savings/Commercial_Lighting

21 The Commercial Lighting Calculation Tool is available on the ESS website at: www.ess.nsw.gov.au/Methods_for_calculating_energy_savings/Commercial_Lighting

22 The Commercial Lighting Calculation Tool *DA (development approvals)* is available on the ESS website at: www.ess.nsw.gov.au/Methods_for_calculating_energy_savings/Commercial_Lighting.

23 The Commercial Lighting Calculation Tool – Lighting for roads and public spaces is available on the ESS website at: www.ess.nsw.gov.au/Methods_for_calculating_energy_savings/Commercial_Lighting

- **Use the Commercial Lighting Calculation Tool – Lighting for roads and public spaces** if the lighting upgrade is part of a refurbishment that is required to comply with the AS/NZS 1158.

We have developed these calculation tools to assist you in calculating energy savings from lighting upgrades in accordance with the ESS Rule. You can develop your own calculation tool if you wish, but you must calibrate its outputs against the relevant Scheme Administrator tool.

If you need assistance in using any of the Commercial Lighting Calculation Tools, contact the Scheme Administrator for further guidance.

4.3 Calculating energy savings from projects that include upgrades to both building and road/public space lighting

If a particular implementation includes a combination of Building Lighting and Lighting for Roads and Public Spaces, you must calculate energy savings for each space separately.

If you are using the calculation tools provided by the Scheme Administrator, you must use two versions of the tool for the implementation.

- one to calculate the energy savings from all spaces classified as 'Building Lighting' and
- another to calculate energy savings from all 'Lighting for Roads and Public Spaces' areas.

Spaces classified as Building Lighting must comply with the requirements for Building Lighting, and areas classified as Lighting for Roads and Public Spaces must comply with the requirements for Lighting for Roads and Public Spaces.

When a particular space can be classified as either Building Lighting or Lighting for Roads and Public Spaces (eg, an outdoor carpark), you must treat the space as Lighting for Roads and Public Spaces.

5 How are Energy Savings Certificates created under the method?

The Evidence Manual for the method provides instructions on how to register ESCs and defines the requirements for keeping records that verify the energy savings achieved.

The Evidence Pack[24] that accompanies the Evidence Manual can be used to record and store data to meet these requirements.

6 How do you apply for accreditation to create ESCs using the method?

For you or your organisation to become an ACP and generate ESCs from projects that use the Commercial Lighting Energy Savings Formula method, you need to complete an application that is tailored to this method.

An application has multiple parts, which are explained in the *Application Guide for ESS Accreditation* (Application Guide).[25] As a minimum, you will have to provide:

- Application Form: Part A - General Details,[26] and
- Application Form: Part B - Method Details.[27]

A full explanation of the application process is provided in the Application Guide.

7 Where can you find further information on the method?

As noted throughout this guide, the following documents and tools provide further information and assistance on the method: [28]

- Evidence Manual – Commercial Lighting Energy Savings Formula
- Evidence and Certificate Registration Pack – Commercial Lighting Energy Savings Formula

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24 The Evidence Pack is available on the ESS website at: http://www.ess.nsw.gov.au/Methods_for_calculating_energy_savings/Commercial_Lighting

25 The *Application Guide for ESS Accreditation* is available on the ESS website at: http://www.ess.nsw.gov.au/How_to_apply_for_accreditation/Apply_now_-_guides_and_application_forms

26 The Application Form: Part A - General Details is available on the ESS website at: http://www.ess.nsw.gov.au/How_to_apply_for_accreditation/Apply_now_-_guides_and_application_forms

27 The Application Form: Part B - Method Details Commercial Lighting Energy Savings Formula is available on the ESS website at: http://www.ess.nsw.gov.au/How_to_apply_for_accreditation/Apply_Now_-_Guides_and_Application_Forms

28 All these documents and tools are located at: http://www.ess.nsw.gov.au/Methods_for_calculating_energy_savings/Commercial_Lighting

- Building Lighting Information Sheet
- Commercial Lighting Calculation Tool
- Commercial Lighting Calculation Tool DA
- Commercial Lighting Calculation Tool – Lighting for roads and public spaces

You can also contact the Scheme Administrator if you have further questions or need assistance in applying the calculation tools.

8 Glossary

Table 8.1 Commercial Lighting Energy Savings Formula Definitions

Acronym	Description
ACP	Accredited Certificate Provider
BCA	Building Code of Australia. Also referred to as the National Construction Code (NCC)
ESCs	Energy Savings Certificates
ESS	Energy Savings Scheme
Evidence Manual	Evidence Manual – Commercial Lighting Energy Savings Formula
Evidence Pack	Evidence and Certificate Registration Pack – Commercial Lighting Energy Savings Formula
Glare	Difficulty seeing in the presence of a very bright light and possibly causing discomfort or inability to see
Implementation	The delivery of a RESA to a particular site
Implementation date	The date when the lighting upgrade was completed
IPD	Illumination Power Density
Licensed electrician	A person that holds a licence to carry out low voltage electrical work in NSW without supervision, and is registered as an electrical contractor to contract, or offer to contract, or to carry out electrical installation work
Lighting upgrade	The replacement of existing general lighting End-User Equipment (EUE) with new general lighting EUE that consumes less electricity, or the modification of existing general lighting EUE resulting in a reduction in the consumption of electricity compared to what would have otherwise been consumed
IPART	Independent Pricing and Regulatory Tribunal – the Scheme Administrator
Illuminance	The amount of light that falls on a surface per unit area, which is sometimes referred to as the “Lighting Level” (measured in Lux)
LCP	Lamp Circuit Power
Lumen	The unit of luminous flux, which is a measure of the total amount of visible light emitted from a light source
Lumen Depreciation	The decrease in lumen output from a lamp over time
Lux	The unit of Illuminance (1 lux equals 1 lumen per square metre (lm/m^2)
MWh	Megawatt hour (unit of energy)
NLP	Nominal Lamp Power – the power consumption of a lamp excluding any external control gear
Nominated energy saver	A person nominated to be the energy saver by the original energy saver and satisfying the conditions of clause 5.2(b) of the ESS Rule (see section 3.1)
Original energy saver	The person defined as the purchaser in clauses 9.4.3 and 9.4.4 of the ESS Rule with reference also to clause 5.2 of the ESS Rule (see section 3.2)
RCP	Reflected Ceiling Plan
RESA	Recognised Energy Saving Activity

Appendices

A Building Code of Australia (Part A3 – Classification of Buildings and Structures)

Part A3 of the BCA – Volume 1 – 2014 classifies buildings and structures. Under the ESS, only premises in the following BCA classes are eligible for commercial lighting upgrades:

- Class 3, 5, 6, 7, 8, 9 or 10(b) buildings, or
- the **common areas**[29] of a Class 2 building.

Under Part A3.3 of the BCA "Multiple Classification", different areas within the same building may be classified in different BCA classes.

This appendix provides a transcript of Part A3 of the BCA.

PART A3 – Classification of Buildings and Structures

A3.1 - Principles of Classification

The classification of a building or part of a building is determined by the purpose for which it is designed, constructed or adapted to be used.

A3.2 - Classifications

Buildings are classified as follows:

Class 1: one or more buildings which in association constitute –

(a) **Class 1a** – a single dwelling being –

(i) a detached house; or

(ii) one of a group of two or more attached dwellings, each being a building, separated by a *fire-resisting* wall, including a row house, terrace house, town house or villa unit; or

(b) **Class 1b** –

(i) A boarding house, guest house, hostel or the like –

[29] Please note that the ESS Rule defines "Common areas" as:
- For buildings owned under strata title, the common property as defined in either the *Strata Schemes (Freehold Development) Act 1973 (NSW)*, or *Strata Schemes (Leasehold Development) Act 1986 (NSW)*; or
- For buildings not owned under strata title (e.g., under company title), the non-residential property of BCA Class 2 buildings

A. with a total area of all floors not exceeding 300 m^2 measured over the enclosing walls of the Class 1b; and

B. in which no more than 12 persons would ordinarily be resident; or

(ii) 4 or more single dwellings located on one allotment and used for short-term accommodation,

which are not located above or below another dwelling or another Class of building other than a *private garage*.

Class 2: a building containing 2 or more *sole-occupancy units* each being a separate dwelling.

Class 3: a residential building, other than a building of Class 1 or 2, which is a common place of long term or transient living for a number of unrelated persons, including:

(a) a boarding-house, guest house, hostel, lodging house or backpackers accommodation; or

(b) a residential part of a hotel or motel; or

(c) a residential part of a *school*; or

(d) accommodation for the aged, children or people with disabilities; or

(e) a residential part of a *health-care building* which accommodates members of staff; or

(f) a residential part of a *detention centre*.

Class 4: a dwelling in a building that is Class 5, 6, 7, 8 or 9 if it is the only dwelling in the building.

Class 5: an office building used for professional or commercial purposes, excluding building of Class 6, 7, 8, or 9.

Class 6: a shop or other building for the sale of goods by retail or the supply of services direct to the public, including -

(a) an eating room, café, restaurant, milk or soft-drink bar; or

(b) a dining room, bar area that is not an *assembly building*, shop or kiosk part of a hotel or motel; or

(c) a hairdresser's or barber's shop, public laundry, or undertaker's establishment; or

(d) market or sale room, showroom, or *service station*.

Class 7: a building which is -

(a) **Class 7a** - a *carpark*; or

(b) **Class 7b** - for storage, or display of goods or produce for sale by wholesale.

Class 8: a laboratory, or a building in which a handicraft or process for the production, assembling, altering, repairing, packing, finishing, or cleaning of goods or products is carried on for trade, sale, or gain.

Class 9: a building of a public nature -

(a) **Class 9a** - a *health-care building*, including those parts of the building set aside as a laboratory; or

(b) **Class 9b** - an *assembly building*, including a trade workshop, laboratory or the like in a primary or secondary school, but excluding any other parts of the building that are of another Class; or

(c) **Class 9c** - an *aged care building*.

Class 10: a non-habitable building or structure -

(a) **Class 10a –** a non-habitable building being a *private garage*, carport, shed, or the like; or

(b) **Class 10b –** a structure being a fence, mast, antenna, retaining or free-standing wall, *swimming pool*, or the like.

(c) **Class 10c –** a *private bushfire shelter.*

A3.3 - Multiple Classifications

Each part of the building must be classified separately, and -

(a)

(i) where parts have different purposes – if not more than 10% of the *floor* area of a *storey,* being the minor use, is used for a purpose which is a different classification, the classification applying to the major use may apply to the whole *storey*; and

(ii) the provisions of (i) do not apply when the minor use is a laboratory of Class 2,3 or 4 part; and

(b) Classes 1a, 1b, 7a, 7b, 9a, 9b, 9c, 10a, 10b and 10c are separate classification; and

(c) A reference to –

(i) Class 1 – is to Class 1a and 1b; and

(ii) Class 7 – is to Class 7a and 7b; and

(iii) Class 9 – is to Class 9a, 9b and 9c; and

(iv) Class 10 – is to Class 10a, 10b and 10c; and

(d) A plant room, machinery room, lift motor room, boiler room or the like must have the same classification as the part of the building in which it is situated.

Part A3.4 – Parts with more than one classification

(a) Notwithstanding A3.3, a building or part of a building may have more than one classification applying to the whole building or to the whole of that part of the building.

(b) If a building or part of a building has more than one classification applying to the whole building or part in accordance with (a), that building or part must comply with all the relevant provisions of the BCA for each classification.

Terms in Italics have a specific meaning defined in the BCA (NCC)[30] .

[30] Building Code of Australia (BCA), which is also referred to as the National Construction Code (NCC).

B List of relevant standards in the AS/NZS Series

B.1 AS/NZS 1680 Series – Building Lighting

A list of standards making up the AS/NZS 1680 series, and the areas specifying design values are provided below:

AS/NZS 1680.0 – Safe Movement

AS/NZS 1680.1 – General Principles and Recommendations

- Section 3 – Task Visibility

AS/NZS 1680.2.1 - Specific Applications, Circulation Spaces and other General Areas

- Appendix D – Specific Recommendations for Circulation Spaces and Other General Areas

AS/NZS 1680.2.2 - Specific Applications, Office and Screen-based Tasks

- Appendix E – Specific Recommendations for Office and Screen-Based Visual Tasks

AS/NZS 1680.2.3 - Specific Applications, Educational and Training Facilities

- Appendix D – Specific Recommendations for Educational and Training Facilities

AS/NZS 1680.2.4 – Interior Lighting, Industrial Tasks and Processes

- Appendix E – Specific Recommendations for Industrial Tasks and Processes

AS/NZS 1680.2.5 – Interior Lighting, Hospital and Medical Tasks

- Appendix F – Specific Recommendations for Hospital and Medical Tasks

Please note that any values contained in any AS/NZS 1680.2 series Standard take precedence over AS/NZS 1680.1

AS/NZS 1680.3 – Measurement, calculation and presentation

AS/NZS 1680.4 - Lumen Maintenance

B.2 AS/NZS 1158 Series – Lighting for Roads and Public Spaces

- AS/NZS 1158.0 - Introduction
- AS/NZS 1158.1.1 – Vehicular Traffic (Category V) lighting – Performance and design requirements
- AS/NZS 1158.1.2 – Vehicular Traffic (Category V) lighting – Guide to design, installation, operation and maintenance
- AS/NZS 1158.2 – Computer procedures for the calculation of light technical parameters for Category V and Category P lighting
- AS/NZS 1158.3.1 – Pedestrian Area (Category P) lighting – Performance and design requirements
- AS/NZS 1158.4 – Lighting for Pedestrian crossings
- AS/NZS 1158.5 – Tunnels and underpasses
- AS/NZS 1158.6 - Luminaires

In order to demonstrate compliance with the standard, you must refer to the following parts:

- Appendix D of AS/NZS 1158.1.1 specifies the documentation required to demonstrate vehicular lighting (category V lighting) is compliant with the standard.
- Appendix E of AS/NZS 1158.3.1 specifies the documentation required to demonstrate pedestrian lighting (category P lighting) is compliant with the standard, and
- Appendix D of AS/NZS 1158.4 specifies the documentation required to demonstrate pedestrian crossing lighting (category PX) is compliant with the standard.

C Equations and inputs to Commercial Lighting Energy Savings Formula calculations[31]

Equation 6

For each Implementation:

Energy Savings = Baseline Energy Consumption - Upgrade Energy Consumption

Where:

Baseline Energy Consumption, in MWh, is calculated:

- using Equation 7, if the Lighting Upgrade is part of a refurbishment that would not have been required to comply with the BCA Part J6, had the Lighting Upgrade component of the refurbishment not occurred;
- using Equation 7 if the Lighting Upgrade is part of a refurbishment that would have been required to comply with the BCA Part J6, had the Lighting Upgrade component of the refurbishment not occurred and where the existing lighting meets or is below the maximum IPD requirements of the BCA Part J6; or
- using Equation 8 if the Lighting Upgrade is part of a refurbishment that would have been required to comply with the BCA Part J6, had the Lighting Upgrade component of the refurbishment not occurred, and where the existing lighting does not meet the IPD requirements of the BCA Part J6.

Equation 7

$$\textit{Baseline Energy Consumption (MWh)} = \sum_{\textit{Each Incumbent Lamp}} (\textit{LCP} \times \textit{Asset Lifetime} \times \textit{Annual Operating Hours} \times \textit{CM} \times \textit{AM}) \div 10^6$$

Where:

- *Each Incumbent Lamp* means each Lamp and Control Gear in the pre-existing lighting system;
- *LCP*, in Watts, is the default lamp circuit power corresponding to that type of Lamp and Control Gear for that End-User Equipment as set out in **Table A9.2** or **Table A9.4** of Schedule A to the ESS Rule, representing the power drawn by the Lamp, plus the losses of its Control Gear;

[31] Extract of the ESS Rule 2009, as updated form time to time.

- *Asset Lifetime*, in years, is the default lifetime of the Lighting Upgrade for the relevant End-User Equipment as used in Equation 9;
- *Annual Operating Hours*, in hours/year, is the default number of hours per annum that the upgraded lighting system is expected to operate for the relevant building and space type as set out in **Table A10.2** of Schedule A to the ESS Rule;
- *CM* is the control multiplier. If the Lamp is connected to a Control System, the factor for the control multiplier shall be applied for the relevant End-User Equipment or activity as set out in **Table A10.4** of Schedule A to the ESS Rule, otherwise CM = 1.0; and.
- *AM* is the air-conditioning multiplier for the space as used in Equation 9.

Equation 8

$$\textit{Baseline Energy Consumption (MWh)} = \sum_{\textit{Each Space}} (\textit{IPD} \times \textit{Area} \times \textit{Asset Lifetime} \times \textit{Annual Operating Hours} \times \textit{AM}) \div 10^6$$

Where:

- *Each Space* means each portion of space within the Site requiring a different IPD as defined in Part J6 of the BCA;
- *IPD*, in Watts/m^2, is the maximum allowable IPD for each space, as required by Table J6.2b of the BCA. For simplicity, the Scheme Administrator may take a weighted average of similar IPDs in the Commercial Lighting Formula. The IPD should not be adjusted by the adjustment factors tabled in Table 6.2c of the BCA (Lighting Power Density Calculations: Adjustment);
- *Area*, in m^2, is the area of Each Space;
- *Asset Lifetime*, in years, is the default lifetime of the Lighting Upgrade for the relevant End-User Equipment as used in Equation 9;
- *Annual Operating Hours*, in hours/year, is the default number of hours per annum that the upgraded lighting system is expected to operate for the relevant building and space type as set out in **Table A10.2** of Schedule A to the ESS Rule; and
- *AM* is the air-conditioning multiplier for the space as used in Equation 9.

Equation 9

$$\textit{Upgrade Energy Consumption (MWh)} = \sum_{\textit{Each Upgrade Lamp}} (\textit{LCP} \times \textit{Asset Lifetime} \times \textit{Annual Operating Hours} \times \textit{CM} \times \textit{AM}) \div 10^6$$

Where:

- *Each Upgrade Lamp* means each Lamp and Control Gear in the upgraded lighting system.
- *LCP*, in Watts, is the default lamp circuit power corresponding to that type of Lamp and Control Gear for that End-User Equipment as set out in **Table A9.2** or **Table A9.4** of Schedule A to the ESS Rule, representing the power drawn by the Lamp, plus the losses of its Control Gear.
- *Asset Lifetime*, in years, is the default lifetime of the Lighting Upgrade for the relevant End-User Equipment as set out in **Table A10.1** of Schedule A to the ESS Rule, or another value accepted by the Scheme Administrator.
- *Annual Operating Hours*, in hours/year, is the default number of hours per annum that the upgraded lighting system is expected to operate for the relevant building and space type as set out in **Table A10.2** of Schedule A to the ESS Rule.
- *CM* is the control multiplier. If the Lamp is connected to a Control System, the factor for the control multiplier shall be applied for the relevant End-User Equipment or activity as set out in **Table A10.4** of Schedule A to the ESS Rule, otherwise CM = 1.0, and
- *AM* is the air-conditioning multiplier for the space, after Implementation, as set out in **Table A10.5** of Schedule A to the ESS Rule.

D Tables from the ESS Rule

Table A9.1: Standard Equipment Classes for Lighting Upgrades

Equipment Class	Definition
T12 linear fluorescent Lamp	A double-capped fluorescent Lamp as defined by *AS/NZS 4782.1 Double-capped fluorescent lamps – Performance specifications* with a tube diameter of 38.1mm. These are also referred to as T38
T8 linear fluorescent Lamp	A double-capped fluorescent Lamp as defined by *AS/NZS 4782.1 Double-capped fluorescent lamps – Performance specifications* with a tube diameter of 25.4mm. These are also referred to as T26
T5 linear fluorescent Lamp	A double-capped fluorescent Lamp as defined by *AS/NZS 4782.1 Double-capped fluorescent lamps – Performance specifications* with a tube diameter of 15.9mm. These are also referred to as T16
T5 or T8(T9) Circular fluorescent Lamp	A circular double-capped circular fluorescent Lamp with a typical tube diameter of 16mm or 29mm as defined by *AS/NZS 4782.1 Double-capped fluorescent lamps – Performance specifications*. These are also referred to as T9
Compact fluorescent Lamp with non-integrated ballast (CFLn)	An externally ballasted single-capped fluorescent Lamp as defined by *AS/NZS 60901 Single-capped fluorescent lamps-Performance specifications*. The Lamp may include an internal means of starting and pre-heated cathodes.
Compact fluorescent Lamp with integrated ballast (CFLi)	A Self-ballasted compact fluorescent Lamp as defined by *AS/NZS 4847 Self-ballasted lamps for general lighting services*
Tungsten halogen Lamp (240V)	A Tungsten halogen Lamp as defined in *AS 4934 Incandescent lamps for general lighting service*, with a rated voltage of 240V.
Tungsten halogen Lamp (ELV)	A Tungsten halogen Lamp as defined in *AS 4934 Incandescent lamps for general lighting service*, with a ELV rating, typically 12V. These amps run off an Extra-low voltage lighting converter (ELC) as defined in *AS 4879.1*
Infrared coated (IRC) halogen Lamp (ELV)	A ELV Tungsten halogen Lamp as defined in *AS 4934* where the halogen globe is coated with a reflective infrared coating this improves the efficiency of the globe.
Metal halide Lamp	A discharge Lamp classified as a Metal halide Lamp as defined *by IEC 61167 Metal halide lamps – Performance specification*
Mercury vapour Lamp	A discharge Lamp classified as a High-pressure mercury vapour Lamp as defined by *IEC 60188 High-pressure mercury vapour lamps – Performance specifications*
High pressure sodium (HPS) Lamp	A discharge Lamp classified as a High pressure sodium vapour Lamp as defined by *IEC 60662 High-pressure sodium vapour lamps*
Lighting for Roads and Public Spaces or traffic signals (other than LED lighting)	Lighting for Roads and Public spaces as defined by *AS 1158 Lighting for roads and public spaces*

Table A9.2: Lamp Circuit Power (LCP) values for Standard Equipment Classes

Equipment Class	Control Gear	LCP (Watts)	Notes
T8 or T12 linear fluorescent Lamp or T8(T9) or T12 circular fluorescent Lamp	Electronic ballast, EEI = A1	NLP + 2	If EEI of Electronic ballast is not known, use EEI = A3
	Electronic ballast, EEI = A2	NLP	
	Electronic ballast, EEI = A3	NLP + 2	
	Magnetic ballast, EEI = B1	NLP + 6	If EEI of Magnetic ballast is not known use EEI = C
	Magnetic ballast, EEI = B2	NLP + 8	
	Magnetic ballast, EEI = C	NLP + 10	
	Magnetic ballast, EEI = D	NLP + 12	
T5 linear fluorescent Lamp or T5 circular fluorescent Lamp	Electronic ballast, EEI = A1	1.13 × NLP + 2.5	If EEI of Electronic ballast is not known, use EEI = A3
	Electronic ballast, EEI = A2	1.08 × NLP + 1.5	
	Electronic ballast, EEI = A3	1.13 × NLP + 2.5	
Compact fluorescent Lamp with non-integrated ballast (CFLn)	Electronic ballast, EEI = A1	NLP + 3	If EEI of Electronic ballast is not known, use EEI = A3
	Electronic ballast, EEI = A2	NLP + 1	
	Electronic ballast, EEI = A3	NLP + 3	
	Magnetic ballast, EEI = B1	NLP + 5	If EEI of Magnetic ballast is not known use EEI = C
	Magnetic ballast, EEI = B2	NLP + 7	
	Magnetic ballast, EEI = C	NLP + 9	
	Magnetic ballast, EEI = D	NLP + 11	
Compact fluorescent Lamp with integrated ballast (CFLi)	Built In	NLP	

Equipment Class	Control Gear	LCP (Watts)	Notes
Tungsten halogen Lamp (240V)	Built In	NLP	
Tungsten halogen Lamp (ELV) or Infrared coated (IRC) halogen Lamp (ELV)	Magnetic transformer	1.25 × NLP	Maximum NLP of removed Lamp = 35W
	Electronic transformer	1.08 × NLP	
Metal halide Lamp	Magnetic ballast (reactor type)	1.05 × NLP + 14	
	Magnetic ballast (constant wattage type)	1.07 × NLP + 22	
	Electronic ballast	1.10 × NLP + 0.9	
Mercury vapour Lamp	Magnetic ballast	1.03 × NLP + 11	
High pressure sodium (HPS) Lamp	Magnetic ballast	1.05 × NLP + 13	
Lighting for Roads and Public Spaces or traffic signals (other than LED lighting)	Built in or Independent	Lighting Load Table Published by AEMO or relevant regulator.	An entire traffic signal unit or Integrated Luminaire is used as the basis for calculation, rather than individual Lamps.

Table A9.3: Other Equipment Classes for Lighting Upgrades

Equipment Class	Definition
T5 adaptor kit	Any equipment that enables a T8 or T12 Luminaire to accommodate or provide physical support to a T5 Lamp or Luminaire.
Retrofit Luminaire - LED Linear Lamp	A T5, T8 or T12 Luminaire that has been retrofitted with an LED linear Lamp in place of the linear fluorescent Lamp. This cannot involve modification to the wiring of the Luminaire other than removal, replacement or modification of the starter.
LED Lamp Only – ELV	A LED Lamp that runs off an existing Extra-low voltage lighting converter (ELC) designed for retrofitting into an existing Luminaire or Lamp holder. These are typically used as a replacement for ELV Tungsten halogen Lamps
LED Lamp Only – 240V Self Ballasted	A self-ballasted LED Lamp as defined by IEC 62560 Self-ballasted LED lamps for general lighting services by voltage > 50 V. These Lamps are connected directly to a 240V supply.
Induction Luminaire	A gas discharge Lamp in which the power required to generate light is transferred from outside the Lamp envelope to the gas via electromagnetic induction.
LED Lamp and Driver	A LED-reflector Lamp and matching LED Driver intended as an alternative to a Mirrored Reflector Halogen Lamp
Modified Luminaire –LED Linear Lamp	A T5, T8 or T12 luminaire that has been modified for use with an LED linear Lamp. This involves modifying, removing or rendering redundant any wiring or structure of the Luminaire, beyond the replacement of a starter.
LED Luminaire – fixed type	A LED Luminaire intended for use as a fixed luminaire as defined in AS/NZS 60598.2.1 Luminaires – Particular requirements – Fixed general purpose luminaires
LED Luminaire – Linear Lamp	An LED Luminaire intended for use as an alternative to a linear fluorescent Luminaire, where the Luminaire houses a matching Linear LED tube or a linear array of integrated LEDs. Where the Luminaire uses a Linear LED tube, the Luminaire must not be compatible with a linear fluorescent Lamp.
LED Luminaire – floodlight	A LED Luminaire intended for use as a floodlight as defined in AS/NZS 60598.2.5 Luminaires – Particular requirements - Floodlights
LED Luminaire – recessed	A LED Luminaire intended for use as a recessed luminaire as defined in AS/NZS 60598.2.2 Luminaires – Particular requirements – Recessed luminaires
LED Luminaire – high/lowbay	A LED Luminaire intended for use as high-bay or low-bay lighting
LED Luminaire – streetlight	A LED Luminaire intended for use as a streetlight as defined in AS/NZS 60598.2.3 Particular requirements – Luminaires for road and street lighting
LED Luminaire – emergency lighting	A LED Luminaire intended for use as an Emergency lighting luminaire as defined in AS/NZS 60598.2.22 Particular requirements – Luminaires for emergency lighting

Equipment Class	Definition
LED Luminaire – hospital use	A LED Luminaire intended for use in the clinical areas of a hospital or health care building as defined in AS/NZS 60958.2.25 Particular requirements – Luminaires for use in clinical areas of hospitals and health care buildings
Other Emerging Lighting Technology	Any lighting equipment not defined above.

Table A9.4: Lamp Circuit Power (LCP) values and Equipment Requirements for other Equipment Classes for Lighting Upgrades

Equipment Class	Control Gear	LCP Value	Equipment Requirement
T5 Adaptor Kit	Not Applicable (ineligible)	Not Applicable (ineligible)	Ineligible
Retrofit Luminaire - LED Linear Lamp	Not Applicable(ineligible)	Not Applicable (ineligible)	Ineligible
LED Lamp Only – ELV	Built In + Existing Magnetic Transformer	1.25 × NLP as Published by Scheme Administrator	Must meet product requirements and minimum performance specifications for Lamp Life, electro-magnetic compatibility (where applicable), lumen efficacy, power factor, LCP, and any other requirements as Published by the Scheme Administrator, as evidenced by: a) a certification scheme accepted by the Scheme Administrator; and b) test reports from an accredited laboratory, in accordance with requirements Published by the Scheme Administrator; or c) compliance with a relevant AS/NZS standard for the relevant Equipment Class recognised by the Scheme Administrator; or d) demonstrated product acceptance under schedules of the VEET scheme recognised as relevant by the Scheme Administrator including compliance with any additional Equipment Requirements Published by the Scheme Administrator.
	Built In + Existing Electronic Transformer	1.08 × NLP as Published by Scheme Administrator	
LED Lamp Only – 240V Self Ballasted	Built In	As Published by the Scheme Administrator	
Induction Luminaire	Built In or Independent		
LED Lamp and Driver			
Modified Luminaire- LED Linear Lamp			
LED Luminaire – fixed type			
LED Luminaire – Linear Lamp			
LED Luminaire – floodlight			
LED Luminaire – recessed			
LED Luminaire – high/lowbay			
LED Luminaire – streetlight			
LED Luminaire – emergency lighting			
LED Luminaire – hospital use			
Other Emerging Lighting Technology			

Table A9.5: Control gear for Lighting Upgrades

Control Gear	Definition
Magnetic ballast	A Ferromagnetic ballast as defined in *AS/NZS 4783 Performance of electrical lighting equipment – Ballasts for fluorescent lamps*
Electronic ballast	An A.C. supplied electronic ballast as defined in *AS/NZS 4783 Performance of electrical lighting equipment – Ballasts for fluorescent lamps*
Magnetic ballast (reactor type)	An electromagnetic ballast that use an inductor or autotransformer to limit the current and provide the voltage necessary to ignite the Lamp. These ballasts do not include any means of regulating the light output.
Magnetic ballast (constant wattage type)	An electromagnetic ballast that uses a combination of inductive and capacitive components to provide a regulated power output (constant wattage) to the Lamp
Magnetic transformer	A magnetic isolating transformer as defined in *AS/NZS 4879.1 Performance of transformers and electronic step-down convertors for ELV lamps - Test method - Energy performance.*
Electronic transformer	An electronic step-down convertor as defined in *AS/NZS 4879.1 Performance of transformers and electronic step-down convertors for ELV lamps - Test method - Energy performance.*

Table A9.6: Default Lamp Life for Lighting Upgrades

Type of Lamp	Lamp Life (hours)
Standard equipment classes defined in Table A9.1	As per product labelling.
Other equipment classes defined in Table A9.3	As Published by the Scheme Administrator.

Table A10.1: Asset Lifetimes for Lighting Upgrades

Activity	Asset Lifetime (years)
Replacement of : ▾ Luminaire, or ▾ Control Gear (not integrated into Lamp).	Lighting for Roads and Public Spaces or traffic signals: 12 years All other lighting: 10 years
Replacement of: Lamp Only.	Lamp Life ÷ Annual Operating Hours (Where Lamp Life is measured in accordance with Table A9.6 and is a maximum of 30,000 hours) Maximum Asset Lifetime = 10 years for Buildings and 12 years for Lighting for Roads and Public Spaces or traffic signals
Installation of: Control System as listed in Table A10.4 where the Lighting Upgrade only consists of the installation of a Control System	Maximum Asset Lifetime = 5 years

Table A10.2: Operating Hours for Lighting Upgrades by space type

Space Type	Annual Operating Hours (hours per annum)
Auditorium, church and public hall	2,000
Board room and conference room	3,000
Carpark – general (undercover) and Car Park - entry zone (first 20 m of travel)	7,000
Carpark – general (open air)	4,500
Common rooms, spaces and corridors in a Class 2 building	7,000
Control room, switch room, and the like	Value in Table A10.3 for BCA Classification of the surrounding space
Corridors	Value in Table A10.3 for BCA Classification of the surrounding space
Courtroom	2,000
Dormitory of a Class 3 building used for sleeping only or sleeping and study	3,000
Entry lobby from outside the building	Value in Table A10.3 for BCA Classification of the surrounding space.

Space Type	Annual Operating Hours (hours per annum)
Health-care - children's ward, examination room, patient ward, all patient care areas including corridors where cyanosis lamps are used	6,000
Kitchen and food preparation area	Value in Table A10.3 for BCA Classification surrounding space
Laboratory - artificially lit to an ambient level of 400 lx or more	3,000
Library - stack and shelving area, reading room and general areas	3,000
Lounge area for communal use in a Class 3 building or Class 9c aged care building	7,000
Maintained Emergency Lighting	8,500
Museum and gallery - circulation, cleaning and service lighting	2,000
Office	3,000
Plant room	Value in Table A10.3 for BCA Classification of the surrounding space
Restaurant, café, bar, hotel lounge and a space for the serving and consumption of food or drinks	5,000
Retail space including a museum and gallery whose purpose is the sale of objects	5,000
School - general purpose learning areas and tutorial rooms	3,000
Sole-occupancy unit of a Class 3 building	3,000
Sole-occupancy unit of a Class 9c aged care building	6,000
Storage with shelving no higher than 75% of the height of the aisle lighting	5,000
Storage with shelving higher than 75% of the height of the aisle lighting	5,000
Service area, cleaner's room and the like	Value in Table A10.3 for BCA Classification of the surrounding space
Toilet, locker room, staff room, rest room and the like	Value in Table A10.3 for BCA Classification of the surrounding space
Wholesale storage and display area	5,000

Space Type	Annual Operating Hours (hours per annum)
Other spaces not defined above	Value in Table A10.3 for BCA Classification of space

Table A10.3: Annual Operating Hours for Lighting Upgrades by building type

Building Classification	Annual Operating Hours (hours per annum)
BCA Class 2 buildings (Common Areas)	7,000
BCA Class 3 buildings (Common Areas)	7,000
BCA Class 3 buildings (other than Common Areas)	3,000
BCA Class 5 buildings	3,000
BCA Class 6 buildings	5,000
BCA Class 7 buildings	5,000
BCA Class 7 (a) buildings (open air car parks)	4,500
BCA Class 7 (a) buildings (undercover car parks)	7,000
BCA Class 8 buildings (other than ANZSIC Division C, Manufacturing)	3,000
BCA Class 8 buildings (ANZSIC Division C, Manufacturing)	5,000
BCA Class 9a and 9c buildings	6,000
BCA Class 9b buildings	2,000
BCA Class 10b buildings	1,000
Roads and Public Spaces	4,500
Traffic Signals	8,760

Table A10.4: Control Systems and Control Multipliers for Lighting Upgrades

Control System	Definition	Control Multiplier (CM)
Occupancy Sensor	Control device that uses a motion sensor to detect the presence of people in the Space and adjusts the light output of the Luminaire. Each Occupancy Sensor must control a maximum of 6 Luminaires.	0.7
Daylight-Linked Control	Control device that uses a photoelectric cell to measure ambient daylight levels to automatically vary Luminaire light output. Each Luminaire must be located close to a significant source of daylight.	0.7
Programmable Dimming	Luminaire light output controlled by pre-selected light levels (scenes) which are automatically selected according to time of day, photoelectric cell and/or Occupancy Sensor. Scenes must reduce lighting power.	0.85
Manual Dimming	Control device that allows a user to control Luminaire light output using a knob, slider or other manual input mechanism or by manually selecting a pre-programmed light level (scene).	0.9
Multiple Control Systems	Programmable Dimming and Manual Dimming	0.76
	Any other combination of 2 or more control systems above.	0.6
Voltage Reduction Units (VRU)	A control device that reduces the voltage applied to the Luminaire after start-up, when used with appropriate Luminaires.	As approved by Scheme Administrator

Table A10.5: Air-conditioning Multipliers for Lighting Upgrades

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

Table A17: End-Use Services

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

Table A18: Business Classifications

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