



# Non-Building Based Lighting Upgrade Activity Guide

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# Introduction to this guide

Accredited persons (APs) must comply with Victorian Energy Upgrades (VEU) program requirements when undertaking non-building based lighting upgrade (activity 35) to create Victorian energy efficiency certificates (VEECs).

## About this guide

Use this guide for assistance in meeting the specific requirements of non-building based lighting upgrade under the VEU program.

- Section 1 explains the eligibility criteria for lighting upgrades under the program
- Section 2 explains the variables you will use to create VEECs for activities
- Section 3 lists upgrade installer requirements
- Section 4 details requirements for each activity you undertake, including compliance with external standards
- Section 5 lists record keeping and evidence requirements for your upgrades
- Section 6 is a step-by-step guide on how to create VEECs using the non-building based lighting upgrade activity under the program.

## Who should use this guide

You should use this guide if you are:

- seeking accreditation to undertake this activity. It will help you to understand the activity and evidence requirements you must meet to create and register VEECs.
- accredited to undertake non-building based lighting upgrades. It will help you understand the evidence you need to calculate energy savings and register VEECs for this activity.

## Before you begin

This activity is complex, both administratively and technically. Participants should dedicate considerable time to understand the activity requirements, even if you have considerable experience in the lighting industry.

To further understand how to participate in this activity, including your obligations, review the following documents:

- VEEC Assignment Form Template: Non-Building-Based Lighting Upgrade (Activity 35)

- AS/NZS 1158 Compliance Declaration Template Non-Building Based Lighting Upgrade (Activity 35)
- AS 2560 Compliance Declaration Template Non-Building Based Lighting Upgrade (Activity 35) -
- Obligations and Program Guide for Accredited Persons.

The above documents can be accessed at [www.esc.vic.gov.au/non-building-based-lighting](http://www.esc.vic.gov.au/non-building-based-lighting) and [www.esc.vic.gov.au/veu-accredited-persons](http://www.esc.vic.gov.au/veu-accredited-persons)

## **Seeking assistance**

If you are unsure about aspects of undertaking this activity, and cannot find the answer in this guide or the documents listed above, contact us on (03) 9032 1310 or [veu@esc.vic.gov.au](mailto:veu@esc.vic.gov.au)

## **Legal context for this guide**

We have prepared this guide as a general summary of relevant parts of:-

- Victorian Energy Efficiency Target Act 2007 (the VEET Act)
- Victorian Energy Efficiency Target Regulations 2018 (the VEET Regulations)
- Victorian Energy Upgrades Specifications 2018 (the VEU specifications)
- Victorian Energy Efficiency Target Guidelines (the VEET guidelines)

View these documents at: [www.esc.vic.gov.au/veu-legislation](http://www.esc.vic.gov.au/veu-legislation)

This guide should not be relied upon as substitute for legal advice and should be read in conjunction with the above source documents. In the event of inconsistency between this guide and the source documents, the content in the source documents apply.

# 1. Introduction to non-building based lighting upgrades

A non-building based lighting upgrade is defined as a lighting upgrade that is undertaken in a place (other than an upgrade referred to in activity 27 or activity 34).

## 1.1. Which upgrades are eligible?

For your non-building based lighting upgrade to be eligible under the VEU program:

- The upgrade must take place at an eligible site.
- The upgrade must be undertaken in accordance with activity requirements.
- The product installed must be eligible.
- You must be accredited with relevant approvals to undertake non-building based lighting upgrades.

### 1.1.1. Eligible sites

To be eligible for a non-building based lighting upgrade, a site must not be a scheduled activity premises as defined in Regulation 4 of the VEET Regulations, unless it has been 'opted in' to the program as described in Regulation 28.

### 1.1.2. Eligible upgrade activities

For an upgrade to be eligible:

- The treatment of the works as part of the same upgrade must be reasonable and defensible.
- The upgrade must have been completed after the date on which you lodged your application for accreditation or application for additional activity approval.
- The existing lighting equipment must be connected to an electricity supply before the upgrade if it is decommissioned.
- The existing lighting equipment must be connected to an electricity supply both before and after the upgrade, and must be operable after the upgrade, if it is not decommissioned.
- You must have all necessary documentation to verify the pre-upgrade (baseline) lighting situation.

### **1.1.3. Eligible products**

Any product installed as part of a non-building based lighting upgrade must be listed as an approved product on our Register of Products at the time of VEEC creation. The documentary requirements for a lighting product application differ depending on the type of product being applied for.

Learn more about applying for lighting product approvals, by reading our Lighting Product Application Guide available at [www.esc.vic.gov.au/veu-product-applicants](http://www.esc.vic.gov.au/veu-product-applicants)

### **1.1.4. Appropriate accreditation and approvals from us**

You must be accredited by us, for non-building based lighting upgrade (activity 35) in order to undertake this activity. You will also require specific approval from us to undertake retrofit upgrades (see Section 4.4).

Find out how to become accredited for this activity at [www.esc.vic.gov.au/become-veu-accredited](http://www.esc.vic.gov.au/become-veu-accredited)



## 2. Calculating the number of eligible VEECs

The number of VEECs awarded for your non-building based lighting upgrade depends on a number of variables.

The number of VEECs you receive for a given upgrade is based on the deemed abatement associated with that upgrade. The deemed abatement is calculated using assumptions about an upgrade's energy saving factors, which may vary from the actual abatement.

The VEEC calculation method is defined in Part 35 of the VEU specifications, and detailed in Appendix D: VEEC calculation for non-building based lighting upgrades of this guide. An explanation of some of the calculation variables is provided in Section 2.2 below.

### 2.1. Upgrades: Areas and calculation zones

To calculate the baseline and upgrade energy use for a given upgrade, you must subdivide the upgrade into smaller components (known as calculation zones). How you subdivide upgrade into calculation zones depends on the specific project. A calculation zone is a series of lamps for which all of the variables of the greenhouse gas emissions reduction equation are common.

The **baseline calculation** for the project must be divided into calculation zones containing common incumbent lamps with the same nominal lamp power and rated lifetime hours (if a retrofit scenario), and sharing a common asset lifetime and control device.

The **upgrade calculation** for the project must be divided into calculation zones with a common upgrade lamp, lighting control device installed and asset lifetime reference.

This information, and the definition of a calculation zone, is represented in Figure 1. Even for simple upgrades, there will normally be at least two calculation zones; one for the baseline and one for the upgrade. Complex upgrades may require many more. The online upload form can accommodate up to 50 calculation zones.

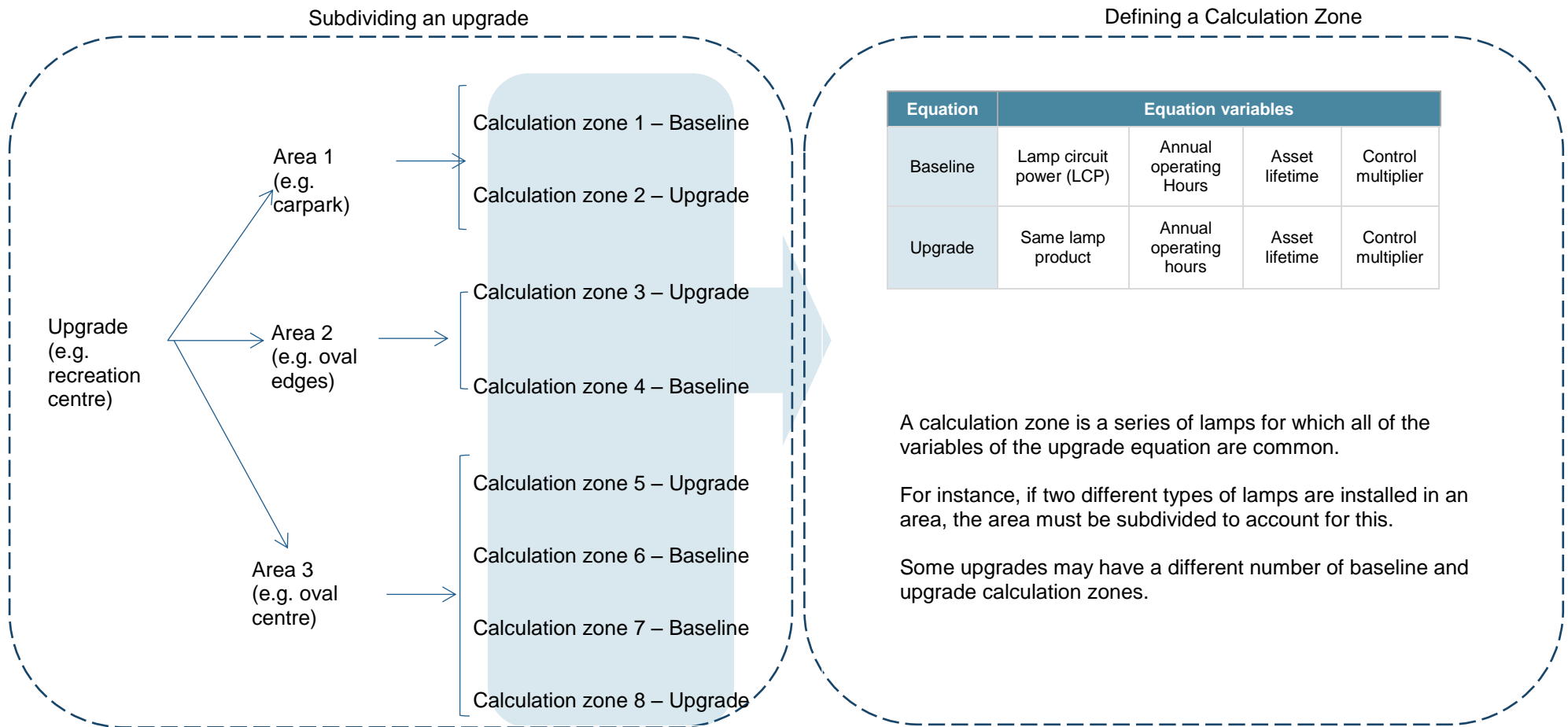


Figure 1: Dividing an upgrade project into calculation zones

## 2.2. Calculation variables

### 2.2.1. Lamp circuit power

One factor in the VEEC calculation is the lamp circuit power (LCP), which refers to the combined power draw of the lamp and its control gear (light source). For most baseline and upgrade light sources, the LCP is determined by adding and/or multiplying by a default factor to the nominal lamp power (NLP) of the lamp as set out in Table 18 of this guide.

We can determine the LCP for products not listed in this table. You can apply for a LCP determination by emailing your application to: [veu@esc.vic.gov.au](mailto:veu@esc.vic.gov.au). You will need to provide us with laboratory tests on the lamp and its control gear in support of your application.

### 2.2.2. Asset lifetime

An upgrade's asset lifetime variable depends on the type of upgrade undertaken (see Table 1). Typically, more permanent upgrades which cannot be reversed without the services of an electrician receive higher asset lifetimes. Those that are easily reversible by the consumer receive lower asset lifetimes.

Importantly, within one upgrade project you may need to select different asset lifetimes. For instance, where you undertake permanent upgrades in one area of the premises (such as a luminaire replacement) and then do reversible upgrades in another area (like installing a lighting control device only), you will use different asset lifetimes for each of the two areas.

When entering VEEC creation data for an upgrade activity, you must select the same asset lifetime for the baseline ('before') calculation zone and the upgrade ('after') calculation zone **for each area of the upgrade activity**.

Table 1: Asset lifetime references

Condition met by lighting upgrade	Asset lifetime (years)
Luminaire replacement: The existing luminaire is replaced	10
Modification: The incumbent lamp is replaced and all legacy control gear not essential for the operation of the upgrade lamp is either removed from the site or from the electrical circuit so that it does not draw any power	5
Retrofit: The incumbent lamp is replaced and any wiring or structure of the luminaire is kept intact, other than the removal, replacement or modification of the starter and the removal of the legacy capacitor	Lifetime for the <u>upgrade</u> lamp, determined in accordance with our performance requirements (in hours and not exceeding 30,000 hours), divided by annual operating hours, to a maximum of 5 years

Condition met by lighting upgrade	Asset lifetime (years)
Delamping: The lamp is removed from a luminaire that houses multiple lamps, where no more than half of the lamps are removed; all legacy control gear not essential for the operation of remaining lamp(s) is either removed from the site or from the electrical circuit so that it does not draw any power	5
Lighting control device: A lighting control device is installed and no lighting equipment of any other type is installed in the space	5
Luminaire decommissioning: the lamp is removed and not replaced, and either the luminaire or all legacy control gear is removed from the site or from the electrical circuit so that it does not draw any power	10
In any other case	Manufacturer's rated lifetime (in hours and not exceeding 30,000 hours) for the <u>incumbent</u> lamp divided by annual operating hours, to a maximum of 5 years

### 2.2.3. Annual operating hours

The annual opening hours awarded for a non-building based lighting upgrade depends on the type of upgrade undertaken as detailed in Table 2.

Table 2: Annual operating hours

Type of area	Annual operating hours (per year)
Road, other than the replacement or installation of traffic signals	4500
A public or outdoor space <sup>1</sup> that is not a sports field	4500
In any other case	1000

### External lighting affixed to eligible buildings or structures

External lighting affixed to eligible buildings or structures is not covered by non-building based lighting upgrade (activity 35). In this case the major BCA classification of the building or structure applies, along with the annual operating hours of the main building/structure, under building based lighting upgrade (activity 34) of the program. If your upgrade includes these lights, then they must comply with the requirements of building based lighting upgrade (activity 34), which are detailed in

<sup>1</sup> This includes open air car parks.

the building based lighting upgrade activity guide, available at [www.esc.vic.gov.au/building-based-lighting](http://www.esc.vic.gov.au/building-based-lighting).

Note: Lights on poles, or similar are not regarded as a light affixed to a building and must be undertaken under non-building based lighting (activity 35).

### Open air car parks

A carpark - general (open air) environment is defined as: "an area that is for the parking of cars or other vehicles, which has illumination provided by at least one luminaire attached to a pole, bollard, canopy or similar". These luminaire installations are eligible under non-building based lighting (activity 35) and are covered by the applicable requirements of AS/NZS 1158 - in particular those outlined in Table 2.5 and Table 2.9 of AS/NZS 1158.3.1:2005 for the lighting subcategories P11a, P11b, P11c and P12.

Luminaires attached to the wall of an open air car park are eligible under building based lighting upgrades (activity 34).

#### 2.2.4. Control multiplier

A control multiple is another factor in the VEEC calculation. This factor applies when a lighting control device (LCD) is present in either the baseline or upgrade environment. The control multiplier value awarded to a particular activity is detailed in Table 3.

Table 3: Control multiplier values for baseline and upgrade calculations at all sites

Number of LCDs	Types(s) of LCDs	Control multiplier
None	N/A	1.00
One	Occupancy sensor that controls 1 to 2 luminaires	0.55
	Occupancy sensor that controls 3 to 6 luminaires	0.70
	Occupancy sensor that controls more than 6 luminaires	0.90
	Programmable dimmer	0.85
More than one	A combination of one occupancy sensor that controls 1 to 2 luminaires, and any other LCD(s)	0.4 or, if greater, the multiple of the two lowest control multiplier values for the combination of LCDs
	A combination of one occupancy sensor that controls 3 to 6 luminaires, and any other LCD(s)	0.5 or, if greater, the multiple of the two lowest control multiplier values

	for the combination of LCDs
Any LCDs, except occupancy sensors that control 1 to 6 luminaires	0.6 or, if greater, the multiple of the two lowest control multiplier values for the combination of LCDs

An LCD can either be in-built into the upgrade lamp and/or installed as separate devices to the lamp. Table 4 details how the system will apply control multiplier values for the purposes of calculating the number of VEECs based on data entered for an activity’s upgrade zone in our VEEC creation form.

Table 4: How the control multiplier value will be applied based on activity data entered for a VEEC creation claim

Lamp installed	Integrated LCD features activated?	Other LCD devices installed?	Control multiplier applied
No integrated LCD features	Not applicable	No LCD devices entered	No value applied
		Allowed to install, and enter, any LCD devices in your VEEC claim	Calculated based on LCD devices installed
With integrated LCD features	Yes	Not allowed to enter LCD devices which are the same as that integrated into the lamp in your VEEC claim	Calculated based on LCD features of lamp
		Allowed to install, and enter, LCD devices which are different to that integrated into lamp in your VEEC claim	Calculated based on combination of LCD features of lamp and LCD devices installed
With integrated LCD features	No	Allowed to install, and enter, any LCD devices in your VEEC claim	Calculated based on LCD devices installed

For baseline zones, control multiplier values will be calculated based on your entries in the LCD fields in the VEEC creation form. If the baseline environment contains a lamp with integrated LCD features, you will need to specify the lamps’ LCD features in the LCD fields in the VEEC creation form.

## 3. Requirements for personnel undertaking non-building based lighting upgrades

All non-building based lighting upgrades must be undertaken by electricians licensed by Energy Safe Victoria.

### 3.1. Product safety, OHS and compliance with standards

You must comply with all relevant laws and regulations, including occupational health and safety (OHS), even if you subcontract the installation to a third party.

To minimise risk and ensure a safe work environment, you and your installers should be aware of the risks applicable to lighting upgrades in non-building based environments including:

- activity installation risks – relating to installers and the general public where installations are associated with working at heights, requiring the use of specialist equipment (e.g. elevated work platforms)
- product risks – risks may also depend on the type of upgrade activity and where that activity is being undertaken.

### 3.2. Required installer training and qualifications

All non-building based lighting upgrades must be undertaken by a licensed electrician (also known as 'A Grade' electrician). Work may also be performed by the holder of a supervised worker's licence (L) or (ES) (i.e apprentices) provided they are effectively supervised by an A Grade electrician in accordance with the guidance outlined in Energy Safe Victoria's supervising framework.<sup>2</sup>

In addition, the upgrade manager and AP must ensure all risks have been identified and the installer receives any required additional training. You will need to complete a training identification matrix and installer qualifications declaration template available at [www.esc.vic.gov.au/non-building-based-lighting](http://www.esc.vic.gov.au/non-building-based-lighting). This declaration must be signed by the upgrade manager and an AP representative.

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<sup>2</sup> In particular the elements of effective supervision outlined in <https://www.esv.vic.gov.au/technical-information/electrical-installations-and-infrastructure/electrical-technical-guidelines-and-determinations/requirements-for-the-effective-supervision-of-apprentice-electricians/>

### **3.3. Role of the supervising electrician**

For each upgrade, an A grade electrician must be nominated as the supervising electrician. This person must provide relevant details, including their licence number, and sign the VEEC assignment form.

### **3.4. Role of the upgrade manager**

For each upgrade, you must nominate a single person (referred to as the upgrade manager) to legally represent your business to verify the documentation for the upgrade, including but not limited to:

- the VEEC assignment form
- training identification matrix declaration
- installer qualifications declaration
- AS 2560 compliance declaration/ AS/NZS 1158 compliance declaration.

You don't need to directly employ the upgrade manager but they must have the authority to sign on your behalf. Additionally, the role of the upgrade manager, as defined by the VEEC assignment form and other program documentation, must be completed by a single person.

### **3.5. Role of the lighting designer**

A qualified lighting designer must confirm that the design and installation of the lighting upgrade either meets, deviates from or should be exempted from the requirements of the following standards:

- AS 2560 and the relevant specific application (e.g. outdoor tennis) and associated level of play (e.g. recreational, amateur, semi-professional and professional play)
- AS/NZS 1158 and the relevant subcategory (e.g. lighting subcategory – P5).

This verification is provided by the lighting designer signing the applicable compliance declaration described in Section 4.

### **3.6. Lighting design & lighting designer qualifications**

To create VEECs under non-building based lighting upgrade (activity 35) you must engage a suitably qualified lighting designer to prepare a lighting design.



The lighting designer must hold one of the qualifications below:<sup>3</sup>

- Member of the Illuminating Engineering Society of Australia and New Zealand (MIES), or
- Fellow of the Illuminating Engineering Society of Australia and New Zealand Limited (FIES), or
- Registered Lighting Practitioner (RLP) - Illuminating Engineering Society of Australia and New Zealand.

Please refer to Section 4 for detailed information about the lighting design requirements for non-building based lighting upgrades.

### **3.7. Using subcontractors**

You, as the accredited person, may use sub-contractors to conduct lighting upgrades on your behalf. However, all responsibility and liability under the program rests with you. This means that if a subcontractor does not comply with a relevant law or fails to properly record information about the upgrade, you may be subject to compliance action.

As the use of subcontractors may represent a compliance risk, you must provide information about the contractual arrangements on the VEEC assignment form for each upgrade you undertake.

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<sup>3</sup> To suggest other applicable lighting designer qualifications, please contact the commission on [veu@esc.vic.gov.au](mailto:veu@esc.vic.gov.au).

## 4. Activity requirements

You should be aware of, and adhere to, requirements that apply to non-building based lighting upgrades to ensure that you comply with the legislation.

### 4.1. Assignment of rights to create VEECs

A consumer may assign their right to create VEECs to an AP. A VEEC assignment form must be completed (by both the consumer and the upgrade manager) for you to create VEECs and demonstrate compliance with the legislation.

Download the VEEC assignment form template for this activity at [www.esc.vic.gov.au/non-building-based-lighting](http://www.esc.vic.gov.au/non-building-based-lighting)

You must give the consumer a copy of the VEEC assignment form (or another document containing the same information) at the time of signing (for written assignment) or within 10 business days (for electronic assignment). You must also ensure that all personal information collected in the VEEC assignment form is held in accordance with the Information Privacy Principles (IPPs) under the Privacy and Data Protection Act 2014 (Vic).

Details of how to comply can be found at [www.privacy.vic.gov.au](http://www.privacy.vic.gov.au)

### 4.2. Decommissioning and recycling requirements

If your non-building based lighting activity involves decommissioning lighting equipment, you must dispose of that equipment prior to VEEC creation in a waste disposal facility of a class determined by us.

Table 5 sets out the class of waste disposal facilities we have determined as suitable for lighting equipment decommissioned under the program.

Table 5: Recycling requirements for lighting equipment

Type of lighting equipment	Eligible disposal facilities
Mercury-containing equipment: Lamps that	A licensed recycling facility <sup>4</sup> : A facility licensed by the EPA to accept D121 waste for the purpose of

<sup>4</sup> Facilities licensed to recycle mercury-containing waste by the relevant environmental protection regulator in other jurisdictions, are also considered a licensed recycling facility for the purposes of this determination.

use mercury for their operation and any other recycling at that facility (i.e. has a license with lighting equipment potentially contaminated treatment code R4 for D121 waste) with mercury as a result of in-house recycling or disassembling attempts

This requirement does not preclude you from transporting your equipment to a licensed temporary holding facility<sup>5</sup> that will forward your equipment to a licensed recycling facility for recycling. As evidence of proper disposal and decommissioning, you must obtain and maintain a recycling invoice from the licensed recycling facility for the decommissioned lighting equipment prior to VEEC creation.

A list of facilities and their EPA license conditions is available from: <https://portal.epa.vic.gov.au>

Details of your decommissioning practices must be supplied to us for review before you are accredited to undertake this activity.

### **4.3. Meeting your decommissioning declaration requirements**

You, or your associate, or an entity under your instructions, must not install a product for the purposes of decommissioning it as part of an activity under the program (e.g. you have not altered the baseline environment for a given installation for the purposes of inflating the VEEC claim for that installation).

For a non-building based lighting upgrade activity involving the decommissioning of product(s), you, your installer, and the consumer will need to provide a declaration to us stating that the decommissioned product was not installed for the purposes of decommissioning it as part of this activity under the program. This declaration must be made:

- as part of your VEEC assignment form (by the energy consumer and your installer) – either in electronic or in written form
- as part of you accepting the terms and conditions of your VEEC creation claim made via your VEU account.

### **4.4. Compliance with AS/NZS 1158**

Lighting upgrades for roads or in public spaces (including tunnels and underpasses) must either:

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<sup>5</sup> A facility licensed by the EPA to accept D12 waste for storage pending recycling or accumulation of material intended for recycling (i.e. has a license with treatment codes D15 and/or R13 for D121 waste)

- meet the installation and performance requirements of the relevant part or parts of AS/NZS 1158
- deviate from the installation and performance requirements of the relevant part of AS/NZS 1158 (see Section 4.6)
- be exempted from the installation and performance requirements of the relevant part of AS/NZS 1158 (see Section 4.7 for the exemption application process to determine the minimum illuminance standards).

The AS/NZS 1158 series covers lighting schemes for roads and outdoor spaces. The standard provides for lighting to be designed with three aims:

- The safe movement of people (this is the primary aim)
- The discouragement of illegal acts
- Contribution to the amenity of an area through increased aesthetic appeal.

AS/NZS 1158 is divided into two main categories:

- Category V – lighting designed for roads where the needs of motorists are the most important factor.
- Category P and PX – lighting designed for roads and outdoor spaces where the needs of pedestrians are the most important factor<sup>6</sup>.

The standard sets out the installation and performance and design requirements of a non-building based lighting scheme dependant on the needs of the installation. The identification of these needs and the AS/NZS 1158 lighting category should be via consultations with the activity client (i.e. the energy consumer) and lighting designer responsible for the lighting design.

Refer to Appendix A for list of the relevant parts of the AS/NZS 1158 standard. APs engaged in non-building based lighting activities should have a copy of these standards.

Depending on the installation environment, you may be required to have the documentation described in the appendices in the relevant part of AS/NZS 1158. These outline the documentation required for demonstrating compliance. Additionally, please see Section 5.9 for our evidentiary requirements.

#### **4.5. Compliance with AS 2560**

The primary purpose of lighting upgrades for sports fields is to provide illumination to the sports field playing surface. These lighting upgrades must either:

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<sup>6</sup> This includes requirements for installations for the environment: carpark – general (open air)

- meet the installation and performance requirements of the relevant part of AS 2560
- deviate from the installation and performance requirements of the relevant part of AS 2560 (see Section 4.6)
- be exempted from the installation and performance requirements of the relevant part of AS 2560 (see Section 4.7 for the exemption application process to determine the minimum illuminance standards).

AS 2560 series includes general principles and recommendations for sports field lighting, descriptions of lighting equipment, as well as measurement and assessment method requirements for installations. It also provides for the needs of different levels of play (e.g. recreational, training, club, national, international), and for the visual requirements of participants, officials and spectators. This standard provides no detail on the special requirements of lighting for colour television broadcasting.

Sports fields may be multiuse facilities, so you must understand the primary sporting use that is driving the lighting upgrade. This should be completed via consultations primarily with the activity client (i.e. the energy consumer), stakeholders involved in the upgrade decision making process (e.g. ground committees), and the qualified lighting designer involved in the design and verification of the upgrade. Once the lighting application has been identified, the relevant parts of AS 2560 should be considered.

Refer to Appendix B for list of the relevant parts of the AS 2560 standard. APs engaged in sports field lighting activities should have a copy of these standards.

Depending on the installation environment, APs may be required to have the documentation described in the appendices to each part of AS 2560. These outline the documentation required for demonstrating compliance. Additionally, please see Section 5.10 for our evidentiary requirements.

#### **4.6. Deviation from AS/NZS 1158 or AS 2560**

If the light output of the lighting upgrade specified in the lighting design deviates from the requirements of the relevant part or parts of AS/NZS 1158 or AS 2560, you must engage a lighting designer to:

- identify the deviations to the relevant part or parts of AS/NZS 1158, or specify why it is unreasonable to expect the lighting upgrade to achieve the requirements of AS 2560
- outline why the deviations are justified
- declare and sign-off that the deviations are acceptable.

The energy consumer must also sign-off on the deviations to demonstrate acceptance of the lighting design. Please refer to Sections 5.11 and 5.12 for detailed information about the

documentation required if the non-building based lighting upgrade deviates from AS/NZS 1158 or 2560.

#### **4.7. Exemption process if non-building based lighting upgrade is not of a kind for which AS/NZS 1158 or AS 2560 is designed**

If a non-building based lighting upgrade is not of a kind for which AS/NZS 1158 or AS 2560 is designed, you may seek an exemption from the need to comply with those standards by applying to [veu@esc.vic.gov.au](mailto:veu@esc.vic.gov.au) prior to the commencement of the upgrade. The exemption application must be prepared by a qualified lighting designer<sup>7</sup> and must:

- specify why the lighting upgrade is not of a kind for which AS/NZS 1158 or AS 2560 is designed
- propose an alternative standard applicable to the upgrade and provide a rationale why it is applicable to the upgrade
- provide evidence that the proposed standard is equivalent to the intent of the AS/NZS 1158 or AS 2560 standard and appropriate for the installation environment (where relevant)
- provide details of the illuminance (lux) levels for each area of the lighting upgrade
- provide additional requirements relevant to the lighting upgrade (e.g. light level depreciation, glare, uniformity of illuminance, recommended maintenance regime, where relevant).

#### **4.8. Retrofit/Modification of luminaires and obligation to meet power factor requirements**

You must:

- measure and assess the power factor of the upgraded lighting circuit if you elect to retrofit linear LED lamps into linear fluorescent luminaires without removal of the legacy ballast
- ensure the upgrade meets relevant legislation, codes and guidelines relating to power factor and does not have a detrimental impact on the customer's compliance with Section 4.3 of the Electricity Distribution Code (view the Electricity Distribution Code at <https://www.esc.vic.gov.au/electricity-distribution-code> obtain approval from us for your proposed power factor measurement and assessment methodology prior to proceeding.

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<sup>7</sup> Acceptable qualifications are one of the following:

- 'Member' of the Illuminating Engineering Society of Australia and New Zealand Limited (MIES), or
- A 'Fellow' of the Illuminating Engineering Society of Australia and New Zealand Limited (FIES), or
- A Registered Lighting Practitioner (RLP) - Illuminating Engineering Society of Australia and New Zealand.

If you replace a linear fluorescent lamp with an LED tube, you should also ensure that you understand the OHS, compliance, warranty and recordkeeping implications, which require you to:

- confirm that your product meets the requirements set out in the AS/NZS 60598.2.1:2014 standard for these luminaires
- ensure the products you install do not pose any unreasonable electrical risks to your installers or to your client, either during the installation process or post-installation
- understand that 'modifying' an existing luminaire may effectively create a 'new' luminaire from a legal viewpoint – this means that you will likely become responsible for that luminaire's compliance with relevant safety and electro-magnetic compatibility laws and standards
- understand the upgrade may void the warranty provided by the original luminaire manufacturer, meaning you may be considered liable should the product malfunction post-installation – the assignment form must include this information as a tick box for the customer to sign, and you should ensure that they are aware of the implications of the modification work prior to the installation taking place
- retain a record of the Certificate of Electrical Safety which Energy Safe Victoria may require for this work – this document must detail the modification work you performed on each type of linear fluorescent luminaire you modify, as well as specify whether the modification work includes electrical isolation of the legacy ballast, capacitor and other control gear
- retain adequate evidence of any approved power factor measurement and assessment approach used and the result of the power factor measurement – provide this to us upon request
- understand the decommissioning requirements associated with installations of LED tubes; any replaced control gear must be decommissioned and made permanently unusable.

If you feel unsure about the obligations and risks associated with installing LED tubes, seek independent technical and legal advice.

## 5. Record keeping and evidence requirements

You must collect evidence to verify that each upgrade has been undertaken in accordance with the VEET Regulations and VEU specifications. You are also required to maintain documentation for each upgrade and provide it to us upon request.

A summary of the evidence requirements is provided in Appendix C.

### 5.1. Record keeping obligations

You must keep appropriate records, which we may request, to verify all details of the lighting upgrade which relate to the calculation of greenhouse gas abatement and the creation of VEECs. Your records must be an auditable record of the work undertaken in each area of the site. If your documentation fails to provide an auditable record of the work undertaken, you may be required to surrender VEECs equivalent to those which cannot be verified.

### 5.2. Geo-tagged photograph obligations

You must take geo-tagged photographs to verify lighting upgrades that:

- are clear and in focus
- include any relevant markings
- include a date stamp showing the date the photographs 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 geo-tagged photographs.

### 5.3. Evidence of assignment of rights to create VEECs

You must ensure that the VEEC assignment form captures all the relevant installation information.

Table 6: Evidence of assignment of rights to create VEECs

Documentation	Description
VEEC assignment form	All fields in the VEEC assignment form must be completed and correctly filled in.



## 5.4. Evidence of commercial transaction and energy consumer

You must have proof of the commercial transaction relating to the installation, including evidence of the energy consumer<sup>8</sup>.

Table 7: Evidence of commercial transaction and energy consumer

Documentation	Description
Tax invoice	A valid tax invoice for the work carried out which must include: <ul style="list-style-type: none"><li>• the name, address and Australian Business Number (ABN) of the energy consumer</li><li>• the installation address</li><li>• the name, address and ABN of the installer business</li><li>• an itemisation of the installed lighting equipment<sup>9 10</sup> including brand(s) and model(s) names – the listed product(s) must match the Register of Products.</li></ul>

## 5.5. Baseline lighting configuration

You must be able to prove the existence and nature of all baseline lighting equipment<sup>11</sup>.

Table 8: Baseline lighting configuration

Documentation	Description
Geo-tagged photographs	Geo-tagged photographs of the type of baseline lighting equipment to verify the nature and configuration of all baseline lighting equipment.

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<sup>8</sup> In accordance with Section 16(2A) of the VEET Act, the energy consumer is the person responsible for the payment of electricity for the upgraded lighting asset. In instances, where there are multiple energy consumers, a lead energy consumer must be identified. A lead energy consumer is the nominated energy consumer for the purposes of assigning rights for the VEECs created by a non-building based lighting upgrade activity, where multiple bodies or persons are responsible for the payment of electricity for the lighting asset to be upgraded. The onus is on the AP to provide evidence of the energy consumer.

<sup>9</sup> As per the VEET Regulations lighting equipment includes lamps, luminaires, lighting control devices and control gear.

<sup>10</sup> Itemisation is not required for integrated lighting control devices (LCDs) s. A lamp with an integrated LCD is one which has lighting control capabilities according to the product specification sheet.

<sup>11</sup> As per the VEET Regulations, lighting equipment includes lamps, luminaires, lighting control devices and control gear.

## 5.6. Upgrade lighting configuration

You must be able to prove the existence and nature of all upgrade lighting equipment.

Table 9: Upgrade lighting configuration

Documentation	Description
Geo-tagged photographs	Geo-tagged photographs of the type of upgrade lighting equipment to verify the nature and configuration of all upgrade lighting equipment.

## 5.7. Evidence of electrical compliance

You must ensure that all work undertaken complies with relevant standards.

Table 10: Evidence of electrical compliance

Documentation	Description
Certificate of Electrical Safety (COES) <sup>12</sup>	<p>A COES must be provided if one is required by law. The VEECs must detail:</p> <ul style="list-style-type: none"><li>• the location of the lighting upgrade</li><li>• the type and number of baseline lighting equipment</li><li>• the type and number of upgrade lighting equipment.</li></ul> <p>Where a luminaire has been modified, the COES must:</p> <ul style="list-style-type: none"><li>• comply with Energy Safe Victoria's requirements</li><li>• define the modification work for each type of linear fluorescent luminaire you modify</li><li>• specify that the modification work includes electrical isolation of the legacy ballast (and removal and destruction of the capacitor if one was present).</li></ul>

## 5.8. Evidence of decommissioning and recycling of lighting equipment

All existing lighting equipment must be decommissioned and recycled in accordance with the VEET Regulations.

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<sup>12</sup> An appendix may be provided with a COES where there is insufficient space in the 'description of work undertaken' box to provide an accurate description of all the electrical installation work performed. Where an appendix is used with a CoES, the following criteria must be fulfilled: (i) each page of the attachment must detail the CoES number (ii) the number of pages contained within the attachment must be detailed on the CoES and (iii) the CoES and each page of the attachment must be signed by the electrician responsible for the lighting upgrade

Table 11: Evidence of decommissioning and recycling

Documentation	Description
Recycling invoice	<p>The following documents must be provided prior to VEEC creation:</p> <ul style="list-style-type: none"> <li>• A third-party recycling invoice per upgrade site clearly showing: <ul style="list-style-type: none"> <li>– an itemised breakdown of the disposed baseline lighting equipment (showing the lamp type, type of control gear and type of fitting/luminaire)<sup>13</sup></li> <li>– the date of collection.</li> </ul> </li> <li>OR</li> <li>• A third-party bulk recycling invoice (for multiple upgrade sites) clearly showing: <ul style="list-style-type: none"> <li>– an itemised breakdown of the disposed baseline lighting equipment (showing the lamp type, type of control gear and type of fitting/luminaire)</li> <li>– the date of collection</li> </ul> </li> </ul> <p>The bulk recycling invoice must be accompanied by a document itemising the disposed baseline lighting equipment in kilograms per upgrade site to establish a link between each upgrade and the recycling invoice.</p>
Geo-tagged photographs	<p>The following photographs must be provided to us:</p> <ul style="list-style-type: none"> <li>• for all installations, geo-tagged photographs of all removed lighting equipment in a pile or in a recycling container.</li> <li>• for linear LED tube modification installations <ul style="list-style-type: none"> <li>– geo-tagged photograph of all removed capacitors</li> <li>– geo-tagged photographs of the ballast/transformer showing the terminal block removed or the removed terminal blocks.<sup>14</sup></li> </ul> </li> </ul>

## 5.9. Evidence of AS/NZS 1158 compliance

If the lighting upgrade is of a kind for which AS/NZS 1158 is designed, you must demonstrate that the lighting design complies with the relevant part or parts of that standard, and also demonstrate that the energy consumer has accepted the lighting design.

<sup>13</sup> Where an itemised breakdown is not provided on the invoice, you must provide a document itemising the disposed baseline lighting equipment in kilograms for that site.

<sup>14</sup> Ballast/transformers and capacitors (where fitted) must be 'rendered permanently unusable' to qualify for decommissioning. If it is possible to reverse any modifications made to the legacy control gear as part of the lighting upgrade, then it does not qualify as decommissioned. Acceptable methods of decommissioning the ballast/choke include:

- complete removal of all redundant electrical components, inclusive of the ballast and capacitor (where fitted)
- removal or destruction of the ballast terminal block and capacitor (where fitted).

Table 12: Evidence of AS/NZS 1158 compliance

Documentation	Description
Lighting design	<p>A lighting design prepared by the lighting designer that:</p> <ul style="list-style-type: none"> <li>sets out the location and specifications of all existing lighting equipment in the area to which the lighting design applies</li> <li>sets out the location and specification of all lighting equipment to be installed in the area to which the lighting design applies</li> <li>includes information demonstrating that all the required values of the light technical parameters for all subcategories within the upgrade have been met.</li> </ul>
AS/NZS 1158 compliance declaration	<p>A declaration by the lighting designer declaring that the light output of the lighting upgrade specified in the lighting design complies with the relevant part or parts of AS/NZS 1158.</p> <p>The energy consumer is required to demonstrate acceptance of the lighting design by signing the relevant section of the declaration.</p>

## 5.10. Evidence of AS 2560 compliance

If the lighting upgrade is of a kind for which AS 2560 is applicable, you must demonstrate that the lighting design complies with the relevant part or parts of that standard, and also demonstrate that the energy consumer has accepted the lighting design prepared by the lighting designer.

Table 13: Evidence of AS 2560 compliance

Documentation	Description
Lighting design	<p>A lighting design prepared by the lighting designer that:</p> <ul style="list-style-type: none"> <li>sets out the location and specifications of all existing lighting equipment in the area to which the lighting design applies</li> <li>sets out the location and specification of all lighting equipment to be installed in the area to which the lighting design applies</li> <li>includes supporting information detailing the lighting criteria values associated with the level of play.</li> </ul>
AS 2560 compliance declaration	<p>A declaration by the lighting designer declaring that:</p> <ul style="list-style-type: none"> <li>the lighting output of the lighting upgrade specified in the lighting design complies with the relevant part or parts of AS 2560</li> <li>the lighting criteria values associated with the level of play have been met.</li> </ul>

The energy consumer is required to demonstrate acceptance of the lighting design by signing the relevant section of the declaration.

### 5.11. Evidence of AS/NZS 1158 deviation

If the lighting upgrade deviates from the relevant part of parts of AS/NZS 1158 you must justify the deviations and set out why the deviations are justified. The energy consumer must demonstrate acceptance of the lighting design prepared by the lighting designer.

Table 14: Evidence of AS/NZS 1158 deviation

Documentation	Description
Lighting design	<p>A lighting design prepared by the lighting designer that:</p> <ul style="list-style-type: none"> <li>• sets out the location and specifications of all existing lighting equipment in the area to which the lighting design applies</li> <li>• sets out the location and specification of all lighting equipment to be installed in the area to which the lighting design applies</li> <li>• includes information demonstrating that the light output of the upgrade lamp or luminaire to be either equivalent or superior to the replaced lamp or luminaire</li> <li>• includes information about the light technical parameters (LTP) for the lighting upgrade (where applicable).</li> </ul>
AS/NZS 1158 compliance declaration (Part D2: AS/NZS 1158 deviation declaration)	<p>A declaration by the lighting designer declaring that:</p> <ul style="list-style-type: none"> <li>• the lighting design deviates from AS/NZS 1158</li> <li>• the deviations are justified in accordance with the standard, setting out the way in which the deviations are justified</li> </ul> <p>The energy consumer must also sign the compliance declaration to accept the lighting design prepared by the lighting designer.</p>

### 5.12. Evidence of AS 2560 deviation

If the lighting upgrade deviates from the relevant part or parts of AS 2560 you must specify why it is unreasonable to meet that standard, as well as demonstrate that the energy consumer has accepted the lighting design prepared by the lighting designer.

Table 15: Evidence of AS 2560 deviation

Documentation	Description
Lighting design	A lighting design prepared by the lighting designer that:

- sets out the location and specifications of all existing lighting equipment in the area to which the lighting design applies
- sets out the location and specification of all lighting equipment to be installed in the area to which the lighting design applies
- includes information demonstrating that the light output of the upgrade lamp or luminaire to be either equivalent or superior to the replaced lamp or luminaire
- includes supporting information detailing the lighting criteria values associated with the level of play (where applicable).

AS 2560 compliance declaration (Part D2: AS 2560 deviation declaration)

A declaration by the lighting designer declaring that:

- the lighting design deviates from AS 2560
- it specifies why it is unreasonable to expect the lighting upgrade to achieve the requirements of that standard
- the lighting criteria values associated with the level of play have been met.

The energy consumer must also sign the compliance declaration to accept the lighting design prepared by the lighting designer.

### 5.13. Evidence of minimum illuminance if upgrade is not of a kind for which AS/NZS 1158 designed

If the lighting upgrade is not of a kind for which AS/NZS 1158 is designed, you must ensure the upgrade meets the minimum illuminance standards applicable to the lighting upgrade as approved by us. The energy consumer must demonstrate acceptance of the lighting design prepared by the lighting designer.

Table 16: Evidence minimum illuminance if upgrade is not of a kind for which AS/NZS 1158 is designed

Documentation	Description
Lighting design	<p>A lighting design prepared by the lighting designer that:</p> <ul style="list-style-type: none"> <li>• sets out the location and specifications of all existing lighting equipment in the area to which the lighting design applies</li> <li>• sets out the location and specification of all lighting equipment to be installed in the area to which the lighting design applies</li> <li>• includes information demonstrating that the light output of the upgrade lamp or luminaire to be either equivalent or superior to the replaced lamp or luminaire</li> <li>• includes information detailing the light technical parameters (LTP) for the lighting upgrade (where applicable).</li> </ul> <p>The lighting design should be accompanied by a document prepared by the lighting designer that includes a declaration that the lighting design complies with the</p>

minimum illuminance standards determined by the commission. The document should also be signed by the consumer to demonstrate that the consumer has accepted the lighting design prepared by the lighting designer.

#### **5.14. Evidence of minimum illuminance if upgrade is not of a kind for which AS 2560 is designed**

If the lighting upgrade is not of a kind for which AS 2560 is designed, you must ensure the upgrade meets the minimum illuminance standards applicable to the lighting upgrade, as approved by us. The energy consumer must demonstrate acceptance of the lighting design prepared by the lighting designer.

Table 17: Evidence of minimum illuminance if upgrade is not of a kind for which AS 2560 is designed

Documentation	Description
Lighting design	<p>A lighting design prepared by the lighting designer that:</p> <ul style="list-style-type: none"><li>• sets out the location and specifications of all existing lighting equipment in the area to which the lighting design applies</li><li>• sets out the location and specification of all lighting equipment to be installed in the area to which the lighting design applies</li><li>• includes information demonstrating that the light output of the upgrade lamp or luminaire to be either equivalent or superior to the replaced lamp or luminaire</li><li>• includes information detailing the lighting criteria values associated with the level of play (where applicable).</li></ul> <p>The lighting design should be accompanied by a document prepared by the lighting designer that includes a declaration that the lighting design complies with the minimum illuminance standards determined by the commission. The document should also be signed by the consumer to demonstrate that the consumer has accepted the lighting design prepared by the lighting designer.</p>

## 6. Non-building based lighting upgrade process

This section provides you with an end-to-end process for undertaking a non-building based lighting upgrade under the VEU program.

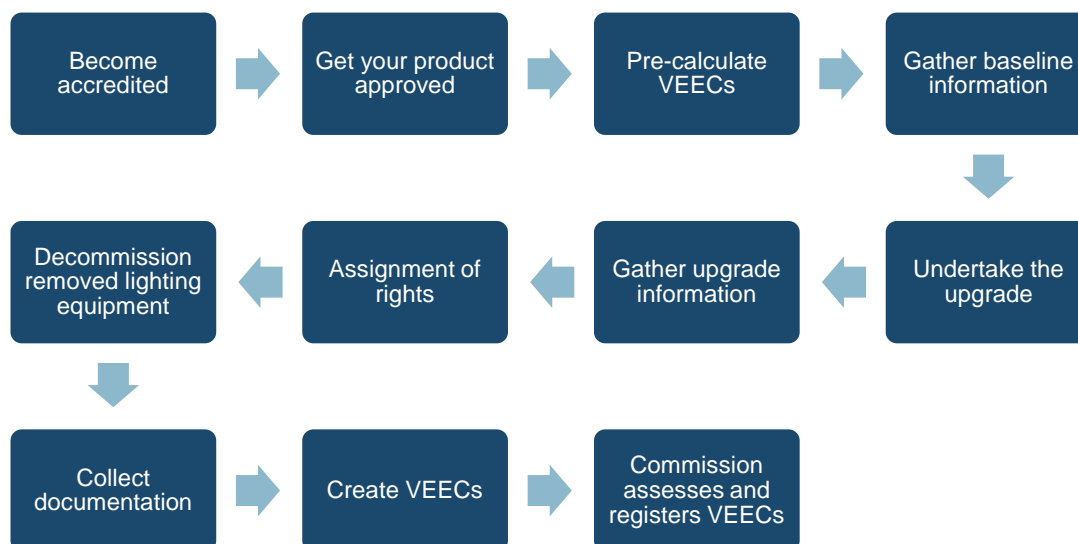


Figure 2: Process for undertaking non-building based lighting upgrade

### 6.1. Become accredited

You must be accredited to create VEECs. Visit [www.esc.vic.gov.au/become-veu-accredited](http://www.esc.vic.gov.au/become-veu-accredited) for information on how to become accredited.

### 6.2. Get your product approved

To create VEECs for any lighting upgrade, the product installed must be listed as an approved product on our Register of Products.

Learn more about getting your lighting products approved in our Lighting Product Application Guide at [www.esc.vic.gov.au/veu-product-applicants](http://www.esc.vic.gov.au/veu-product-applicants)

### 6.3. Pre-calculate VEECs

To quote for a job or develop a business case, you may need to estimate the number of VEECs an upgrade will generate. You can use the calculator at [www.veu-registry.vic.gov.au/calculators](http://www.veu-registry.vic.gov.au/calculators) for calculating a single baseline and upgrade scenario.



		<b>Baseline</b>						
Asset lifetime reference:		Luminaire replacement	Modification	Retrofit	Delamping	Lighting control device	Luminaire decommissioning	Other
Baseline: Area type								
Baseline: Asset lifetime reference								
Baseline: Lamp ballast combination								
Baseline: Quantity								
Baseline: Rated lifetime hours			Upgrade lamp					Baseline lamp
Baseline: Nominal lamp power								
Baseline: Type of first LCD								
Baseline: Type of second LCD								
		<b>Upgrade</b>						
Asset lifetime reference:		Luminaire replacement	Modification	Retrofit	Delamping	Lighting control device	Other	
Upgrade: Lamp ballast combination								
Upgrade: Quantity								
Upgrade: Rated lifetime hours								Baseline lamp
Upgrade: Nominal lamp power								
Upgrade: Lamp circuit power								
Upgrade: Type of first LCD								
Upgrade: Type of second LCD								
Postcode								
<b>Key</b>								
	<input type="text"/>	Do <u>not</u> enter data into this cell						
	<input type="checkbox"/>	You <u>must</u> enter data in this cell						
	<input type="checkbox"/>	Inputs optional						

(RM ref: C/18/24126)

Figure 3 details the data you'll need to enter into our calculator based on the upgrade type.

		Baseline						
Asset lifetime reference:	Luminaire replacement	Modification	Retrofit	Delamping	Lighting control device	Luminaire decommissioning	Other	
Baseline: Area type	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Baseline: Asset lifetime reference	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Baseline: Lamp ballast combination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Baseline: Quantity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Baseline: Rated lifetime hours	<input type="text"/>	<input type="text"/>	Upgrade lamp	<input type="text"/>	<input type="text"/>	<input type="text"/>	Baseline lamp	
Baseline: Nominal lamp power	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Baseline: Type of first LCD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Baseline: Type of second LCD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		Upgrade						
Asset lifetime reference:	Luminaire replacement	Modification	Retrofit	Delamping	Lighting control device	Other		
Upgrade: Lamp ballast combination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Upgrade: Quantity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Upgrade: Rated lifetime hours	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Baseline lamp		
Upgrade: Nominal lamp power	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Upgrade: Lamp circuit power	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Upgrade: Type of first LCD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Upgrade: Type of second LCD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Postcode	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<b>Key</b>	<input type="text"/>	Do <u>not</u> enter data into this cell						
	<input type="checkbox"/>	You <u>must</u> enter data in this cell						
	<input type="checkbox"/>	Inputs optional						

(RM ref: C/18/24126)

Figure 3: VEEC calculator - variable data requirements

When selecting the 'lamp ballast combination' for the upgrade zone of a particular activity, the entry must align with the lamp product type of the installed product (as recorded in our Register of Products). See Appendix E: Lamp ballast combination for guidance on this issue.

You can also upload details of an upgrade activity using the VEEC upload form, to help you determine how many VEECs can be created for a given activity. This is particularly useful for calculating complex installations (those involving more than one baseline and upgrade zone). You can delete uploaded activities from your activity queue. You must not 'submit' an uploaded activity for creation unless the activity has been validly undertaken. See Section 6.8 for help in completing a VEEC upload form.

## 6.4. Gather baseline information

Verify the baseline environment by collecting any necessary baseline data you need for VEEC creation prior to performing the upgrade. Evidence requirements are outlined in Section 5.

## **6.5. Undertake the upgrade and gather information**

Ensure you comply with relevant other legislation, such as OHS, while performing the upgrade, and that you collect all evidence requirements. Evidence requirements are outlined in Section 5.

## **6.6. Assignment of rights**

An important part of the VEEC creation process is the valid assignment of the right to create VEECs from the consumer to you. You must ensure the signatory has the legal authority to sign on behalf of the consumer entity.

## **6.7. Decommission and recycle removed lighting equipment**

Lighting equipment that is replaced or removed must be decommissioned and disposed of in an accordance with the VEET Regulations. See Section 5.8 for these requirements.

## **6.8. Collect documentation and create VEECs online**

Prior to creating certificates for this activity, you must ensure you have collected the required documents for the upgrade as specified in Section 5. You may be asked to submit some or all of these documents as part of our assessment process.

To create VEECs for this activity, you can upload the activity using either a bulk upload form or the online user interface on the VEU Registry. Different upgrade types have different data input requirements. The user interface has been designed to accommodate all upgrade types, so it is important you input the correct data in the relevant field – you must also leave some fields blank.

Figure 4 shows the user interface for activity 35 through a series of screenshots. Figure 5 outlines the data inputs required for the upgrade. The LCD fields should only be completed if a lighting control device was present in the baseline environment, or installed as part of an upgrade.

When selecting the 'lamp ballast combination' for the upgrade zone of a particular activity, the entry must align with the lamp product type of the installed product (as recorded in our Register of Products). See Appendix E: Lamp ballast combination for guidance on this issue.

## Tabs system

The user interface is divided into two tabs. The 'Detail' tab collects high level information about the upgrade and the 'Calculations' tab collects the data required to perform the abatement calculations. Navigate between them using the tab names as marked below.

### Detail tab

Figure 4: Activity 35 user interface

## Calculations tab

The calculations tab contains a grid designed to accommodate the data requirements of a range of upgrade scenarios.

A: Area Name	B: Space Type	C: Space Type (Unlisted)	D: BCA Classification	E: Baseline/Upgrade	F: Area of Calc Zone	G: Lamp Ballast Combination	H: Lamp Category	I: Quantity	J: BASELINE Asset Lifetime Reference	K: UPGRADE Asset Lifetime Reference	L: Product Brand	M: Product Model	N: Rated Lifetime Hours	O: Nominal Lamp Power	P: Type of First Controller	Q: Type of Second Controller	R: VRU Product Brand	S: VRU Product Model	T: HVAC A/C?	
Calc Zone 01																				
Calc Zone 02																				
Calc Zone 03																				
Calc Zone 04																				
Calc Zone 05																				

## Maximum of 50 calculation zones

The user interface and upload form can accommodate up to 50 calculation zones. If you require additional calculation zones please contact us.

Scenarios													
#	Asset lifetime reference	Area type	Baseline/ Upgrade	Lamp ballast combination	Quantity	Asset lifetime reference	Product brand	Product model	Integrated LCD activated	Rated lifetime hours	Nominal lamp power	First LCD type	Second LCD type
1	Luminaire replacement	Dark Blue	Baseline	Dark Blue	Dark Blue	Dark Blue	White	White	White	White	Dark Blue	Light Blue	Light Blue
2	Modification	Dark Blue	Baseline	Dark Blue	Dark Blue	Dark Blue	White	White	White	White	Dark Blue	Light Blue	Light Blue
3	Retrofit	Dark Blue	Baseline	Dark Blue	Dark Blue	Dark Blue	White	White	White	Upgrade lamp	Dark Blue	Light Blue	Light Blue
4	Delamping	Dark Blue	Baseline	Dark Blue	Dark Blue	Dark Blue	White	White	White	White	Dark Blue	Light Blue	Light Blue
5	Lighting control device	Dark Blue	Baseline	Dark Blue	Dark Blue	Dark Blue	White	White	White	White	Dark Blue	Light Blue	Light Blue
6	Luminaire decommissioning	Dark Blue	Baseline	Dark Blue	Dark Blue	Dark Blue	White	White	White	White	Dark Blue	Light Blue	Light Blue
7	Other	Dark Blue	Baseline	Dark Blue	Dark Blue	Dark Blue	White	White	White	Baseline lamp	Dark Blue	Light Blue	Light Blue
8	Luminaire replacement	Dark Blue	Upgrade	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Light Blue	White	White	Light Blue	Light Blue
9	Modification	Dark Blue	Upgrade	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Light Blue	White	White	Light Blue	Light Blue
10	Retrofit	Dark Blue	Upgrade	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Light Blue	White	White	Light Blue	Light Blue
11	Delamping	Dark Blue	Upgrade	Dark Blue	Dark Blue	Dark Blue	White	White	White	White	Dark Blue	Light Blue	Light Blue
12	Lighting control device	Dark Blue	Upgrade	Dark Blue	Dark Blue	Dark Blue	White	White	White	White	Dark Blue	Light Blue	Light Blue
13	Other	Dark Blue	Upgrade	Dark Blue	Dark Blue	Dark Blue	Light Blue	Light Blue	Light Blue	Baseline lamp	Light Blue	Light Blue	Light Blue

Key       Do not enter data into this cell       You must enter data in this cell       Inputs optional      (RM ref: C/18/24126)

Figure 5: VEEC creation - variable data requirements

## **6.9. Commission assesses VEEC creation claims**

Before you create VEECs for a non-building based lighting upgrade, the creation data you submit must first pass preliminary validation and address verification checks.

After you press the 'create' button for your validated activities, the VEECs associated with your upgrade are created and assigned a unique identifier. We then assess your created VEECs and decide whether to register them.

If you are new to the non-building based lighting activity, your VEECs creation claims will begin as a 'stage 1' stream. In this stage, we will request you submit the documentation associated with your first few upgrades. Once we are satisfied with the quality and reliability of your activity documentation, we will move your creation claims to a 'stage 2' stream and you will no longer have to submit documentation for each upgrade in order to have your VEECs assessed and registered.

For creation claims in the stage 2 stream, instead of performing desk audits on every upgrade, we use a risk analytics tool to monitor and highlight risk factors in your creation data. We update our risk analytics tool based on trends in the scheme, information about you and your installers, data on specific types of product, and other factors. All stage 2 stream VEEC creations are subject to this process, allowing us to focus our assessment on higher risk creations. We may still request you submit documentation for a particular upgrade. Regardless, you must always retain complete and accurate documentation for each upgrade you have undertaken.

## **6.10. Commission registers VEECs**

Once your VEEC creation claims have been validated, we will provide you with an invoice for the VEECs registration fee of \$1 per VEEC. Once payment is received, we will register your VEECs and notify you that the VEECs are available to be traded and/or surrendered to us.

# Glossary

Term	Definition
Ballast	Ballast means a unit inserted between the electricity supply and one or more discharge lamps which, by means of inductance, capacitance, or a combination of inductance and capacitance, serves mainly to limit the current of lamp(s) to the required value. The ballast may consist of one or more separate components. It may also include means for transforming the supply and voltage, and arrangements which help provide the starting voltage, preheating current, prevent cold starting, reduce stroboscopic effects, correct the power factor and/or suppress radio interference.
Capacitor	Capacitor means a two-terminal circuit device characterised by its capacitance, which is used in circuitry for the operation and power factor correction of gas discharge lamps
CM	CM means the control multiplier for a light source.
Control gear	Control gear means a device for the control of one or more light sources but does not include a lighting control device. Examples: Ballasts, transformers, capacitors and step-down converters such as drivers.
Decommission	Decommission means disable and render permanently unusable.
Electronic ballast	Electronic ballast means a mains-supplied AC to DC inverter for starting and operating one or more light sources generally at a high frequency.
Energy consumer	Energy consumer, in relation to a prescribed activity, means the person who is the consumer of electricity or gas in respect of whom a prescribed activity is undertaken within the meaning of Section 16 of Victorian Energy Efficiency Target Act 2007.
Fluorescent lamp	Fluorescent lamp means a discharge lamp of a low-pressure mercury type where most of the light is emitted by one or more layers of phosphors excited by the ultraviolet radiation of the discharge.
Illuminance	Illuminance means the amount of light that falls on a surface per unit area (measured in lux).

Term	Definition
Lamp circuit power	Lamp circuit power, in relation to a non-integrated luminaire, means: <ul style="list-style-type: none"> <li>the power drawn by the lamp</li> <li>the power losses of any associated control gear, which are divided equally between the lamp and any other lamps associated with the control gear.</li> </ul>
LCD	LCD means lighting control device as defined in the VEET Regulations.
LCP	LCP means the lamp circuit power for a light source.
LED integrated luminaire	LED integrated luminaire means a product that contains a LED device and the equipment required to distribute, filter or transform the light being transmitted and includes: <ul style="list-style-type: none"> <li>all parts necessary for supporting, fixing and protecting the product and for connecting the product to the electricity supply</li> <li>any lighting control device for the product.</li> </ul>
LED lamp with integrated driver	LED lamp with integrated driver means a self-ballasted LED module, incorporating control gear and any additional elements necessary for stable operation that is designed for direct connection to an electricity supply.
Legacy control gear	Legacy control gear means the control gear that was used to operate any lighting components that were present prior to an upgrade being carried out pursuant to the VEET Regulations.
Licensed electrician	Licensed electrician means an A Grade electrician licensed under the Electricity Safety Act 1998 to carry out electrical work.
Light output	Light output means the luminous flux emitted by a lamp or luminaire (measured in lumens).
Light source	Light source means: <ul style="list-style-type: none"> <li>in relation to a non-integrated luminaire, the lamp fitted to the luminaire; or</li> <li>in relation to a LED integrated luminaire, the whole luminaire.</li> </ul>
Lighting control device	Lighting control device means a device that is used to control the light output of a luminaire. Examples: Occupancy sensors, daylight-linked controls, programmable dimmers, manual dimmers and voltage reduction units.



Lighting equipment	<p>Lighting equipment includes:</p> <ul style="list-style-type: none"> <li>• lamps</li> <li>• luminaires</li> <li>• lighting control devices</li> <li>• control gear.</li> </ul>
Luminaire	Luminaire means a non-integrated luminaire or a LED integrated luminaire.
Nominal lamp power (NLP)	Nominal lamp power (NLP) means the manufacturer's rated value for power drawn by a light source (in Watts).
Non-integrated LED lamp	Non-integrated LED lamp means a LED module where the control gear is separate from the LED module for operation under constant voltage, constant current or constant power.
Occupancy sensor	Occupancy sensor means a lighting control device that uses a motion sensor to detect the presence of people in a space and adjusts the output of a luminaire in that space accordingly.
Programmable dimmer	Programmable dimmer means a lighting control device that can automatically select a luminaire's light output according to the time of day.
Remote driver	Remote driver means the external control gear used to operate a non-integrated LED lamp.
Scheduled activity premises	<p>Scheduled activity premises means the following:</p> <ul style="list-style-type: none"> <li>• the premises at the addresses specified in column 2 of the Table in Part 1 of Schedule 5 of the VEET Regulations</li> <li>• the premises specified in column 2 of the Table in Part 2 of Schedule 5 of the VEET Regulations</li> <li>• any other premises in relation to which there was, on 29 June 2014, an entry on the register of scheduled activities kept under Section 26G of the Environment Protection Act 1970 as in force immediately before that day.</li> </ul>

## Appendix A: List of relevant standards in the AS/NZS 1158 series

Relevant part of AS/NZS 1158 standard	Title
AS/NZS 1158: Lighting for roads and public spaces series comprising -	
AS/NZS 1158.0:2005	Lighting for roads and public spaces—Part 0: Introduction
AS/NZS 1158.1.1:2005	Lighting for roads and public spaces—Vehicular traffic (Category V) lighting—Part 1.1: Performance and design requirement
AS/NZS 1158.1.2:2010	Lighting for roads and public spaces—Vehicular traffic (category V) lighting—Part 1.2: Guide to design, installation, operation and maintenance
AS/NZS 1158.2:2005	Lighting for roads and public spaces— Part 2: Computer procedures for the calculation of light technical parameters for Category V and Category P lighting
AS/NZS 1158.3.1:2005	Lighting for roads and public spaces— Pedestrian area (Category P) lighting— Part 3.1: Performance and design requirements
AS/NZS 1158.4:2015	Lighting for roads and public spaces—Part 4: Lighting of pedestrian crossings
AS/NZS 1158.5:2014	Lighting for roads and public spaces—Part 5: Tunnels and underpasses
SA/NZS 1158:6:2015	Lighting for roads and public spaces—Part 6: Luminaires— Performance

## Appendix B: List of relevant standards in the AS 2560 series

Relevant part of AS 2560 standard	Title
AS 2560 series: Guide to sports lighting as published by Standards Australia comprising—	
AS 2560.1—2002	Sports lighting—Part 1: General principle
AS 2560.2.1—2003 (R2017)	Sports lighting—Part 2.1: Specific applications— Lighting for outdoor tennis
AS 2560.2.3—2007 (R2017)	Sports lighting—Part 2.3: Specific applications— Lighting for football (all codes)
AS 2560.2.4—1986 (R2017)	Guide to sports lighting—Part 2.4: Specific recommendations— Lighting for outdoor netball and basketball
AS 2560.2.5—2007 (R2017)	Sports lighting—Part 2.5: Specific applications— Swimming pools
AS 2560.2.6—1994 (R2017)	Guide to sports lighting—Part 2.6: Specific recommendations— Baseball and softball
AS 2560.2.7—1994 (R2017)	Guide to sports lighting—Part 2.7: Specific recommendations— Outdoor hockey
AS 2560.2.8—2007 (R2017)	Sports lighting—Part 2.8: Specific applications— Outdoor bowling greens

## Appendix C: Evidence checklist

Evidence type	Document	Description
Evidence of assignment of right to create VEECS	VEEC assignment form	A completed and signed VEEC assignment form.
Evidence of commercial transaction and energy consumer	Tax invoice	A valid tax invoice for the work carried out
Evidence of baseline lighting configuration	Geo-tagged photographs	Geo-tagged photographs of the baseline lighting equipment
Evidence of upgrade lighting configuration	Geo-tagged photographs	Geo-tagged photographs of the upgrade lighting equipment
Evidence of electrical compliance	Certificate of Electrical Safety (COES)	A completed and signed COES if one is required by law
Evidence of decommissioning and recycling	Third-party recycling invoices	<ul style="list-style-type: none"> <li>• A third-party recycling invoice specific to the upgrade activity, <b>or</b></li> <li>• A third-party bulk recycling invoice accompanied by a reconciliation document.</li> </ul>
Evidence of AS/NZS 1158 compliance	Lighting design, <b>and</b>	A lighting design
	AS/NZS 1158 compliance declaration	AS/NZS 1158 compliance declaration
Evidence of AS/NZS 1158 deviation	Lighting design, <b>and</b>	A lighting design
	AS/NZS 1158 compliance declaration	Part D2: AS/NZS 1158 deviation declaration
Evidence of AS 2560 compliance	Lighting design, <b>and</b>	A lighting design
	AS 2560 compliance declaration	AS 2560 compliance declaration
Evidence of AS 2560 deviation	Lighting design, <b>and</b>	A lighting design
	AS 2560 compliance declaration	Part D2: AS 2560 deviation declaration
Evidence of minimum illuminance if upgrade is not of a kind for which AS/NZS 1158 is designed	Lighting design	A lighting design

Evidence type	Document	Description
Evidence of minimum illuminance if upgrade is not of a kind for which AS 2560 is designed	Lighting design	A lighting design

# Appendix D: VEEC calculation for non-building based lighting upgrades

VEECs are calculated using the following equation:

$$GHG \text{ eq. reduction} = (\text{Baseline} - \text{Upgrade}) \times \text{Lifetime} \times \text{Regional factor}$$

- GHG eq.: Greenhouse gas equivalent
- Regional factors that apply are 0.98 for upgrades undertaken in metropolitan Victoria and 1.04 for upgrades undertaken in regional Victoria.

Lifetime is calculated as follows:

$$\text{Lifetime} = \text{Asset lifetime} \times \text{Annual operating hours} \times 10^{-6}$$

- Asset lifetime: See Table 1 for reference values
- Annual operating hours: Defined based on space in which upgrade occurs See Table 2 for reference values

The baseline and upgrade calculation are detailed below.

## Baseline calculation ('before')

The following equation is used to calculate the baseline energy consumption for all sites:

$$\text{Baseline} = \sum_{\text{each incumbent light source}} LCP \times CM \times GHG \text{ coefficient}$$

- LCP: The lamp circuit power, usually taken from Table 18 – if the type of lamp being replaced is not listed in Table 18, you must apply to us to have a value approved (see Section 2.2.1).
- CM: The control device multiplier, as outlined in Table 3
- GHG coefficient: The greenhouse gas coefficient, which is 1.095

## Upgrade calculation ('after')

The following equation is used to determine the upgrade energy consumption for all sites:

Equation 1 – Upgrade calculation at all sites

$$\text{Upgrade} = \sum_{\text{each upgrade light source}} LCP \times CM \times GHG \text{ Coefficient}$$

- LCP: The lamp circuit power, usually taken from Table 18 – if the type of lamp being replaced is not listed in Table 18, you must apply to us to have a value approved (see Section 2.2.1)
- CM: The control device multiplier, as outlined in Table 3
- GHG coefficient: The Greenhouse gas coefficient, which is 1.095

Table 18: Lamp circuit power (LCP) calculations for baseline and upgrade calculations for non-building based lighting upgrades

Type of incumbent or upgrade light source	Lamp circuit power for incumbent light source	Lamp circuit power for upgrade light source
T8 or T12 linear fluorescent or circular fluorescent lamp with ballast (EEI of A or electronic with no EEI marked)	NLP	NLP
T8 or T12 linear fluorescent or circular fluorescent lamp with ballast (EEI of $\geq$ B or magnetic with no EEI marked)	NLP + 6	NLP + 6
T5 linear fluorescent lamp with T5 adaptor and magnetic ballast*	$NLP \times 0.94 + 1.78$	N/A
T5 linear fluorescent or circular fluorescent lamp with ballast	$NLP \times 1.08 + 1.5$	$NLP \times 1.08 + 1.5$
Compact fluorescent lamp with non-integral ballast (EEI of A or electronic with no EEI marked)	NLP + 1	NLP + 1
Compact fluorescent lamp with non-integral ballast (EEI $\geq$ B or magnetic ballast with no EEI marked)	NLP + 5	NLP + 5
Compact fluorescent lamp with integral ballast	NLP	NLP
Tungsten incandescent or halogen lamp (mains voltage)	$NLP \times 0.7$	NLP
Tungsten incandescent or halogen lamp with ELC	$NLP$ (being no greater than 37 Watts) $\times 1.163$	$NLP \times 1.163$
Metal halide lamp with magnetic ballast	$NLP \times 1.058 + 18$	$NLP \times 1.058 + 18$
Metal halide lamp with electronic ballast	$NLP \times 1.096 + 0.9$	$NLP \times 1.096 + 0.9$
Mercury vapour lamp with ballast	$NLP \times 1.033 + 11$	$NLP \times 1.033 + 11$
High pressure sodium lamp with magnetic ballast	$NLP \times 1.051 + 13$	$NLP \times 1.051 + 13$
LED lamp with integrated driver with no associated legacy ballast connected	NLP	NLP

Type of incumbent or upgrade light source	Lamp circuit power for incumbent light source	Lamp circuit power for upgrade light source
Non-integrated LED lamp with remote driver or ELC	$NLP \times 1.1$	$NLP \times 1.1$
LED lamp with integrated driver, connected with a non-integral legacy ballast used for a T8 or T12 linear or circular fluorescent lamp, marked with EEI of A or electronic ballast with no EEI marked	NLP	NLP
LED lamp with integrated driver, connected with a non-integral legacy ballast used for a T8 or T12 linear or circular fluorescent lamp, marked with EEI of $\geq B$ or magnetic ballast with no EEI marked	$NLP + 6$	$NLP + 6$
LED lamp with integrated driver, connected with a legacy ballast used for a T5 linear or circular fluorescent lamp	$NLP \times 1.08 + 1.5$	$NLP \times 1.08 + 1.5$
LED lamp with integrated driver, connected with a legacy ballast used for a CFL, marked with EEI of A or electronic ballast with no EEI marked	$NLP + 1$	$NLP + 1$
LED lamp with integrated driver, connected with a legacy ballast used for a CFL, marked with an EEI of $\geq B$ or a magnetic ballast with no EEI marked	$NLP + 5$	$NLP + 5$
LED integrated luminaire	NLP	NLP
Non-integrated LED luminaire with remote driver	$NLP \times 1.1$	$NLP \times 1.1$
LED lamp with integrated driver, connected with a legacy magnetic ballast used for HID lamps	$1.033 \times NLP + 11$	$1.033 \times NLP + 11$
LED lamp with integrated driver, connected with a legacy electronic ballast used for HID lamps	$1.096 \times NLP + 0.9$	$1.096 \times NLP + 0.9$
Induction lamp with integrated ballast	NLP	NLP
Induction lamp with non-integrated ballast	$NLP \times 1.056$	$NLP \times 1.056$
Self-ballasted Mercury Vapour lamp	NLP	NLP
Other	As determined by the ESC	As determined by the ESC

\* T5 adaptors as a light source are not an eligible type of upgrade lighting equipment for this activity.



## Appendix E: Lamp ballast combination

Table 19: Available lamp ballast combinations for installed fluorescent lamp product types

Lamp ballast combinations	Installed fluorescent lamp product types				
	CFL with integrated ballast	CFL with non-integrated ballast	T5 fluorescent lamp with ballast	T8 fluorescent lamp with ballast	T12 fluorescent lamp with ballast
Compact fluorescent lamp with integral ballast	✓				
Compact fluorescent lamp with non-integral ballast (EEI of A or electronic with no EEI marked)		✓			
Compact fluorescent lamp with non-integral ballast (EEI > B or magnetic ballast with no EEI marked)		✓			
T5 linear fluorescent lamp with T5 adaptor (only available for incumbent lamp, not for upgrade)			✓		
T5 linear or circular fluorescent lamp with ballast			✓		
T8 or T12 linear or circular fluorescent lamp with ballast (EEI of A or electronic with no EEI marked)				✓	✓
T8 or T12 linear or circular fluorescent lamp with ballast (EEI of > B or magnetic with no EEI marked)				✓	✓

Table 20: Available lamp ballast combinations for installed LED lamp product types

Lamp ballast combinations	Installed LED lamp product types	
	LED lamp with integrated driver	LED lamp with non-integrated driver or ELC
LED Integrated luminaire	✓	
LED lamp with integrated driver, connected with a non-integral legacy ballast used for a T8 or T12 linear or circular fluorescent lamp, marked with EEI of A or electronic ballast with no EEI marked	✓	
LED lamp with integrated driver, connected with a non-integral legacy ballast used for a T8 or T12 linear or circular fluorescent lamp, marked with EEI of > B or magnetic ballast with no EEI marked	✓	
LED lamp with integrated driver with no associated legacy ballast connected	✓	
LED lamp with integrated driver, connected with a legacy ballast used for a CFL, marked with EEI of A or electronic ballast with no EEI marked	✓	
LED lamp with integrated driver, connected with a legacy ballast used for a CFL, marked with an EEI of >B or a magnetic ballast with no EEI marked	✓	
LED lamp with integrated driver, connected with a legacy ballast used for a T5 linear or circular fluorescent lamp	✓	
LED lamp with integrated driver, connected with a legacy electronic ballast used for HID lamps	✓	

Lamp ballast combinations	Installed LED lamp product types	
	LED lamp with integrated driver	LED lamp with non-integrated driver or ELC
LED lamp with integrated driver, connected with a legacy magnetic ballast used for HID lamps	✓	
Non-integrated LED lamp with remote driver or ELC		✓
Non-integrated LED luminaire with remote driver		✓

Table 21: Available lamp ballast combinations for other installed lamp product types

Lamp ballast combinations	Other installed lamp product types		
	Induction lamp with integrated ballast	Induction lamp with non-integrated ballast	Other
Induction lamp with integrated ballast	✓		
Induction lamp with non-integral ballast		✓	
Other – LCP determined by ESC*			✓

\* This option is only available for lamp products which have been provided a LCP determination by the commission

# Document version control

The RM reference for this document is: C/18/19768

Version	Amendments made	Date published
1.0	First release	10 December 2018
1.1	Revision to: <ul style="list-style-type: none"><li>• clarify requirements relating to open air car parks</li><li>• clarify decommissioning and reconciliation requirements</li><li>• define licensed electricians</li><li>• provide guidance in respect of lamp ballast combinations for lamp product types (Appendix E)</li></ul>	4 April 2019