Victorian Energy Upgrades

Lighting Activities Issues Paper

Victorian Energy Upgrades

VICTORIA State Government | Environment, Land, Water and Planning

Author
This document has been prepared by the Department of Environment, Land, Water and Planning.

Acknowledgment

We acknowledge and respect Victorian Traditional Owners as the original custodians of Victoria's land and waters, their unique ability to care for Country and deep spiritual connection to it. We honour Elders past and present whose knowledge and wisdom has ensured the continuation of culture and traditional practices.

We are committed to genuinely partner, and meaningfully engage, with Victoria's Traditional Owners and Aboriginal communities to support the protection of Country, the maintenance of spiritual and cultural practices and their broader aspirations in the 21st century and beyond.

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Executive Summary

Victorian Energy Upgrades (formerly the Victorian Energy Efficiency Target scheme) is Victoria's flagship energy efficiency and emissions reduction program. It is a market-based program that encourages households and businesses to reduce their energy consumption. Approximately 1.8 million households and 100,000 business premises have participated in the Victorian Energy Upgrades (VEU) program since it commenced in 2009. The program has reduced Victoria's greenhouse gas (GHG) emissions by 55 million tonnes over that time. The VEU program provides households and businesses savings on their energy bills, with an average annual saving of $145 and $4,800 respectively for those that participated in 2018.

The VEU program has been highly successful at encouraging the transformation of the lighting industry. Victorian consumers have greatly benefited from the highly efficient LED lighting products that have been installed using incentives provided by the program. The program has also helped enable lasting change in the availability of new lighting technologies. Lighting technology development, decreasing unit costs, consumer demands, economies of scale and market disruption have resulted in a vastly changed lighting market for Victoria.

The VEU program can only incentivise upgrade activities where the GHG reduction is considered additional. An activity is 'additional' if it happens because of a VEU incentive, in contrast to an activity that is 'business-as-usual' (or non-additional) which would occur irrespective of the incentive.

Through other governmental processes, there are forthcoming regulatory changes which will encourage and/or enforce the continued rapid transformation of the lighting market. These need to be considered along with the other market transitions that are impacting on the additionality of lighting activities in the VEU program. Key future impacts include minimum energy performance standards for LED lamps, a national phase out of halogen lamps, the 2019 changes to the National Construction Code (NCC) and the Minamata Convention on Mercury.

There are clear timelines for the mandatory changes to the NCC and the Minamata Convention on Mercury. Aligned with these, it is proposed that in August 2020, to remove both J6 activities from Part 34, and mercury vapour lamps from the baseline calculations for Part 27, Part 34 and Part 35. The changes will have a limited impact on VEU program participants as these activities have relatively minor uptake.

The proposed changes to Part 21 and Part 34 activities will have a more significant impact given the broad uptake of these activities. In considering the pathway and timing for phasing out these activities, the following issues have been taken into account: the relative importance of lighting activities for the program; the current popularity of different activities; and the role the program plays in the lighting market.

To address these issues, two options for the phase out of Part 21 and Part 34 activities are proposed:

- Option 1 involves an initial reduction in incentives and then the removal of some activities
- Option 2 brings forward the removal of some lighting activities.

One proposed approach is to decrease the incentives provided to an activity before removal or significant change. This would provide a lead time ahead of the change, allowing accredited providers and the market to plan and transition. Conversely, it is possible that this approach may not be acceptable or suitable for all program participants, who may rather no decrease in incentives. It is also critical that this policy accounts for the reduced additionality due to market changes.

The timelines for these two options are shown in the table below.

Timeline of options for the proposed changes to Part 21 and Part 34

Lighting Activity		August 2020	October 2020	February 2021
Part 21	Option 1	Reduced incentive for all activities		Activity removed
	Option 2	Activity removed		
Part 34 – Non J6	Option 1	Reduced incentive for HID* lamp activities		All lamp activities (including HIDs) removed except for fluorescent tube upgrades
	Option 2		All lamp activities (including HIDs) removed except for fluorescent tube upgrades	

* high intensity discharge

Upgrade activities are specified in the *Victorian Energy Efficiency Target Regulations 2018* and associated Specifications. The technical elements in the Specifications can require updates more frequently in response to changing circumstances and processes for modification are streamlined but still involve appropriate consultation processes.

The changes proposed in this paper will impact on the VEU lighting product register. For example, if an efficacy requirement is applied to existing Part 34 registrations, products that cannot meet the efficacy requirements would cease to be approved for installation under the program. Similarly, any products within the Part 21 efficacy categories that are proposed for removal would also be taken off the register. The proposed changes may also impact on the ability of the program to meet the 2020 target.

Stakeholder feedback is requested on the impact of the proposed changes on the lighting product register and the 2020 target.

You are encouraged to provide any comments and feedback you may have for the proposed changes to lighting activities.

Your responses should clearly define the topic and question being addressed.

If you are interested in learning more about the proposed changes, or if you wish to raise any preliminary queries with the department, please email energy.upgrades@delwp.vic.gov.au

The department will be running an information session on these proposed changes to lighting activities.

Consultation timelines and the date and registration details for the public information session are detailed on the Engage Victoria website at: https://engage.vic.gov.au/

Indicative key milestones in the revision of lighting activities in the VEU program are:

- Open stakeholder consultation on proposed changes to lighting — https://engage.vic.gov.au/
- Lighting stakeholder information session — https://engage.vic.gov.au/
- Close stakeholder consultation on the proposed changes to lighting — https://engage.vic.gov.au/
- Response to Consultation published — February 2020
- Updated Specifications and revised activities commence — August 2020
- Removal of some lighting activities from the Regulations — Oct 2020 or Feb 2021

Introduction

This paper explores considerations for revisions to lighting-based activities in the Victorian Energy Upgrades (VEU) program.

Victorian Energy Upgrades (formerly the Victorian Energy Efficiency Target scheme) is Victoria's flagship energy efficiency and emissions reduction program. It is a market-based program that encourages households and businesses to reduce their energy consumption. Approximately 1.8 million households and 100,000 business premises have participated in the VEU program since it commenced in 2009. The program has reduced Victoria's greenhouse gas (GHG) emissions by more than 55 million tonnes over that time. The VEU program provides households and businesses savings on their energy bills, with an average annual saving of $145 and $4,800 respectively for those that participated in 2018.

The VEU program includes 36 activities that can be done in eligible Victorian residential, business and non-residential premises. Accredited providers who undertake these energy efficiency activities create Victorian Energy Efficiency Certificates (VEECs). Each VEEC represents one tonne of GHG emissions saved over the lifetime of the activity or product installed. VEECs can then be sold to energy retailers, who must meet an emissions reduction target each year.

The VEU program is governed by the *Victorian Energy Efficiency Target Act 2007* and has three objectives:

1. reduce greenhouse gas emissions
2. encourage the efficient use of electricity and gas
3. encourage investment, employment and technology development in industries that supply goods and services which reduce the use of electricity and gas by consumers.

The VEU program has been highly successful at achieving all three objectives, but in respect of lighting activities, the program has had a major impact on technology development and has encouraged the transformation of the lighting industry. Victorian consumers have greatly benefited from the highly efficient LED lighting products that have been installed using incentives provided by the program. This has helped enable rapid and lasting change in the lighting market.

The VEU program can only incentivise upgrade activities where the GHG reduction is considered additional (i.e. the GHG reduction attributed to the activity would not have otherwise occurred). These activities are specified in the *Victorian Energy Efficiency Target Regulations 2018* and associated Specifications, and the *Victorian Energy Efficiency Target (Project-Based Activities) Regulations 2017* and associated Specifications. The Regulations set out the activities that attract incentives and the methodologies for calculating GHG emissions reductions, while the Specifications document provides further technical details of the GHG emissions calculations. The technical elements in the Specifications can be more responsive to changing circumstances and be updated more frequently, without foregoing appropriate consultation processes.

Purpose

The purpose of this Issues Paper is to inform stakeholders on proposed revisions to lighting upgrade activities under the VEU program and to seek their feedback on:

- the future direction of lighting activities in VEU program
- the technical changes proposed within this document (which will be drafted in the Specifications)
- the remaining opportunities for lighting upgrades under the VEU program
- what impact the proposed changes may have on meeting the 2020 target
- how the proposed changes to lighting activities will impact program participants.

Stakeholder feedback

The Department of Environment, Land, Water and Planning (the department) is seeking feedback from all stakeholders on proposed revisions to lighting activities.

The feedback you provide will help the department make sure the activity regulations and supporting technical details in the Specifications assist the market in transitioning away from receiving incentives for lighting activities.

You are encouraged to provide any comments and feedback you may have for the proposed changes to lighting activities.

Your responses should clearly define the topic and discussion point being addressed.

If you are interested in learning more about the proposed changes, or if you wish to raise any preliminary queries with the department, please email energy.upgrades@delwp.vic.gov.au

The department will be running an information session on these proposed changes to lighting activities.

The department will consider all feedback received regarding the proposed changes to lighting activities before it publishes the response to consultation.

All comments and submissions received in relation to the consultation documents will be treated as public documents unless the organisation or individual lodging the submission specifically requests that it not be made publicly available.

Consultation timelines and the date and registration details for the public information session are detailed on the Engage Victoria website at: https://engage.vic.gov.au/

Additionality

Under Section 15 of the *Victorian Energy Efficiency Target Act 2007*, energy efficiency upgrades can be prescribed activities and eligible to create VEECs, provided the GHG reduction attributed to the activity would not have otherwise occurred.

This is broadly captured under the term 'additionality'. An activity is 'additional' if it happens because of a VEU incentive, in contrast to an activity that is 'business-as-usual' (or non-additional) which would occur irrespective of the incentive.

The Specifications determine the GHG reduction attributed to a prescribed activity by subtracting the emissions associated with the upgrade activity from a baseline (the hypothetical emissions if the activity had never been undertaken).

Hypothetical baseline emissions are set to account for circumstances where the activity would have occurred outside the program. For example, when luminaires are wholly replaced as part of a Part 34 upgrade, the baseline assumes this equipment would have otherwise remained in place for 10 years. Whereas when an upgrade occurs as part of a site refurbishment that is required to comply with Section J6 of the building code, the baseline technology is assumed to be the level of efficiency required under the National Construction Code (NCC).

Changes in circumstance, including increasing energy costs, government regulation and improvements to the quality and affordability of energy-efficient technologies, can drive energy efficiency activity, resulting in projects occurring with little or no incentive provided by the VEU program. The hypothetical baseline then needs to be adjusted to decrease the number of VEECs generated from undertaking that activity.

Recent amendments to the Regulations and the introduction of the Specifications have adjusted the hypothetical baseline scenario to account for improvements in the efficiency of lighting products installed or available on the market. Examples of this include the 2015 amendment to (the then) Schedule 21 – Incandescent Lighting, the discount factors applied to some Part 34 activities in 2018, and subsequent changes to the Regulations and Specifications as part of the Regulation sunsetting process in late 2018.

The annual Victorian Energy Upgrade program targets are fixed in advance. The current 2016-2020 targets were set in 2015, and at that time, considered some energy efficiency upgrades to be business-as-usual. Where business-as-usual circumstances change during a target period, the baseline emissions assumptions can be adjusted to ensure VEU continues to drive energy efficiency upgrades that are additional to business-as-usual.

Current lighting activities

The VEU program currently includes four lighting activities. These will be the focus of this paper.
Each activity, referred to as a 'Part' in the Specifications, is made up of separate scenarios (as listed below).

Specified activities

Part 21 Activity – Incandescent lighting

- 21A – LED replacing incandescent or CFL
- 21B – LED replacing incandescent reflector lamp
- 21C – LED replacing 12V halogen incandescent
- 21D – LED luminaire replacing 12V halogen incandescent luminaire
- 21E – LED replacing GU10 halogen incandescent
- 21F – LED luminaire replacing GU10 halogen incandescent luminaire.

Part 27 Activity – Public lighting upgrade

- 27A – Installing an LCD (historically 34B)
- 27B – Lighting equipment replacement (historically 34D)
- 27C – Removing an LED integrated luminaire or the lamp and control gear associated with a non-integrated luminaire (historically Regulation 6(2)(d) and 6(3)(d)).

Part 34 Activity – Building based lighting upgrade

- 34A – Installing a lighting control device (historically 34B)
- 34B – Installing a voltage reduction unit (historically 34C)
- 34C – Replacing lighting equipment (historically 34D)
- 34D – De-lamping and decommissioning control gear (historically Regulation 6(2)(d) and 6(3)(d))
- 34E – Removing an LED integrated luminaire or the lamp and control gear associated with a non-integrated luminaire (historically Regulation 6(2)(d) and 6(3)(d)).

Part 35 Activity – Non-building based lighting upgrade

- 35A – Installing a lighting control device (historically 34B)
- 35B – Replacing lighting equipment (historically 34D)
- 35C – De-lamping and decommissioning control gear (historically Regulation 6(3)(d))
- 35D – Removing an LED integrated luminaire or the lamp and control gear associated with a non-integrated luminaire (historically Regulation 6(3)(d)).

Historic activity

Lighting has historically been responsible for a significant proportion of the certificates generated under the VEU program. Over the first two years of the program, activities that involved the replacement of incandescent lamps with compact fluorescent lamps (CFLs) produced approximately 80 per cent of VEEC creation. The schedule was ended in 2011 and replaced with the Part 21 activities, which provided reduced levels of incentive (comparatively).

The introduction of a 12V halogen lamp replacement activity into VEU in 2013 again produced a significant proportion of VEECs in the program. This activity was overtaken in 2015 when a change to the Regulations resulted in significant uptake of non-residential lighting, which then produced the majority of certificates in the program.[1]

In December 2018, scenario 21A was revised to allow the replacement of CFLs with LED products. This activity is continuing to grow in popularity.

Figure 1 below shows the registered VEECs from 2009 to 2019, using quarterly intervals (up to end Q2 2019). The influence of lighting activities can be clearly seen. VEEC registration in the VEU program has been dominated by residential lighting upgrades (Schedule 16), followed by residential lighting upgrades (Part 21), and then non-residential lighting upgrades (Part 34, 27 and 35). Only the influence of standby power controllers from 2012 to 2014 interrupted the trend.

Note – There has been no uptake under Part 27 or 35, and the proportion of Part 34 J6 lighting upgrades is too small to be visible in the figure.

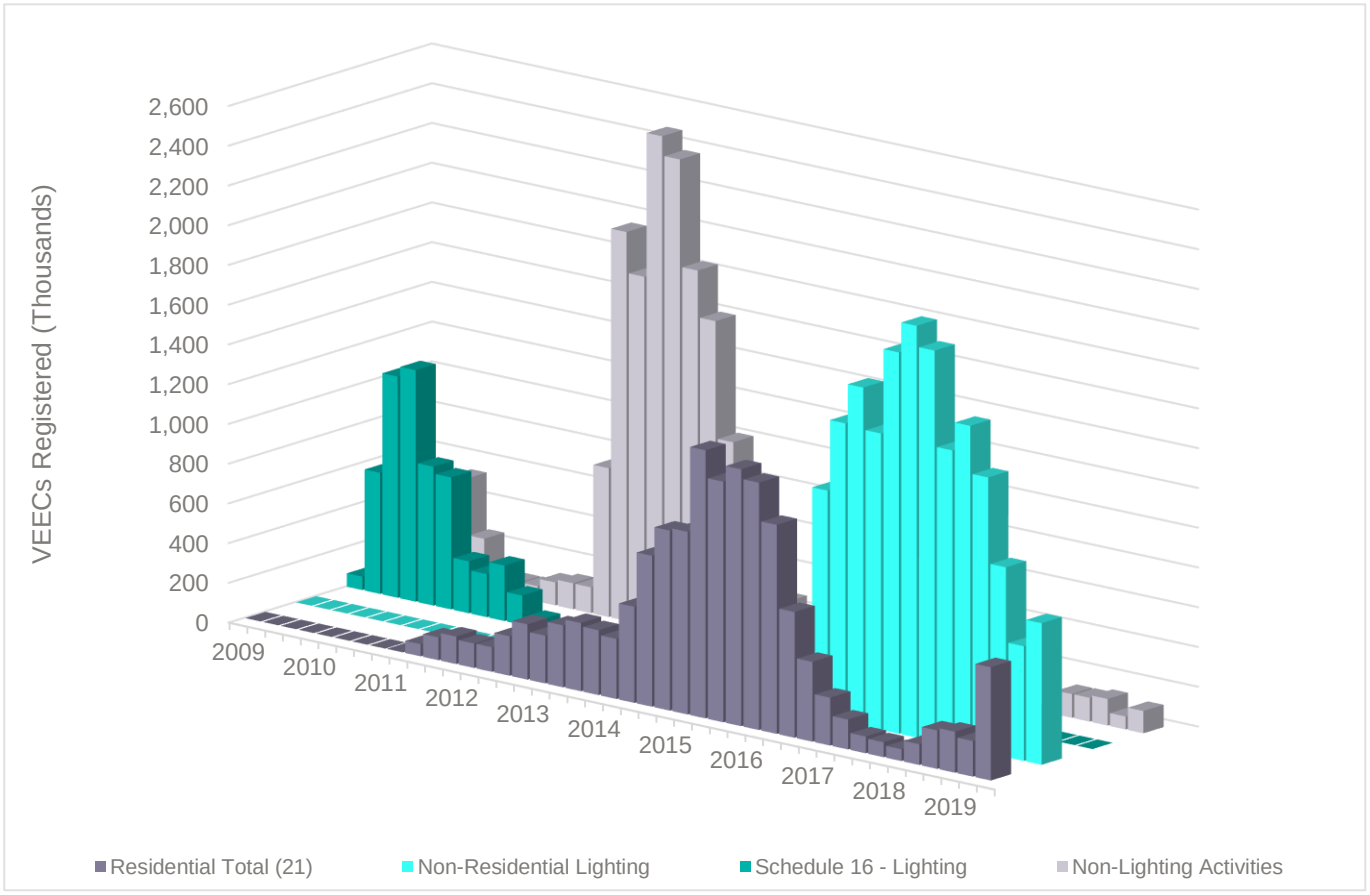

Figure 1: registered VEECs by activity date from 2009 to 2019 – quarterly intervals.

1 Part 34 (both J6 and non-J6), Part 35 and Part 27 are all captured under the category 'non-residential lighting'.

Market changes and considerations

Lighting technologies have been evolving at a rapid pace over the past decade. Market forces including technology development, decreasing unit costs, consumer demands, economies of scale and market disruption have resulted in a rapidly changing lighting market. The VEU program needs to continually adjust to ensure that only energy efficiency activities which are additional (i.e. would not have taken place without an incentive) are part of the program.

Market changes

The residential lighting market has transformed significantly over the past decade in Australia. The 2010 Residential Lighting Survey commissioned by the Commonwealth Government, found that a phase out of low efficiency incandescent lamps in 2009 and a reduction of CFL costs resulted in CFLs making up approximately 31 per cent of the market in 2010.[2] The survey also found that LED lamps made up only 1.4 per cent of the lighting stock, mostly in the form of novelty lighting and applications such as nightlights for children.

The residential lighting survey was undertaken again in 2016 and found that LEDs made up approximately 15 per cent of the lights in surveyed Australian households. It also found that the VEU program had reached more than 30 per cent of Victorian households and had a significant impact on the overall lighting efficacy in the residential sector.[3] Given the survey was three years ago, it is expected that the market impact of the VEU program and general ownership of LEDs in Victoria would be much higher than that found by the 2016 survey.

The luminous efficacy of LED technology has increased rapidly over the past decade. This efficacy is projected to continue to increase over the next decade, however the speed of the increase will begin to slow as the technology approaches practical limits.[4] As the efficacy of LED packages and efficiency of luminaires is increasing to levels approaching the potential maximum, the focus in LED product design is turning to other features, including:

- Spectral tuning for lighting and health (circadian spectrum for alertness and wellbeing).
- Connected lighting (or 'smart' lighting) where lamp/luminaire functions beyond provision of light become significant. This may include security sensors, speakers, Wi-Fi signal boosters, and connected controls.[5]

Organic LED technology (OLED) is another grouping within the solid-state lighting family that could potentially transform the market in the future. OLED lighting is diffuse, allowing it to be placed very close to the occupant or object being lit, while other lighting technologies (including LED products) may require optical diffusion to protect occupants from lighting source glare. Significant technology barriers remain for OLED lighting, with progress lagging behind LED performance and cost.[6]

The VEU program has had a profound impact on Australia's lighting market. The program has incentivised the installation of millions of highly efficient LED lighting products in homes and businesses across Victoria. In the absence of national regulatory requirements for LEDs, the VEU program Regulations, Specifications and the approval processes administered by the Essential Services Commission (ESC) mean that Victoria has become the proxy national LED lighting regulator. It should also be noted that the lighting product register administered by the ESC is also leveraged by jurisdictions other than Victoria.

2. Department of Climate Change and Energy Efficiency, (2010), 2010 Residential Lighting Report.
3. Department of Industry, Innovation and Science, (2016), 2016 Residential Lighting Report - Results of a lighting audit of 180 Australian homes.
4. Penning, J., Stober, K., Taylor, V., & Yamada, M. (2016). "Energy savings forecast of solid-state lighting in general illumination applications" (No. DOE/EE-1467). Navigant Consulting Inc., Washington, DC (United States).
5. Pattison, P., Hansen, M., Tsao, J.Y., (2018) "LED lighting efficacy: Status and directions", Comptes Rendus Physique, Volume 19, Issue 3, Pages 134-145.
6. Pattison, M, (2019) "2018 Solid-State Lighting R&D Opportunities" DOE BTO SSL Program.

Future regulatory changes to lighting

Through other governmental processes, there are proposed regulatory changes which will encourage and/or enforce the continuation of the rapid transformation of the lighting market. These need to be considered along with the other market transitions that are impacting on the additionality of lighting activities in the VEU program.

LED Minimum Energy Performance Standard (MEPS) and Halogen Phase Out

In April 2018, the federal Energy Minister approved the release of the decision Regulation Impact Statement (RIS) prepared by the Australian Department of the Environment and Energy on behalf of the COAG Equipment Energy Efficiency program.[7] The RIS considers policy proposals to improve the energy efficiency of residential and commercial lighting in Australia. The RIS includes that MEPS for LED lamps will be introduced in September 2021 under the federal Greenhouse and Energy Minimum Standards (GEMS) Act.[8] This proposal also includes a complementary phase out of halogen incandescent lamps. The final date of implementation is dependent on the European Union (EU) lighting regulations and standards which are being leveraged for this work.

This future LED MEPS and halogen phase out will have a major impact on the additionality of Part 21 activities in the VEU program.

National Construction Code 2019 Changes

The National Construction Code 2019 will introduce significant changes to maximum Illumination Power Densities (IPD) in section J6 – Lighting energy efficiency. These changes will become mandatory on 1 May 2020. The changes will require all new builds and retrofits that require a building permit to meet these requirements.

Changes to lighting requirements (for enforcement in 2020) have been assessed for their potential impact on product application (and availability). With respect to how different lighting technologies might be able to meet the updated requirements:

- CFLs will not be broadly applicable in most design spaces
- linear fluorescent technology may still be applicable, but in many spaces only where the highest quality products (efficacy, colour quality and controls) are used
- LED technology will be most broadly applied, but again will require careful consideration (high efficacy and colour quality product) in many of the more challenging design spaces where maximum illumination power densities are low.

The NCC changes will have a major impact on the additionality of Part 34 J6 activities in the VEU program.

Minamata Convention

The Minamata Convention on Mercury is an international treaty designed to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds.[9] It contains provisions supporting this objective that relate to the entire life cycle of mercury, including controls and reductions across a range of products, processes and industries where mercury is used, released or emitted.

The ratification of the Minamata Convention by a country means that by 2020 it is prohibited in manufacturing, importing or exporting certain mercury added products. Australia has signed but not yet ratified the Convention. The Minamata Convention particularly impacts mercury vapour lamps due to the levels of mercury they contain.

Australia does not manufacture mercury vapour lamps and sourcing these products will become challenging as a result of curtailed production overseas. It is likely that manufacturers of these lamps will stop making them due to their country's ratification (many already have ratified) and/or reduced demand from other countries. This means mercury vapour lamps will not be available through import into Australia from 2020.

7. Department of the Environment and Energy (2018) Decision Regulation Impact Statement: Lighting. Equipment Energy Efficiency Program.
8. Note that the proposed LED MEPS only covers lamps and does not cover integrated (or 'all-in-one') LED products.
9. See also - http://www.mercuryconvention.org/

From 2020 onwards, and once all remaining retail stock of mercury vapour lamps has been exhausted, lighting infrastructure owners are expected to upgrade these lamps to LED, which will greatly reduce the additionality of this activity (i.e. replacing mercury vapour lamps) in the VEU program.

Mercury vapour lamp replacements represented approximately 6.5 per cent of all lamps replaced under Part 34 since the activity began. Following the updating of the Regulations in December 2018, mercury vapour lamp replacements have only represented approximately 3.7 per cent of all lamps replaced, suggesting the prevalence of such lamps in Victoria is decreasing.

Current MEPS requirements in Australia for compact fluorescent lamps and linear fluorescent lamps limit mercury content at or below the levels required by the Minamata Convention, so these product types will not be impacted in 2020.

Timeline for proposed changes

The VEU program needs to make changes to deal with the evolution of the lighting market and reduced additionality for lighting activities. The implementation timelines should also anticipate and align with future regulatory and market impacts.

The timelines for the mandatory changes to the NCC and the Minamata Convention on Mercury are clear. To align with these, it is proposed in August 2020 to remove J6 activities from Part 34, and mercury vapour lamps from the baseline calculations for Part 27, Part 34 and Part 35. The changes will have limited impact on VEU program participants as these activities have minor uptake.

The proposed changes to Part 21 and Part 34 activities have more substantial impacts and therefore the department has considered how a phase out might be designed to transition the program, noting the importance of lighting activities for the program, the current popularity of different activities, and the role the program plays in the lighting market. One way to balance these considerations would be to decrease the incentives provided to an activity before removal or significant change. This would provide a lead time ahead of the change, allowing accredited providers and the market to plan and transition. Conversely, it is possible that this approach may not be acceptable or suitable for all program participants, who may rather no decrease in incentives. It is also critical that this policy accounts for the reduced additionality due to market changes.

Two options are proposed for the changes to Part 21 and Part 34 activities:

- Option 1 involves an initial reduction in incentives for certain lighting activities and then the removal of some activities.
- Option 2 brings forward the removal of some lighting activities.

The timelines for these two options are shown in Table 1. Timelines in this issues paper are indicative only and are subject to the outcomes of the consultation.

Table 1: Timeline of options for the proposed changes to Part 21 and Part 34

Lighting Activity		August 2020	October 2020	February 2021
Part 21	Option 1	Reduced incentive for all activities		Activity removed
	Option 2	Activity removed		
Part 34 – Non J6	Option 1	Reduced incentive for HID lamp activities		All lamp activities (including HIDs) removed except for fluorescent tube upgrades
	Option 2		All lamp activities (including HIDs) removed except for fluorescent tube upgrades	

Consultation request:

The department is interested your views on the proposed timelines, including whether you prefer Option 1 or Option 2 for changes to Part 21 and Part 34.

Please include any relevant context and reasoning for your position.

The details of the proposed changes specific to each activity are outlined in the following section.

Proposed changes and discussion

This section outlines the proposed changes to each of the lighting activities in the VEU program. Each activity is discussed separately in its own subsection. The proposed changes to the activity are introduced with proposed implementation dates, followed by the justification and discussion.

Consultation request:

The department is interested your views on each of the proposed changes and lighting activities outlined in this section.

Please include any relevant context and reasoning for your position.

The section has been broken down into the following activities:

- Part 21 Incandescent lighting upgrades
- Part 27 Public lighting upgrades
- Part 34 J6 Building based lighting upgrades
- Part 34 Non-J6 Building based lighting upgrades
- Part 35 Non-building based lighting upgrades.

Part 21 – Incandescent lighting activities

Part 21 comprises lighting activities that incentivise the replacement of existing incandescent lamps and CFLs (scenario 21A only), with high efficiency LED lamps. Part 21 is split into six scenarios based on six common residential lighting upgrades.

Part 21 proposed changes

August 2020

- removal of lower lifetime categories for all lamps (the minimum for all scenarios will be 15,000 hours)
- removal of lower efficacy categories for all scenarios (excluding scenario 21A)

Part 21 proposed changes – Option 1

August 2020

- introduce a higher efficacy category for scenario 21B
- apply a consistent power factor multiplier across all scenarios (lamps with a power factor less than 0.8 will have a power factor multiplier of 0.8)
- apply a discount factor for higher lamp lifetime categories for all scenarios
- increase the discount factors for each scenario.

February 2021

- Part 21 will be removed from the Regulations.

Part 21 proposed changes – Option 2

October 2020

- Part 21 will be removed from the Regulations.

The proposed changes to the input values in the Specifications for Part 21 are outlined in the following table.

Table 2: Revised input values for Part 21

Activity	Minimum efficacy (lumens/watt)	Lamp lifetime (hours) 15,000	20,000	25,000
21A	84	0.07	0.09	0.10
	100	0.14	0.18	0.21
	120	0.22	0.29	0.33
	140	0.30	0.40	0.45
21B	78	0.46	0.61	0.69
	94	0.47	0.62	0.70
21C	62	0.44	0.58	0.66
	75	0.46	0.61	0.69
	90	0.48	0.63	0.72
21D	58	0.45	0.59	0.67
	69	0.47	0.62	0.70
	83	0.49	0.64	0.72
	100	0.50	0.66	0.74
21E and 21F	58	0.55	0.72	0.82
	69	0.57	0.75	0.84
	83	0.58	0.77	0.87
	100	0.59	0.78	0.89
Power Factor multiplier (all Part 21 activities)				
PF Multiplier	PF < 0.8	0.8		
	PF ≥ 0.8	1.0		

Efficacy

The efficacy requirements of each of the Part 21 activity scenarios differ. Some of these differences are due to the limitations of the particular lighting technology, while others are due to the limitations of the market at the time that the requirements were set.

Scenario 21A sets aspirational efficacy requirements to encourage leaps in efficiency, allowing for the replacement of both incandescent and CFL products. Analysis completed for the department shows that the efficacy of scenario 21A products is above international levels for both the general market and comparable international incentive schemes.

Scenario 21B products have low efficacy requirements and all approved VEU products meet the highest efficacy category of 78 lumens/watt. It is proposed to add an additional higher efficacy category for this reason. It is also proposed to remove the three lowest efficacy categories for scenario 21B (45, 54 and 65 lumens/watt) as they have never received a registration.

The lowest efficacy category for scenario 21C (52 lumens/watt) and the lowest efficacy category for scenario 21D, 21E and 21F (48 lumens/watt) are proposed to be removed, as efficacy in the lighting market has progressed significantly since these categories were set for the scheme.

Scenario 21C and 21D have some historic products registered in the lowest efficacy category. When these changes commence, these products will no longer be eligible to generate VEECs under the program.

Part 21 proposed changes:

To account for the transformation of the lighting market, it is proposed that efficacy categories are changed for Part 21 –

- three lowest efficacy categories for scenario 21B are removed
- additional higher efficacy category is added for scenario 21B
- lowest efficacy category for[10] scenario 21C is removed
- lowest efficacy category for[10] scenario 21D is removed
- lowest efficacy category for[10] scenario 21E is removed
- lowest efficacy category for[10] scenario 21F is removed.

Baseline and additionality

The baseline for scenario 21A activities is based upon the proportion of CFLs, halogen and incandescent lamps currently installed in households in Victoria. Discounts are applied to each of these product types to capture the likelihood that a replacement with an LED lamp would occur under business-as-usual.

All activities have a discount applied to ensure that the GHG reduction is additional. The LED market has continued to grow in both proportion of sales and efficacy since these discounts were originally set in the release of the 2018 Regulations. This discount will need to be revised with the introduction of MEPS for LED lamps and the national phase out of halogen lamps. These changes will have a significant impact on the discount applied to the replacement of halogen lamps with LED lamps.

Part 21 proposed change:

An increased discount will be applied to all Part 21 activities to account for the increasing likelihood that LED lamp replacements are business-as-usual. This will result in a reduction in the incentive provided to Part 21 activities.

10. Previous version incorrectly stated, “or”, this was amended 5/12/19.

Lifetime categories

Multiple lifetime categories were added to Part 21 activities to allow for potential trade-offs between lamp lifetime and efficiency. Scenario 21A allowed for lifetimes as low as 8,000 hours, which was included in case products needed to reduce their lifetime to meet the aspirational efficacy categories. All products currently registered under Part 21 have a lifetime above 20,000 hours, with most products having a lifetime above 25,000 hours.

Part 21 proposed changes:

Lower lifetime categories will be removed.

Three lifetime categories will remain for all Part 21 activities:

- 15,000+ hours
- 20,000+ hours
- 25,000+ hours.

Product lifetime

The daily use of most lamps averages around 2 hours.[11] Using this figure, it can be estimated that an LED lamp lasting for 25,000 hours could be in use for 34 years. Much can change in this timeframe, including the environment the lamp is installed in, lighting technology developments and the generation source of the electricity that powers it.

It is possible that some houses will complete a retrofit within the lifetime of a LED lamp, involving the replacement of lamps for reasons unrelated to the performance of the lamp. The potential development of other lighting technologies including 'smart' lamps or other unforeseen technology developments also increases the chance that a lamp may be replaced prior to end of life. The average emissions intensity of electricity generated in Victoria is also projected to decrease significantly.

It is proposed to apply discount factors to the higher lamp lifetime categories for all Part 21 scenarios to account for the potential impacts of these external factors, which may reduce the total GHG savings over the lifetime of a lamp.

Part 21 proposed change:

Additional discount factors will be applied to higher lifetime categories for all Part 21 scenarios.

Power factor adjustments

Historically, Part 21 products receive an incentive for achieving a power factor of 0.9 or above. The introduction of the 2018 Regulations altered the factors in scenario 21A and decreased the level of GHG reduction for products which have a power factor below 0.8. This change created an inconsistency in Part 21 activities.

Part 21 proposed changes:

It is proposed that the power factor multiplier is consistent across all Part 21 scenarios –

- products with a power factor of at least 0.8 will receive a power factor multiplier of 1.0
- products with a power factor less than 0.8 will receive a power factor multiplier of 0.8.

11. Department of Industry, Innovation and Science, (2016), 2016 Residential Lighting Report - Results of a lighting audit of 180 Australian homes.

Part 27 – Public lighting activities

The Part 27 – Public lighting activity provides incentives for energy efficient upgrades of street lights and their controls. There has been no uptake of the Part 27 activity to date.

There has been stakeholder interest in utilising the VEU incentive, with one project reportedly in the process of creating VEECs however the replacement of public lighting is a challenging task that can have long lead times.

Part 27 proposed changes:

August 2020

- Mercury vapour lamps will be removed from the baseline calculations and will no longer generate VEECs.

Post August 2020

- Part 27 will remain to provide incentives for upgrading public lighting.

The Minamata Convention will make it difficult to source replacement mercury vapour lamps. It is highly likely that these lamps will be upgraded to LED products when they fail. This means the upgrade of mercury vapour lamps will no longer be additional, removing the need for the VEU program to incentivise this type of upgrade.

Part 34 – J6 Building based lighting upgrades

Part 34 J6 building based lighting upgrades is contained within Part 34 and is used where a building upgrade requires a building permit and must therefore meet the requirements in the National Construction Code (NCC). Part 34 J6 uses a calculation where only the additionality above the minimum requirements of the NCC is used to generate VEECs.

Part 34 J6 proposed changes:

August 2020

- The Part 34 J6 building based lighting upgrade activity will be removed from the Specifications.

Part 34 J6 activities currently generate a very small proportion of the total VEECs registered annually for the VEU program. The J6 activity experienced some uptake in both 2018 and 2019, with just over 40,000 VEECs created throughout the lifetime of the activity.

The IPD requirements that underpin these activities are being significantly increased when the J6 changes of the NCC commence on 1 May 2020. With the new IPD requirements in section J6 of the NCC, the baseline IPD requirements will need to be updated to ensure the GHG reduction attributed to the activity would not otherwise have occurred. This update will result in a baseline that is near, or in some cases potentially beyond, what existing products on the register are able to achieve. This would result in a significant decrease in the GHG reduction that J6 building based lighting upgrades could achieve.

Given the low uptake and that a significant reduction in incentive would prevent any further J6 lighting upgrades in the program, the department proposes to remove J6 lighting upgrades from Part 34.

Part 34 – Non-J6 building based lighting upgrades

Part 34 – building based lighting upgrades provides incentives to upgrade the energy efficiency of a range of lighting types in non-residential buildings.

Non-J6 activities in Part 34 has been the most significant activity in the VEU program in recent years. In 2018, Part 34 accounted for approximately 84 per cent of all certificates submitted. There has been a decrease in the number of certificates created by Part 34 in 2019. This is possibly due to the pool of opportunity decreasing with high intensity discharge (HID) lamp replacements upgrades becoming more difficult to undertake.

Part 34 Non-J6 proposed changes

August 2020

- mercury vapour lamps will be removed from the baseline calculations and will no longer generate VEECs.

Part 34 Non-J6 proposed changes – Option 1

August 2020

- the lamp circuit power (LCP) for metal halide and high-pressure sodium lamp upgrades will be reduced.

February 2021

- the replacement of all lighting types, except for T8 and T12 linear fluorescent and circular fluorescent lamps, will be removed
- minimum efficacy requirements will be introduced
- the lifetime of lamp replacements will be reduced from 5 years or a maximum of 5 years, to 4 years or a maximum of 4 years.

Part 34 Non-J6 proposed changes – Option 2

October 2020

- the replacement of all lighting types, except for T8 and T12 linear fluorescent and circular fluorescent lamps, will be removed
- minimum efficacy requirements will be introduced
- the lifetime of lamp replacements will be reduced from 5 years or a maximum of 5 years, to 4 years or a maximum of 4 years.

High intensity discharge (HID) lamp replacements

Historically, the replacement of HID or ‘high bay’ lamps has represented approximately 13 per cent of all lamp replacements under Part 34. Following the introduction of the 2018 Regulations, HID lamp replacements have made up approximately 17 per cent of all lamp replacements under Part 34. The large amount of GHG reduction provided by these type of replacements means that they have created the majority of all VEECs created under Part 34.

A discount factor of 0.85 was applied to HID replacements on 1 February 2018, with the discount factor increased to 0.7 on 1 May 2018.[12] This discount factor was then incorporated into the Specifications document as part of the sunsetting of the 2008 Regulations.[13] This was done by incorporating the discount factor of 0.7 into the lamp circuit power (LCP) equation.

Recently, the volume of HID lamp replacements has decreased, suggesting the pool of opportunity for replacements is decreasing. The decreasing pool of opportunity has also resulted in some compliance issues and installations in spaces where operating hours may not be as high as the deemed assumption. The short payback period of these type of replacements and the increasing volume of LED replacements on the market, coupled with the decreasing cost, suggests that the additionality provided by the program is continuing to decrease. For these reasons, it is proposed to make changes to the LCP for metal halide and high-pressure sodium lamp activities, reducing the GHG reduction of these upgrades. This will reduce the incentive provided for these upgrades.

Previous LCP changes for these lamps were equivalent to a discount factor of 0.7, the proposed changes will be equivalent to a discount factor of 0.6.

The Minamata Convention will make it difficult to source replacement mercury vapour lamps. It is highly likely that these lamps will be upgraded to LED products when they fail. This means the upgrade of mercury vapour lamps will no longer be additional, removing the need for the VEU program to incentivise this type of upgrade.

Part 34 Non-J6 proposed changes:

- mercury vapour lamps will be removed from the baseline calculations and will no longer generate VEECs
- the lamp circuit power (LCP) for metal halide and high-pressure sodium lamp upgrades will be reduced using the equations given below:

Metal halide lamp with magnetic ballast -	NLP x 0.772 + 13.1
Metal halide lamp with electronic ballast -	NLP x 0.8 + 0·7
High pressure sodium lamp with magnetic ballast -	NLP x 0.767 + 9.5

The future of Part 34

The rapid market transition to efficient lighting has reduced the level of additionality of lighting upgrades completed in the VEU program. Modelling completed for the department suggests there is still a remaining pool of opportunity for T8 and T12 lighting retrofits particularly in commercial premises. It is proposed that T8 and T12 lighting upgrades will remain as eligible activities in Part 34 to incentivise this remaining opportunity. All other Part 34 lighting upgrades will be removed as part of the second phase of changes to lighting activities.

Part 34 Non-J6 proposed changes:

- the replacement of all lighting types, except for T8 and T12 linear fluorescent and circular fluorescent lamps, will be removed.

12. Department of Environment, Land. Water and Planning, (2017), Victorian Energy Upgrades, Response to Consultation - Changes to Schedule 34 Lighting Upgrade.
13. Department of Environment, Land. Water and Planning, (2018) Proposed Activity Changes, Victorian Energy Efficiency Target Regulations 2018.

Efficacy

The age of many of the approved products in the Part 34 lighting product register is increasing. Analysis completed for the department has shown that the average efficacy of the products installed in the VEU program has not kept up with the pace of technology development of LED products in the wider market. Linear LED lamps and luminaire products (batten, troffer and grid types) on the VEU program lighting register perform at or below efficacy trends for the broader international market. This is due to the average age of the products being installed. The policy aims for the program are to incentivise installations that are above market average efficacy levels.

Currently there is no efficacy requirement included in the VEU program for Part 34. A requirement could be applied to existing registrations, with products that cannot meet the efficacy levels becoming ineligible for installation under the program.

Analysis of the scenario 21A product register suggests that setting and updating appropriate efficacy requirements encourages the registration of newer products. This provides better outcomes for Victorian consumers and may also push the broader lighting market toward high efficacy products. Comparatively, the product register for Part 34 shows that without these requirements, products remain on registers resulting in the efficacy of products installed under the program starting to lag behind general market levels.

Part 34 Non-J6 proposed change:

- a minimum efficacy requirement will be introduced for Part 34 product registrations.

Lifetime

Building retrofits are a common occurrence in the non-residential sector, particularly when tenancies change. Lamp replacements are more likely to be short term, taking place prior to the next major refurbishment. The suitability of lamp replacements (e.g. lamp compatibility with existing fixtures) may also result in a lifetime shorter than the lamp is rated for. Luminaire replacements are more likely to be part of a comprehensive retrofit and are likely to remain for a number of years. Concerns have been raised that lamp lifetimes may overestimate the length of time that these upgrades remain in place. The lifetime of lamps in Part 34 was adjusted in late 2018 due to these reasons.

It is proposed to discount the lifetime of lamp upgrades in Part 34 by a factor of 0.8. This will take into account reducing lamp lifetimes and the increasing market transition to more energy efficient lighting. This will only impact T8 and T12 lamp upgrade activities as it will occur in the second phase of the proposed changes.

Part 34 Non-J6 proposed changes:

- the lifetime of lamp replacements will be reduced from 5 years or a maximum of 5 years, to 4 years or a maximum of 4 years.

Part 35 – Non-building based lighting upgrades

The Part 35 – Non-building based lighting activity provides incentives for energy efficient upgrades of lights and their controls that are not attached to or part of a building. There was a small amount of uptake of the activity under the previous 2008 Regulations when it was included in Part 34, with a total of 600 VEECs created.

Part 35 proposed changes:

August 2020

- Mercury vapour lamps will be removed from the baseline calculations and will no longer generate VEECs.

Post August 2020

- Part 35 will remain to provide incentives for upgrading non-building based lighting.

There has currently been no uptake under the new Part 35, leaving the pool of opportunity largely untouched. To encourage uptake of these upgrades, there are no proposed adjustments other than those required to address the impact of the Minamata Convention on Mercury (i.e. the removal of mercury vapour lamps as a baseline).

Lighting product register

The lighting product register for the VEU program is an extremely comprehensive database. It includes approximately:

- 320 products approved for use in Part 21
- 50 products approved for use in Part 27
- 6,100 products approved for use within Part 34
- 120 products approved for use in Part 35.

The Essential Services Commission administer the register and have set comprehensive product quality requirements which are supported by a robust compliance and check testing regime. These approval processes mean that Victoria has become the proxy national LED lighting regulator. They have also allowed the VEU lighting register to be leveraged in the requirements of jurisdictions other than Victoria.

The changes proposed in this paper will impact on the lighting product register. If an efficacy requirement is applied to existing Part 34 registrations, products that cannot meet the efficacy requirements would cease to be approved for installation under the program. Similarly, any products within the Part 21 efficacy categories that are proposed for removal would also be taken off the register.

Consultation request:

The department is interested in your views on the use of and benefits provided by the lighting product register outside the VEU program.

Program targets

The VEU 2019 program target of 6.3 million VEECs has been met. An additional 3.3 million certificates have been created (51 per cent the 2020 target), with a weekly average creation of approximately 52,000 VEECs required to meet the 2020 target of 6.5 million VEECs.[14] The weekly average over the past six months is in excess of 100,000 VEECs.

Consultation request:

The department is interested in your views on the impact the proposed changes may have on meeting the 2020 VEU program target.

Lighting-based activities have historically provided a significant proportion of the VEECs generated under the program (approximately 92 per cent of the 2018 target), so it is important to understand what impact the changes proposed in this paper will have on the VEU program participants and broader market.

14. Data current as at 30/10/2019.

Submissions

Summary of consultation discussion points

The department is interested in your views on the following points:

1. Proposed changes to lighting activities coming into effect August 2020:
    a. Part 21:
        i. (Option 1&2) the removal of lower lifetime categories for lamps (minimum 15,000 hours)
        ii. (Option 1&2) the removal of lower efficacy categories for all scenarios (excluding scenario 21A)
        iii. (Option 1) the introduction of a higher efficacy category for scenario 21B (94 lumens/watt)
        iv. (Option 1) applying a consistent power factor multiplier across all scenarios
        v. (Option 1) applying a discount factor for higher lamp lifetime categories for all scenarios
        vi. (Option 1) increasing the discount factors for each scenario
    b. the removal of Part 34 J6 building based lighting upgrades
    c. Part 34:
        i. (Option 1) changes to the LCP for metal halide and high-pressure sodium lamp upgrades
    d. the removal of mercury vapour lamp upgrades from Part 27, Part 34 and Part 35.
2. Proposed changes to lighting activities coming into effect February 2021 (Option 1) or October 2020 (Option 2):
        i. the removal of Part 21 activities
        ii. the removal of the replacement of all lighting types from Part 34, except for the replacement of T8 and T12 linear and circulator fluorescent lamps
        iii. the reduction of lifetime for lamp replacements from 5 years to 4 years
        iv. the introduction of a minimum efficacy requirement for product registrations.
3. Whether you prefer Option 1 or Option 2 for the proposed changes to Part 21 and Part 34 and any feedback on the timing of changes for your preferred Option.
4. The use of and benefits provided by the lighting product register outside the VEU program.
5. The impact the proposed changes may have on meeting the 2020 VEU program target.

Please include any relevant context and reasoning for your position.

Next steps

You are encouraged to provide any comments and feedback you may have for the proposed changes to lighting activities.

Your responses should clearly define the topic and question being addressed.

If you are interested in learning more about the proposed changes, or if you wish to raise any preliminary queries with the department, please email energy.upgrades@delwp.vic.gov.au

The department will be running an information session on these proposed changes to lighting activities.

Consultation timelines and the date and registration details for the public information session are detailed on the Engage Victoria website at: https://engage.vic.gov.au/

Indicative key milestones in the revision of lighting activities in the VEU program are:

- Open stakeholder consultation on proposed changes to lighting — https://engage.vic.gov.au/
- Lighting stakeholder information session — https://engage.vic.gov.au/
- Close stakeholder consultation on the proposed changes to lighting — https://engage.vic.gov.au/
- Response to Consultation published — February 2020
- Updated Specifications and revised activities commence — August 2020
- Removal of some lighting activities from the Regulations — Oct 2020 or Feb 2021

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