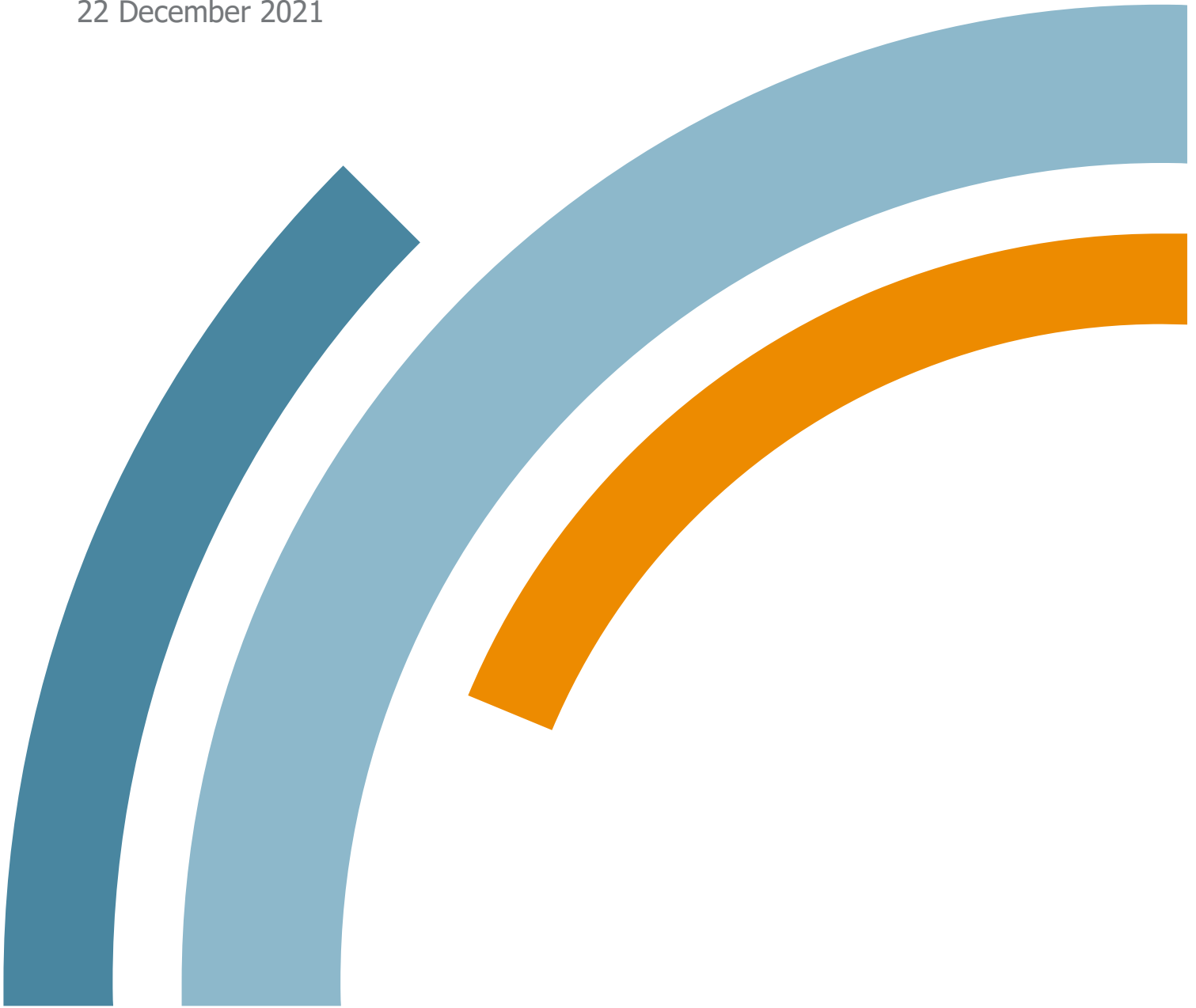


Cold Room Activity Guide

22 December 2021



An appropriate citation for this paper is:

Essential Services Commission 2021, Cold Room Activity Guide, 22 December

Copyright notice

© Essential Services Commission, 2021



This work, Cold Room Activity Guide, is licensed under a Creative Commons Attribution 4.0 licence [creativecommons.org/licenses/by/4.0]. You are free to re-use the work under that licence, on the condition that you credit the Essential Services Commission as author, indicate if changes were made and comply with the other licence terms.

The licence does not apply to any brand logo, images, or photographs within the publication.

Contents

Introduction	1
1. Introduction to cold room activity	3
1.1. Which cold room upgrades are eligible	3
2. Calculating Victorian energy efficiency certificates	6
2.1. Calculation variables	6
2.2. Certificate claim for multiple cold rooms upgraded with a shared condenser and/or compressor	7
3. Requirements for personnel undertaking cold room activity	9
3.1. Required installer training and qualifications	9
3.2. Role of the upgrade manager	9
4. Record keeping and evidence requirements	10
4.1. Record keeping obligations	10
4.2. Geo-tagged photograph obligations	10
5. Minimum evidence requirements	11
5.1. Installing an electronic expansion valve and superheat controller into a refrigeration system (activity 43A)	11
5.2. Installing a refrigeration system with three upgraded parts (activity 43B(i))	13
5.3. Installing a refrigeration system with five upgraded parts (activity 43B(ii))	14
Glossary	17
Appendix A: Calculation for cold room activities and worked examples	18

Introduction

Accredited persons (APs) and their installers under the Victorian Energy Upgrades (VEU) program must comply with program requirements when undertaking cold room activities to create Victorian energy efficiency certificates (VEECs).

About this guide

Use this guide for assistance in meeting the specific requirements (products, installation, decommissioning, recommissioning, training, safety and evidentiary) for cold room activity upgrades. We have split the guide into five key sections:

- Section 1: Introduction to cold room activity
- Section 2: Calculating Victorian energy efficiency certificates
- Section 3: Requirements for personnel undertaking cold room activity
- Section 4: Record keeping and evidence requirements
- Section 5: Minimum evidence requirements

You should read this guide in conjunction with our Obligations and Program Guide for Accredited Persons for:

- overarching information about the Victorian Energy Upgrades program
- your obligations under the program
- guidance on how to create VEECs under the program.

Access this document at www.esc.vic.gov.au/veu-accredited-persons

Who should use this guide

You should use this guide if you are:

- seeking accreditation to undertake cold room activities under the program
- accredited to undertake cold room activities under the program
- an installer seeking to undertake installations for this activity under the program.

This guide will help you to understand the activity, your responsibilities, and evidentiary requirements you must meet to create and register VEECs.

To apply for accreditation for this activity, access the required documents at www.esc.vic.gov.au/become-veu-accredited

Seeking assistance

If you are unsure about any aspects of undertaking this activity and cannot find the answer in this guide or the documents listed above, contact VEU support on (03) 9032 1310 or 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

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.

Feedback on this guide

We are committed to implementing a risk-based regulatory framework for this activity. To achieve this objective, we would like to hear from you if you have any feedback on the requirements set out in this guide.

To provide feedback, please contact VEU Support on veu@esc.vic.gov.au or (03) 9032 1310.

1. Introduction to cold room activity

In August 2021, the Department of Environment, Land, Water and Planning introduced the cold room activity to the VEU program under Part 43 of the VEET Regulations. The new cold room activity (activity 43) provides for three activity upgrade scenarios that are tailored towards simple retrofit upgrades and installation of new cold rooms.

A summary of the new cold room activity upgrade scenarios is described in [Table 1](#).

These activities are based on a deemed method for calculating Victorian energy efficiency certificates (VEECs) under the Victorian Energy Upgrades (VEU) program. If your cold room activity is complex or linked to another upgrade, we recommend you consider the suitability of the measurement and verification method for project-based activities in accessing certificates under the program.

Find out how to participate in project-based activities at www.esc.vic.gov.au/project-based-activities

Table 1 Summary of eligible cold room activity scenarios

Activity scenario	Summary description
43A	Installing an electronic expansion valve and compatible superheat controller in a refrigeration system
43B(i)	Installing a refrigeration system that includes at least three of the parts as set out in Table 2 below.
43B(ii)	Installing a refrigeration system that includes all of the five parts as set out in Table 2 below.

1.1. Which cold room upgrades are eligible

For the cold room upgrade to be eligible under the VEU program:

- the upgrade must take place in an eligible site
- the product installed must be eligible
- you must be accredited to undertake the cold room activity
- the upgrade must be undertaken in accordance with the activity requirements (see sections 4 and 5 of this document)

1.1.1. Eligible sites

To be eligible, the upgrade must be undertaken in a business/non-residential premises. The upgrade must be for a room or structure where goods are stored at temperatures below 7 degrees Celsius. It must not be for a room or structure which is:

- a refrigerated cabinet
- equipment or a product used exclusively for medical, scientific, or research purposes; or
- a portable or mobile cold room or refrigerated container.

1.1.2. Eligible products

Products are not required to be listed in our register of products or any other product registers.

The installation and commissioning of all upgrade product(s) and parts must meet the product criteria listed in [Table 2](#).

Table 2: Product criteria for cold room activity scenarios

Activity	Product criteria
43A	An electronic expansion valve and compatible superheat controller that: <ul style="list-style-type: none">• are designed to be installed together in the refrigeration system of a cold room; and• when installed together into a refrigeration system can and will automatically control the superheat of the refrigeration system.
43B(i)	A refrigeration system that includes at least three of the parts set out in this Table for Activity 43B(ii), provided that at least one of the three parts must be: <ul style="list-style-type: none">• technology capable of varying condensing temperature with ambient temperature to improve system performance; or• compressors with variable capacity modulation such as variable speed capacity control, other than<ul style="list-style-type: none">– on/off capacity control on single compressor systems– hot gas bypass– fixed stage cylinder unloading
43B(ii)	A refrigeration system that includes all of the following parts: <ul style="list-style-type: none">• technology capable of varying condensing temperature with ambient temperature to improve system performance

- compressors with variable capacity modulation such as variable speed capacity control, other than
 - on/off capacity control on single compressor systems
 - hot gas bypass
 - fixed stage cylinder unloading
- electronic expansion valve and compatible superheat controller that meet the requirements of Activity 43A
- speed controlled condensing fans, that
 - are electronically commutated (EC) fans, or
 - are variable speed drive (VSD) driven fans
- evaporator fans, that are electronically commutated (EC) fans.

1.1.3. Appropriate accreditation and approvals

You must be accredited by us and approved for the cold room activity to create VEECs for this activity.

Find out how to become accredited at <https://www.esc.vic.gov.au/become-veu-accredited>.

2. Calculating Victorian energy efficiency certificates

The number of Victorian energy efficiency certificates (VEECs) you receive for a given cold room upgrade is based on the deemed abatement associated with the activity.

The deemed abatement is calculated using assumptions about an upgrade situation's key variables, such as the temperature factor and deemed improvement in the energy efficiency of the cold room.

Due to these assumptions, the deemed abatement calculated may vary from the actual abatement achieved for a particular upgrade. If you wish to claim VEECs using a more accurate abatement value, the measurement and verification method for project-based activities is an available option.

The key variables used to calculate the number of VEECs for the cold room activity are:

- energy savings
- lifetime
- electricity emissions factor
- temperature factor
- regional factor.

The VEEC calculation method is detailed further in part 43 of the Victorian Energy Upgrade specifications. Appendix A includes examples of how to calculate VEECs for this activity.

An explanation of some of the key calculation variables is provided below.

2.1. Calculation variables

2.1.1. Energy savings

The energy savings from a high efficiency refrigeration system are achieved by using more energy efficiency components and by improving the control of components that make up the system, so it more effectively responds to changes in demand (e.g., temperature variations).

The energy savings input values provided for each activity scenario are:

- 1.7 for activity 43A
- 3.4 for activity 43B(i)
- 5.1 for activity 43B(ii)

2.1.2. Lifetime

The asset lifetime provided for all upgrade scenarios for the cold room activity is 12 years.

2.1.3. Electricity emissions factor

The electricity emissions factor (EEF) represents energy intensity and is the factor to be used in greenhouse gas equivalent emissions reduction. The electricity emissions factor is as follows:

- From 1 August 2021 to 31 January 2022, the EEF is 0.9546
- From 1 February 2022 to 31 January 2023, the EEF is 0.8142
- From 1 February 2023 to 31 January 2024, the EEF is 0.6738
- From 1 February 2024 to 31 January 2025, the EEF is 0.5334
- From 1 February 2025, the EEF is 0.393

2.1.4. Temperature factor

The energy use of a cold room can vary if the premises operates as a cool room or freezer. To reflect this variation, a temperature factor is used to determine the relative energy use of a cold room. The temperature factors are as follows:

- For cold rooms operating at or above 0°C, the temperature factor is 1.0
- For cold rooms operating below 0°C (freezers), the temperature factor is 1.4

2.1.5. Regional factor

Regional factor is the input value used to account for fluctuations in average energy usage due to distribution losses. The regional factors are as follows:

- For upgrades in metropolitan Victoria the regional factor is 0.98
- For upgrades in regional Victoria the regional factor is 1.04.

2.2. Certificate claim for multiple cold rooms upgraded with a shared condenser and/or compressor

We have clarified our position that an upgrade involving multiple cold rooms using a shared compressor(s) and/or condenser(s) – or a shared combined compressor and condenser in a single refrigeration system – can be claimed based on the number of cold room upgrades. This is provided that other upgrade components have been installed in each cold room, and the upgrade meets all requirements for the relevant activity scenario as detailed in Part 43 of the Victorian Energy Upgrades Specifications.

For example, an accredited person will be able to claim certificates for three activities for an upgrade at a single site under activity 43B(i) involving:

- the upgrade of a single condenser and compressor serving three cold rooms in a single refrigeration system

- the installation of new electronically commutated evaporator fans in each of the three cold rooms.

3. Requirements for personnel undertaking cold room activity

3.1. Required installer training and qualifications

All cold room upgrades must comply with legal requirements and be undertaken by personnel holding the following licenses:

- An RAC01 refrigerant handling licence (where handling of refrigerants is required)
- An electrician licence registered with Energy Safe Victoria (where wiring work is undertaken)
- A plumber licence registered with the Victorian Building Authority (where plumbing work is undertaken).

3.1.1. Installer training and qualification record keeping requirements

Accredited persons must maintain a register of installers' qualifications (electrical licence, and plumbing licence and/or refrigerant handling licence if required) to confirm all installers have the relevant qualifications needed to undertake the upgrade.

3.2. 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 and documentation outlined in the evidence requirements.

This should be the person who is responsible for overseeing the installation and commissioning of the cold room upgrade.

4. Record keeping and evidence requirements

You must collect evidence to demonstrate that each upgrade has been undertaken in accordance with the Victorian Energy Efficiency Target Regulations and Victorian Energy Upgrade Specifications. You are also required to maintain documentation for each cold room upgrade and provide it to us upon request.

4.1. Record keeping obligations

You must keep appropriate records to verify all details of the upgrade which relate to the calculation of greenhouse gas abatement and the creation of VEECs.

We may ask to review these records prior to VEECs being registered, or up to six years after they are registered, as evidence that your upgrade complies with the legislation.

Your records must be an auditable record of the work undertaken. If your documentation fails to provide an auditable record of the work undertaken, you may be required to surrender VEECs equivalent to those which we cannot verify or be subject to other compliance and enforcement actions.

4.2. Geo-tagged photograph obligations

You are required to take geo-tagged photographs to verify that the installation of all parts has been performed in accordance with the Victorian Energy Efficiency Target Regulations. Geo-tagged photographs must:

- be 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. Minimum evidence requirements

5.1. Installing an electronic expansion valve and superheat controller into a refrigeration system (activity 43A)

Table 3: Evidence requirements for installing an electronic expansion valve and superheat controller into a refrigeration system (activity 43A)

Requirements	Documentation	Description
Assignment of rights to create VEECs	VEEC assignment form	All fields in the VEEC assignment form must be completed and correctly filled in.
Eligibility	VEEC assignment form	<p>A declaration, signed by the AP or the installer, declaring that the installed cold room is not:</p> <ul style="list-style-type: none"> • a refrigerated cabinet • equipment or a product used exclusively for medical, scientific, or research purposes, or • a portable or mobile cold room or refrigerated container.
Proof of commercial transaction and energy consumer	Tax invoice	<p>A valid tax invoice for the work carried out must include:</p> <ul style="list-style-type: none"> • the name, address, and Australian Business Number (ABN)/Australian Company Number (ACN) of the energy consumer • the date of issue of the invoice • the installation address • the name, address, and ABN of the upgrade manager business • the itemised list of installed cold room parts including brand(s) and model(s) names.
Upgrade product(s)	Technical/data sheet(s)	Technical/data sheet(s) detailing all installed parts which clearly show the brand name and model for each of the installed parts.
	Geo-tagged photographs of the installed parts	<p>The photographs must:</p> <ul style="list-style-type: none"> • show the electronic expansion valve (EEV) and superheat controller, and • show all installed parts in situ, connected and as part of the refrigeration system.

Requirements	Documentation	Description
Temperature factor	Geo-tagged photograph of the thermostat controlling the installed cold room system.	The photograph must clearly show the room temperature set point or actual temperature on responsive controller display.
Compliance	Certificate of electrical safety (CoES)	A CoES must be provided if one is required by law. The certificate must include the type and number of parts installed (where more than one upgrade is undertaken at a single premises).
	Victorian Building Authority (VBA) compliance certificate	VBA compliance certificate for upgrades costing \$750 or more (if applicable).

5.2. Installing a refrigeration system with three upgraded parts (activity 43B(i))

Table 4: Evidence requirements for installing a refrigeration system with three upgraded parts (activity 43B(i))

Requirements	Documentation	Description
Assignment of rights to create VEECs	VEEC assignment form	All fields in the VEEC assignment form must be completed and correctly filled in.
Eligibility	VEEC assignment form	<p>A declaration, signed by the AP or the installer, declaring that the installed cold room is not:</p> <ul style="list-style-type: none"> • a refrigerated cabinet, • equipment or a product used exclusively for medical, scientific, or research purposes, or • a portable or mobile cold room or refrigerated container.
Proof of commercial transaction and energy consumer	Tax invoice	<p>A valid tax invoice for the work carried out must include:</p> <ul style="list-style-type: none"> • the name, address, and Australian Business Number (ABN)/Australian Company Number (ACN) of the energy consumer • the date of issue of the invoice • the installation address • the name, address, and ABN of the upgrade manager business • the itemised list of installed cold room parts including brand(s) and model(s) names.
Upgrade product(s)	Technical/data sheet(s)	<p>Technical/data sheet(s) detailing all installed parts which clearly show the brand name and model for each of the installed parts</p> <p>Where multiple cold rooms are served by shared compressor(s) and/or condenser(s), a schematic diagram (e.g. a single line diagram) of the refrigeration system.</p>
	<p>Geo-tagged photographs of the installed parts</p> <p>Manufacturer document listing installed parts</p>	<p>EITHER:</p> <ul style="list-style-type: none"> • Photographs showing: <ul style="list-style-type: none"> – the nameplate of each of the installed parts – all installed parts in situ, connected and as part of the refrigeration system.

Requirements	Documentation	Description
		<p>OR</p> <ul style="list-style-type: none"> • manufacturer document (e.g. bill of materials) listing installed parts • photograph of unit name plate • photograph showing all installed parts in situ, connected and as part of the refrigeration system.
Temperature factor	Geo-tagged photograph of the thermostat controlling the installed cold room system.	The photograph must clearly show the room temperature set point or actual temperature on responsive controller display.
Compliance	Certificate of electrical safety (CoES)	A CoES must be provided if one is required by law. The certificate must include the type and number of components installed (where more than one upgrade is undertaken at a single premises).
	Victorian Building Authority (VBA) compliance certificate	VBA compliance certificate for upgrades costing \$750 or more (if applicable).

5.3. Installing a refrigeration system with five upgraded parts (activity 43B(ii))

Table 5: Evidence requirements for installing a refrigeration system with five upgraded parts (activity 43B(ii))

Requirements	Documentation	Description
Assignment of rights to create VEECs	VEEC assignment form	All fields in the VEEC assignment form must be completed and correctly filled in.
Eligibility	VEEC assignment form	<p>A declaration, signed by the AP or the installer, declaring that the installed cold room is not:</p> <ul style="list-style-type: none"> • a refrigerated cabinet, or • equipment or a product used exclusively for medical, scientific, or research purposes, or • a portable or mobile cold room or refrigerated container.

Proof of commercial transaction and energy consumer	Tax invoice	<p>A valid tax invoice for the work carried out must include:</p> <ul style="list-style-type: none"> the name, address, and Australian Business Number (ABN)/Australian Company Number (ACN) of the energy consumer the date of issue of the invoice the installation address the name, address, and ABN of the upgrade manager business the itemised list of installed cold room parts including brand(s) and model(s) names.
Upgrade product(s)	Technical/data sheet(s)	<p>Technical/data sheet(s) detailing all installed parts which clearly show the brand name and model for each of the installed parts</p> <p>Where multiple cold rooms are served by shared compressor(s) and/or condenser(s), a schematic diagram (e.g. a single line diagram) of the refrigeration system</p>
	<p>Geo-tagged photographs of the installed parts</p> <p>Manufacturer document listing installed parts</p>	<p>EITHER:</p> <ul style="list-style-type: none"> Photographs showing: <ul style="list-style-type: none"> the nameplate of each of the installed parts all installed parts in situ, connected and as part of the refrigeration system. <p>OR</p> <ul style="list-style-type: none"> manufacturer document (e.g. bill of materials) listing installed parts photograph of unit name plate photograph showing all installed parts in situ, connected and as part of the refrigeration system.
Temperature factor	Geo-tagged photograph of the thermostat controlling the installed cold room system.	The photograph must clearly show the room temperature set point or actual temperature on responsive controller display.
Compliance	Certificate of electrical safety (CoES)	A CoES must be provided if one is required by law. The certificate must include the type and number of parts

	installed (where more than one upgrade is undertaken at a single premises).
Victorian Building Authority (VBA) compliance certificate	VBA compliance certificate for upgrades costing \$750 or more (if applicable).

Glossary

Term	Definition
Cold room	<p>A refrigerated room or structure where goods are stored at temperatures below 7 degrees Celsius but does not include:</p> <ul style="list-style-type: none"> • a refrigerated cabinet, • equipment or a product used exclusively for medical, scientific, or research purposes, or • a portable or mobile cold room or refrigerated container
Electronic expansion valve	An electrically driven device which regulates the flow of volatile refrigerant into an evaporator of a refrigeration system.
Evaporator	A heat exchanger in which liquid refrigerant is vaporised by absorbing heat from the substance to be cooled.
Refrigeration system	An assembly of parts used in the cooling of a space, substance, or system to lower and/or maintain its temperature below the ambient one (removed heat is rejected at a higher temperature).
Saturation temperature	The temperature at which a refrigerant changes from a liquid state to a vapour, or from a vapour to a liquid state.
Superheat	<p>The difference in temperature between:</p> <ul style="list-style-type: none"> • the saturation temperature corresponding to the pressure measured at the outlet of an evaporator of the refrigeration system; and • the temperature of the refrigerant vapor when leaving the outlet of an evaporator.
Superheat controller	A device responsive to changes of pressure, temperature, or other variables for regulation of superheat in a refrigeration system in normal operation.
VEEC	A Victorian energy efficiency certificate created under Section 17 of the Victorian Energy Efficiency Target Act 2007.

Appendix A: Calculation for cold room activities and worked examples

VEECs for these activities are calculated using the following equation (VEECs equivalent to tonnes of CO₂ equivalent emissions abated):

GHG Eq. Reduction

$$= \text{Energy Savings} \times \text{Lifetime} \times \text{EEF} \times \text{Temperature Factor} \\ \times \text{Regional Factor}$$

- GHG Eq.: greenhouse gas equivalent, in tonnes of CO₂ equivalents
- Energy Savings: energy saving generated (as per VEU specifications)
- Lifetime: The asset lifetime (as per VEU specifications)
- EEF: Electricity emissions factor (as per VEET Regulations at the time of installation)
- Temperature factor: variation in cold room energy use, as per VEU specifications
- Regional factor: climatic region applicable to the site, as per VEU specifications

Worked examples for creating VEECs

Activity 43A – Electronic expansion valve and superheat controller

- Energy savings is 1.7
- Lifetime is 12
- Electricity emissions factor is 0.9546
- Temperature factor is 1.0 for cold rooms operating at or above 0°C and 1.4 for cold rooms operating below 0°C
- Regional factor is 0.98 for upgrades in metropolitan Victoria and 1.04 for upgrades in regional Victoria

Table 6: Worked example for activity 43A: electronic expansion valve and superheat controller

Activity	Upgrade scenario	Greenhouse Gas Equivalent Reduction Equation	VEECs generated
43A	Installing an electronic expansion valve and superheat controller for a cold room operating at below 0°C (freezer) in regional Victoria	$1.7 \times 12 \times 0.9546 \times 1.4 \times 1.04$	28

Activity 43B(i) – Refrigeration system with three upgraded parts

- Energy savings is 3.4
- Lifetime is 12
- Electricity emissions factor is 0.9546
- Temperature factor is 1.0 for cold rooms operating at or above 0°C and 1.4 for cold rooms operating below 0°C
- Regional factor is 0.98 for upgrades in metropolitan Victoria and 1.04 for upgrades in regional Victoria

Table 7: Worked examples for activity 43B(i): refrigeration system with three upgraded parts

Activity	Upgrade scenario	Greenhouse Gas Equivalent Reduction Equation	VEECs generated
43B(i)	Installing a minimum of three specified parts for a cold room operating at or above 0°C in Metropolitan Victoria.	$3.4 \times 12 \times 0.9546 \times 1 \times 0.98$	38

Activity 43B(ii) – Refrigeration system with five upgraded parts

- Energy savings is 5.1
- Lifetime is 12
- Electricity emissions factor is 0.9546
- Temperature factor is 1.0 for cold rooms operating at or above 0°C and 1.4 for cold rooms operating below 0°C (freezer)
- Regional factor is 0.98 for upgrades in metropolitan Victoria and 1.04 for upgrades in regional Victoria

Table 8: Worked example for activity 43B(ii): refrigeration system with five upgraded parts

Activity	Upgrade scenario	Greenhouse Gas Equivalent Reduction Equation	VEECs generated
43B(ii)	Installing all specified parts for a cold room operating below 0°C (freezer) in Regional Victoria.	$5.1 \times 12 \times 0.9546 \times 1.4 \times 1.04$	85

Document version control

The Content Manager reference for this document is: C/21/15788

Version	Amendments made	Date published
1.0	First release	17 August 2021
1.1	Changes to some evidence requirements and clarification on eligibility of multiple cold room upgrades	22 December 2021