EXPLANATORY STATEMENT

Issued by the authority of the Minister for Energy and Emissions Reduction

Greenhouse and Energy Minimum Standards Act 2012

Greenhouse and Energy Minimum Standards (Refrigerated Cabinets) Determination 2020

Purpose

The *Greenhouse and Energy Minimum Standards (Refrigerated Cabinets) Determination 2020* (the Determination) establishes minimum energy efficiency requirements, and associated requirements for conducting tests, for refrigerated display cabinets, refrigerated storage cabinets, ice cream freezers and refrigerated display scooping cabinets for gelato.

The details of the Determination are the same as those of the *Greenhouse and Energy Minimum Standards (Refrigerated Cabinets) Determination 2019* (the 2019 Determination), which was revoked before its scheduled commencement date of 15 August 2020. This was in response to representations from commercial refrigeration stakeholders regarding the impact of COVID-19 on supply chains and testing facilities (both in-house and third party), and consequently the stakeholders' ability to have all of their products, particularly in the newly regulated product categories, registered by the commencement date. The Government agreed to a delayed commencement date of 1 May 2021 to allow time for these issues to be overcome.

This Determination revokes and replaces the *Greenhouse and Energy Minimum Standards (Refrigerated Display Cabinets) Determination 2012* (revoked Determination). The reason why this new Determination must be made, rather than amending the 2019 Determination, is explained in the Explanatory Statement to the *Greenhouse and Energy Minimum Standards (Refrigerated Cabinets Revocation) Instrument 2020*.

Refrigerated cabinets are used to display and store food in retail and commercial premises. They run continuously, resulting in significant energy use, running costs, and greenhouse gas emissions. In 2015, Australian businesses owned around 845,000 refrigerated cabinets. By 2035, sales of refrigerated cabinets are projected to increase by over 40 percent and energy use will increase to over 9,000GWh per year.

This Determination extends the range of refrigerated cabinets regulated under the *Greenhouse and Energy Minimum Standards Act 2012* (the Act). As well as being applicable to refrigerated display cabinets covered by the revoked Determination, requirements will also be imposed on refrigerated storage cabinets, ice cream cabinets and gelato scooping cabinets for the first time in Australia. The Determination introduces a voluntary star rating framework and aligns with international best practice by adopting minimum energy performance standards set by the European Commission in 2017-18.

The Determination adopts International Organisation for Standardisation (ISO) and European test methods. It also includes alternative, less onerous testing requirements for refrigerated cabinets supplied in low volumes, and widened family of models circumstances, to reduce the costs of demonstrating compliance for registration.

Background

The *Greenhouse and Energy Minimum Standards Act 2012* established a national framework for regulating the energy efficiency of products supplied or used within Australia, replacing individual state and territory legislative frameworks. The Act implemented the Council of Australian Governments' (COAG) commitment to establish national legislation to regulate energy efficiency and labelling standards for appliances and other products.

The Act permits the Australian Government to set mandatory minimum efficiency requirements, which drive greater energy efficiency for regulated products and exclude the poorest performing products from the market. These are referred in the Determination as greenhouse and energy minimum standards (GEMS) level requirements, and are generally known as minimum energy performance standards (MEPS).

The Act also allows the Australian Government to set nationally-consistent labelling requirements, to increase Australian consumers' awareness of options to improve energy efficiency and reduce energy consumption, costs, and greenhouse gas emissions.

Other regulatory requirements possible under the Act include requirements relating to product performance, and the impact of the product on the environment or the health of human beings.

Authority

Under subsection 23(1) of the Act the Minister may, by legislative instrument, make a determination (a GEMS determination) that specifies one or more classes of products if the products in those classes use energy or affect the amount of energy used by other products. A GEMS determination is the vehicle by which energy efficiency requirements (GEMS level requirements), energy labelling requirements (GEMS labelling requirements) and other requirements for a product class are established.

Section 35 of the Act allows a Minister to make replacement determinations through revoking the previous determination and making a new determination to replace the revoked determination. The new determination can specify the new requirements and retain any relevant existing requirements from the revoked determination. The revoked determination ceases to be in force immediately before the replacement determination comes into force.

Under section 36 of the Act, a replacement determination must specify whether it affects the registration of models of GEMS products. Under subsection 36(2) of the Act, if a replacement determination does not specify that it affects a model's registration, the model is taken to be registered against the replacement determination. If a replacement determination specifies that it affects a model's registration, then under paragraph 48(2)(c) of the Act, the model's registration ceases to be in force from the time the replacement determination comes into force (or the beginning of the

day a registration of the model against the replacement determination comes into force, whichever is the earlier).

Under section 25 of the Act, the GEMS level requirements specified in a GEMS determination may be:

- requirements relating to one or more of the following:
    - the amount of energy used in operating products in relevant product classes;
    - the amount of greenhouse gases resulting from operating products in the relevant product class;
    - the effect of those products on the amount of energy used by operating other products; and
- requirements for conducting tests in relation to products in the relevant product class in order to determine whether the products meet the specified requirements.

Under section 26 of the Act, the GEMS labelling requirements specified in a GEMS determination may be:

- requirements relating to the information that must be communicated in connection with supplying or offering to supply products in the relevant product class;
- requirements relating to the manner in which that information must be communicated; and
- requirements for conducting tests in relation to products in the relevant product class in order to determine whether the products meet the specified requirements.

Under section 27 of the Act, other requirements that may be specified in a GEMS determination are:

- requirements relating to the performance of products in the relevant product class;
- requirements relating to the impact of products in that product class on the environment or on the health of human beings;
- requirements for conducting tests in relation to products in the relevant product class in order to determine whether the products meet the specified requirements; and
- requirements of a kind specified in the regulations for the purposes of this paragraph.

Incorporated material and copyright

The Determination references ISO and European Standard (EN) test standards. Requirements for marking plates are referenced from an Australian/New Zealand adoption of an International Electrotechnical Commission (IEC) standard. A list of standards incorporated by reference is included in section 4 of the Determination (Attachment A).

The Australian/New Zealand standard and the ISO standards can be purchased from Standards Australia, through its current licensee, SAI Global. EN standards are available for purchase through a range of sources including the British Standards Institute. Commercial users who have ascertained that they are likely to be covered by the Determination (which is possible from reading the Determination in isolation) would be expected to purchase the referenced standards in order to comply with the Determination.

In its new Distribution and Licensing Policy Framework, published in November 2019, Standards Australia committed to striving to maximise the availability of public library reading room access such that Australian Standards can be accessed by the general public in physical public library reading rooms for personal, domestic and household use. It also committed to funding and providing this type of access by other means, currently anticipated to be online provision directly by Standards Australia, by no later than December 2023.

The Department continues to engage with Standards Australia while this work is underway regarding options for non-commercial users to access standards incorporated in this Determination without charge. During this period, interested non-commercial users may be able to access standards without cost through the National Library of Australia, including via interlibrary loans. In addition, should requests to view standards be received from non-commercial users, the Department will work with the requesting party to provide appropriate access to any standard referenced in the Determination on a case-by-case basis.

This Determination contains a copyright notice that acknowledges the inclusion of material that is copyrighted to the European Committee for Standardisation (CEN) and ISO. There is only limited copyright material included in the Determination. This includes material in Schedule 4 of the Determination which relates to M-package temperature classes and material in Schedule 5 relating to test room climate classes.

The copyright notice clarifies the permitted use of the Determination by those seeking to comply with their obligations under it.

Consultation

In the development of the 2019 Determination, Australian and New Zealand businesses were consulted on four separate occasions between 2016 and 2018 including participation in an 18-month Technical Working Group process to ensure international test standards were fit for adaptation locally. Industry stakeholders were also consulted on the other provisions of this Determination.

A Consultation Regulatory Impact Statement (RIS) was released to industry in July 2016. Four public consultation sessions were held in August 2016 in Melbourne Sydney, Brisbane and Auckland. Twenty written submissions were received from a variety of manufacturers, industry groups, individuals and academics.

Following feedback from the Consultation RIS, a Technical Working Group (TWG) was convened, made up of industry representatives, regulators and independent experts who were primarily tasked with reviewing the international standards' suitability for the Australasian market and considering any potential technical alterations to the standards proposed to be adopted. The TWG made provisional technical findings and recommendations available to industry stakeholders for feedback from April to September 2017. Only two submissions were received. One did not support regulation of the sector and the other supported the introduction of an alternative approach to labelling which aligns with the European requirements rather than the Energy Rating Label requirements that are in place in Australia.

Extensive consultation was undertaken with state, territory and NZ government agencies. The draft Determination was amended to reflect the outcome of these consultations including assessment of compatibility with existing state run incentive schemes.

A draft of the 2019 Determination was developed with input from industry and other stakeholders. Feedback was sought on an implementation update paper in May 2018. Four submissions were received. One raised concerns over timing, two sought clarification of technical issues. Again one submission supported the introduction of an alternative approach to labelling.

On 16 November 2018, an exposure draft of the 2019 Determination was released for public comment over a four-week period. Four responses were received, seeking confirmation on the coverage of the Determination. No change to the draft 2019 Determination was required from this process.

This Determination was prepared in response to representations from industry stakeholders regarding the impact of COVID-19 on their circumstances. Further consultation was undertaken with a number of those stakeholders to seek additional information about the range and severity of the impacts, in order to develop a response appropriate for the industry as a whole.

Regulatory Impact

A comprehensive COAG Decision RIS which took into account stakeholder feedback was prepared as part of the process of developing the 2019 Determination, which applies equally to this Determination given the substantive content has not changed. On 18 February 2019, COAG Energy Council Ministers agreed to the preferred option in the Decision RIS.

The Office of Best Practice Regulation assessed the RIS as meeting the Council of Australian Government's best practice regulation requirements. The RIS is set out in full at Attachment C.

Detailed description of the Determination

Details of the Determination are set out at Attachment A.

Statement of compatibility with human rights

A statement of compatibility with human rights for the purposes of Part 3 of the *Human Rights (Parliamentary Scrutiny) Act 2011* is set out at Attachment B.

Attachment A

Details of the Determination

Part 1—Preliminary

Section 1—Name

This section sets out the title of the Determination.

Section 2—Commencement, revocation and replacement

This section provides that the Determination commences and comes into force on 1 May 2021. It also provides that the Determination revokes and replaces the *Greenhouse and Energy Minimum Standards (Refrigerated Display Cabinets) Determination 2012*.

Section 3—Authority

Section 3 sets out the authority under which this Determination has been made.

Section 4—Definitions—standards referred to in this Determination

Section 4 lists the standards referred to in the Determination. The definition of *test standard* in section 5 provides which standard a type of refrigerated cabinet must be tested against.

The Determination makes variations to several standards to make them fit for purpose in the domestic market. Variations are set out in Schedule 3 to the Determination, and summarised in the table below:

Test standard incorporated by reference	**Shortened name**	**Variation to standard**	**Applicable refrigerated cabinet type**
European Standard 16825:2016 Refrigerated storage cabinets and counters for professional use — Classification, requirements and test condition	EN 16825	Yes	Refrigerated storage cabinet (RSC)
European Standard 16838:2016 Refrigerated display scooping cabinets for gelato — Classification, requirements and test conditions	EN 16838	No	Scooping cabinet
European Standard 16901:2016 Ice cream freezers — Classification, requirements and test conditions	EN 16901	Yes	Ice cream freezer cabinet
International Organisation for Standardisation Standard 23953-1:2015, Refrigerated display cabinets – Part 1: Vocabulary	ISO 23953-1	No	Refrigerated display cabinet (RDC)

Test standard incorporated by reference	Shortened name	Variation to standard	Applicable refrigerated cabinet type
International Organisation for Standardisation Standard 23953-2:2015, Refrigerated display cabinets – Part 2: Classification, requirements and test conditions	ISO 23953-2	Yes	RDC; Low sales volume RSC

The Determination references marking plate requirements (see section 33) set out in clause 7 of *Australian/New Zealand Standard 60335.2.89:2010, Household and similar appliances – Safety. Part 2.89: Particular requirements for commercial refrigerating appliances with an incorporated or remote refrigerant condensing unit or compressor*. This Australian/New Zealand standard is a modified adoption of International Electrotechnical Committee standard IEC 60335-2-89 Edition 2.

The applicable version of each standard referenced in the Determination is the version that existed at the date the Determination was made (see subsection 14(2) of the Determination).

The use of these standards is consistent with the Australian Government's policy of harmonisation with international standards where appropriate.

Section 5—Definitions—other expressions used in this Determination

Sections 5 sets out definitions and meanings of terms and expressions used in the Determination, including net volume and total display area.

The 'net volume' of an ice cream freezer cabinet or a refrigerated storage cabinet is determined in accordance with Annex B of EN 16901 and clause 6.1 of EN 16825 respectively.

The 'total display area' or 'TDA' of refrigerated display cabinets and scooping cabinets is determined in accordance with Annex A of ISO 23953-2 and clause 6.2 of EN 16838 respectively.

The test standards for each type of refrigerated cabinet are also defined (see table above).

Section 6—Meaning of *refrigerated cabinet*

A refrigerated cabinet, as defined in section 6, is a device that:

- consists of an insulated cabinet with an opening (whether or not the opening has a lid or a door);
- is capable of obtaining and maintaining a specified temperature within the insulated cabinet within a range that overlaps the range -18^{o}C to + 10^{o}C; and
- is designed primarily for storage, display, or both storage and display, of chilled or frozen foodstuffs.

Section 7—Meaning of *integral* and *remote*

Section 7 provides that the location of the condensing unit of a refrigerated cabinet determines whether the cabinet is considered 'integral' and 'remote'. A refrigerated cabinet is integral if its refrigerating system is incorporated within, or directly attached to the cabinet. If it is not integral, the refrigerated cabinet is remote.

Section 8—Types of refrigerated cabinets

The types of refrigerated cabinet covered by the Determination, as defined in section 8, are:

- ice cream freezer cabinet;
- RDC or refrigerated display cabinet;
- Refrigerated drinks cabinet;
- RSC or refrigerated storage cabinet; and
- scooping cabinet.

Section 9—Meaning of *horizontal* and *vertical* cabinets

Section 9 defines the meaning of 'horizontal' and 'vertical' refrigerated display and storage cabinets. A horizontal RDC has an access opening only from the top of the cabinet, whether or not the opening can be closed by a door or lid. A horizontal RSC is no taller than 1,050 mm when determined in accordance with EN 16825. If an RDC or RSC is not horizontal, it is vertical.

Section 10—M-package temperature classes

Section 10 sets out the meaning of, and details when a cabinet is considered to meet the requirements of, the M-package temperature classification for RDCs, RSCs, scooping cabinets and ice cream freezers.

An M-package temperature class is a way of grouping refrigerated cabinets based on their storage temperatures. The M-package temperate classes are set out in Schedule 4 and requirements relating to the temperature class are in section 32.

Section 11—Meaning of *light duty*, *normal duty* and *heavy duty*

Section 11 sets out how to determine if an RSC is considered 'light duty', 'normal duty' or 'heavy duty'. Under section 23, the GEMS level requirements for heavy duty RSCs differ from those of light or normal duty RSCs.

Section 12—Meaning of *E24h* and *energy consumption*

Energy consumption, also referred to as E24h, is the energy consumption of a refrigerated cabinet over a 24 hour period. Section 12 sets out how to determine the energy consumption of a refrigerated cabinet, including which test standard is to be used.

The applicable test standard also requires testing to be conducted at a specific climate class. A climate class specifies a range of climactic conditions (e.g. humidity) that a cabinet must be tested at to ensure the performance and energy consumption recorded is representative of the conditions likely to be experienced in operation. This Determination includes this level of specificity due to Australian climatic conditions being different to those typically experienced in Europe.

Section 13—Meaning of *low sales volume* and *oversize*

Section 13 defines the meaning of 'low sales volume' and 'oversize' cabinets. Under this Determination, the annual energy consumption (AEC) and reference annual energy consumption (RAEC), and hence the energy efficiency index (EEI), of 'low sales volume' and/or 'oversize' RDCs, and of 'low sales volume' RSCs, are calculated differently from other RDCs and RSCs (see sections 24 and 25). There is also additional testing requirements for certain 'low sales volume' RDCs and RSCs (see section 27).

An RSC or RDC is 'low sales volume' at a particular date if no more than 25 units of the models within a family of models are sold in a calendar year that includes that date, or for models that are not part of a family of models, no more than 10 units are sold in a calendar year that includes that date. Ice cream freezers and scooping cabinets cannot be "low sales volume".

Only RDCs can be classified as 'oversize'. Ice cream freezer cabinets, scooping cabinets and RSCs cannot be 'oversize'. If at the time of applying to register, or vary a registration, there is no National Association of Testing Authorities (NATA) approved laboratory that can test the cabinet to the relevant test standard (ISO 23953-2) due to its size, the RDC is 'oversize'.

For an RDC, if at some time after registration, its annual sales exceed the threshold sales volumes, unless models of the product are also 'oversize', they will need to comply with the requirements of this Determination that apply to RDCs generally.

For an RSC, if at some time after registration, its annual sales exceed the threshold sales volumes, models of the product will need to comply with the requirements of this determination that apply to RSCs generally.

Section 14—Interpretation

Section 14 provides guidance for interpreting certain aspects of the Determination.

Subsection 14(1)
This subsection sets out the order in which priority should be taken in the interpretation of relevant provisions if there are any inconsistencies between the Act, the Determination and the standards.

Subsection 14(2)
The purpose of this subsection is to make clear that the applicable version of any standard referenced in the Determination, or other relevant document that is referred to in a standard, is the version that is current on the date that the Determination was made.

Subsection 14(3)
This subsection clarifies that unless a contrary intention appears, expressions used in the Determination have the same meaning as in the relevant test standards.

Section 15—Families of models

Section 28 of the Act provides that a GEMS determination must specify, for each product class covered by the determination, the circumstances in which two or more models in that product class are in the same family of models. The circumstances in which a model may be considered to be in the same family has been widened in this Determination compared to the revoked Determination.

This section specifies that for two or more models to be in the same family of models, they must be in the same product class, and the 'worst' performing model, as determined by the criteria listed in subsection 15(2), must be identified as the parent model. Other models belonging to that same family of models must meet the requirement of the same or warmer M-package temperature class as the parent model. Specific requirements are set out for families of models of each type of refrigerated cabinet under subsections 15(4) to 15(7).

In subsection 15(8), the maximum number of models in a family has been lifted to 25 compared to the revoked Determination.

Subsection 15(9) outlines how to calculate a refrigerated cabinet's specific energy consumption which is used to determine the parent model of a family.

Section 16—Product categories

Section 29 of the Act requires that a GEMS determination specify whether the products it covers are category A or category B products. Category B products are subject to higher penalties than category A products for certain offences under the Act, on the basis that category B products have a high impact on energy use or greenhouse gas production.

Section 16 specifies that covered by the Determination are category A products. This is unchanged from the revoked Determination.

Section 17—Registrations affected by this Determination

Section 36 of the Act requires that a GEMS replacement determination must specify whether it affects the registration of all models, specified models, or no models, of GEMS products that were covered by the revoked Determination. A registration is affected if the product, or products, covered by it cannot meet the GEMS level requirements imposed by this Determination.

Section 17 provides that the registration of models made under the revoked Determination listed in Table 1 of Schedule 2 to this Determination are affected registrations. This means that the registration of those models against the revoked Determination cease to be in effect from the date this Determination comes into force.

Registrations that are not listed in Table 1 of Schedule 2 are taken to be registered against this Determination from the date it comes into force.

Part 2—Products covered by determination

Section 18—Purpose of Part

This Part specifies the classes of products that are covered by the Determination and those that are not, for the purposes of subsections 23(1) and (2) of the Act.

Section 19—Classes of products that are covered by the Determination

This section specifies that product classes covered by the Determination are those listed in Schedule 1. Classification is based on cabinet type (see section 8), whether the cabinet is integral (see section 7), whether the cabinet is horizontal or vertical (see section 9) and whether the cabinet is a chiller or freezer.

Products covered by the Determination include refrigerated cabinets, which are defined in section 6 as devices that:

- consist of an insulated cabinet with an opening (whether or not the opening has a lid or a door);
- are capable of attaining and maintaining a specified temperature within the insulated cabinet within a range that overlaps the range -18°C to +10°C; and
- are designed primarily for storage, display, or both storage and display, of chilled or frozen foodstuffs.

The types of refrigerated cabinet covered by the Determination (see section 8) has been widened compared to the revoked Determination. The revoked Determination covered only refrigerated display cabinets, whereas the scope of this Determination includes refrigerated storage cabinets, ice cream freezer cabinets and gelato scooping cabinets.

The Determination covers products in the product classes listed in Schedule 1 irrespective of whether the context in which they are used, for example if they are used in an industrial, commercial or domestic context. For example, refrigerated drinks cabinets designed for a commercial application that are being used in a domestic applications are covered by the Determination.

Section 20—Classes of products that are not covered by the determination

This section sets out product classes that are not covered by the Determination. These classes of products include:

- refrigerated vending machines;
- icemakers;
- cabinets designed for both processing and storage (e.g. bakery cabinets that chill, heat and humidify; open top tables and saladettes for food preparation; storage cabinets designed to operate at temperatures outside the scope of this Determination (e.g. for storing fresh meat, fresh fish, wine);
- refrigerated cabinets with water cooled condensers;
- products covered by the *Greenhouse and Energy Minimum Standard (Household Refrigerating Appliances) Determination 2012,* for example domestic refrigeration appliances other than beverage coolers;

- refrigerated storage cabinets that are built-in cabinets (as specified in EN 16825);
- refrigerated storage cabinets that are roll-in cabinets (as specified in EN 16825);
- refrigerated storage cabinets that are pass through cabinets (as specified in EN 16825);
- appliances for short term or intermittent normal operation during the full day;
- RDCs that are low sales volume, oversize or both, and have an indirect refrigeration system within the meaning of ISO 23953-2; and
- RSCs that are not light duty, normal duty, or heavy duty.

Definitions are provided for terms that are used in this section.

Part 3—GEMS level requirements

Division 1—Preliminary

Section 21—Purpose of Part

This Part specifies, in accordance with section 25 of the Act, the GEMS level requirements for energy use for refrigerated cabinets covered by the Determination, including requirements for conducting tests in order to demonstrate compliance and how to determine the Energy Efficiency Index (EEI) for all types of cabinets and low sales volume and oversize refrigerated cabinets, for the purposes of paragraphs 24(1)(a) and 25(b) of the Act.

Section 22—Definitions

Section 22 defines the low–efficiency terms that are used in this Part, including relevant components of RDCs or RSCs and standard components in relation to determining the EEI of bespoke or oversize refrigerated cabinets. Section 25 uses the components defined in this section to calculate the EEI for these types of cabinets.

Division 2—GEMS level requirements

Section 23—GEMS level requirements

This section specifies GEMS level requirements for energy use for refrigerated cabinets covered by the Determination, in terms of the EEI. The following types of cabinet are grouped in relation to their maximum EEI levels:

- RDCs (other than low sales volume or oversize cabinets), scooping cabinets and ice cream freezer cabinets;
- RSCs that are heavy duty;
- RSCs that are light duty or normal duty.

Section 24—Calculation of energy efficiency index (EEI)

This section specifies the formula for calculating the EEI using AEC (annual energy consumption) and RAEC (reference annual energy consumption).

Section 25—Calculation of annual energy consumption (AEC) and reference annual energy consumption (RAEC)

This Section specifies the method of calculating the AEC and the RAEC for each type of refrigerated cabinet covered by the Determination. Similar cabinet types are grouped into product classes to reduce compliance complexity and enable comparability.

AEC is the annualised total of electricity used by a refrigerated cabinet. It is derived from the measured 24 hour electricity consumption of the cabinet as provided by the specified test method described in the appropriate test standard.

RAEC is the Reference AEC. The RAEC is a calculated value used to relate the measured electricity consumption of the cabinet (the AEC) to the product class the cabinet is covered by under the Determination.

The RAEC is calculated from co-efficients (specified in Schedule 1) which are unique to cabinet types specified in a given product class. The co-efficients are combined with the cabinet's total display area (TDA) or net volume (Vn) to calculate the RAEC.

The AEC and RAEC are the inputs used to establish a cabinet's EEI, which is calculated by dividing the AEC by the RAEC.

Division 3—Conducting tests

Section 26—Testing requirements—general

This section specifies the requirement that testing of refrigerated cabinets covered by the Determination must be conducted in accordance with the relevant test standards as cited in the definition of test standard in section 5 of this Determination.

The test standard for refrigerated display cabinets (including those used in domestic applications), ISO 23953-2, has been varied as set out in Schedule 3 to this Determination to reduce the door opening and lighting system test requirements to reflect current Australian practice.

Section 27—Additional testing requirements—integral, low sales volume RDCs that are not oversize and low volume RSCs

This section provides that for integral, low sales volume refrigerated display cabinets that are not oversize, and for low sales volume refrigerated storage cabinets, the total energy consumption of the cabinet as a whole must be measured directly by testing in accordance with ISO 23953-2. ISO 23953-2, has been varied as set out in Schedule 3 to this Determination to reduce the door opening and lighting system test requirements to reflect current Australian practice.

Part 4—GEMS labelling requirements

Section 28—Purpose of Part

Section 28 states that this Part, in accordance with section 26 of the Act, specifies the GEMS labelling requirements for the product classes covered by the Determination for the purposes of paragraph 24(1)(b) of the Act.

Section 29—Use of star ratings

Refrigerated cabinets covered by this Determination do not need to be labelled. This section sets out a method of calculating star ratings for suppliers who wish to communicate the energy efficiency of a refrigerated cabinet in terms of stars. If a product's energy efficiency is described in terms of one or more stars, for example in on-line advertising, the rating must be calculated in accordance with Schedule 6 to this Determination.

Section 30—Impact of replacement determination

Section 30 provides a mechanism, in the event that this Determination is replaced in the future, to allow a transitional labelling provision to be specified in that replacement determination (the new determination) with the effect that complying with its requirements will be taken to be compliance with the labelling requirements of this Determination. This is to prevent the situation arising, in circumstances where a registrant chooses to register to the new determination between the time it is made and when it comes into force (as allowed by section 44 of the Act), of a product needing to comply with the labelling requirements of both determinations.

Part 5—Other requirements

Section 31—Purpose of Part

This Part specifies other requirements in accordance with section 27 of the Act, for the purposes of subsection 24(2) of the Act.

Section 32—Requirement relating to M-Package temperature class

This section specifies the M-package temperature class products covered by the Determination must meet. The requirements do not apply to oversize RDCs. Section 10 of this Determination sets out definitions in relation to M-Package temperature classes.

Test standards require testing to be conducted at specific climactic conditions (e.g. humidity). This ensures performance and energy consumption recorded is representative of the conditions likely to be experienced in operation. As Australian conditions are different to those typically experienced in Europe, test room climate classes representing Australian conditions are set out in this section. Schedule 3 to this Determination sets out variations to the relevant test standards.

Section 33—Marking Plates

This sections provides that marking plates are required to be permanently affixed to all types of refrigerated cabinets covered by the Determination. This section specifies the marking plate requirements by identifying the clause of the relevant standards that must be complied with. Information included on marking plates is specific to the type of refrigerated cabinet, but typically includes:

- the model and serial number of the cabinet including the condensing unit;
- all information relating to the power supply of the cabinet; and
- the type and mass of the refrigerant used.

Schedule 1—Product Classes

This Schedule specifies the product classes, product class descriptions, sub-class codes and the specific coefficients required to calculate the RAEC for refrigerated chiller and freezer cabinets covered by the Determination. Section 19 of the Determination sets out the definition of product class.

Schedule 2—Registrations affected by the Determination

This Schedule lists registrations under the revoked Determination affected by the Determination. Section 17 sets out when a registration is affected by the Determination.

Schedule 3—Variations to Standards

This Schedule lists all variations to the standards listed in section 4 that specify the test methods and requirements for testing refrigerated cabinets covered in the Determination.

Many of these changes to the test standards are intended to address Australian climatic conditions being different to those typically experienced in Europe. The variations also reflect current practice in the Australian market around door opening test procedures, lighting systems and alternative test packages.

Schedule 4—M-package temperature classes

This Schedule lists the M-package temperature class and corresponding highest and lowest M-package temperatures for refrigerated cabinets covered by the Determination. Section 10 sets out definitions in relation to M-package temperature classes.

Schedule 5—Test room climate classes

This Schedule lists the range of climate classes that are applicable to refrigerated cabinets covered by the Determination. The term test room climate class is defined in section 5.

Schedule 6—Star Ratings

This Schedule lists the EEI range and the corresponding number of stars for refrigerated cabinets covered by the Determination. Section 29 sets out the requirements in relation to using star ratings.

Attachment B

Statement of Compatibility with Human Rights

Prepared in accordance with Part 3 of the Human Rights (Parliamentary Scrutiny) Act 2011

Greenhouse and Energy Minimum Standards (Refrigerated Cabinets) Determination 2020

This Legislative Instrument is compatible with the human rights and freedoms recognised or declared in the international instruments listed in section 3 of the *Human Rights (Parliamentary Scrutiny) Act 2011*.

Overview of the Legislative Instrument

The *Greenhouse and Energy Minimum Standards (Refrigerated Cabinets) Determination 2020* prescribes matters relating to minimum energy efficiency requirements for refrigerated cabinets under the *Greenhouse and Energy Minimum Standards Act 2012*. The Determination establishes requirements for energy use and energy labelling, including requirements for conducting tests in order to demonstrate compliance with those requirements. The Determination also sets out the circumstances in which two or more models in a product class may be a family of models, and establishes the applicable product category for the purposes of calculating certain penalties under the Act.

Human rights implications

This Legislative Instrument does not engage any of the applicable rights or freedoms.

Conclusion

This Legislative Instrument is compatible with human rights as it does not raise any human rights issues.

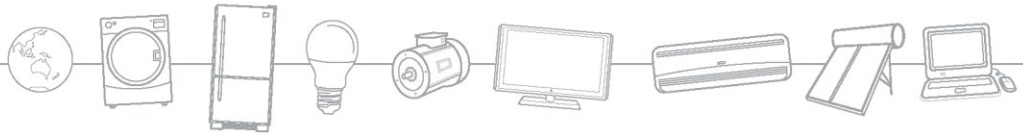
The Hon Angus Taylor MP
Minister for Energy and Emissions Reduction

Attachment C

E3
Equipment Energy Efficiency

Decision RIS: Refrigerated display and storage cabinets

November 2017



A joint initiative of Australian, State and Territory and New Zealand Governments.

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Glossary

AS/NZS	Australian Standards and New Zealand Standards
AU	Australia
BAU	Business As Usual
BCR	Benefit Cost Ratio
CO_{2-e}	Carbon dioxide equivalent units
COAG Energy Council	Council of Australian Governments
E3	Equipment Energy Efficiency Program
EuP	EU description for Energy Using Products
GEMS	Greenhouse and Energy Minimum Standards
GEMS Act	Greenhouse and Energy Minimum Standards Act 2012
GHG	Greenhouse Gas
GWh	Giga Watt hour – 1 million kilo Watt hours
GWP	Global Warming Potential
HEPS	High Efficiency Performance Standards – levels specified in the Standard AS 1731 that indicate highly efficient cabinets

HFC	Hydrofluorocarbons
Kt	Kilo tonnes – 1 thousand tonnes
kWh	Kilo Watt hour – 1 thousand Watt hours
LED	Light Emitting Diode
MEPS	Minimum Energy Performance Standards
NEPP	National Energy Productivity Plan
NPV	Net Present Value: the value of a sum of money in the hand, in contrast to some future value it will have when it has been invested at compound interest
NZ	New Zealand
NZEECS	New Zealand Energy Efficiency and Conservation Strategy 2017-2022
NZES	New Zealand Energy Strategy
Refrigerated commercial Cabinets	Inclusive term for both refrigerated display and storage cabinets
RIS	Regulatory Impact Statement
TEC/TDA	Total Energy Consumption/Total Display Area. The standard metric for energy consumption for Display cabinets, which balances energy use per unit of display area

Executive Summary

Background

This Regulation Impact Statement (RIS) considers policy proposals to improve the energy efficiency of commercial refrigerated cabinets – namely:

- Refrigerated display cabinets - commercial fridges designed to display food or drink for sale. These cabinets are used by retailers such as supermarkets, corner stores and bakeries to keep food and beverages cool or frozen. Many are open-fronted (to allow customer or staff access), or include transparent doors or lids. They are currently regulated for energy efficiency in Australia and New Zealand.

- Refrigerated storage cabinets - (also known as professional or service cabinets) typically have solid doors, are often used behind the scenes in kitchens or by catering companies and are not intended to display food for sale. They have not been regulated for energy efficiency in Australia or New Zealand even though they use very similar components to refrigerated display cabinets.

Both refrigerated display and storage cabinets are important in the food sector. They are widely used by a range of companies, from small owner-operated businesses to large companies such as supermarket chains.

The nature of commercial refrigeration use means that commercial cabinets are commonly used for 24 hours per day, seven days a week – resulting in significant energy use, running costs and greenhouse gas emissions.

Problem

Energy use from commercial refrigeration is growing in Australia and New Zealand[1]. Sales of commercial refrigerated cabinets are expected to increase by over 40% by 2035. Annual energy use from commercial cabinets is estimated at 7426GWh for Australia and New Zealand in 2015 and is forecast to increase to over 9000GWh by 2035, despite general improvements from existing regulation.

Current regulatory requirements applicable to refrigerated commercial cabinets have contributed to the development and supply of more efficient appliances in Australia and New Zealand than would have been the case under BAU. However, there is scope to make significant changes to the regulations that can address the current regulatory problems, namely:

- MEPS levels are set too low for the Australian and New Zealand markets and are no longer driving improved efficiency. More stringent efficiency levels are required to improve energy use in the commercial refrigerated cabinet sector, reduce consumers' net costs of commercial refrigeration ownership, and also reduce the negative externality of GHG emissions.
- The scope of the regulations is confusing and complicated and has not kept pace with the market. This means refrigerated storage cabinets that are similar in construction to regulated cabinets, and now account for around 20% of the stock, are not included in the scope of the regulations.
- Requiring suppliers to test their appliances to complicated Australian and New Zealand standards, which apply nowhere else in the world make appliance testing more difficult than necessary, resulting in an unnecessarily high regulatory burden that contributes to non-registration of products, especially at the low volume end of the market.

These regulatory problems are compounded by market and information failures. The nature of the supply chain in the refrigerated commercial cabinet market means that some buyers are not the end-users creating split incentives regarding cabinet purchase. There is also a lack of accessible and comparable information about the energy efficiency of cabinets that prevents energy efficiency comparisons between models. Voluntary high efficiency standards that were introduced alongside MEPS have failed to resolve this due to their low uptake, and are now out-of-date. In addition, the health and environmental costs of greenhouse gas emissions (and other pollutants) from electricity generation, constitute negative externalities that are not reflected in the electricity price.

Consequently there is scope to improve the regulations by:

[1] Population growth is a primary driver

- increasing MEPS levels across the board or harmonising with MEPS levels adopted by Europe in 2017[2];
- adopting ISO and IEC test standards[3], rather than a regionally specific Australian and New Zealand test standard[4];
- including refrigerated storage cabinets in the scope of the regulations;
- providing consumers with accessible and comparable information on refrigerated commercial cabinet energy efficiency and running costs.

Objective

The objective of the proposed government action is to resolve problems with the existing regulations that impede the supply and purchase of energy efficient cabinets and to remove market and information failures that persist under the status quo.

The proposed regulatory action will help Australia and New Zealand to meet their climate change commitments, by improving energy efficiency and reducing greenhouse gas emissions. It will also ensure that the regulations remain relevant and effective over time.

Policy options

Five policy options have been identified to resolve these problems and improve the energy efficiency of refrigerated commercial cabinets. There are three regulatory options which all involve including refrigerated storage cabinets in the scope of the regulation, increased MEPS levels, adoption of International and European test Standards, and the introduction of voluntary online labelling (which replaces the mandatory labelling previously proposed).

The five options are:

- **Option 1**: Business as Usual (BAU) – no change to current MEPS requirements which primarily covers refrigerated display cabinets.

- **Option 2:** Adopting ISO (international) test method for refrigerated display cabinets and EN (European) test methods for other refrigerated display cabinet types and storage cabinets. Australasian MEPS increased to affect the least efficient 10% of cabinet models, based on groups of similar cabinet types (European method), with voluntary online labelling added.

- **Option 3:** As per Option 2 except Australasian MEPS increased to affect the least efficient 30% of models per group.

[2] December 1st 2019 is the proposed implementation date for both refrigerated display cabinets and storage cabinets

[3] ISO 23953, EN16825, EN16901, EN16838

[4] AS1731 parts 1-14

- **Option 4** As per Option 3 except Australasian MEPS to align with European Commission MEPS levels. Approximately 25% of the market is affected, with some groups affected more than others. (See Table 1 below for the relevant standards and EC MEPS levels).

- **Option 5:** Non-regulatory options in addition to BAU and as an alternative to regulatory intervention.

Table 1: Published and draft EN Standards and EC MEPS levels (and the parts which are not currently being considered for adoption in Australia and New Zealand).

	Standards Published	EC MEPS levels Published	Parts of standards or regulations that are not being considered by current proposals
ISO 23953 Refrigerated Display Cabinets	Published	Draft	Beverage Vending machines
EN 16825 Refrigerated Storage Cabinets and Counters for Professional Use	Published	Published	Blast cabinets, condensing units and process chillers
EN 16901 Small Ice-cream Freezers	Published	Draft	
EN 16838 Refrigerated Display Scooping Cabinets for Gelato (soft scoop)	Published	Published	

Option 4 has been modified and developed following feedback on the Consultation RIS. The original proposal was to adopt ISO and EN test methods and European Commission MEPS, from 2017 and require a mandatory energy rating label.

Option 4 now looks at adopting the test method ISO 23953 for refrigerated display cabinets and beverage cabinets and EN 16825 for refrigerated storage cabinets, from 2019, with minor local variations. It also involves adopting related display cabinet standards for gelato cabinets and small ice-cream cabinets. In addition, the European Commission's MEPS levels for these cabinet types are copied (developed by grouping similar cabinet types together and setting a group MEPS level). Option 4 also introduces online energy rating information based on the European Commission's labelling scheme, translated into star-rating labels. A further modification is the addition of 'deemed to comply' requirements to remove concerns that testing would place disproportionately high compliance costs on low-volume manufacturers, making it harder for them to compete in the market.

Costs and Benefits

The regulatory proposals will involve one-off new regulatory costs for suppliers of currently regulated products, over and above the existing cost of regulations, as we transition to the new regulatory proposal. The implementation plan recognises this and looks to reduce this additional cost as much as possible. However, over the longer term, the move to international test standards should reduce regulatory costs for suppliers, as it will simplify testing and improve efficiencies.

Any additional regulatory costs are of particular concern to local manufacturers who typically build low volume products to local requirements. They face high testing and other compliance costs and may be unable to compete against importers in the market under a revised regulatory environment, as importers will be able to source international product already tested to the required standard. It is proposed that broader family groups of cabinet models and a 'deemed to comply' provision be drafted for inclusion in the regulatory proposals in order to reduce testing and regulatory compliance costs.

Any regulatory cost need to be weighed against the significant energy savings and greenhouse gas reductions which will result from the proposed regulatory changes.

While some improvements in energy efficiency are expected under BAU due to changes in technology and increased user awareness of the cost of energy, all regulatory options (options 2 to 4) will result in increased energy savings and greenhouse gas reductions when compared with BAU. These options will save cabinet buyers and users from significant running costs because less electricity will be used to deliver their chilled food or drink. The benefit of reduced running costs outweighs the costs to business from any increased compliance or capital costs.

Table 2 overleaf shows the costs and benefits of all regulatory options (options 2-4) relative to BAU. It shows that option 4 provides the most energy efficiency gains. The estimated Net Present Value (total benefits less the total costs) of option 4 (EC MEPS would be $1,340 million in Australia and $87 million in New Zealand). The costs of each option increase incrementally with the benefits to be gained (leading to a similar BCR for option 4). While the BCR for option 4 in both countries is lower than the Consultation RIS analysis, the overall benefits from option 4 are greater than the other options.[5]

[5] The analysis has been revised since the Consultation RIS. The period of the analysis is 2017 to 2035 (rather than 2014 to 2035), with a delay in the ability to accumulate savings through to 2020 (3 years less cumulative savings). The overall BCR is lower for New Zealand due to the use of the long run marginal electricity price and wholesale costs of electricity. A New Zealand discount rate of 6% has also been applied rather than the 5% used in the Consultation RIS analysis.

Table 2: A summary of the cost-benefit analysis of regulatory options for Australia and New Zealand, including online energy rating information (from 2017 to 2035).

AUSTRALIA	Option 2		3		4		NEW ZEALAND	2		3		4	
	10% + vol labelling from 2019		Au/NZ MEPS 30% + vol labelling from 2019		EC from 2019+ vol labelling			10% + vol labelling from 2019		Au/NZ MEPS 30% + vol labelling from 2019		EC from 2019+ vol labelling	
Costs ($M)	$31		$115		$193		Costs ($M)	$4.9		$14.6		$23.7	
Benefits ($M)	$340		$912		$1,532		Benefits ($M)	$24.5		$65.9		$111.1	
NPV ($M)	$309		$798		$1,339		NPV ($M)	$19.6		$51.3		$87.4	
BCR	11.0		8.0		7.9		BCR	5.0		4.5		4.7	
Abatement Cost ($/t CO_2-e)[6]	-$98		-$97		-$100		Abatement Cost ($/t CO_2-e)	-$235		-$239		-$238	
Energy savings (GWh)							Energy savings (GWh)						
Year	2025	2035	2025	2035	2025	2035	Year	2025	2035	2025	2035	2025	2035
Annual	86	293	283	711	517	1,156	Annual	15	52	51	126	93	205
Cumulative	270	2,278	957	6,406	1,774	11,099	Cumulative	49	404	173	1,142	322	1,986
GHG Emission reduction (kt $CO_{2\text{-}e}$)							GHG Emission reduction (kt $CO_{2\text{-}e}$)						
Year	2025	2035	2025	2035	2025	2035	Year	2025	2035	2025	2035	2025	2035
Annual	65	216	214	524	391	853	Annual	2	7	7	16	12	26
Cumulative	207	1,692	734	4,767	1,360	8,263	Cumulative	6	52	22	147	41	256

The cost benefit analysis incorporated a consideration of the incremental costs of the changed regime (including testing costs) and the regulatory cost burden on Australasian companies, with the majority of the costs relating to the requirements to meet the new MEPS.

Sensitivity testing was used to assess the effect of changing costs on the modelling outcomes. Full details are contained in Attachment C.

[6] The avoided costs of GHG emissions abatement due to the decrease in energy used by commercial refrigeration equipment

Consultation

The proposals have been finalised following two main rounds of stakeholder consultation, with meetings held in Australia and New Zealand on the product profile in 2013 and then on the Consultation RIS in August 2016.

There was almost unanimous support from industry, including individual companies, for the proposal to align with ISO 23953 and EN test methods, with option 4 regarded as the best policy proposal to achieve this. There was consistent support across both consultation processes for an extension of regulatory measures to include storage cabinets.

It was agreed that MEPS levels needed to be revised, with the majority supporting a move to harmonise with EU efficiency levels, provided there would be sufficient lead in time to ensure that industry could adapt to any changes and find compliant models.

Although industry largely supported aligning with international standards and efficiency levels, local manufacturers expressed concern that low-volume suppliers would continue to incur high compliance costs under international standards, while importers would gain a competitive advantage through being able to source compliant products more easily. There was strong support for a 'deemed to comply' provision as a means of reducing costs and demonstrating compliance where testing in a laboratory setting may be too difficult or expensive, for example for bespoke or low volume products.

The only area of disagreement was with mandatory labelling. Stakeholders at the product profile consultation were supportive of a mandatory energy rating label of some kind (although their preference was for this to be on-line or in the literature) accompanied by education of buyers. It was considered that labelling alone would not add much cost. While there were mixed feelings about the benefit of high efficiency endorsement labelling, the simplistic labelling methods proposed in Europe (in conjunction with European MEPS levels) were supported. European Commission labelling was seen as likely to be useful in distinguishing between better performing and less efficient models.

At the more recent consultation meetings the proposal to add mandatory labelling to the regulatory options was opposed by industry. Concern was expressed at the additional cost of physical labels which were considered to be of minimal benefit given the purchasing decision or product comparison was not made in the showroom. There was support, however, for online energy rating information using the European Commission style of labelling.

A Technical Working Group (TWG) was convened following feedback on the Consultation RIS. The TWG was made up of industry representatives, regulators and independent experts and considered the suitability of the international standards for the local market and if any alterations to these standards would be required.

Industry feedback was sought on the recommendations of the TWG and two submissions were received. One proposed increasing the MEPS level recommended under option 4. The

other (from a small local importer) recommended all regulation be abandoned and the European CE mark to be accepted as compliance. Modelling of the costs and benefits was revised to account for changes following the consultation on the TWG recommendations, including the move to voluntary labelling.

Conclusion

Option 4 provides the greatest Net Present Value in both Australia and New Zealand. While the costs of each option increase with the benefits to be gained, the overall benefits of option 4 are greater than the other options. Out of the policy options being considered, option 4 also has the highest energy savings and greenhouse gas reduction potential and the most support from industry.

There are considerable benefits to be gained from moving away from the complexity of the current Australian and New Zealand regionally-specific Standard AS 1731. Adopting the European approach to both test methods and MEPS would provide a simpler regime and harmonization with international standards would facilitate the transition to the new standards.

Adoption of a voluntary online label based on the EU label would resolve many of the issues with the market that prevent buyers from making an informed decision about the effects that energy use and has on a cabinet's life-cycle cost. It would also align energy efficiency specifications with Australia and NZ's major trading partners.

It is also proposed that broader family groups of cabinet models and a 'deemed to comply' provision be drafted for inclusion in the regulatory proposals which would reduce testing and regulatory compliance costs for low volume manufacturers.

Implementation and Review

The risks of implementing these proposals are considered to be low, given they involve changes to local standards to align with internationally accepted test standards and methods.

An implementation date of no earlier than 1 December 2019 is proposed to allow industry to adapt to the changes.

The main implementation risk is that there may be delays with the implementation of the new MEPS levels in Europe but this has been mitigated by introducing the EU January 2018 (announced) MEPS levels in December 2019.

The membership of the TWG that advised on this proposal represented about 70% of industry by volume and consensus was achieved on the proposed implementation timeline. This provides sufficient time for trans-Tasman industry to improve product supply prior to future alignment with EU MEPS when they become available.

If the Council of Australian Governments' (COAG) Energy Council in Australia approves one of the proposals, the Greenhouse and Energy Minimum Standards (Refrigerated Display Cabinets) Determination 2012 would be revised for approval by the Commonwealth Minister for the Environment and Energy. In New Zealand, a policy option requires approval by Cabinet before being adopted under the Energy Efficiency (Energy Using Products) Regulations 2002. If approved, the updated regulations would be subject to compliance monitoring and review in both countries.

For Australia, a regulatory offset has not been identified to accompany Option 4. However, the Commonwealth Department of the Environment and Energy is seeking to pursue net reductions in compliance costs and will work with affected stakeholders and across Government to identify regulatory burden reductions where appropriate.

1. Introduction

This Decision RIS considers several policy proposals to raise the energy efficiency of commercial refrigeration products and various issues with the existing regulation. These proposals have been developed through the Equipment Energy Efficiency (E3) Program, which aims to increase the energy efficiency of appliances and equipment used in the residential, commercial and manufacturing sectors in Australia and New Zealand.

Australia and New Zealand first introduced energy efficiency regulation for commercial refrigeration in 2003, using an Australian Standard. Since then, there has been a considerable growth in energy use in the sector due to higher demand for ready-to-eat food and the general increases in population. Meanwhile, there are now technologies available that can achieve much higher efficiencies than when MEPS were first introduced. So the existing MEPS levels are no longer achieving the intended market transformation.

International standards have also been developed that could be applied to update and simplify existing requirements and eliminate the need for testing to local standards, thereby reducing the cost to business from having to meet local requirements in a global market.

While the current regulations have gone some way to achieving their objective by raising the baseline efficiency of commercial refrigeration cabinets, there is now significant scope to revise the existing requirements.

This section provides background information about refrigerated commercial cabinets, the cabinet market and the policy context behind the proposals referred to in this document.

Refrigerated commercial cabinets

The term “refrigerated commercial cabinet” in this context refers to a range of food display and preparation situations. It covers a variety of display fridges and freezers, including those with transparent doors or lids, open-fronted cabinets with shelves, horizontal freezers and drinks chillers – all of which display food for sale. These are often described as refrigerated display cabinets.

It also covers refrigerated storage cabinets (also known as professional or service cabinets), which are often used behind the scenes in kitchens or catering, with transparent or opaque (solid) doors or lids. Both display and storage cabinets are important in the food sector

and used by a range of company sizes – from small, owner-operated cafes and corner shops through to larger companies such as supermarket chains.

Refrigerated storage cabinets are designed to store chilled or frozen foodstuffs at food-safe temperatures, but not to display products for sale to the public.

They are an essential part of the "cold chain" and are mostly used by small to medium enterprises in catering and hospitality applications, including non-retail areas of restaurants and institutional facilities such as hospitals, nursing homes and canteens. Often storage cabinets are required to operate under more onerous ambient conditions, (e.g. commercial kitchens), and are rarely visible to the general public. In contrast, refrigerated display cabinets operate in a visible and often air conditioned space.

Refrigerated commercial cabinets are commonly used for 24 hours per day, seven days a week and as a result use significant amounts of energy, which increases emissions of greenhouse gases.

Energy use from commercial refrigeration is growing in Australia and New Zealand due to population growth and increased demand for ready-to-eat food and this increase is expected to continue. By 2035, Australasian sales of refrigerated commercial cabinets are projected to increase by over 40% and energy use will increase to over 9000GWh per year, despite general improvements in these cabinets from past regulatory action. This compares with a commercial energy of 7426GWh (Australia and New Zealand - 2015).

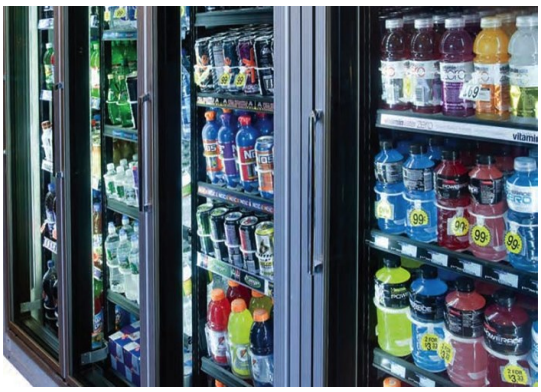
Examples of refrigerated display and storage cabinets are shown in **Figure 1** and **Figure 2** below:

Figure 1: Examples of refrigerated display cabinets.

Horizontal, frozen, open-top, island cabinet

Vertical, chilled, open, multi-deck cabinet

Semi-vertical, chilled, multi-deck cabinet



Vertical, refrigerated, glass-door cabinet

Horizontal, chilled service-counter

Horizontal, chilled, glass-door display cabinet

Figure 2: Storage cabinets

Refrigerated storage cabinet

Vertical refrigerated storage cabinet

The Market

The supply chain for refrigerated display and storage cabinets is complex and ownership arrangements vary. Suppliers can be manufacturers or importers. Supermarkets and, to a lesser extent convenience stores are usually supplied by companies in long term relationships as preferred suppliers. Larger companies may buy direct from factories without a "middleman" – or may become fleet owners (for example, beverage companies) who either hire out cabinets or install them for free. The buyer or hirer of the product may be motivated by factors other than energy efficiency such as up-front cost and may not be responsible for paying the electricity bill.[7]

Chilled drinks cabinets (IVC4) occupy the largest share (48%) of the Australian and New Zealand cabinet market, followed by supermarket display cabinets with piped refrigeration that is located remotely (away from the shop floor). Plug in horizontal and vertical glass door fridges and freezers occupy a significant portion of the integral display cabinet types. Storage cabinets (for catering and hospitality) to account for approximately 20% of the refrigerated commercial cabinet market.[8]

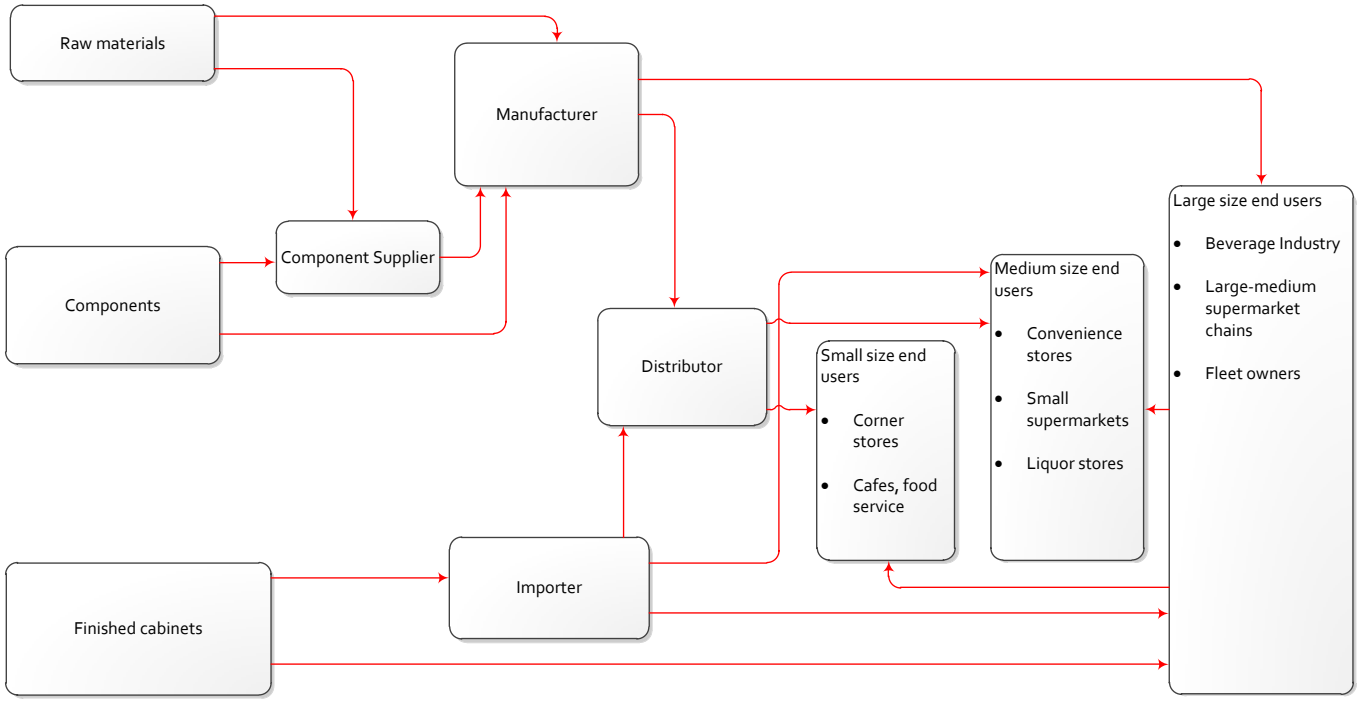
The majority of wholesalers in Australia and New Zealand service both the hospitality and the retail industries, with refrigerated cabinets sourced from local and overseas manufacturers. The length of the supply chain may mean that efficiency information, if available, would only get through to customers if it was mandatory to provide it.

Figure 3 overleaf shows that in some instances the "importer" and the "manufacturer" are also distributors. Fleet owners (particularly large end users like beverage companies) usually offer free placement of logo-carrying display cabinets to other end users, while rental or lease companies offer "plain" refrigerated display cabinets.

[7] See the discussion in the Problem Section as to split-incentives arising from this aspect of the market.

[8] Refrigerated storage cabinets were the subject of an extensive European Eco-design study in 2011 which found that they comprised around 20% of the market by quantity.

Figure 3: Refrigerated commercial cabinet supply chain.



Most refrigerated display and storage cabinets are imported with more than 80% coming from Asia, notably China. The same factories also manufacture for Europe[9]. Approximately 15% of cabinets are imported from Europe, 2% from North America and 0.5% from South Africa. Factories can manufacture to Australasian specifications (including regulatory requirements or supplier's design).

Feedback from the product profile consultation showed that many believe it is not economic to manufacture to an Australian local standard and international harmonisation is realistic. They want assurance that an international efficiency standard is actually being met and do not want to incur additional costs for "small runs" manufactured specifically for the Australasian market.

Over the past 6 to 8 years (while the E3 program has been in operation for refrigerated cabinets), more than 500 different companies supplied the Australian market.

[9] Product Profile: Commercial Refrigeration - Refrigerated Display and Storage Cabinets. 28/08/2013. Energy rating website.

Of these 500 companies:

- the top 10 importers accounted for around 60% of imports
- the top 20 importers accounted for more than 75% of imports
- 250 companies (approximately half of those operating in the market) imported less than 20 units, of which 200 companies imported less than 10 units.

The New Zealand market is similar but on a smaller scale with a core group of committed companies making up a significant portion of the market (plus a long tail of miscellaneous importers). See **Attachment D** for a full list of Australian and New Zealand manufacturers and importers.

Over recent years, local manufacturers of display cabinets have experienced more challenging business conditions and increasing competition from imported products. The local manufacturing base is small. All cabinets manufactured in Australia and New Zealand now use some imported components. Stainless steel sheeting for cases is usually imported and some cabinets have pre-made evaporator units fitted into locally-made cases.

Most integral (self-contained storage and display) cabinets are imported intact and are ready to operate with no modifications required. Some remote cabinets (for example, supermarket multi-deck and horizontal types) are imported partially assembled and fitted on site.

Australia and New Zealand trade refrigerated commercial cabinets with each other, with most being traded from New Zealand to Australia. This is important when considering where the costs of are borne.

Stock and sales

The Australasian stock of refrigerated display and storage cabinets is expected to grow from around 972,000 units in 2015 to approximately 1.5 million units in 2035.

(See **Attachments A, B** and **C** for more detailed information about Australian and New Zealand stock (by major sectors and stock analysis.)

Three methods were used to estimate and cross check the existing stock and sales estimates of equipment in Australia and New Zealand, making use of industry knowledge and previous reports. These methods were:

Modelling aggregated sales data estimates by cabinet type, average lifespans and growth rates to predict stock from 2000 to 2030 (this is considered to be the most reliable estimate available.)

Stock estimated using the number of outlets where these cabinets are used, multiplied by the number of each type (i.e. integral display cabinet; remote display cabinet and storage cabinet).

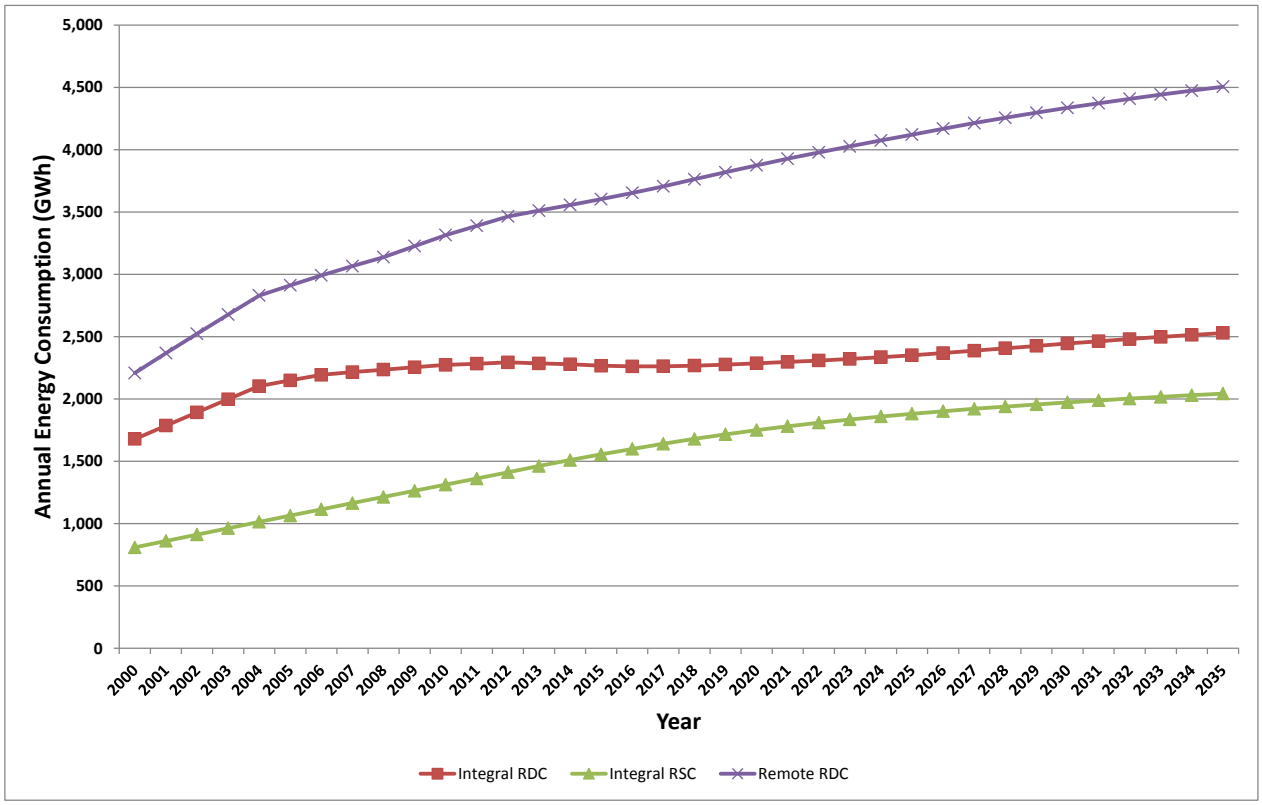
Estimating the Australian and New Zealand stock based on scaling Ecodesign 2013 EU-28 stock on a per capita basis.

How much energy do refrigerated commercial cabinets use?

Display cabinets have been regulated since 2004 and their energy use and sales are able to be tracked in New Zealand under sales collection legislation.[10] This has enabled cross-checking and standardising of baseline energy use modelling and graphs.

At present the stock of refrigerated commercial cabinets in Australia and New Zealand is estimated to be using 7426GWh of energy per annum. By 2035 this is expected to increase to 9077GWh per annum. See **Figure 4** below for the increase in annual energy consumption of refrigerated commercial cabinets out to 2035.

Figure 4: estimated annual BAU energy consumption of refrigerated display and storage cabinets (by category) in Australia and New Zealand to 2016 and projected to 2035.



[10] EECA has the power to collect sales data per model on an annual basis under the *Energy Efficiency (Energy Using Products) Regulations 2002*.

Australian market sales, stock and applications

The estimates of Australian stock using aggregated sales data shows there were approximately 845,000 display cabinets and storage cabinets in 2015. Sales and stock data were derived from a large company's knowledge of their display cabinets for beverages, and the total number of these, plus the pre-charged imports of commercial refrigerated cabinets.

The two other methods of estimating stock corroborated this estimate. Further details of these methods are provided in **Attachments A** and **C. Figure** shows the share of stock in 2015 and while **figure 6** shows the historical and projected stock to 2035.

Figure 5: 2015 Commercial refrigerated cabinet stock in Australia (estimate).

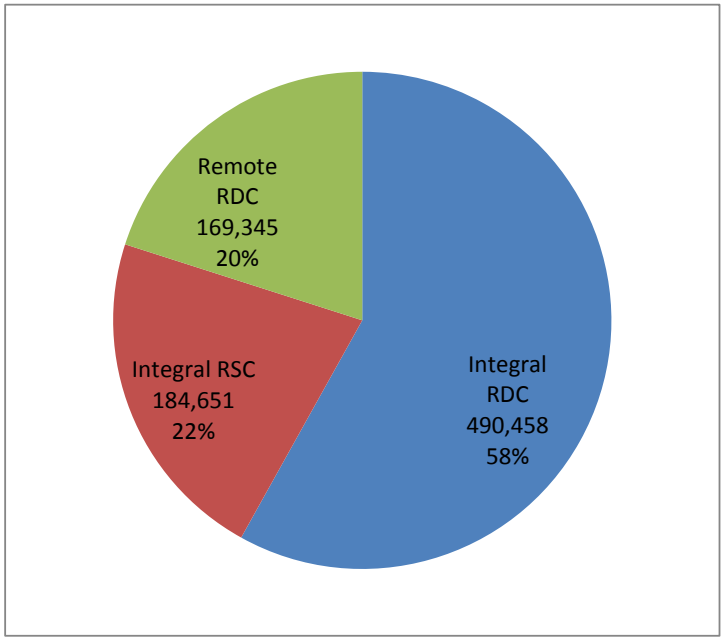
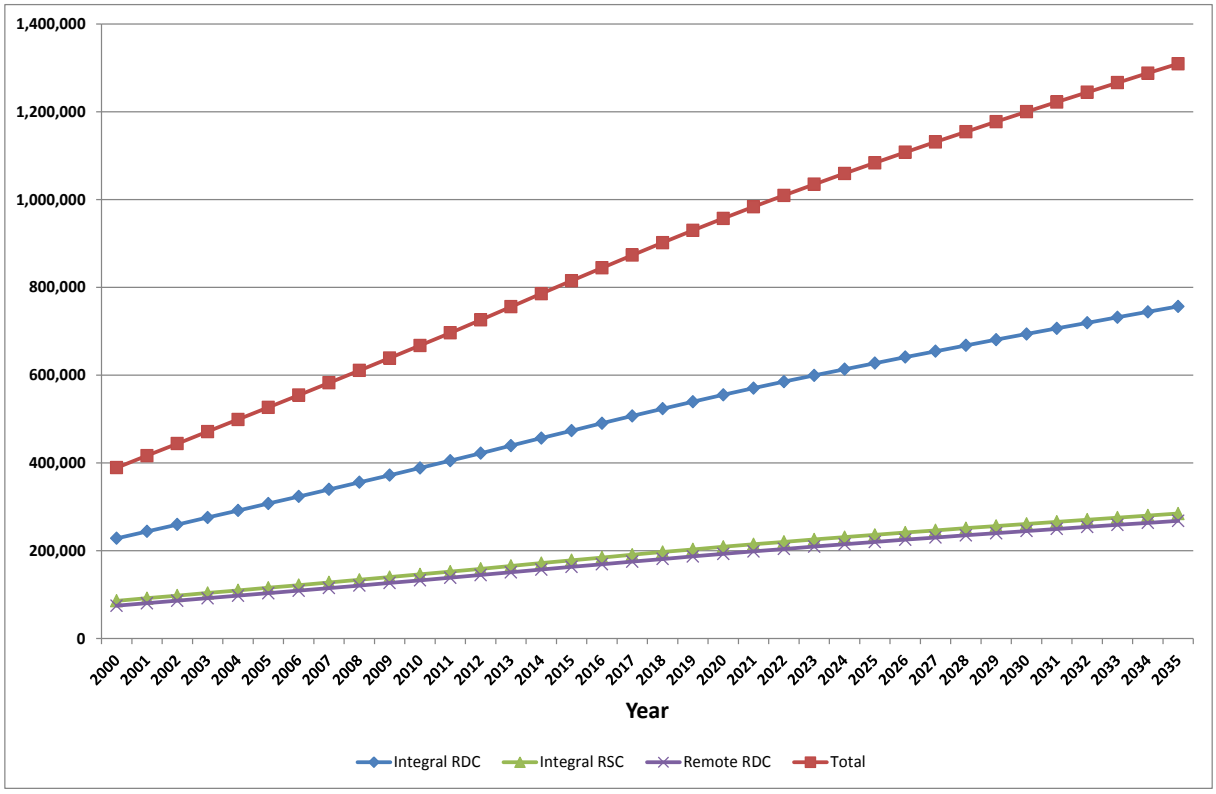


Figure 6: Projected stock in Australia from 2000 to 2035.



Sales growth has slowed since the 1990s from around 7% per annum to 4% from 2000 to 2013. It is estimated to be around 2.5% per annum currently and is expected to fall to 2.0% per annum from 2020 to 2035. The high growth in the 1990s was due to food retail stores adapting to changing consumer preferences (i.e. convenience meals, variety, etc.), which required more refrigeration per trading floor. Current sales are driven by replacement of existing stock and growth is linked to population growth.

New Zealand market sales, stock and applications

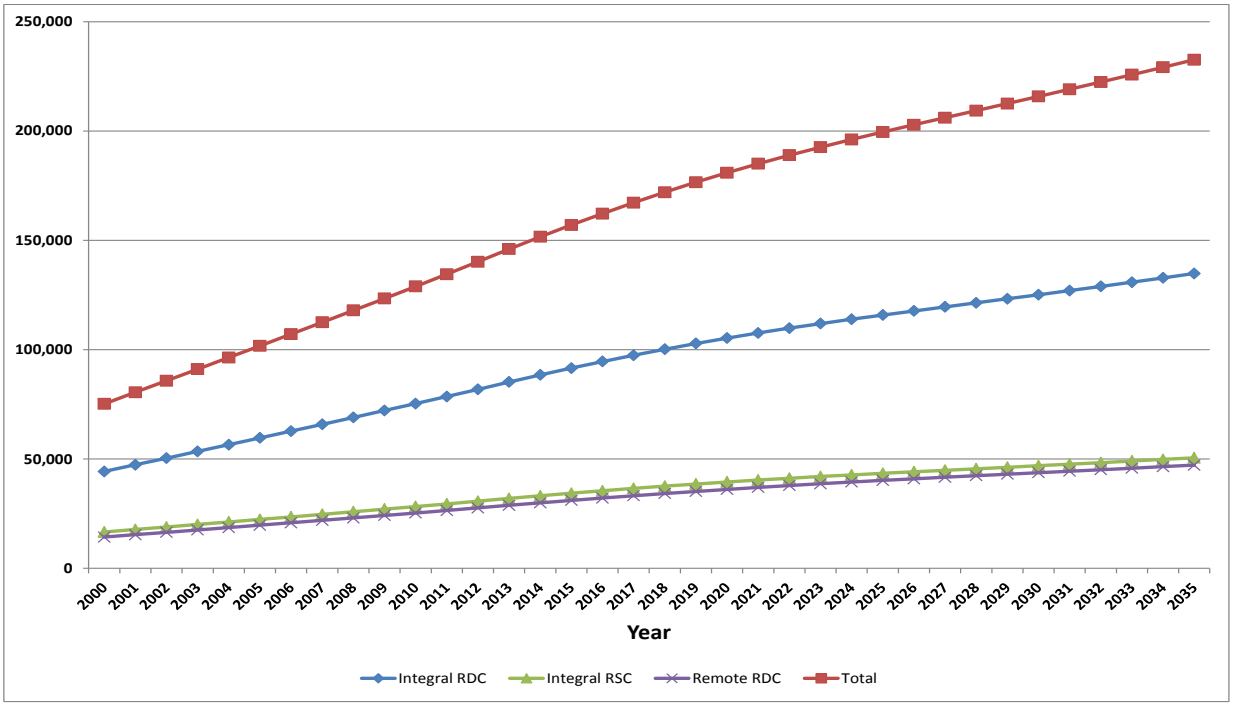
New Zealand stock in 2015 was approximately 157,000 refrigerated commercial cabinets. Sales and stock data is derived from the annual data collected by the Energy Efficiency and Conservation Authority (EECA) in New Zealand. This data has been collected for regulated cabinets only, since 2005 as part of the *Energy Efficiency (Energy Using Products) Regulations 2002*. Importers or manufacturers of products covered by the MEPS regulations must provide sales information and the energy performance characteristics of their stock.

There are five sub-types within this data, of which three dominate sales in the New Zealand market. For example, integral VC4, display cabinets (self-contained, vertical glass door display fridges) comprise over 45% of the display types.

Discussions with suppliers about storage cabinets enabled an estimate to be derived as a ratio from the sales of refrigerated display cabinets.

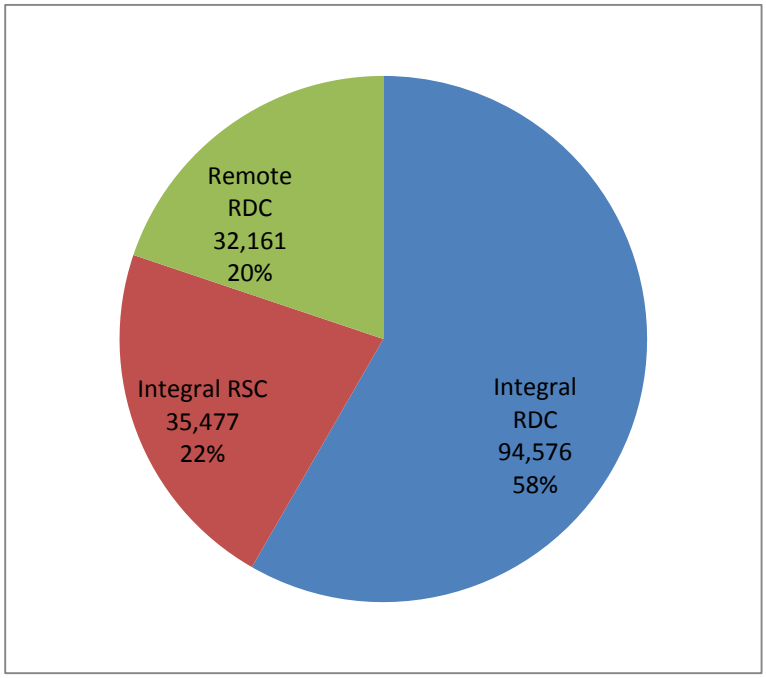
In 2015, the total sales of refrigerated display cabinets and storage cabinets were estimated to be 15,000 and the total stock was estimated to be 157,000 cabinets. **Figure 7** below shows the historical and projected stock to 2035.

Figure 7: Projected stock in New Zealand from 2000 to 2035.



The other two methods for deriving stock and sales estimates differed. Stock estimated from outlets were 20% higher than the more reliable estimate based on sales. However, the estimate from the EU information was similar to the estimate based on sales. Further details on these methods are provided in **Attachments B** and **C. Figure 8** overleaf shows the share of refrigerated cabinet stock in 2015 by type of cabinet.

Figure 8: 2015 Commercial refrigerated cabinet stock in New Zealand (estimate).



When looking at the split between the main types of cabinets – Integral Display vs Remote Display vs Storage types – all three methods resulted in a similar proportional market share. Integral display types has about 60% of the market with Storage types and Remote Display types taking up about half each of the remainder.

Current regulations and requirements

Refrigerated display cabinets are currently regulated in Australia and New Zealand for their energy efficiency using AS 1731, an Australian Standard. AS 1731 specifies the general mechanical, physical and test requirements to check the energy efficiency performance of refrigerated display cabinets that are used for the sale or display of food products, including beverages.[11] There are 14 parts to the standard, which are all sold separately. The relevant legislation that requires compliance with AS 1731 is: the *Energy Efficiency (Energy Using Products) Regulations 2002* in New Zealand and the *Greenhouse and Energy Minimum Standards Act 2012* in Australia.

Part 14 of AS 1731 defines energy efficiency as a function of Total Energy Consumption divided by the Total Display Area, expressed in kilowatt hours per day per square metre of display area. (TEC/TDA, in kWh/day/m^2).

[11] As 1731.1–2003: Refrigerated display cabinets-Part 14 contains the MEPS levels and cabinet type definitions and the applicable testing standards are in parts 1 to 13 (see also schedule 1 of the *Energy Efficiency (Energy Using Products) Regulations* 2002).

Testing is generally performed at climate class 3 (25° C with relative humidity of 60%). Cabinets are further classified into operating temperatures between minus 15° C to positive 10° C and a special operating temperature can be defined by the manufacturer. If the cabinet is made to operate over a range of temperatures, it should comply with the lowest operating temperature range (the lower operating temperature the more electricity used for a given cabinet.)

Part 1 of AS 1731 specifies terms and definitions for refrigerated display cabinets for the sale and display of foodstuffs. It further defines the scope of the standard so that it applies to "commercial refrigerators and freezers used for the sale or display of food products including beverages", but specifically excludes "refrigerated vending machines, ice-makers, cabinets intended for use in catering and similar non-retail applications".

AS 1731 therefore excludes cabinets *intended for use* in catering and similar non-retail applications.[12] As will be discussed in this RIS, this "intended situation of use" exemption operates to exclude most storage cabinets, a sub-category of refrigerated display cabinets. Storage cabinets are largely unregulated by MEPS despite using significant amounts of electricity and using the same refrigeration mechanisms as display cabinets. **Figure 9** (in the Problem Section) provides a process map for identifying whether a given cabinet is covered by AS 1731.

Refrigerated commercial cabinets are not labelled to show their energy efficiency. Unlike domestic fridges, they are not sold from retail outlets where different models can be compared side by side. Energy efficiency is therefore largely invisible to buyers and this was one of the reasons why MEPS were devised and implemented as part of AS 1731 in both countries.

However, as will be outlined in the Problem Section, there are both regulatory issues and market barriers that constrain buyers from choosing a more energy efficient cabinet. Updating the regulations to reflect the global trade in cabinets and to encompass a much broader range of models could yield significant electricity savings and greenhouse gas reductions for buyers and users.

[12] AS 1731.1 – Part 1.1.

Policy context

Over the past decade New Zealand and Australia have introduced and maintained MEPS and labelling measures through the Equipment Energy Efficiency (E3) Program. Participation in this program has benefited both countries by:

Helping to uphold the principles of the Trans-Tasman Mutual Recognition Arrangement (under which goods legal for sale in either country can legally be offered for sale in both) and maintain regulatory alignment between Australia and New Zealand.
Reducing costs to consumers.
Reducing costs to businesses (as they bear a single cost for meeting the standards and labelling requirements of both countries).

New Zealand

The policy context for improving the energy use of products available for sale in New Zealand is set out in the *New Zealand Energy Strategy 2017-2021*. This strategy outlines key priorities and strategic direction across New Zealand's energy sector, including the efficient use of energy.

Its companion document, *The New Zealand Energy Efficiency and Conservation Strategy 2017-2022*, sets actions and targets that will contribute to achieving the Government's policies and objectives. One of the three priority areas identified by the Strategy is the innovative and efficient use of electricity. The target for this priority area is the 90% of electricity that will be generated from renewable sources by 2025 (in an average hydrological year) providing security of supply is maintained. Significant progress has been made towards this target over the last few years, due in part to increasing uptake of energy efficient technologies. MEPS and labelling "contribute to the Government's policy priorities of innovative and efficient use of electricity by improving the energy performance of products, such as fridges, freezers and heat pumps."

By 2030, New Zealand's energy demand is forecast to increase by 16% (against reported demand in 2013), resulting in a total energy demand of 632.2 PJ p.a. and producing an estimated 32.6 million tonnes of CO_2 emissions (MBIE 2012, 2014).

Greater uptake of energy efficient products could result in significant energy savings for New Zealand compared with forecast demand. The Energy Efficiency Conservation Authority (EECA) has identified 109 PJ in potential energy savings and 5.17 million tonnes of CO_2 savings across these sectors that could be realised by improving the energy efficiency of the products and equipment used in New Zealand (including adopting best available technology and adapting how products are used).

Achieving these savings would reduce running costs and improve business competiveness and profit. It would also help to curb growth in energy demand, thereby deferring the need to invest in new energy supply infrastructure. This helps New Zealand to continue to meet most of its stationary energy needs from renewable and low emissions energy sources.

Australia

In April 2015, the Australian Government released the Energy White Paper (EWP) which recognises that energy productivity improvement could help reduce business and household costs, promote competition in energy markets and energy using products, encourage economic growth and contribute to emissions reduction targets.

At their meeting on 23 July 2015, the COAG Energy Council agreed to support the development of the National Energy Productivity Plan (NEPP) as a coordinated national plan. The NEPP provides a framework and an initial economy-wide work plan designed to accelerate action to deliver a 40% improvement in Australia's energy productivity by 2030. In better coordinating energy efficiency, energy market reform and climate policy, it brings together new and existing measures from across the Council's work program, as well as from the Commonwealth and industry. The Energy Efficiency Advisory Team (EEAT) will play an important role in delivering the goals of the NEPP, and is expected to contribute to the improvement of energy efficiency.

As part of its Industry Innovation and Competiveness Agenda, the Australian Government is committed to removing inefficient regulation, simplifying compliance, improving regulator responsiveness and harmonising with international standards where appropriate to help small and large businesses thrive. This includes removing regulation that duplicates trusted overseas processes, except in cases where unique Australian regulations can be justified i.e. international harmonisation.

International

Internationally, there has been a focus on how to achieve substantial efficiency improvements for individual products and how to translate this into national energy savings and reductions in CO2 emissions. This helps countries to meet their emissions targets.

The combination of addressing standards and labelling has been shown to provide substantial energy efficiency gains. A global assessment of national Energy Efficiency Standards and Labelling (EESL) programs which operate in more than 80 countries established that:[13]

- One-off improvements of more than 30% in the energy efficiency of major appliances in a number of countries has been observed when new EESL programs have been first introduced to a market where few energy efficiency programs had existed previously and have translated to national energy savings and reductions in CO2 emissions. In all of the EESL programs reviewed, the national benefits outweighed the additional costs by a ratio of at least 3 to 1, i.e. EESL programs deliver energy and CO2 reductions while also reducing total costs. This compares favourably with the cost of other clean energy options and supports the conclusion from the International Energy Agency that end-

[13] *Achievements of appliance energy efficiency standards and labelling programs – A Global Assessment* – 4E Energy Efficient End-use Equipment International Energy Agency.

use efficiency measures offer the least cost pathway to energy and CO_2 emission reductions.

- Appliances and equipment covered by EESL programs have not only dramatically improved in efficiency over the past 20 years, but are also cheaper to purchase. While EESL programs may have caused increases in prices on the introduction of new energy efficiency measures, they appear to have had little long-term effect on appliance price trends.

2. The Problem

Introduction

While the regulations in Australia and New Zealand have driven improvements in the energy efficiency of refrigerated display cabinets since 2003, they are not achieving the intended market transformation.

Problems with the way regulatory standards are written have made compliance difficult and costly for industry and created grey areas under the regulation that need to be fixed

The exclusion of most refrigerated storage cabinets from regulatory requirements, even though these account for roughly 20% of sales and can be near-identical to regulated models, means that a large portion of potential energy savings are not being realised, and also compromises the fairness of the regulations.

The minimum levels for energy efficiency mandated in regulatory standards have not kept pace with changes in the market and the wider range of cabinets now available, so the MEPS no longer serve to exclude the least efficient products from the market. In addition, the voluntary high efficiency levels in the standard no longer differentiate the most efficient models on the market.

Differences between local and international standards makes it harder and more expensive for manufacturers to assess compliance with regulation and for suppliers to source compliant models on the global market.

The regulations also do not resolve information failures in the market that make it hard for buyers to compare the energy efficiency and running costs of different purchase options, or identify the most efficient models. Manufacturers and suppliers have made little use of the existing voluntary high efficiency standard that was established for this purpose.

There are also split incentives and negative externalities in the market. The regulations do not focus on these market failures but the effects of split incentives and negative externalities could be ameliorated by improving regulation and reducing information failures.

The benefits that can be realised from strengthening the existing regulations are significant. In the estimates modelled for this RIS, 97,000 cabinets were sold in Australia and New Zealand in 2015. These use 7426GWh of electricity every year. If the least efficient 10% of cabinets were required to be more efficient from 2019 the dollar savings in NZD could be in excess of $47 million (AUD $40 million) each and every year just from reduced electricity use.

For each person who bought a cabinet in this improved 10% bracket, they would save on average more than AUD $140 in Australia and NZD $115 in New Zealand on electricity, every year14. This change would also reduce annual emissions of CO2-e by 109 kt.

Problems with the existing regulation

Refrigerated display cabinets have been subject to mandatory Minimum Energy Performance Standards (MEPS) in Australia and New Zealand since 2003.[15] MEPS set maximum allowable levels of energy consumption (by cabinet type) that cabinets must not exceed. The MEPS were introduced as a means to reduce energy consumption despite buyers not considering energy use as a primary factor in their purchase decision, and therefore buying models that cost more to run where more efficient models with lower whole-of-life costs were available. Voluntary high efficiency performance standards (HEPS) were also introduced to provide 'stretch' targets, or help suppliers to upsell more efficient cabinets influence buyers' choices.

The Standard

The current standard AS 1731 that applies under Australian and New Zealand regulations is specific to our markets and is not aligned to international standards. As Australia and New Zealand are small players on the global market and most of our refrigerated cabinets are imported[16], this makes it difficult and costly to test products to the local Standard and for suppliers to source products that meet our specific test methods and MEPS levels. As well as placing a high compliance burden on the industry, this limits the range of products available in our markets and the levels of compliance achieved.

In addition to being specific to our markets, AS 1731 is also hard to interpret and apply. It has 14 parts that must be purchased at a cost of about AUD$120 per part. Products are divided across more 50 product classes falling across a range of sizes, temperatures and configurations, with different MEPS levels and test procedures applying. Some categories are open to interpretation[17] while some are in fact fictive, as they were devised to cater for types of cabinets that might be invented one day, in an attempt to 'future-proof' the Standard. MEPS levels have only been allocated to 34 of the product classes but only way to establish whether or not they apply to a given cabinet is to buy the entire 14 part

[14] Based on average prices of 20c/kwh in AU and 16.6 c/kWh in NZ, and a 10% saving of the weighted average annual energy use for cabinets.

[15] Australian Standard (AS 1731.1 – 2003) Refrigerated display cabinets, first published 1 October 2013; see also Schedule 1 of the *Energy Efficiency (Energy Using Products) Regulations 2002* which specifies the MEPS requirements in New Zealand (AS 1731.14-2003).

[16] The majority of refrigerated cabinets are imported, with more than 80% coming from Asia, notably China. Approximately 15% are imported from Europe, 2% from North America and 0.5% from South Africa.

[17] For example, the definition of a family of models could refer to individual sections of cabinets (built as clip-on units stacked side by side) or the resulting cabinet once these units are put together.

Standard[18]. All in all, is hard to establish what class a product falls under, what requirements apply to it, and whether any exemptions apply.

Feedback from industry stakeholders has also highlighted a need for the standard to provide a better 'family of models' definition that gives due consideration to compliance costs, and to make clearer distinctions between commercial and domestic fridges (which are subject to separate MEPS and labelling requirements) – for example in cases where a commercial wine cabinet or bar fridge is installed in a domestic setting and is not held subject to either set of requirements. The issues with the standard not only increase costs to businesses but also undermine compliance with the MEPS regime, as some companies, finding the whole process too hard, opt not to register their products.

Feedback on the Consultation RIS was in favour of adopting international standards in light of these issues. One submitter stated "Quite simply it is inappropriate that there remain a significant number and proportion of the market that avoids meeting regulatory requirements and are free riders."

Another submitter said that "in view of the fact that the majority of refrigerated display cabinets that are used in significant quantities in Australia [and New Zealand] are imported, the proposed Option 4 [alignment with international standards] is clearly the way to go". This majority was estimated by one supplier to be over 97%. Compliance costs would be "minimal as many of these units are sourced from high volume manufacturers already selling into the Euro market [and therefore already complying with the proposed changes]".

There was also consensus from industry that the same measures should be extended to storage cabinets, which are unregulated in Australia and New Zealand. (See the discussion under "product scope" in this section).

However, local manufacturers that supply products in low volumes[19] were concerned that migration to international standards would affect their ability to compete in the market. Such manufacturers would continue to incur very high costs (in proportion to the volume of units they produce) to comply with regulation, whereas it would become easier for their competitors to source and import compliant product.

Any changes to regulation involving the adoption of international standards need to give consideration to this issue and avoid harming on low-volume manufacturers.

All the regulatory options presented in this RIS involve aligning local MEPS levels with international standards, as a means to resolve the issues with the current standard AS

[18] If they have no MEPS value, regulators can interpret this to mean that cabinets are exempt from testing and registration requirements.

[19] These manufacturers represent only a small share of the overall market: see Section One for a more detailed discussion of the market.

1731, reducing compliance costs for the majority of businesses, and increasing the range of products available on the local market.

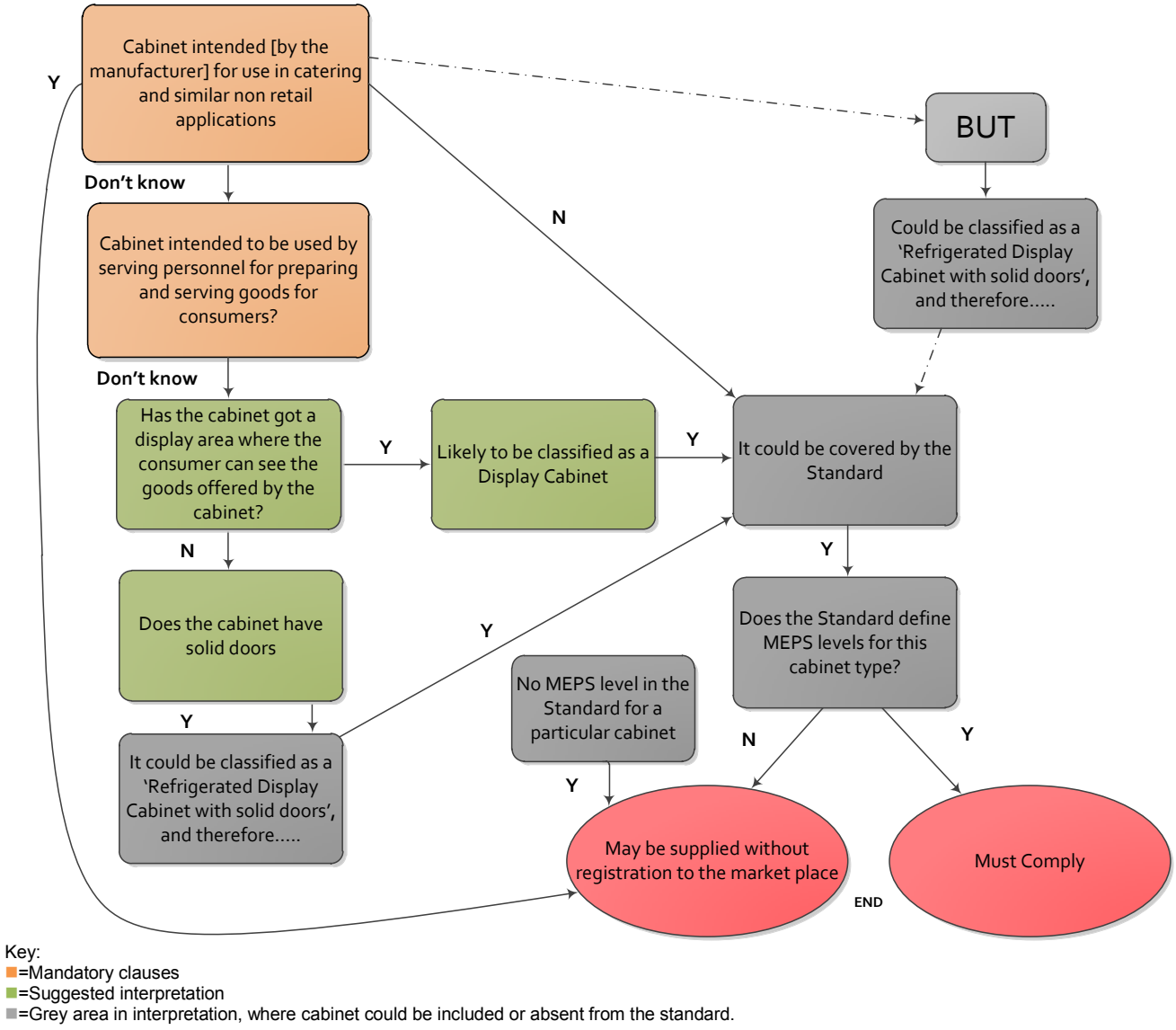
Product scope

The standard applies to display cabinets but may not apply to storage cabinets which can be identical in appearance and have similar uses to display cabinets. If a manufacturer intends a refrigerated commercial cabinet to be used to display and sell food, the cabinet must comply with MEPS. However, a storage cabinet intended to be used for food storage purposes may be exempt[20]. This creates a significant grey area in the interpretation and application of AS 1731.

Figure 9 shows how AS 1731 may be applied in practice and the grey areas in interpretation that could result.

[20] A minor sub-category of storage cabinets are by definition potentially covered by the Standard: for example, some "solid door" storage cabinets have specified MEPS levels.

Figure 9: Process map for the interpretation of AS 1731



The "intended situation of use" exemption was written into AS 1731 because storage cabinets made up only a small part of the market for refrigerated commercial cabinets at the time the standard was created. However, this is no longer the position – they now make up 20% of the market for refrigerated commercial cabinets.[21] This means that a sizeable share of the refrigerated commercial cabinet market is unregulated and not subject to any energy efficiency requirements.

Modelling estimates provided for this RIS indicate that in 2020, approximately 22,000 'storage' cabinets will be sold in Australia and New Zealand. Because of the 'intended situation of use' exclusion, the majority of those storage cabinets may be exempt from, and

[21] This market stock percentage is taken from Australian data and is estimated from the proportion of stock in Europe and stock count by outlet type.

therefore not comply with, the current MEPS. Of the 16 Consultation RIS submissions that specifically mentioned storage cabinets, all but one supported an expansion of measures to cover storage cabinets.[22]

Refrigerated storage cabinets have been regulated for efficiency in North America since 2010 and in Europe since 2015. Refrigerated storage cabinets were the subject of an extensive European Eco-design study in 2011 which found that they comprised around 20% of the market by quantity and had an average estimated 32% energy saving potential per year.[23] Significant energy savings could therefore be achieved by regulating storage cabinets.

Minimum Energy Performance Standards

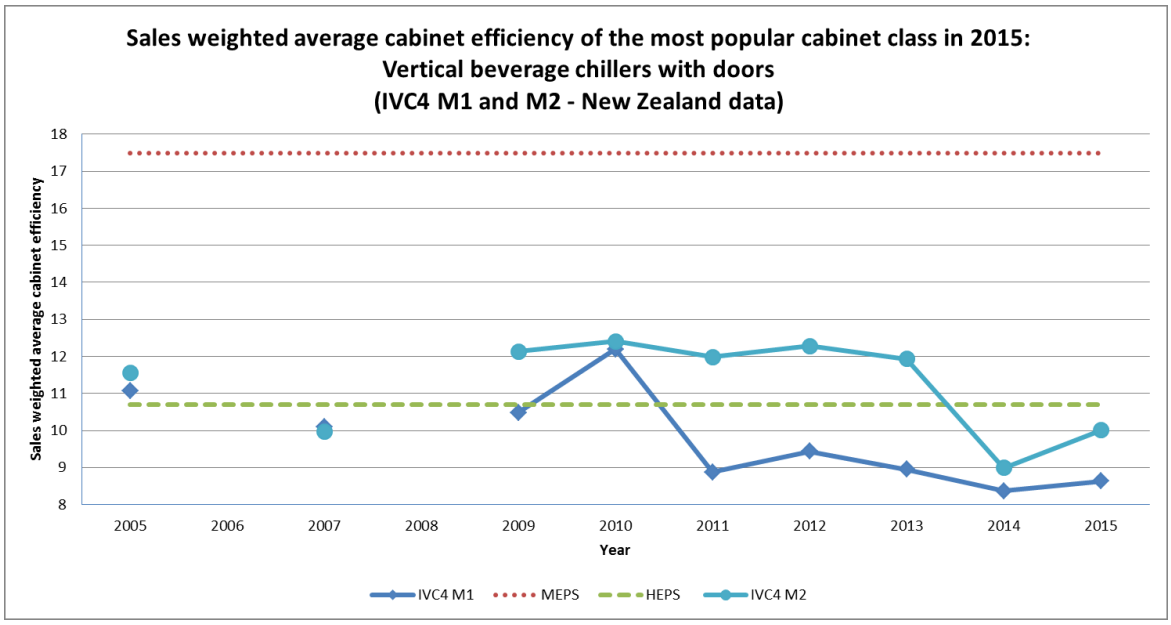
MEPS no longer serve the market as well as they once did because the MEPS levels have not been updated since 2003. The average efficiency of commercial refrigeration remains clustered around the existing levels and there is no longer any market transformation occurring under the status quo.

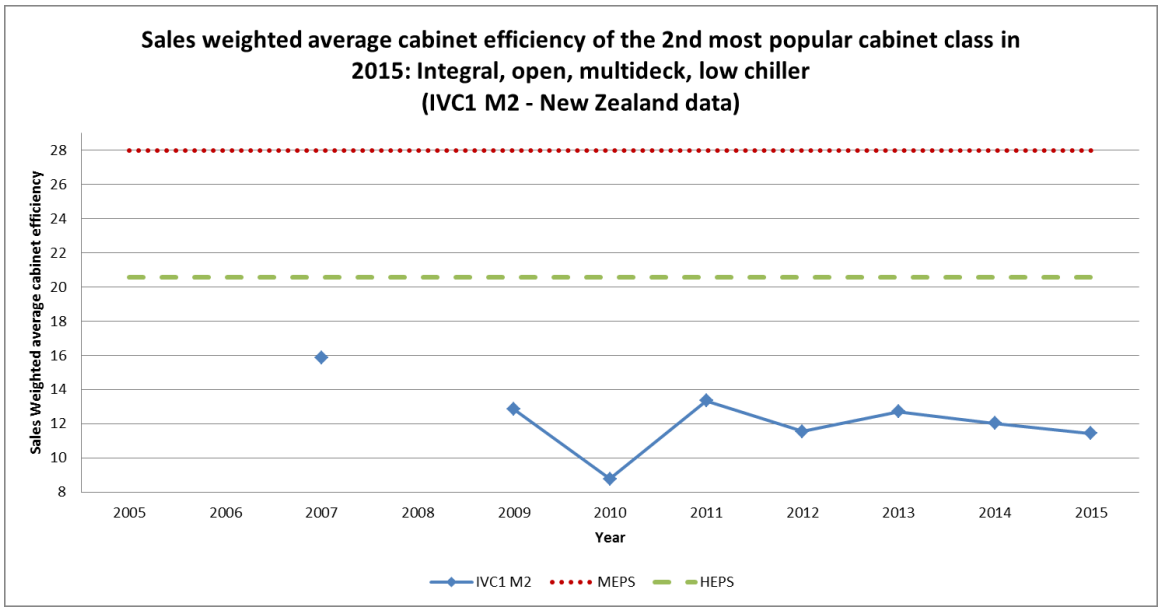
Sales data from New Zealand (**Figure 10)** below shows sales weighted average efficiency for three of the four most common product classes is approaching or surpassing the current HEPS levels, which indicates a need for more stringent MEPS that reflect the actual efficiency of cabinets in the market.

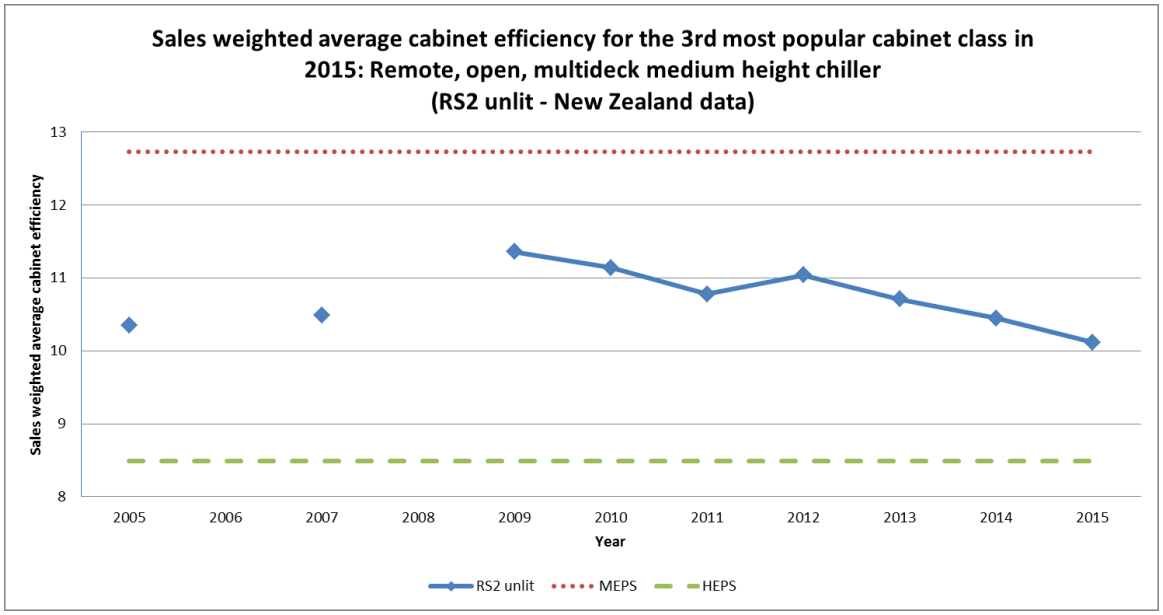
[22] The submitter who disagreed was a small company who felt there was little to be gained (by way of energy savings and GHG reduction) from including storage cabinets within the scope of the regulatory measures.

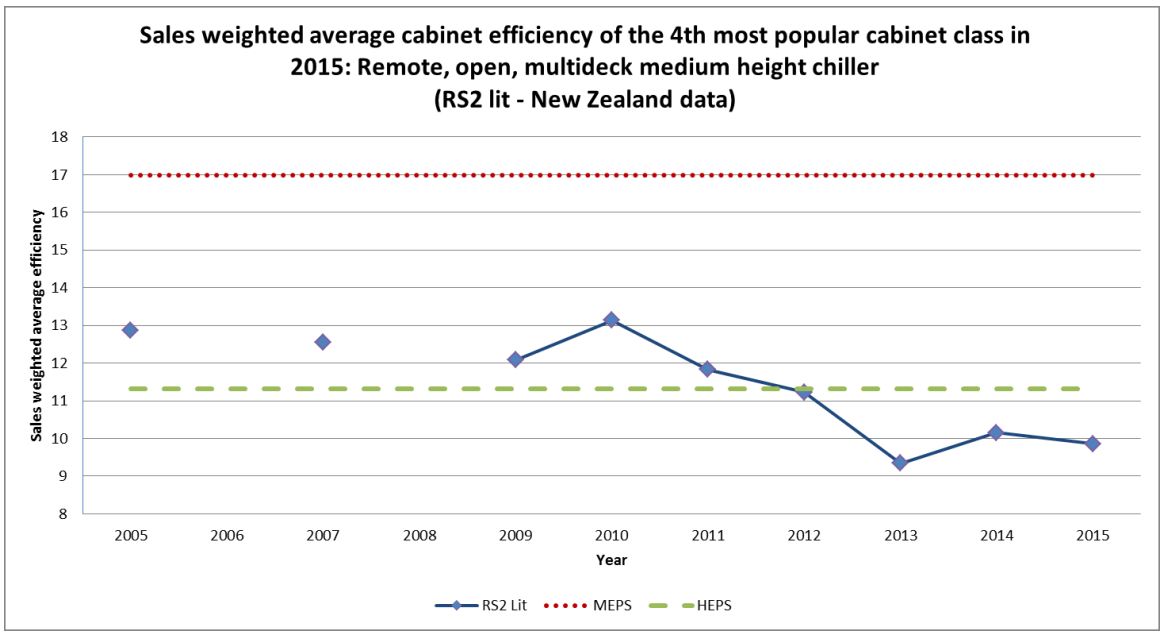
[23] *European Commission DG ENTR,* Preparatory Study for Eco-design (Refrigerating and freezing equipment, February 2011). The market stock proportion of 20% is consistent with market research undertaken in Australian and New Zealand as part of the Consultation RIS process: collecting data on types of catering and hospitality businesses/institutions, combined with estimates of the typical number of refrigeration cabinets by businesses/institution to derive a bottom up stock estimate, reviewing Department of Environment and Energy pre-charged import equipment data, a comprehensive review of existing suppliers and interviewing key market participants.

Figure 10: Sales weighted average efficiency (NZ data) for the most popular cabinet classes.







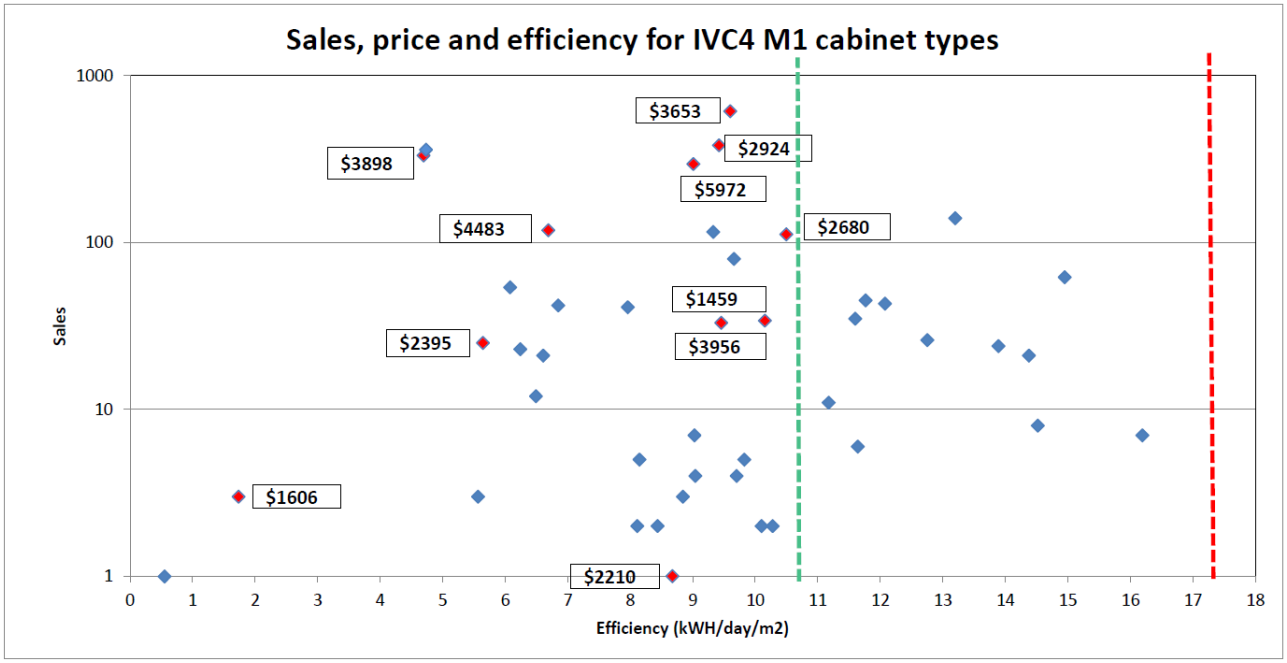


New Zealand sales data also shows new models entering the market at a slower rate than you would expect to see in a market where there was already sufficient incentive to raise product efficiency. Of the units sold in 2015, 28% were models registered before 2007 and only 12% were models registered in the last three years. By comparison, 40% of domestic fridge freezers sold in the same year were from models registered in the last three years. If there was sufficient motivation to raise efficiencies beyond the current minimum, sales of commercial refrigeration units could be expected to fall along similar lines. Notably, the efficiency levels for domestic fridges have been updated since they were first introduced, whereas the levels for commercial refrigeration have not.

Sales analysis of the top-selling cabinet type in New Zealand in 2015 is shown in **Figure 11** below. The lack of any correlation between price and efficiency suggests that efficiency is not valued in the market. There are also no trends linking sales volumes with energy

efficiency, which suggests that the efficiency of products (and hence their total cost of ownership) is not driving demand under the status quo.

Figure 11: Analysis of sales, price & efficiency of the most purchased cabinet type in New Zealand, 2015



Notes on Figure 11: These are self-contained beverage cabinets (product class IVC4 M1 – Integral Vertical Chiller type 4, with a temperature range of +5 to -10C). As there are many sub-types under this category, the sample size is limited. There is some variation in storage capacity and door configuration between the models shown but this does not affect the analysis. The HEPS level is shown by the green dashed line near the center and the level MEPS is shown in red at the far right. Prices are shown for the models plotted in red. Relative positions are shown here because the scales of the axis have been removed to protect confidentiality.

In summary more stringent MEPS are required to keep raising the energy performance of the least efficient cabinets and to achieve greater energy savings. All proposed regulatory options outlined in this RIS therefore incorporate increases to the current MEPS levels.

Summary

All the regulatory options presented in this RIS seek to resolve the issues identified with the current regulation in order to reduce business compliance costs, increase compliance, raise the efficiency of products in line with what is now achievable, and increase the range of products available on the local market.

Information failures

Information failures may prevent buyers from making informed decisions about energy efficiency when making their cabinet selections. Information about energy efficiency may be unavailable, difficult to access, or difficult to verify, reducing its value to buyers.

In any market, buyers should be able to research all relevant factors that help them to buy the product that is best suited to their needs. In the case of refrigerated commercial cabinets, this should include energy use and the whole-of-life cost alongside other factors such as price, cabinet size, appearance, and quality.

However, there are costs associated with obtaining this information, and most buyers will make a decision when they feel they have sufficient information on which to choose between different models on offer. Where information on any particular aspect, such as whole-of-life cost, is missing or difficult to obtain or comprehend, buyers will use rules of thumb, such as knowledge of past purchases, to help them decide.

Buyers in the commercial refrigeration market may not be aware of the significant savings they can make by choosing a more efficient cabinet. For example, the capital cost of a typical supermarket display cabinet is only 24% of its lifetime cost, so 76% of the expense of owning a refrigerated cabinet goes on running it.[24] Buyers may therefore be paying more than they need to over the lifetime of the product.

Feedback during consultation on the product profile and the Consultation RIS confirms that commercial refrigeration products are not promoted and sold on the basis of their energy use and operating costs. Both suppliers and manufacturers have indicated that they sell certain types of cabinets into 'type-price' brackets which do not differentiate between their respective efficiencies.

It was nonetheless suggested that information on annual running costs is accessible to buyers. However, in a website search of 56 Australian supplier websites, only 17 made any mention of energy efficiency. These ranged from statements about efficient LED-lighting for fridges; types of glazing; additions to refrigerants and adjectives such as high, outstanding or quality refrigerating efficiency or low energy consumption. Only seven companies promoted the energy efficiency of their cabinets, or identified ways to meet their emissions targets or improve their refrigeration systems.[25]

While the Energy Rating database[26] is a potential source of information to consumers on whole-of-life costs, it does not currently provide an easy way to identify or compare the energy efficiency of different purchase options or calculate their running costs. Moreover, searching the database for a specific cabinet type can be a time consuming process for

[24] Based on the TEC of an "average" Supermarket display cabinet of 39 kWh/day with energy cost (commercial) of 16.9 c/kWh, increasing at 2.5% per annum. Cost of an "average" Supermarket display cabinet at $12,500. Over a 13 year lifetime the energy cost is $39,740. No depreciation or GST taken into account.

[25] These companies included: Coca-Cola Amatil, Frigoglass, Huxford-Orford, McAlpine Hussmann, Sanden International, Skope and Stoddart (Koldtech).

[26] http://reg.energyrating.gov.au/comparator/product_types/

buyers and requires them to have an understanding of the standard to know what type of cabinet they are searching for. Plus, due to the limited scope of the current MEPS, a number of cabinet types on the market are not required to be registered and thus do not appear on the database.

Low uptake of high efficiency standards

Although a voluntary high efficiency performance standard (HEPS) has been in place since MEPS were first introduced in 2004, few suppliers have taken up option to certify and promote their products as meeting HEPS.

In 2015 the class IVC1 M2 (semi-vertical, self-contained display cabinets at M2 temperature class) had approximately 40 models registered in the Energy rating database. Eighty-four percent of these registrations actually met HEPS levels but only half were identified as such by suppliers. This may indicate that only half of the suppliers were aware that a HEPS declaration applied to their cabinets or that suppliers saw little advantage in seeking to identify and register their models as meeting HEPS levels. It may also be a consequence of the problems applying the relevant standard, as discussed earlier in this section.

If HEPS was functioning effectively as a way to promote high efficiency products and influence buyer behaviour, it could result in significant reductions in energy use over time. Looking at NZ sales data, every buyer of an IVC1 M2 class cabinet that selects a HEPS-compliant model could save approximately NZD $820 every year ($9,100 over the cabinet's lifetime) compared with one that merely passes MEPS. There are likely to be similar benefits for Australian buyers based on market share and cabinet type.

However, the current difficulties with the standard, outdated levels, and low uptake mean that the HEPS is not performing as intended.

Market failures

Split incentives

Split incentives occur when the person who pays for the running of an appliance is not involved in the decision to buy that appliance. A typical example occurs where companies hire out or courtesy-supply branded product-specific fridges but do not pay for the electricity. In this situation there is little incentive for companies to maximise the energy efficiency of their fridges for hire.

All remote refrigerated display cabinets and many integral (self-contained) refrigerated display cabinets must be installed by a licensed refrigerant handler. The use of specialist suppliers places further limitations on the equipment purchase decision.

In response to questions in the Consultation RIS about whether buyers or users actively considered energy use, one industry body stated that "significant sectors of the buying

community are focused on initial capital cost outlay as the single major selection criteria." One submission suggested that "some of the biggest end users have professional buyers who receive their incentives based on capital cost reduction. Therefore, even though their employer would make substantial savings by adopting the high efficiency range, they may ignore it and go for the normal efficiency models to reduce the initial purchase price. By comparison, individual bar owners [who pay the electricity bill] often buy the superficially more expensive, high efficiency version and they find it an easy and obvious choice to make."

The industry body went on to explain that there are "global procurement systems where the vendor is not allowed to meet or speak to the buyer which are not conducive to making detailed arguments about lifetime and efficiency. E- Auctions being the worst example. We did gain one major contract, never having met the buyer nor even spoken to them on the phone."

Resolving some of the issues with the current regulation would help to reduce the effect of split-incentives in the market.

Negative externalities associated with the electricity price

Buyer behaviour has a consequence on others. There are significant greenhouse gas and other atmospheric emissions (including nitrogen oxide and sulphur oxide) that are produced from generating and using electricity (particularly in Australia, less so in New Zealand due to the significant hydro/renewable component).[27] However, buyers do not tend to take this into account when purchasing a refrigerated display cabinet.

In the absence of regulatory measures to incorporate the total environmental cost of electricity use in the price for electricity, measures to promote the sales of more efficient commercial refrigeration products would act to reduce the electricity consumption and associated emissions attributed to commercial refrigeration.

[27] While New Zealand has a much higher level of renewable electricity generation than Australia, it does have some fossil fuel electricity generation. New Zealand has an Emissions Trading Scheme (ETS) and a carbon price, however this is considered to be insufficient to drive significant emissions reduction and does not fully reflect the total costs of the greenhouse emissions arising from electricity use.

Conclusion

There are fundamental problems with the regulation of refrigerated commercial cabinets:

- Regulatory failures arising from the current standard AS 1731, which does not align with international standards although Australia and New Zealand import most of their refrigerated commercial cabinets; is complex and difficult to apply; excludes storage cabinets although these make up around one fifth of sales; and sets MEPS at levels that are too low to achieve their intended purpose.

- Information failures caused by a lack of available information about the relative energy consumption of commercial refrigeration products available on the market, which prevents buyers from knowing the total ownership and environmental costs of refrigerated display and storage cabinets

- Market failures stemming from split-incentives in the commercial cabinet supply chain which mean that the buyer may not be the end-user and may not prioritise whole-of-life costs, and an electricity price that does not reflect the total environment costs of using electricity.

Why is government action needed?

The current regulations impede the supply and purchase of energy efficient commercial refrigeration cabinets and prevent significant electricity savings and reduced emissions:

- The current Standard AS 1731 is complex, making it confusing for industry and difficult to interpret.
- The AS 1731 standard is limited in scope and does not apply to the majority of storage cabinets (used for food storage and catering purposes) which are about 20% of the commercial cabinet market.
- MEPS which do not align with the internationally accepted standards,
- The current system does not provide meaningful information about which cabinets are the most efficient.
- A lack of awareness about energy efficiency - information about relative energy efficiency is either not available at all, or is not readily accessible by buyers – resulting in a lack of awareness of the comparative energy efficiency of different cabinet options and the potential consequences (higher running costs, impact on energy use).

The role of Government

Despite proven, cost-effective opportunities to reduce energy use, a large portion of potential savings are not realised for various reasons, including:

- A lack of information (delivered at the right time and in the right way).
- A lack of awareness by energy users and decision-makers about why they should act (the size and nature of the opportunity, including true lifetime costs and benefits), and what action is best for them, and how they can access the information they need to make informed decisions.
- A lack of capability – people, skills, and processes – to take effective action.
- Low prioritisation of energy efficiency above other, more pressing issues – such as production deadlines, health and safety issues, or day-to-day business pressures.
- Capital constraints – which mean that a business perceives that it cannot afford to take on the up-front costs of an energy efficiency measure, even one with a short pay-back period.

Policy options

The policy options presented in this RIS are directed at improving the average energy efficiency of refrigerated commercial cabinets sold into the Australian and New Zealand and keeping businesses competitive with overseas markets. They are intended to:

- Encourage more efficient refrigerated cabinets to enter the stock, with efficient new technologies becoming main stream within the industry.
- Enable buyers and users to identify efficient units and have confidence in their cabinet selections.
- Reduce the cost of compliance for suppliers.
- Keep the local market competitive with worldwide trends.

- Improve energy efficiency and thereby reduce greenhouse gas emissions, which will help both countries meet climate related commitments.

    - For New Zealand, the policy proposals seek to promote and improve the efficient use of energy, which is a priority under the *New Zealand Energy Strategy 2011-2021* and the *New Zealand Energy Efficiency and Conservation Strategy 2017-2022*. The proposals also contribute to the New Zealand Government's post-2020 climate change target to reduce greenhouse gas emissions to 30 per cent below 2005 levels by 2030. In addition, they contribute to the *Business Growth Agenda's* objective of promoting energy efficiency and the use of renewable energy to build a more competitive and productive economy.

    - The policy objectives also contribute to the COAG Energy Council's National Energy Productivity Plan. This plan aims to improve Australia's productivity by 40 per cent by 2030, to increase the economic benefit from each unit of energy consumed. Improving the regulations will also contribute to the Australian Government's target to reduce greenhouse gas emissions to 26 to 28 percent below 2005 levels by 2030.

- The options proposed in the next section would help to curb growth in energy demand thereby deferring the need to invest in new energy supply infrastructure. In addition these options would help New Zealand to meet most of its stationary energy needs from renewable or low emissions energy sources.
- The proposed options would also help ensure that regulation remains relevant and effective over time.

4. Options

This RIS considers policy options to achieve the objectives and resolve the problems identified with the current regulations. The policy proposals incorporate business as usual (BAU), regulatory and non-regulatory options. The addition of voluntary online labelling to all regulatory options is also considered.

In many countries, policy interventions such as MEPS and energy labelling have been effective at tackling market failures and yielding significant benefits for consumers and businesses compared with the costs of these measures the and burden they place on industry.

MEPS are typically mandatory because regulation, with good compliance, delivers certainty and consistent outcomes for businesses and consumers. Voluntary agreements and other alternatives to MEPS appear successful only in specific circumstances, such as when markets are dominated by a limited number of domestic manufacturers, with similar (high) technical competence and incentives to develop energy efficient products.

All proposed regulatory options include adopting the ISO 23953 Standard for refrigerated display cabinets and beverage cabinets, and European test methods for storage cabinets and other cabinet types (ice-cream and gelato), from 1 December 2019.

If adopted these Standards would cover a much wider range of refrigeration equipment that performs similar functions and has similar characteristics to those already regulated in Australia and New Zealand. Regulatory options also include developing Australian and New Zealand MEPS levels for this broader range of cabinets which align with the European Commission MEPS levels (EC MEPS).[28]

Policy options under consideration

Option 1 is Business as usual (BAU): no changes to the existing requirements.

[28] Preliminary analysis for this RIS showed that simply adopting these standards makes very little difference to energy savings or greenhouse gas reduction. Changing the MEPS levels makes the most difference to these. It does however subject a wider range of cabinet types, to regulation – and associated costs of registration and testing.

Option 2 involves adopting the ISO and EN test methods but setting local MEPS levels for Australia and New Zealand to improve the least efficient **10%** of cabinets, in groups similar to those proposed by the EC MEPS process. Online energy rating information is added. A "deemed to comply" method of compliance is also included for low volume products.

Option 3 looks at adopting the ISO and EN test methods but setting local MEPS levels for Australia and New Zealand to improve the least efficient **30%** of cabinets, in groups similar to those proposed by the EC MEPS process. Online energy rating information is added. A "deemed to comply" method of compliance is also included for low volume products.

Option 4involves adopting the ISO and EN test methods and developing AU/NZ MEPS which align with or are similar to published or draft EC MEPS levels (posed per group), modelled from 2019.[29] Overall this approach affects approximately 25% of registrations but some types are more affected than others. Online energy rating information is added. A "deemed to comply" method of compliance is also included for low volume products.

Option 5 considers the alternative of non-regulatory intervention in addition to BAU.[30] The options are summarised in **Table 3** below.

Table 3: Summary of policy options

Option	Option 1 – BAU	Option 2 –EN and ISO test methods, AU/NZ MEPS 10%, Vol labelling	Option 3 – EN and ISO test methods, AU/NZ MEPS 30%, Vol labelling	Option 4 (Modified) – EN and ISO test methods, EC MEPS, Vol labelling	Option 5 – non-regulatory options
Move to International ISO and EN test methods	✗	✓	✓	✓	✗
New AU/NZ MEPS levels	✗	✓	✓	✗	✗
EC MEPS levels	✗	✗	✗	✓	✗
Deemed to comply method for low volume products	✗	✓	✓	✓	✗
Online energy rating information	✗	✓	✓	✓	✓
Modelled date of implementation	N/A	2019	2019	2019	2019

[29] Option 4 has been modified so that it no longer involves the adoption of EC MEPS for all cabinet types – it now involves developing AU/NZ MEPS (posed per group) which are based on the implemented EC MEPS levels (storage and gelato cabinets) or the draft EC MEPS levels (display cabinets and small ice-cream freezers). Adoption of EC MEPS will be considered once they have been implemented in Europe for all relevant cabinet types.

[30] Option 5 includes incentive schemes and buyer education campaigns which were not modelled but are explained in the non-regulatory part of this section.

European Standards and cabinet groups

The relevant cabinet types and standards are set out in **Table 4** (below). The table also outlines those aspects of the standards that are not being considered by this RIS.

Table 4: Published EN Standards and EC MEPS levels (and the parts which are not currently being considered for adoption in Australia and New Zealand).

	Standards Published	EC MEPS levels Published	Parts of Standards or regulations that are not being considered by current proposals
ISO 23953 Refrigerated Display Cabinets	Published	Draft	Beverage Vending machines
EN 16825 Refrigerated storage cabinets and counters for professional use	Published	Published	Blast cabinets, condensing units and process chillers
EN 16901 Small ice-cream freezers	Published	Draft	
EN 16838 Refrigerated display scooping cabinets for gelato (soft scoop)	Published	Published	

As shown in **Table 4** all relevant standards have now been published in Europe. The only EC MEPS levels, which have been published, however, relate to storage cabinets and gelato cabinets. The EC MEPS levels relating to refrigerated display cabinets and small ice-cream freezers are yet to be published and remain in draft.

Option 1: Business as Usual

- Option 1 is business as usual (BAU): the "no intervention" approach with no changes to standards, scope or test methods. It involves the continued use of AS 1731 as the applicable standard in Australia and New Zealand. AS 1731 is the standard that defines the energy efficiency test procedure for refrigerated display cabinets in Australia and New Zealand. It is made up of 14 separate parts, all sold separately, which specify requirements for classification, installation and maintenance and MEPS and HEPS levels.[31]

- Some efficiency improvement in any new products can be assumed due to projected natural improvement in the market and international policy developments.

This option assumes no changes to the existing regulations in Australia and New Zealand for refrigerated commercial cabinets. Without any regulatory intervention, the problems identified in this RIS will continue:

[31] Cabinets are defined into more than 50 different classes across four operating temperatures, with different MEPS levels and test procedures.

- AS 1731 will continue to exclude most storage cabinets that are intended for use in catering and similar non-retail applications (food storage purposes), and form approximately 20% of the market.

- The MEPS and HEPS levels will remain unchanged. They will not provide meaningful parameters for relative energy efficiency of different cabinet models and will not align with internationally accepted standards.

- Refrigerated cabinets will not be subject to labelling requirements. Consumers will be unable to use labels to compare the relative efficiency of different models.

Regulatory Options

All these options involve:

- Adoption of the ISO and EN test methods for display, storage and related cabinets.

- A change to EC MEPs levels or changes to local MEPs levels to reflect European methods.

- Adoption of the European approach to energy efficiency: the Energy Efficiency Index (EEI) and European efficiency grades.

- The addition of voluntary online labelling using European energy efficiency grades converted to the current star rating system.

- A "Deemed to Comply" method of compliance for low volume products

All regulatory options have been modified following industry feedback to incorporate voluntary online labelling rather than the mandatory labelling previously proposed. Option 4 has also been modified so it proposes revising existing local MEPS levels to align with EC MEPS levels. All proposals now have an implementation date of 1 December 2019.

Test Methods

All regulatory options look at adopting from 2019:

- The ISO standard 23953 for Refrigerated Display Cabinets (in relation to display cabinets and beverage coolers).

- EN 16825 for Refrigerated Storage Cabinets and Counters for Professional Use.

- EN 16901 for small ice-cream freezers.

- EN 16838 for refrigerated display scooping cabinets for gelato.

Essentially, these standards cover a much wider range of refrigeration equipment that performs similar functions or has similar characteristics to those already regulated in Australia and New Zealand. These standards make up a complementary suite of test methods that cover much of the refrigerated cabinet market (previously these were sub-sets in AS 1731). They have been developed using the ISO as a parent standard.

The ISO Standard is widely used in Europe as the preferred test method for display cabinets. Other countries have adopted or adapted it or are looking to do so. There was almost unanimous support from industry for the adoption of the European standards and test methods.

The ISO standard for display cabinets, allows a 'deemed to comply' option for components to be swapped in an already rated model, without the need to re-test or register it as a separate model. The regulatory proposals in this RIS incorporate the inclusion of a 'deemed to comply' provision in the revised standards. This is supported by industry, with the feedback from the consultation process supporting a 'deemed to comply' pathway to compliance, particularly for local manufacturers who face high compliance costs from the proposed regulatory changes than importers would face.

MEPS levels

All regulatory proposals look at either adopting the European MEPS levels or designing MEPS levels based on European methods. The idea of moving to group level MEPS is that it avoids the issues caused by specific definitions and slight class-differences in MEPS levels. Broader product groups are also more inclusive without specific dimensional or physical characteristics creating grey areas and loopholes in regulation.

Three MEPS level scenarios are contained in options 2 to 4:

- Revising local Australia-New Zealand MEPS levels to affect the least efficient 10% of cabinets, per group of similar cabinet types (option 2), or

- Revising local Australia-New Zealand MEPS levels to affect the least efficient 30% of cabinets per group of similar cabinet types (option 3), or

- Aligning with EC MEPS levels (option 4) with approximately 25% of all cabinet models affected but with some sub-sets of cabinets are more affected than others.

Table 5: Summary of 15 groups of display and storage cabinets.

	Group Abbrev.	Application	Temperature	Configuration	AS 1731.14 Types	ISO 23953 Types
1	IRH Integral Refrigerated Horizontal Cabinets	Integral Refrigerated Display Cabinets	Refrigerator	Horizontal	HC1, HC2, HC3, HC4, HC5, HC6	IHC1, IHC2, IHC3, IHC4, IHC5, IHC6, IHC7, IHC8
2	IRV Integral Refrigerated Vertical Cabinets			Vertical	IVC1, IVC2, IVC3	IVC1, IVC2, IVC3, IYC1, IYC2, IYC3
3	IRV-4 Integral Refrigerated Vertical Cabinets with Glass Door				IVC4 Glass door	IVC4, IYC4
4	IFH Integral Freezer Horizontal		Freezer	Horizontal	IHF1, IHF3, IHF4	IHF1, IHF3, IHF4
5	IFH-5 Integral Freezer Horizontal with Lid				IHF5, IHF6	IHF5, IHF6
6	IFV Integral Freezer Vertical			Vertical	IVF1, IVF2, IVF4 Glass door	IVF1, IVF2, IVF4, IYF1, IYF2, IYF3, IYF4
7	RRH Remote Refrigerated Horizontal Cabinets	Remote Refrigerated Display Cabinets	Refrigerator	Horizontal	RS6, RS7, RS8, RS9	RHC1, RHC2, RHC3, RHC4, RHC5, RHC6, RHC7
8	RRV Remote Refrigerated Vertical Cabinets			Vertical	RS1, RS3, RS4, RS5, RS10	RVC1, RVC3, RVC4, RYC1, RYC2, RYC3, RYC4
9	RRV-2 Remote Refrigerated Vertical Cabinet, open, medium temp				RS2	RVC2
10	RFH Remote Freezer Horizontal		Freezer	Horizontal	RS13, RS14	RHF1, RHF3, RHF4, RHF5, RHF6, RHF7
11	RFV Remote Freezer Vertical			Vertical	RS11, RS12, RS15, RS16, RS17, RS18, RS19, RS20	RVF1, RVF2, RVF4, RYF1, RYF2, RYF3, RYF4
12	SRH Service Cabinet, refrigerated Horizontal with solid door	Integral Refrigerated Storage cabinet	Refrigerator	Counter (Horizontal)	No equivalent registered	Storage cabinet types are defined into four categories (but not classified by the technical standards yet)
13	SRV Service Cabinet, Refrigerated, Vertical with solid door			Vertical	IVC4 Solid door M1 & M2	
14	SFH Service Cabinet, Freezer, Horizontal with solid door		Freezer	Counter (Horizontal)	No equivalent registered	
15	SFV Service Cabinet Freezer, Vertical with solid door			Vertical	IVF4 Solid doors L1 & L2	

Options 2 and 3 were developed on the basis of local registration data, overseas data and New Zealand sales weighted data. For ease of interpretation, cabinets were divided into 15 groups of similar types, to distinguish between high selling types (beverage cabinets) and those that would need to comply with distinct standards (ice-cream, beverage, gelato, storage). MEPS levels were imposed per group – an approach which is simpler to understand and enforce.

These 15 groups have distinct efficiency levels and dates of implementation. **Table 5** outlines the groups for the purpose of setting MEPS in Australia and New Zealand.

MEPS levels in Europe are imposed per group irrespective of cabinet type (remote or integral, closed or open). This approach to MEPS levels (broad definitions based on cabinet groups and group-level MEPS), is preferable to the specific class and MEPS definitions in AS 1731. Separate type definitions are still essential for specific test methods and test setups. Essentially the supplier must define what temperature their units will operate at – and from there, work out what group it will be classified into.

Table 6: Proportion of cabinet types per group, estimated from European data vs local sales data.

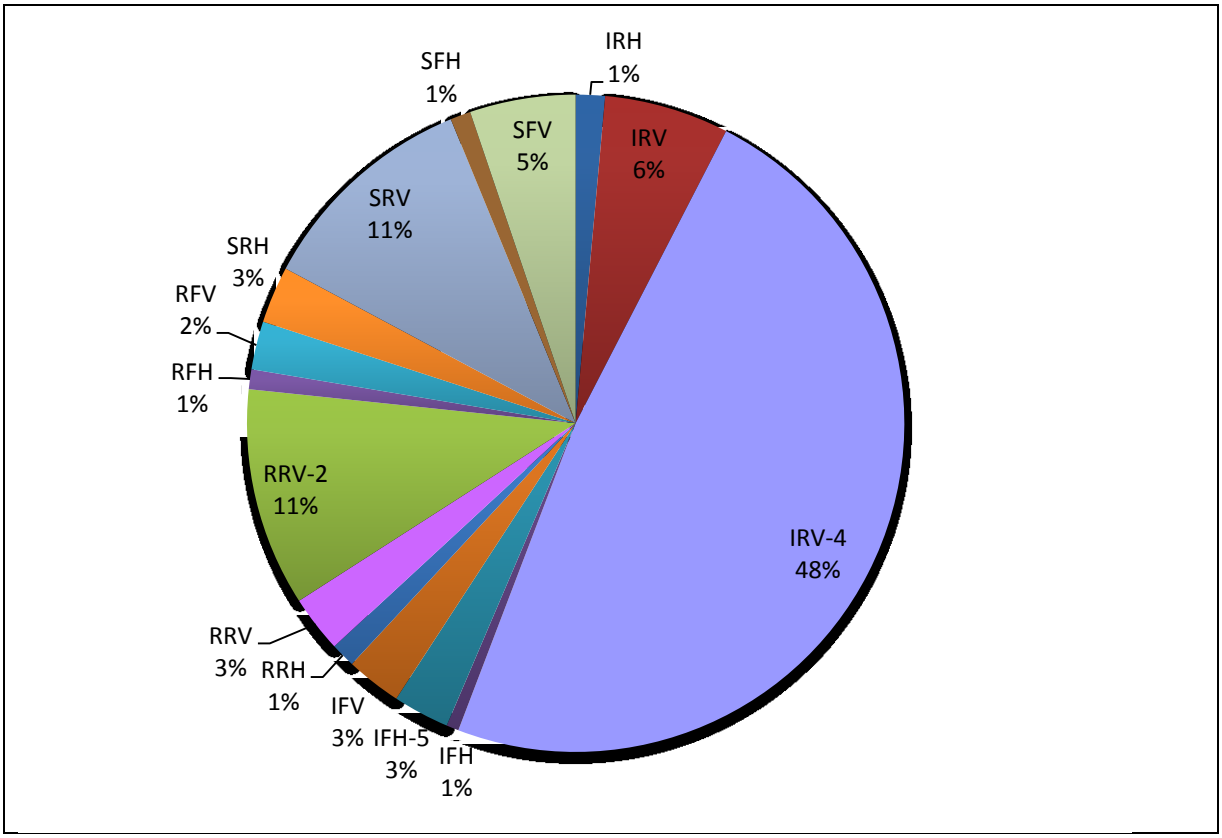
Application	Temperature	Configuration	AS 1731.14 Types	Dissection by type and sub-type		
				EU	Local [(1)32]	
Refrigerated Display Cabinet (Integral)	Refrigerator	Horizontal	HC1, HC2, HC3, HC4, HC5, HC6	67%	62%	1.4%
		Vertical	IVC1, IVC2, IVC3			5.9%
			IVC4			46.5%
	Freezer	Horizontal	HF1, HF3, HF4			0.6%
			HF5, HF6			2.7%
		Vertical	IVF1, IVF2, IVF4			2.6%
Refrigerated Display Cabinet (Remote)	Refrigerator	Horizontal	RS6, RS7, RS8, RS9	14%	18%	1.2%
		Vertical	RS1, RS3, RS4, RS5, RS10			2.7%
			RS2			10.5%
	Freezer	Horizontal	RS13, RS14,			1.0%
		Vertical	RS11, RS12, RS15, RS16, RS17, RS18, RS19, RS20			2.3%
Refrigerated Storage Cabinet (Integral)	Refrigerator	Counter (Horizontal)	Storage cabinet types are defined into four categories. No further breakdown of types yet	19%	20% [(2)33]	1.4%
		Vertical				5.9%
	Freezer	Counter (Horizontal)				46.5%
		Vertical				0.6%

Table 6 above shows a sales profile of grouped cabinet types, including a comparison of Australian and New Zealand registered cabinets and storage types with the European sales profile of broader categories (EC 2014b and EC 2012). Sales of integral display cabinets are slightly higher in the EU than in Australia and New Zealand, and remote types are lower.

[32] EECA data collected via the Energy Efficiency (Energy Using Products) Regulations 2002 sales profile was largely used to establish the local profile by cabinet type and sub-type. There was a slight adjustment for additional sales of IVC4 that was shared across the remote devices. This adjustment made the groupings more consistent with the stock count by outlet estimates.

[33] An allowance was added for storage cabinets similar to the proportion found in the EU and stock count by outlet reviews. The cabinets account for 20% of total sales in Australia, and 22% in New Zealand.

Figure 12: Sales profile for Australia and New Zealand in 2016, based on 15 groups of cabinet types.



European Energy Efficiency Index calculation for MEPS

The proposed move to adopt international standards and test methods would involve adopting the European approach to testing and calculating energy efficiency for refrigerated commercial cabinets.

The European approach uses a simple Energy Efficiency Index (EEI) – a linear equation based on the tested efficiency of a cabinet, compared with the Standard Annual Energy Consumption (SAEC). The EEI score shows how much more efficient a cabinet model is than its SAEC.[34]

[34] For example, a model that had energy consumption which measured as being exactly equal to the Standard Annual Energy Efficiency has an EEI of 100%. A model that was better by half again would have an EEI score of 50%. The term "MEPS" is not used in the European Standards which instead uses the term "efficiency grade" to refer to two concepts: the efficiency grade from A to G and the requirement to meet a better efficiency grade. The EEI Score is based on the SAEC and extra reduction factors or coefficients for specific cabinet uses – both factors were devised by a working group of experts.

The European Commission has specified minimum EEI's that must be achieved by specific years, for all cabinet types. These have been signaled well in advance by publicizing the simple index levels and dates when they will come into force. Table 7 overleaf shows the MEPS implementation dates in Europe. MEPS were introduced for storage cabinets from 1 July 2016.

Table 7: European introduction dates and MEPS for storage cabinets, and draft MEPS for display cabinets.

Introduction date	Refrigerated storage cabinets	Heavy Duty Cabinets	Refrigerated display cabinets
From 1 July 2016	EEI < 115	EEI < 115	
From 1 January 2018*			EEI < 150
From 1 January 2018	EEI < 95		
From 1 January 2019*			EEI < 130
From 1 July 2019	EEI < 85		
From 1 January 2021*			EEI < 110

* Dates for cabinets other than storage cabinets, and MEPS EEI levels – are indicative only. These were taken from the April 2016 EU documents and are not publically available for comment.

See **Attachment E** for more information about European test methods, the EEI and EC MEPS levels.

Proposed EU efficiency levels under current Option 4 regulatory proposal

It is proposed that EU EEI levels adopted from 1 December 2019 for both refrigerated storage cabinets and refrigerated display cabinets (if implemented by that date).
Refrigerated storage cabinet energy efficiency levels would align with the regulated EU 2018 levels (see **Table 8A** below), while the proposed refrigerated display cabinet energy efficiency levels are based on the proposed EU 2017 levels (**Table 8B**).

Table 8A: Proposed "MEPS" implementation dates for refrigerated storage cabinets.

Proposed EU energy efficiency level for refrigerated storage cabinets		
Introduction	Refrigerated storage cabinets Light and Normal Duty	Heavy duty cabinets
1 December 2019	EEI < 95	EEI < 115

Table 8B: Proposed revised "MEPS" implementation dates for refrigerated storage cabinets.

Proposed EU energy efficiency level for refrigerated display cabinets	
Introduction	Specific refrigerated display cabinets
From 1 December 2019	EEI < 130

Energy efficiency labelling

European Efficiency grades

The European Commission has also devised a series of efficiency grades (A – G or similar). The mandatory labelling scheme which obligates suppliers to label on their products and literature depicting the efficiency grade of the product and other relevant efficiency details.

Group A is the highest efficiency grade, where they achieve a score that means their energy use is 70% better than the Standard Annual Energy Consumption. The labelling grades for refrigerated display cabinets shown in **Table 9** below, are still subject to industry-government discussion in Europe, so are likely to change. **Table 10** shows the Energy efficiency classes for labelling of storage cabinets.

Table 9: Proposed efficiency grades for refrigerated display cabinets.

Energy Efficiency Class	Commercial Display Cabinets	Beverage Coolers	Small Ice-cream freezers	Gelato scooping cabinets
A	EEI < 30	EEI < 30	EEI < 40	EEI < 40
B	30 ≤ EEI < 50	30 ≤ EEI < 50	40 ≤ EEI < 70	40 ≤ EEI < 60
C	50 ≤ EEI < 80	50 ≤ EEI < 80	70 ≤ EEI < 90	60 ≤ EEI < 80
D	80 ≤ EEI < 110	80 ≤ EEI < 110	90 ≤ EEI < 110	80 ≤ EEI < 100
E	110 ≤ EEI < 120	110 ≤ EEI < 130	110 ≤ EEI < 130	100 ≤ EEI < 120
F	120 ≤ EEI < 130	130 ≤ EEI < 140	130 ≤ EEI < 140	120 ≤ EEI < 140
G	130 ≤ EEI	140 ≤ EEI	140 ≤ EEI	140 ≤ EEI

Table 10: Energy efficiency classes for labelling of storage cabinets.

Proposed EU energy efficiency levels for labelling of refrigerated storage cabinets	
Energy Efficiency Class	EEI
A+++	EEI < 5
A++	5 ≤ EEI < 10
A+	10 ≤ EEI < 15
A	15 ≤ EEI < 25
B	25 ≤ EEI < 35
C	35 ≤ EEI < 50
D	50 ≤ EEI < 75
E	75 ≤ EEI < 85
F	85 ≤ EEI < 95
G	95 ≤ EEI < 115

There is currently no labelling of refrigerated commercial cabinets in Australia or New Zealand. The proposal in the Consultation RIS to include mandatory labelling as part of the regulatory policy options has been modified following the consultation process. While there was some support for mandatory labelling of refrigerated commercial cabinets from stakeholders, mandatory physical labelling was opposed, primarily due to the additional cost involved. There was also concern that the use of physical labels on commercial cabinets would be impractical and of little benefit given that the purchasing decision or product comparison is often not made in the showroom.

There was, however, support for voluntary electronic labelling online or in the literature. There was a clear preference for online labelling which auto-populates using the Energy Rating website. [35]

The Technical Working Group recommended the introduction of voluntary online labelling, noting that some manufacturers may still choose to apply a physical label under an online energy rating information scheme (see **Attachment F** for further details).

Voluntary online labelling has therefore been incorporated into all regulatory proposals. It is considered a cost-effective alternative to mandatory labelling. It has the advantage of being accessible online, with similar information provided to physical labels. It would also provide consumers with:

- A comparative assessment of the model's energy efficiency through a star rating scale, thereby assisting with the lack of readily available information about energy efficiency.

[35] For more information on voluntary online labelling, go to labelling resources on the Energy rating website.

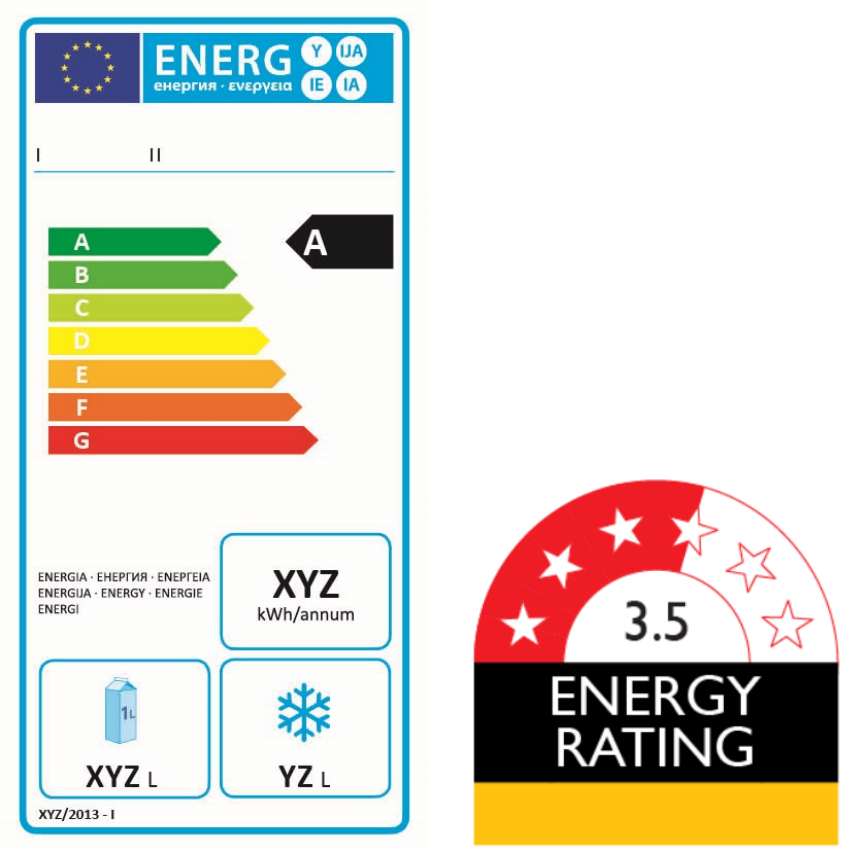
- The comparative energy consumption (usually kilowatt hours/year) which provides an estimate of the annual energy consumption of the appliance based on the tested energy consumption and information about the typical use of the appliance in the home.

It is proposed that, to align with the European approach, a European style label would be adapted for use as an online star rating label in Australian and New Zealand.

In Europe storage cabinets have been regulated to be labelled from 1 July 2016 and display cabinets from 2017.

Some generic examples of the European and the online Energy Rating labels are shown in **Figure 13**.

Figure 13: Generic example of proposed EU label (left) and generic Energy Rating label (right).



It is proposed that the online Energy Rating label be used instead of the European grading A to G, because this is familiar to buyers in Australia and New Zealand. The style of label used in Europe would need to be adapted for use. The actual number of stars could be equivalent to the highest grade that the appliance meets (for example, 6 stars for an A grade model).

Actual label specifications, including the algorithm to translate the European EEI rating into a star rating, will be developed for Australia and New Zealand by government and industry experts and regulators.

Summary of regulatory options

Option 2

Adopt ISO and EN test methods for display, storage and related cabinets. Develop Australasian MEPS to affect the least efficient 10% of models per group. Voluntary labelling is added. Implemented in 2019.

Option 2 proposes Australasian-specific MEPS set at an amalgamated group level to affect the least efficient 10% of cabinet models per group, with voluntary online labelling is added (from 2019).

MEPS levels would be devised per group using model-weighted registration data, where this is available, from the E3 registration database and estimates from European data where there is no local data. This approach would accord with the group-level MEPS method being applied in Europe and make it easier to transition to EC MEPS levels in the future should the need arise.

Option 3

Adopt ISO and EN test methods for display, storage and related cabinets. Develop Australasian MEPS to affect the least efficient 30% of models per group. Online energy rating information is added. Implemented in 2019.

Option 3 is the same as option 2 (including online energy rating information) except Australasian-specific MEPS would be set to affect a greater percentage of the least efficient models – 30% rather than 10% as per option 2 (from 2019).

Option 4

Adopt ISO and EN test methods for display, storage and related cabinets. Develop Australasian MEPS to align with EC MEPS levels. Voluntary labelling is added. Implemented in 2019.

Option 4 is the same as options 2 and 3 (including online energy rating information) except it proposes to align Australasian MEPS levels with EC MEPS levels (see **tables 8a** and **table 8b** for details) per group (from 2019).

Option 5

Non-Regulatory Options

Option 5 looks at possible non-regulatory options for refrigerated commercial cabinets. The aim of any intervention would be to increase the average energy efficiency of refrigerated cabinets sold into the Australian and New Zealand markets. None of the non-regulatory options were modelled as part of the cost-benefit analysis but are discussed in the impacts analysis in the next section.

Non-regulatory interventions could include:

- Incentive schemes.
- Voluntary efficiency Standards, certification or labelling programs.
- Buyer education campaigns.

Incentive schemes

Incentive schemes have been developed for refrigeration-cycle appliances in Europe and, recently, in Australia. These schemes provide an alternative to regulatory action in Australia only as New Zealand does not have any incentive schemes.

In Europe, the Energy Technology List (ETL) lists the most energy efficient products and allows buyers of listed equipment to claim an Enhanced Capital Allowance (ECA) in their tax return.36 Buyers can claim the entire ECA in the first year after purchase (rather than over four years based on the depreciated value of the product).

In Australia, the Emissions Reduction Fund (developed by the Australian Department of the Environment) now provides opportunities for crediting abatement associated with the installation of high efficiency refrigerated display cabinets. It is designed to reward businesses that go the extra mile by installing and using highly efficient appliances. Businesses or their agents can register their project with the Clean Energy Regulator and receive Australian Carbon Credit Units for abatement achieved beyond business as usual by installing high efficiency units.

Voluntary efficiency standards, codes, certification or labelling programmes

Voluntary efficiency standards, certification schemes, high efficiency endorsement labelling or dis-endorsement programmes rely on equipment suppliers agreeing to meet certain criteria in the absence of regulation. High voluntary efficiency levels can subsequently be used to develop rebates, incentives, white certificate schemes or similar.

Suppliers rely on up-to-date standards or industry-accepted methods of testing, declarations of performance and calculations to prove that they qualify.

Feedback on the Consultation RIS provided strong support for voluntary online labelling (see the Consultation Section). All regulatory options, including the new option 4, incorporate online energy rating information rather than the mandatory labelling proposed in the Consultation RIS.

[36] UK Government Energy Technology List

Buyer education programmes

Any non-regulatory intervention would need to involve a buyer education campaign. To be effective such a campaign would need to be ongoing and target buyers across the range of purchase avenues. Feedback from submissions on the product profile suggested that buyer education was important and would be needed anyway with a labelling regime.

However given existing market barriers and issues with the coverage of AS 1731, the ability to influence every buyer through education may be limited.

5. Impacts

This section identifies the groups of stakeholders likely to be affected by each option and outline the associated benefits and costs[37], as well as the distribution of these costs and benefits. In analysing each option, this RIS will assess the impact on those issues identified in the problem section, and whether the identified objectives can be achieved.

The full methodology and analysis, including modelling assumptions and an assessment of the regulatory cost burden on Australian companies, is available at **Attachment C**.

Option 1: Business as Usual (BAU)

Under BAU there is no change to the current requirements for refrigerated commercial cabinets and no policy intervention. This means that the energy efficiency benefits still continue from the existing requirements.

A BAU efficiency improvement of 1.0% pa (based on sales weighted efficiency from 2008 – 2012 from actual sales data) is assumed. This improvement in efficiency can be expected to continue, given ongoing changes in technology and increased user awareness of the cost of energy and international demand for greenhouse gas reductions. However, growth in energy use will outstrip BAU efficiency improvements so that energy consumption will continue to grow, albeit gradually, in both Australian and New Zealand under the BAU scenario.

It is worth noting that this option, when compared to the other options below, would see Australian and New Zealand consumers experiencing lost energy savings of up to 1,361 GWh per year[38], along with the lost opportunity to reduce CO2 emissions. In addition:

- Suppliers and regulators will continue to encounter problems with the complex and outdated AS 1731 test standard.
- AS 1731 will continue to provide incomplete coverage of the refrigerated commercial cabinet market, with an increasing share of that market not subject to compliance requirements.

[37] The costs and benefits analysis was conducted by the consultancy firms Expert Group and Expert Consult.

[38] Australia 1,156 GWh per year by 2035, NZ 205 GWh per year by 2035. See CBA for further details.

- Some products will continue to have 'no value" – as they are not allocated MEPS levels under AS 1731, they do not have to comply with efficiency levels and are likely to remain unregistered. The industry will continue to perceive this as being unfair, there being no technical reason why some cabinet types remain unregulated when they provide a similar function and have similar characteristics to regulated types. Unregulated cabinet types will continue to use significant amounts of energy in both countries.
- Unless MEPS levels are more stringent, demand on energy from the market will continue to significantly outstrip any normal predicted improvements in technology. Regulating a wider product base combined with increased MEPS levels helps to slow energy demand.
- The absence of labelling and lack of comparative information about energy efficiency will continue to prevent consumers from assessing the relative energy efficiency of different display cabinets. As a result they may incur higher running costs than necessary.

Option 2

Adopt ISO and EN test methods for display, storage and related cabinets. Develop Australasian MEPS to affect the least efficient 10% of models per group. Voluntary labelling is added. Implemented in 2019.

Option 2 proposes Australasian-specific MEPS set at an amalgamated group level to affect the least efficient 10% of cabinet models per group, with voluntary online labelling is added (from 2019).

MEPS levels would be devised per group using model-weighted registration data, where this is available, from the E3 registration database and estimates from European data where there is no local data. This approach would accord with the group-level MEPS method being applied in Europe and make it easier to transition to EC MEPS levels in the future should the need arise.

Option 2 proposes the following changes to BAU:

1. Adopt ISO and EN test methods for display, storage and related cabinets.
2. Introduce Australasian MEPS to effect the least efficient 10% of models per group
3. Introduce voluntary online energy efficiency labelling
4. Deemed to comply registration pathway
5. Implementation December 2019.

Each regulatory option have advantages and disadvantages compared to BAU:

Advantages of Option 2:

- Clarification and simplification of regulatory requirements that align with international testing, cabinet classification and methods to determine MEPS levels.
- Removal of "grey" areas of scope of current regulations by including refrigerated storage cabinets and aligning scope of regulations with international standards.
- It will also enable broader families of cabinet models to be designated and registered, which will reduce the number of registrations by an estimated 20%.
- Reduced compliance costs to suppliers of low volume products through deemed to comply compliance pathway
- Lower overall cost of commercial refrigeration to consumers and improved consumer information regarding energy consumption through online labelling
- Additional energy savings and greenhouse gas savings

Dis-advantages of Option 2:

- An overall increase in costs to suppliers due to introducing MEPS to currently unregulated refrigerated storage cabinets

Impacts on Market Participants

The impact on each participant in the refrigerated commercial cabinet market from option 2 are as follows:

Suppliers

Option 2 will simplify compliance and reduce compliance costs for currently regulated products but overall compliance costs will increase due to introducing regulations for previously unregulated refrigerated storage cabinets. For more detail on the positive and negative effects on suppliers of refrigerated commercial cabinets sold in Australia and New Zealand see below.

Positive effects:

Suppliers would no longer need to access, interpret and comply with the very complicated and confusing regionally–specific Australian test standards and no longer need to:

1) Purchase the Australian Standard
2) Have appliances tested to the Australian Standard
3) Incur administrative costs associated with interpreting and complying with the unique Australia/New Zealand specific test Standard

As product groupings will be aligned with international standards and convention it will be much easier for local importers (who account for approximately 95% of all refrigerated cabinets sold in the Australasian market)[39] to identify and source Australasian compliant products from the international market. Importers will be able to select from the international market products already tested to ISO or IEC standard. Therefore reducing compliance costs and potentially improving the range of products on the market.

The "deemed to comply" compliance pathway for low volume products will reduce compliance costs for suppliers (especially domestic manufacturers) that build bespoke or import low volume products. Current regulations require laboratory testing and places an unrealistic compliance burden on these suppliers that result in non-compliance.

Negative effects:

Introducing a new regulatory requirement for Refrigerated Storage Cabinets would add compliance costs on suppliers such as:

1. Administration cost to source complying products and register products
2. Testing costs if only supplying to the Australasian market (if they are already producing refrigerated storage cabinets for the European market these test costs have already been paid.
3. Increase in product cost if existing products being supplied do not meet the proposed MEPS levels

Test Laboratories

At present there are no Australian or New Zealand independent test laboratories that test to the Australian Standard although one in Australia has indicated they have the capability. Therefore harmonising with international test standards will have no effect on Australasian test laboratories.

Consumers

For consumers interested in energy efficiency online labelling on the www.energyrating.gov.au website will provide much improved information on product energy efficiency and running costs that they can use as part of their buying decision.

For consumers already purchasing products that meet the proposed MEPS levels in Option 2 there would be no impact of the proposed changes.

[39] As mentioned earlier, most imported cabinets are manufactured to international Standards.

Consumers purchasing products that do not meet the proposed MEPS levels in Option 2 there would be on average an overall reduction in the cost of their refrigeration needs as any incremental increase in product cost due to upgrades required to meet the MEPS are more than offset by savings in running costs. For more details on costs of improvements see **Attachment C**.

Consumers may also gain access to a wider range of appliances over time because importers will potentially get access to a wider range of international products because international manufacturers no longer need to design and test products to the Australian standard.

Impacts on current market supply

Under Option 2 the least efficient 10% of cabinets in every cabinet group will be removed from the market. These sales will be mostly from the integral freezer category (as you would expect to see in smaller retail outlets) and remote vertical cabinets (i.e. for chilled foodstuffs in supermarkets). Table 11 provides details of this impact.

Table 11: Summary of 15 groups of display and storage cabinets and impacts on models from Option 2.

	Group Abbrev.	Application	Temperature	Configuration	AS 1731.14 Types	ISO 23953 Types	Models affected	Sales affected
1	IRH Integral Refrigerated Horizontal Cabinets	Integral Refrigerated Display Cabinets	Refrigerator	Horizontal	HC1, HC2, HC3, HC4, HC5, HC6	IHC1, IHC2, IHC3, IHC4, IHC5, IHC6, IHC7, IHC8	10%	1%
2	IRV Integral Refrigerated Vertical Cabinets			Vertical	IVC1, IVC2, IVC3	IVC1, IVC2, IVC3, IYC1, IYC2, IYC3	10%	1%
3	IRV-4 Integral Refrigerated Vertical Cabinets with Glass Door				IVC4 Glass door	IVC4, IYC4	10%	6%
4	IFH Integral Freezer Horizontal		Freezer	Horizontal	IHF1, IHF3, IHF4	IHF1, IHF3, IHF4	10%	0%
5	IFH-5 Integral Freezer Horizontal with Lid				IHF5, IHF6	IHF5, IHF6	10%	55%
6	IFV Integral Freezer Vertical			Vertical	IVF1, IVF2, IVF4 Glass door	IVF1, IVF2, IVF4, IYF1, IYF2, IYF3, IYF4	10%	12%
7	RRH Remote Refrigerated Horizontal Cabinets	Remote Refrigerated Display Cabinets	Refrigerator	Horizontal	RS6, RS7, RS8, RS9	RHC1, RHC2, RHC3, RHC4, RHC5, RHC6, RHC7	10%	0%
8	RRV Remote Refrigerated Vertical Cabinets			Vertical	RS1, RS3, RS4, RS5, RS10	RVC1, RVC3, RVC4, RYC1, RYC2, RYC3, RYC4	10%	54%
9	RRV-2 Remote Refrigerated Vertical Cabinet, open, medium temp				RS2	RVC2	10%	0%
10	RFH Remote Freezer Horizontal		Freezer	Horizontal	RS13, RS14,	RHF1, RHF3, RHF4, RHF5, RHF6, RHF7	10%	9%
11	RFV Remote Freezer Vertical			Vertical	RS11, RS12, RS15, RS16, RS17, RS18, RS19, RS20	RVF1, RVF2, RVF4, RYF1, RYF2, RYF3, RYF4	10%	1%
12	SRH Service Cabinet, refrigerated Horizontal with solid door	Integral Refrigerated Storage cabinet	Refrigerator	Counter (Horizontal)	No equivalent registered	Storage cabinet types are defined into four categories (but not classified by the technical standards yet)	10%	NA
13	SRV Service Cabinet, Refrigerated, Vertical with solid door			Vertical	IVC4 Solid door M1 & M2		10%	NA
14	SFH Service Cabinet, Freezer, Horizontal with solid door		Freezer	Counter (Horizontal)	No equivalent registered		10%	NA
15	SFV Service Cabinet Freezer, Vertical with solid door			Vertical	IVF4 Solid doors L1 & L2		10%	NA
Overall effect (Groups 1 to 11)							10%	6.9%

Costs and Benefits

Figure 14 shows the reduction in energy consumption over time due to Option2, there is also a corresponding reduction in greenhouse gas emissions when compared with BAU, but these are not significant when compared with other scenarios (see Options 3 and 4 below).

Figure 14: Annual energy consumption from Option 2.

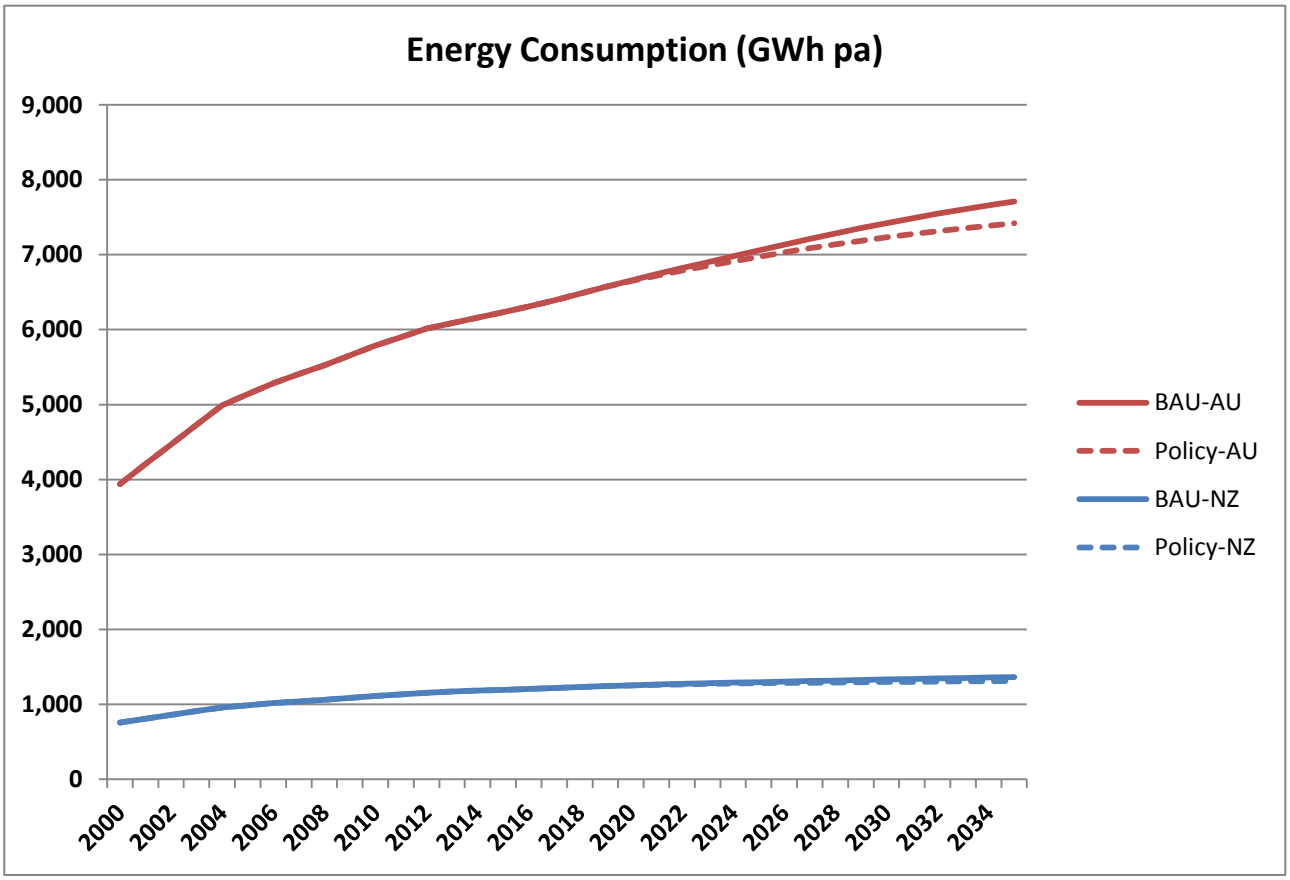


Table 12 shows the modelled impacts of Option 2 and indicates the net benefits to Australia of $AU309 million and to New Zealand of NZ$20 million and the benefit to cost ratios are 11:1 and 5:1 respectively.

Table 12 Evaluation of impacts – Option 2.

Indicator	Appliances installed 2017 - 2035	
	Australia	**New Zealand**
Energy Savings	2278GWh	404GWh
Emissions savings (CO2-e cumulative)	1.69Mt	52kt
Benefits	$AU340 million	$NZ24 million
Costs	$AU31 million	$NZ5 million
Net Present Value	$AU301 million	$NZ20 million[40]

[40] Based on wholesale electricity price and manufacturing cost.

Benefit cost ratio	11:1	5:1

The Benefit Cost Analysis takes the costs (in Table D2, Attachment C), adds them to the cost to improve energy efficiency (using the price to efficiency ratio of 0.5) and discounts them over time and sums them. The analysis also takes the benefits from the reduced electricity costs, and these are also discounted and summed. Further details of the modelling and assumptions are at Attachment C.

Option 3

Option 3 is the same as option 2 except the proposed MEPS levels will affect the worst 30% of cabinets in each group. Therefore it has the same advantages and dis-advantages and impacts on market participants as Option 2 above. However the impact on the models currently sold on the market would be higher resulting in additional compliance costs. However because more energy efficient models would need to supplied and used the benefits are higher as shown below.

Impacts on current market supply

Under Option 3 the least efficient 30% of cabinets in every cabinet group will be removed from the market. Similar to option 2 these sales will be mostly from the integral freezer category (as you would expect to see in smaller retail outlets) and remote vertical cabinets (i.e. for chilled foodstuffs in supermarkets). Table 13 provides details of this impact.

Table 13: Summary of 15 groups of display and storage cabinets and impacts on models from Option 3.

	Group Abbrev.	Application	Temperature	Configuration	AS 1731.14 Types	ISO 23953 Types	Models affected	Sales affected
1	IRH Integral Refrigerated Horizontal Cabinets	Integral Refrigerated Display Cabinets	Refrigerator	Horizontal	HC1, HC2, HC3, HC4, HC5, HC6	IHC1, IHC2, IHC3, IHC4, IHC5, IHC6, IHC7, IHC8	30%	21%
2	IRV Integral Refrigerated Vertical Cabinets			Vertical	IVC1, IVC2, IVC3	IVC1, IVC2, IVC3, IYC1, IYC2, IYC3	30%	17%
3	IRV-4 Integral Refrigerated Vertical Cabinets with Glass Door				IVC4 Glass door	IVC4, IYC4	30%	17%
4	IFH Integral Freezer Horizontal		Freezer	Horizontal	IHF1, IHF3, IHF4	IHF1, IHF3, IHF4	30%	75%
5	IFH-5 Integral Freezer Horizontal with Lid				IHF5, IHF6	IHF5, IHF6	30%	55%
6	IFV Integral Freezer Vertical			Vertical	IVF1, IVF2, IVF4 Glass door	IVF1, IVF2, IVF4, IYF1, IYF2, IYF3, IYF4	30%	32%
7	RRH	Remote Refrigerated	Refrigerator	Horizontal	RS6, RS7,	RHC1, RHC2, RHC3, RHC4,	30%	0%

	Group Abbrev.	Application	Temperature	Configuration	AS 1731.14 Types	ISO 23953 Types	Models affected	Sales affected
	Remote Refrigerated Horizontal Cabinets	Display Cabinets			RS8, RS9	RHC5, RHC6, RHC7		
8	RRV Remote Refrigerated Vertical Cabinets			Vertical	RS1, RS3, RS4, RS5, RS10	RVC1, RVC3, RVC4, RYC1, RYC2, RYC3, RYC4	30%	66%
9	RRV-2 Remote Refrigerated Vertical Cabinet, open, medium temp				RS2	RVC2	30%	27%
10	RFH Remote Freezer Horizontal		Freezer	Horizontal	RS13, RS14,	RHF1, RHF3, RHF4, RHF5, RHF6, RHF7	30%	11%
11	RFV Remote Freezer Vertical			Vertical	RS11, RS12, RS15, RS16, RS17, RS18, RS19, RS20	RVF1, RVF2, RVF4, RYF1, RYF2, RYF3, RYF4	30%	3%
12	SRH Service Cabinet, refrigerated Horizontal with solid door	Integral Refrigerated Storage cabinet	Refrigerator	Counter (Horizontal)	No equivalent registered	Storage cabinet types are defined into four categories (but not classified by the technical standards yet)	30%	NA
13	SRV Service Cabinet, Refrigerated, Vertical with solid door			Vertical	IVC4 Solid door M1 & M2		30%	NA
14	SFH Service Cabinet, Freezer, Horizontal with solid door		Freezer	Counter (Horizontal)	No equivalent registered		30%	NA
15	SFV Service Cabinet Freezer, Vertical with solid door			Vertical	IVF4 Solid doors L1 & L2		30%	NA
Overall effect (Groups 1 to 11)							30%	13.4%

Costs and Benefits

Figure 15 shows the reduction in energy consumption over time due to Option3, there is also a corresponding greenhouse gas emissions when compared with BAU, but these are not significant when compared with other scenarios (see Options 4 below).

Figure 15: Annual energy consumption from Option 3.

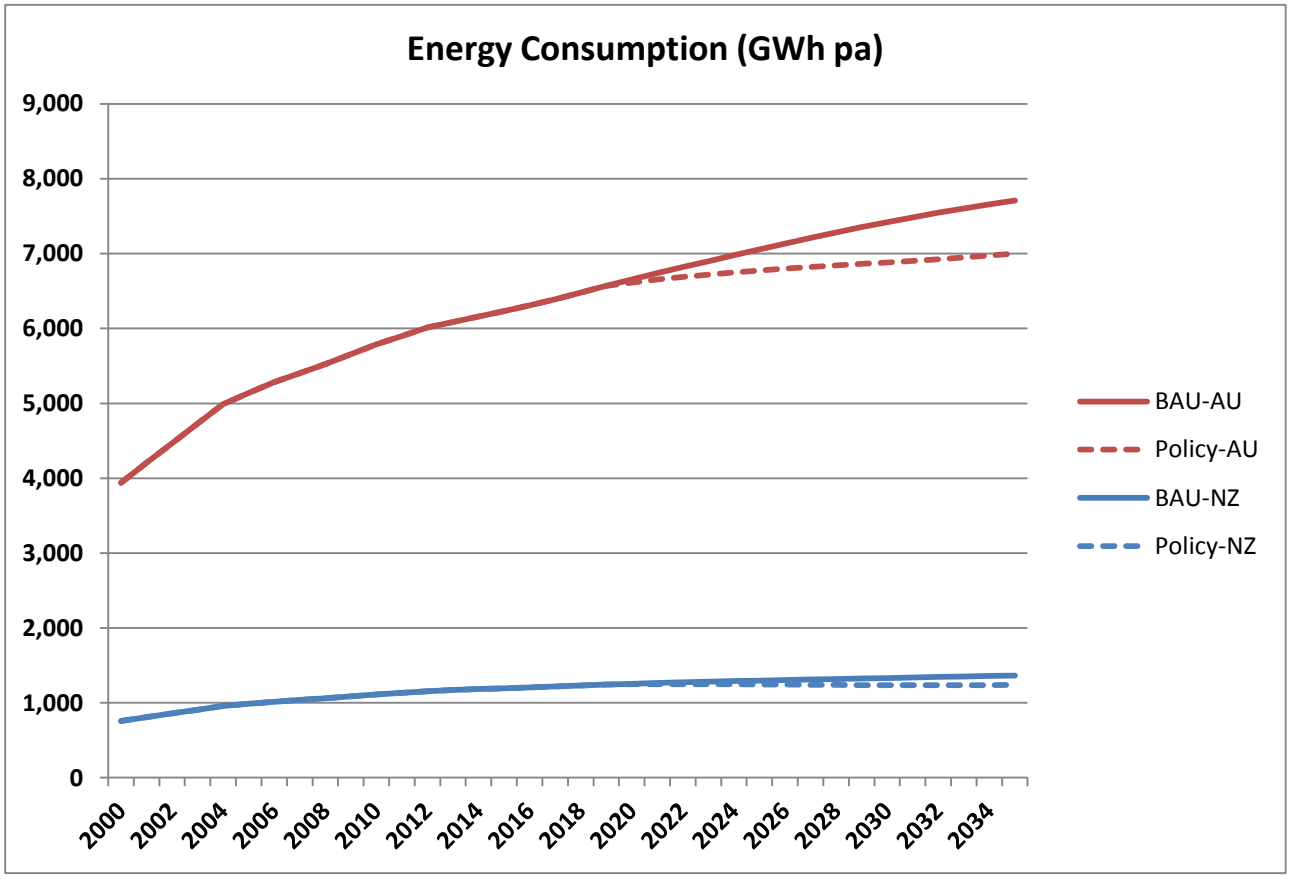


Table 14 shows the modelled impacts of Option 3 and indicates the net benefits to Australia of $AU798 million and to New Zealand of NZ$51 million and the benefit to cost ratios are 8:1 and 4.5:1 respectively.

Table 14 Evaluation of impacts – Option 3.

Indicator	Appliances installed 2017 - 2035	
	Australia	New Zealand
Energy Savings	6406GWh	1142GWh
Emissions savings (CO2-e cumulative)	4.76Mt	147kt
Benefits	$AU912 million	$NZ66 million
Costs	$AU115 million	$NZ15 million
Net Present Value	$AU798 million	$NZ51 million[41]
Benefit cost ratio	8:1	4.5:1

[41] Based on wholesale electricity price and manufacturing cost

Further details of the modelling and assumptions are at **Attachment C**.

Option 4

Option 4 is the same as option 2 and 3 except the proposed MEPS levels will align with EC MEPS levels (see **Table 8A** and **Table 8B** for details) cabinets in each group. Therefore it has the same advantages and dis-advantages and impacts on market participants as Option 2 and 3 above. However the impact on the models currently sold on the market would be different resulting in additional compliance costs. Overall more energy efficient models would need to be supplied and used and the benefits are higher as shown below.

Impacts on current market supply

Under Option 4, cabinets that have a higher EEI will be required to improve their energy efficiency performance to meet EC MEPS levels (for display cabinets, their draft EEI is 130, storage cabinets will have to achieve an EEI of less than 95).

While some local manufacturers may be affected, the large majority of the cabinet types requiring efficiency improvements are imported, typically from Europe and Asia. Essentially all of industry would need to be aware of the changes because the efficiency targets should be an ongoing development with staged introduction of more stringent efficiency levels. If they are not affected in the short term then they should be aware of the next steps that should occur in the medium term.

Table 15 shows the impact of the policy options on the actual sales of models based on 2015 data. The table shows the percentage of products in each group that will not meet the MEPS levels under the options 2, 3 and 4. In some groups there are no sales recorded There is no sales data for the groups 12 to 15 as these products are not currently regulated (shown as NA). The overall impact on the sales is shown in the bottom row. It should be noted that although the MEPS policy options 2 and 3 are set at 10% and 30% of the least efficient registrations, the sales impact will be different due to different models being sold. In the case of Option 4, the MEPS levels are determined in accordance with the EU regulations and will impact differently depending on the efficiency of the products sold in each group.

Table 15: Summary of 15 groups of display and storage cabinets and impacts on models from Option 4.

	Group Abbrev.	Application	Temperature	Configuration	AS 1731.14 Types	ISO 23953 Types	Models affected	Sales affected
1	IRH Integral Refrigerated Horizontal Cabinets	Integral Refrigerated Display Cabinets	Refrigerator	Horizontal	HC1, HC2, HC3, HC4, HC5, HC6	IHC1, IHC2, IHC3, IHC4, IHC5, IHC6, IHC7, IHC8	51	50%
2	IRV Integral Refrigerated Vertical Cabinets			Vertical	IVC1, IVC2, IVC3	IVC1, IVC2, IVC3, IYC1, IYC2, IYC3	21%	11%
3	IRV-4 Integral Refrigerated Vertical Cabinets with Glass Door				IVC4 Glass door	IVC4, IYC4	25%	20%
4	IFH Integral Freezer Horizontal		Freezer	Horizontal	IHF1, IHF3, IHF4	IHF1, IHF3, IHF4	59%	79%
5	IFH-5 Integral Freezer Horizontal with Lid				IHF5, IHF6	IHF5, IHF6	21%	55%
6	IFV Integral Freezer Vertical			Vertical	IVF1, IVF2, IVF4 Glass door	IVF1, IVF2, IVF4, IYF1, IYF2, IYF3, IYF4	33%	35%
7	RRH Remote Refrigerated Horizontal Cabinets	Remote Refrigerated Display Cabinets	Refrigerator	Horizontal	RS6, RS7, RS8, RS9	RHC1, RHC2, RHC3, RHC4, RHC5, RHC6, RHC7	44%	36%
8	RRV Remote Refrigerated Vertical Cabinets			Vertical	RS1, RS3, RS4, RS5, RS10	RVC1, RVC3, RVC4, RYC1, RYC2, RYC3, RYC4	11%	0%
9	RRV-2 Remote Refrigerated Vertical Cabinet, open, medium temp				RS2	RVC2	6%	0%
10	RFH Remote Freezer Horizontal		Freezer	Horizontal	RS13, RS14,	RHF1, RHF3, RHF4, RHF5, RHF6, RHF7	25%	11%
11	RFV Remote Freezer Vertical			Vertical	RS11, RS12, RS15, RS16, RS17, RS18, RS19, RS20	RVF1, RVF2, RVF4, RYF1, RYF2, RYF3, RYF4	29%	3%
12	SRH Service Cabinet, refrigerated Horizontal with solid door	Integral Refrigerated Storage cabinet	Refrigerator	Counter (Horizontal)	No equivalent registered	Storage cabinet types are defined into four categories (but not classified by the technical standards yet)	NA	NA
13	SRV Service Cabinet, Refrigerated, Vertical with solid door			Vertical	IVC4 Solid door M1 & M2		NA	NA
14	SFH Service Cabinet, Freezer, Horizontal with solid door		Freezer	Counter (Horizontal)	No equivalent registered		NA	NA
15	SFV Service Cabinet Freezer, Vertical with solid door			Vertical	IVF4 Solid doors L1 & L2		NA	NA
Overall effect (Groups 1 to 11)							25%	19.5%

Costs and Benefits

Figure 16 shows the reduction in energy consumption over time due to Option 4, there is also a corresponding greenhouse gas emissions when compared with BAU. Option 4 provides the highest net present value of all options considered and is the preferred option.

Figure 16: Annual energy consumption from Option 4.

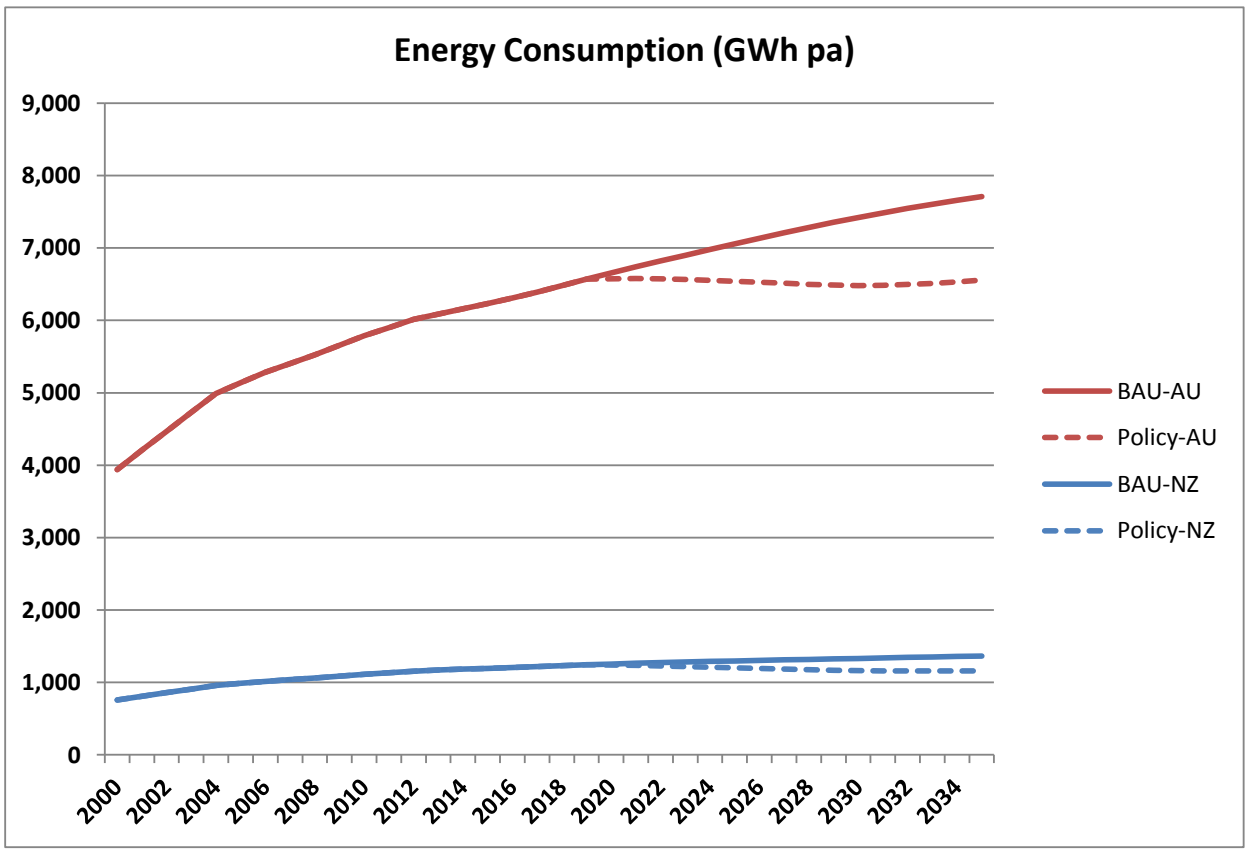


Table 16 shows the modelled impacts of Option 4 and indicates the net benefits to Australia of AU $1340 million and to New Zealand of NZ$87 million and the benefit to cost ratios are 7.9:1 and 4.7:1 respectively.

Table 16 Evaluation of impacts – Option 4.

Indicator	Appliances installed 2017 - 2035	
	Australia	New Zealand
Energy Savings	11,099GWh	1,986GWh
Emissions savings (CO2-e cumulative)	8.26MtMt	256kt
Benefits	$AU1,532 million	$NZ111 million
Costs	$AU193 million	$NZ24 million
Net Present Value	$AU1,339 million	$NZ87 million[42]

[42] Based on wholesale electricity price and manufacturing cost

Benefit cost ratio	7.9:1	4.7:1

Further details of the modelling and assumptions are at **Attachment C**.

Value of online energy rating information

The original proposal was for mandatory labelling to be added to all regulatory options. This proposal was modified following feedback on the Consultation RIS which provided support for online labelling rather than physical labelling. Currently online labelling can only occur on a voluntary basis.

The benefit of online energy rating information is highlighted by identifying the percentage contribution that labelling makes to the overall cost-benefit analysis. Without labelling the energy use and greenhouse gas production increases by more than a fifth.

Table 17: The percentage contribution to the overall cost-benefit analysis, that labelling makes. The scenario is for Option 4 EC MEPS from 2019.

Indicator	Appliances installed 2017 - 2035	
	Australia	New Zealand
Energy Savings	9%	9%
Emissions savings (CO2-e cumulative)	9%	9%
Benefits	11%	11%
Costs	2%	2%
Net Present Value	13%	13%
Benefit cost ratio	8.8%	8.6%

Although MEPS revision alone has a positive benefit, adding labelling to MEPS revision creates a greater, combined benefit –for a comparatively minimal cost, the benefits from the addition of labelling are significant. Labelling works best as an additional measure, supported by the regulatory structure that a MEPS scheme provides.

The value of online energy rating information, added to MEPS revision, includes:

- Adding another level of information about new and currently registered and approved models (which would apply to all cabinet models).[43]
- Addressing current information failures and barriers in the cabinet market which prevent buyers from obtaining information about the relative energy efficiency of different cabinet models. Online energy rating information could assist buyers to make more informed choices where energy use is perceived as being important. The star rating style label is already readily identifiable by consumers and would provide an effective means of assessing the energy efficiency of products.

[43] It is assumed that all current models would be affected because suppliers would need to add labels to marketing material and all their continuing-to-be-supplied models.

- Generating consumer awareness of energy efficiency. Because of the way that cabinets are marketed (not through major retail on-floor comparisons), online energy rating information would be an effective additional measure to drive efficiency improvements in commercial refrigerated cabinets.

Mandatory labelling was not supported by industry when consulted on the Consultation RIS proposals. The main industry concern was that physical labels added cost but were of little benefit when making a purchasing decision or product comparison about refrigerated commercial cabinets (which generally does not occur in a showroom). The general opinion was best expressed by this submitter:

"It is another cost and for a commercial product we see no benefit. It must be remembered that these cabinets are not purchased from a showroom. The purchase order issuer generally never physically interacts with these cabinets, and once installed any label would be covered by the displayed merchandise products."

However, it was also acknowledged that:

"...labelling may bring cultural change in small scale buyers who can at least make a relative judgment using the label information when they are not prepared to make full engineering analysis of energy impact like the large scale buyers."

There was also acceptance that labelling could be approached differently depending on the circumstances. If a product was on display in a showroom then a label must be fixed to the product to assist consumers in their selection. However, with commercial products a developer may buy based on low upfront cost. Physically labelling an item in these circumstances will not reach the payer of the electricity bill, and the labels will likely be removed once the fridge is installed.

Under the regulations that enact the MEPS and labelling requirements in both Australia and New Zealand, mandatory labelling is required on the appliance itself, or nearby.

Use of labels in literature, websites or apps, is voluntary, at this stage. A trial is underway in Australia for voluntary disclosure of labels in literature and online media, for domestic appliances such as TVs and whitegoods. If the decision is made to add labelling to refrigerated display and storage cabinets, an option might be for companies to sign a partnership agreement with government. This would mean that the labels are voluntarily displayed online according to specifications set out in each agreement.[44]

[44] For more information on voluntary online labelling, go to labelling resources on the energy rating website.

Discussion of Non-Regulatory Options

In general, non-regulatory intervention is not considered to be effective enough in conjunction with existing MEPS regulations, to resolve all the issues that present themselves in the market.

Voluntary codes for *industry* will not change *buyer* behaviour unless the whole of industry agrees to adopt them. As seen in other product markets, efficient models tend to be advertised with efficiency factors or qualities highlighted, but less efficient products tend to be advertised using other features.

The European and Australian incentive schemes are underpinned by legislation, energy efficiency standards and/ or databases. They are run by regulatory agencies with auditing programmes and are only as 'good' as the associated efficiency standards.

Improving the energy efficiency standard for refrigerated cabinets and assigning new HEPS levels would improve the Australian Emissions Reduction Fund scheme (for example) and overcome the existing deficiencies with AS 1731 – where approx. 20% of the market is ineligible to take part in the scheme because they are excluded from AS 1731.

For the Australian scheme, there is typically a time lag (about a year) for applicants to learn of and appreciate the possible returns from upgrading equipment and being part of the scheme. Amalgamating many small returns could make it worthwhile for smaller companies to amalgamate their savings potential and sell within the scheme. Otherwise the scheme is likely to only attract larger companies who can justify the returns for their efforts to engage with the process.

New Zealand would have to update its processes to implement a similar scheme rather than focus on changing the existing MEPS regime and establishing eligibility criteria.

Voluntary codes could change buyer behaviour if there are sufficient incentives and if buyers could successfully be targeted by a buyer education campaign. It requires a robust compliance regime to be effective, with the potential for cost to members of the industry who choose to take part.

Summary of impacts, costs and benefits

This Cost Benefit Analysis has considered the five policy options.[45]

The first option is BAU.

Three regulatory options have been considered – options 2, 3 and 4, each of which include adopting the ISO 23953 for display cabinets and related standards for sub-sets of display types (and EN 16825 for storage cabinets but with different MEPS scenarios).

Non-regulatory option 5 was also considered as a possible alternative to regulatory intervention.

The analysis compared the BAU scenario with three regulatory options, each of which showed gains in energy emissions when compared with existing regulation.

The modelling was revised as a result of the consultation process to include the total compliance costs, including the cost of registration.

Each of the regulatory options analysed – starting with a 10% increase in Australasian MEPS levels in option 2 through to adopting EC MEPS in option 4 – achieved gains incrementally from the previous options.

The updated analysis indicates that options 3 and 4 would achieve the greatest overall net benefit, with option 4 resulting in the most significant improvements in energy savings and greenhouse gas deductions.

See **Attachment C** for further details as to the cost/benefit results and methodology, including stock modelling and assumptions and sensitivity tests.

A summary of the estimated impacts of each policy option is shown in **Table 18** below.

[45] The analysis was prepared by Energy Consult.

Table 18: Summary of cost-benefit analysis of regulatory options for Australia and New Zealand (from 2019 to 2035).

AUSTRALIA	Option 2		3		4		NEW ZEALAND	2		3		4	
	10% + vol labelling from 2019		Au/NZ MEPS 30% + vol labelling from 2019		EC from 2019+ vol labelling			10% + vol labelling from 2019		Au/NZ MEPS 30% + vol labelling from 2019		EC from 2019+ vol labelling	
Costs ($M)[46]	$31		$115		$193		Costs ($M)	$4.9		$14.6		$23.7	
Benefits ($M)	$340		$912		$1,532		Benefits ($M)	$24.5		$65.9		$111.1	
NPV ($M)	$309		$798		$1,339		NPV ($M)	$19.6		$51.3		$87.4	
BCR	11.0		8.0		7.9		BCR	5.0		4.5		4.7	
Abatement Cost ($/t CO_2-e)	-$98		-$97		-$100		Abatement Cost ($/t CO_2-e)	-$235		-$239		-$238	
Energy savings (GWh)							Energy savings (GWh)						
Year	2025	2035	2025	2035	2025	2035	Year	2025	2035	2025	2035	2025	2035
Annual	86	293	283	711	517	1,156	Annual	15	52	51	126	93	205
Cumulative	270	2,278	957	6,406	1,774	11,099	Cumulative	49	404	173	1,142	322	1,986
GHG Emission reduction (kt $CO_{2\text{-}e}$)							GHG Emission reduction (kt $CO_{2\text{-}e}$)						
Year	2025	2035	2025	2035	2025	2035	Year	2025	2035	2025	2035	2025	2035
Annual	65	216	214	524	391	853	Annual	2	7	7	16	12	26
Cumulative	207	1,692	734	4,767	1,360	8,263	Cumulative	6	52	22	147	41	256

The analysis shows that in both Australia and New Zealand, option 4 has the greatest overall Net Present Value (total benefits less the total costs). In Australia the NPV is estimated to be $1,340 million for option 4, compared with $ 798 million from option 3. The long term energy savings and emission reductions from option 4 in both countries is significant when compared with the other options.

As **Table 18** shows, the BCR for option 4 is similar to option 3. While the costs of option 4 are higher the overall benefits from this option are significant and far outweigh the other options. The NPV for option 4 is far greater than for the other options.

The inputs for this analysis have been revised since the Consultation RIS:

- The current analysis is for the period 2017 – 2035 (rather than 2014 – 2035).
- The efficiency, sales and stock estimates have been updated to 2016 using current data and trends

[46] 95% of the costs are the costs of increased products due to efficiency improvements, 4% is the admin and testing costs to businesses for compliance, and 1% is the cost of the government to administer and check test.

- It takes into account a three year delay in capturing savings – from 2020 (resulting in three years less accumulated savings).
- It now uses the LRMC and wholesale costs of electricity (with the NZ costs assessed at ½ the retail price compared with the whole retail price for Australia).

In summary, while the BAU and non-regulatory options have been considered, there are benefits to be gained from the regulatory action in options 2, 3 and 4 (including online energy rating information) – in particular, from options 3 and 4:

- Lowering of energy use and greenhouse emissions.
- Benefits to society from reduced emissions.
- Long-term benefits to cabinet users from lower running costs and more efficient cabinets.
- Increased upfront costs (if at all) from improved components will be outweighed by the benefit of increased efficiency.
- Labelling to assist buyers to identify and choose more efficient cabinets (and stimulate competition between suppliers).

Option 4 (EC MEPS) is the preferred option based on this analysis. Considerable consumer benefits would be gained from:

- Addressing the current problems with AS 1731
- Adopting the European test methods, and adopting European MEPS will provide a simpler regime that will be relatively easy to transition to.
- Resolve issues with scope and compliance and assist market participants to make informed choices as to energy use outcomes.

Under option 4, it may cost more to supply models with better components. However, the costs can be spread amongst all types supplied by the importer rather than directed at one model only. The cost to register appliances in Australia may be an initial pressure but once cabinets are registered a different supplier may import the same model without having to re-test and re-register that model.

Local manufacturers

There is a risk that the proposed regulatory changes will result in local manufacturers facing higher compliance costs. As one stakeholder put it:

"…some 97.5% of unit sales are for imported equipment. Compliance costs for these imported units will be minimal as many of these units are sourced from high volume manufacturers already selling into the Euro market (and therefore already complying with the proposed changes). The compliance cost for one (our) company alone has been estimated at ($3M). This massive cost will threaten the future viability of local manufacturing unless significant exemptions are also adopted…."

When consulted on the Consultation RIS, local manufacturers supported a 'deemed to comply' solution as a means of reducing compliance costs.
Despite the higher compliance costs involved, local manufacturers support the move to align with international standards in recognition of the comparative benefits involved. Compliance costs have been factored into the cost benefit analysis.
In response to the concern by local manufacturers at compliance costs, a deemed to comply provision forms part of these regulatory changes. This will help to reduce the cost impacts of the proposal on smaller manufacturers. It will also assist smaller suppliers to continue to compete based on their ability to serve specific requirements within the commercial cabinet market. See **Attachment F** as to the recommendations made by the Technical Working Group about deemed to comply and other alternative registration channels under these proposals.

Sensitivity analysis – what if costs increase?

Various sensitivity analyses were undertaken to show the impact of changing costs on the modelling outcomes. See **Attachment C** for further details as to the cost/benefit results and methodology, including stock modelling and assumptions and sensitivity tests.

The sensitivity analysis of option 4 (EC MEPS + online energy rating information from 2019) is representative of all the policy options modelled. It shows that:

- Even if the costs were increased, there is still a substantial national benefit to be gained from reduced running costs for every user, reduced energy use and reductions in greenhouse gas emissions – despite the cost-burden to the number of companies that intervention may affect.
- The return that the government could make if the money were invested instead is far less than that created for society by reduced running costs for every user, reduced energy use, and greenhouse gas reduction.

In the most extreme test situation, where the costs increase by 20% for a 10% increase in efficiency, it is still cost effective to regulate – with a Benefit Cost Ratio of 2.1 in Australia and 1.3 in New Zealand.

The sensitivity of the results was tested under the following cases:

- Discount rates –
  Australia = 0%, 3%, 7%, 11%
  New Zealand = 0%, 3%, 6%, 8%
- Price efficiency ratios – 0.5, 1.0, 1.5, 2.0
- Carbon price –
  Australia = $0, $11.82, $35
  New Zealand = $0, $25, $50

6. Consultation

There has been ongoing engagement with industry and stakeholders to obtain feedback on and develop the proposed policy options in relation to commercial refrigeration.

Market Research

A range of market research was carried out by the Australian based consultancy firm, Expert Group in 2013 for the purposes of the Consultation Regulation Impact Statement (Consultation RIS) in both Australia and New Zealand. This included conducting interviews with market participants, desk top research and research obtained from consultants in their previous assignments. The market participants who were interviewed included industry associations, beverage companies, manufacturers, importers and large companies purchasing products for their own use. This process informed the cost benefit analysis by identifying data inputs and assisting with the development of assumptions relevant to the cost benefit analysis.

Market research on product costs involved reviewing online information (i.e. specification and prices) for approximately 30 suppliers across both countries to establish who controlled which products/brands and were importers, manufacturers or both. Further online research involved dissecting other data sources such as MEPS registrations.[47]

Public consultation on the product profile

Industry feedback and submissions in relation to the product profile supported the proposed regulatory changes:

- There was consensus that Australia and New Zealand Standards should align with the international test method ISO 23953 for display cabinets, while retaining the option for local standards to be amended.
- All submitters offered support for a 'deemed to comply' provision for low volume production of cabinets (which would apply to small production runs and custom made cabinets under the EN approach).[48] If a 'deemed to comply' pathway could be

[47] Other sources of information include: Eco Design (European MEPS policy development and processes), ABS data on business counts (and the New Zealand equivalent), published counts on numbers of retail outlets (for example, Westfarmers, IGA, Woolworths), BIS Shrapnel Food and Catering report and governmental data sources including Department of the Environment and Energy in Australia for pre-charged equipment and Energy Efficiency and Conservation Authority for amalgamated unattributed sales data.

[48] Consultation on this topic was undertaken with industry in 2009 as part of the review of "*In from the Cold*" (E3 2009) and more recently with the release of the *Product Profile* (E3 2013). It has been consistently agreed by industry stakeholders that this methodology could be applied to custom made cabinets sold in Australia and New Zealand.

formulated, it would demonstrate compliance with MEPS where testing in a laboratory setting may be too difficult or expensive.

- There was also support for simplification of the Australasian Standards, with 50-70% of submitters wanting the Standards to be simpler, to align with international standards where practical and to apply to more types of cabinets on the market (without impacting unduly on small-medium enterprises).
- The feedback showed a vast amount of technical knowledge by some manufacturers, who outlined several inconsistencies with the current standard and its interpretation.
- All submitters (with the exception of one small company) supported an expansion of measures to cover storage cabinets, including MEPS (and therefore the local standards), provided there was sufficient lead in time to adapt and find compliant models.
- There was strong support for the need to update and rationalise MEPS. Although there were mixed comments as to what the MEPS levels should be, the industry felt overall that increased policing of products would make the most difference to cabinet performance (and that to do this effectively, the standards needed to be robust).
- There was broad support for an energy rating label of some kind (preferably in electronic form on-line or in the literature). No interest was expressed in a mandatory labelling scheme, until issues with the current MEPS or HEPS (High Efficiency Performance Specifications) levels were resolved.
- Suppliers wanted HEPS to relate to MEPS as a fixed proportion. If European MEPS levels and labelling were adopted, HEPS could easily be defined as the top two or three levels on the label. HEPS levels need to cater for different methods of achieving high efficiency. The simplistic labelling method proposed in Europe was likely to be very useful in distinguishing between better performing models and those which are less efficient.
- Labelling needed to be accompanied with education of buyers so they did not simply buy the unit that was labelled as more efficient when a different class (due to temperature of operation, configuration) would use far less electricity.
- Label metrics should be thought through so most models could be compared to each other. There was mixed feeling about the benefit of high efficiency endorsement labelling, given the apparent lack of attention by buyers to energy use.

Several suppliers commented that they wanted beverage vending machines to be investigated for MEPS. These products are outside the scope of this RIS, although they are included in the EC MEPS levels and ISO Standard for display cabinets. This is because previous investigation in Australia and New Zealand showed that the fleet was dominated by efficient models, through excellent industry initiatives. The need for *regulatory* intervention was therefore comparatively low. The need to implement MEPS for beverage vending machines may be investigated at a later date if it becomes clear that industry is no longer driving the need for highly efficient models.

Consultation RIS: submissions and consultation meetings

In July 2016 the Equipment Efficiency Committee (E3) released the Consultation RIS in relation to Refrigerated display and storage cabinets. Consultation meetings were held on 9 August 2016 in Melbourne, 10 August in Sydney and 11 August in Brisbane. A further meeting was held in Auckland on 19 August. A phone conference involving one Australian company and one regulator also took place on 24 August.

The consultation meetings were attended by 44 companies and 57 industry representatives, comprising local and national energy regulators and electrical safety regulators from Australia and New Zealand. There were 21 submissions in total, ranging from very comprehensive submissions to those that focused on key issues for the submitter.[49]

The E3 committee conducted the consultations and sought formal submissions on the modelling and assumptions used to determine energy use in the sector. The committee also invited feedback on the policy options presented in the Consultation RIS to improve existing levels of energy efficiency and performance and to reduce greenhouse gas emissions.

Overall the feedback obtained from the consultation meetings and submissions was supportive of the key aspects of the policy proposals and reflected earlier feedback:

- There was almost unanimous industry support for aligning with ISO 23953. There was also general industry support for adopting the EN test methods, subject to local variations and further time to review them.
- Many commented that they supported option 4 in the Consultation RIS (adopting the ISO and EN test methods, and the EC MEPS levels posed per group, with online energy rating information added), as the best policy proposal to achieve this.[50]
- All submitters (with the exception of one small company) supported the extension of the proposed regulatory measures to cover storage cabinets.
- The majority supported a move to harmonise with EU efficiency levels, with industry requiring staggered implementation dates and 3 years notice to prepare for any major design changes.[51]

[49] By comparison there were 14 submissions following the product profile consultation. Seven of the submitters at the Consultation RIS stage had also provided submissions in 2013.

[50] From 2017 as then modelled. The implementation date is now 1 December 2019.

[51] The implementation date referred to at the consultation meetings was 2019 at the earliest, taking into account the regulatory process.

- All of the key industry associations and large local manufacturers supported a deemed to comply option. This option was regarded as particularly important for local manufacturers. A Deemed to Comply path to compliance required a clear definition of the specific types of product covered and the maximum quantity permitted.
- Local manufacturers submitted that a revised registration and compliance regime was required to reduce costs and enable them to compete in the market. The modelling and Cost Benefit Analysis should be revised to take into account these factors. It was further submitted that E3 should consider a review of the testing, compliance and registration process to address these issues, in conjunction with the associated Deemed to Comply option.
- While feedback in 2013 had indicated support for a mandatory energy rating label (preferably online or in the literature), submitters expressed concern at the additional cost of physical labels. These were considered to have minimal benefit given the purchasing decision or product comparison is not made in the showroom. There was support for voluntary online labelling (through product literature and websites) and for EU labelling. In addition to labelling, submitters considered an ongoing education and information campaign would assist buyers to optimise their ownership costs.
- More generally, there was concern at the significant number of free riders within the market that are avoiding meeting regulatory requirements. There is a need for a reduction in compliance costs and an increase in incentives for products who find testing and registration costs prohibitive. There should also be increased monitoring and enforcement to ensure compliance. Increased compliance would result from modified test methods and facilities, including software simulation which assist with low volume models, and large products that cannot fit in a test room.

Common themes were raised in the consultation discussions:

- There was provisional support for aligning with ISO/EN Standards, pending standards comparison.
- It was agreed that physical labels are impractical and voluntary/electronic “online” labelling and auto-population of the Energy rating website is preferable. The European label could be useful to differentiate the appliance from a domestic fridge but would need to include extra information such as annual running cost.
- There was support for the Deemed to Comply option, with suggestions made as to how this may operate in practice.

- There was concern about the current level of compliance and enforcement, including a lack of registrations and the availability of products that do not comply with MEPS. Australian and New Zealand stakeholders encouraged more visibility and action in this area by government.

Other points discussed at the sessions were:

- Redefining a 'family' of cabinets would simplify compliance and permit multiple individual energy performance registrations under one fee. This would also alleviate some of the current compliance issues, including the high GEMS registration fee per model in Australia which is a significant barrier to registration.
- There was a need for definitions which clearly distinguish between commercial display and domestic fridges, as the boundaries between them are confusing.[52]

Technical Working Group: recommendations

A trans-Tasman Technical Working Group (TWG) was convened following consultation on the Consultation RIS, comprised of experienced industry members, regulators and independent experts from Australia and New Zealand .The group has considered the changes that are needed to the proposed standards to implement the proposals in this RIS. The TWG has identified the steps required to adapt test standards and EU regulations for the Australasian market.

The group has also considered other technical issues raised by the consultation process, including product definitions and the alternative registration pathways of Deemed to Comply and families of cabinet.

The TWG has made a number of recommendations as to the steps required to adopt or align with the European Standards and EU MEPS levels. See **Attachment F** for more information about the TWG and a summary of their recommendations.

Feedback was sought from industry in relation to the summary of recommendations made by the technical working group. Two submissions were received from one large and one small supplier. The first of these was broadly in agreement with the proposals with points of clarification raised around the 'families' definition, and the deemed to comply

[52] A specific concern was expressed as to whether the European Commission intended to include wine cabinets in the domestic fridge standard. Wine Cabinets are not covered by these regulatory proposals but they will be considered at a later time.

methodology. EECA and E3 will clarify these technical matters as part of the implementation process.

Recommended option

Option 4 is the recommended policy option. This option involves aligning with the European approach by adopting the European Standard ISO 23953 (with minor local variations) for refrigerated display cabinets and beverage cabinets and EN 16825 test method for refrigerated storage cabinets, from 1 December 2019. It also proposes the adoption of related standards for gelato cabinets and small ice-cream cabinets. It involves adopting the European Commission's MEPS levels for all of these cabinet types (developed by groups) and the introduction of voluntary star rated labelling. It is noted that some of these test methods are still in draft from. Any minor and non-consequential variations to these methods that are published during the period before the Determination is finalised will be incorporated, to enable the aim of aligning with European MEPS to be achieved.

Option 4

This option offers the greatest net benefit to both the Australian and New Zealand communities: in Australia the estimated Net Present Value (total benefits less the total costs) of option 4 (EC MEPS) would be $1$1,340million. In New Zealand, the estimated Net Present Value from option 4 would be $87 million.

In addition to achieving significant long term gains in energy savings and greenhouse gas reductions for both governments, option 4 is the best option to address the regulatory problems identified in this RIS: the complexity and inadequate coverage of the current standard, outdated MEPS and high efficiency specifications which require revision to remain relevant, information and other market barriers that are preventing buyers from purchasing the most energy efficient cabinets.

The adoption of EC MEPS will achieve consistency in approach, allowing for a simpler compliance regime. It will also avoid current inequalities in approach to different products. The move to adopt EC MEPS has industry support due to inconsistencies with the current requirements.

The addition of online labelling of refrigerated commercial cabinets will enhance the ability of purchasers to compare the relative energy efficiency of different cabinet models. Labelling contributes to the overall cost-benefit analysis, with energy use and greenhouse gas production increasing by more than a fifth without labelling.

The current regulatory position in Australia and New Zealand is that mandatory labels must be affixed on or nearby the product. Physical labelling does not have industry support. Option 4 has therefore been modified to incorporate voluntary online labelling.

8 Implementation

Implementation of policy option 4, if approved, would require the new MEPS requirements for commercial refrigerators to be amended in regulations in Australia and New Zealand. It is anticipated the new regulations would take effect on 1 December 2019. Transitional arrangements would apply to products that are already registered.

Implementing regulatory changes

The policy proposals in this RIS would be subject to analysis and ministerial scrutiny in both countries.

The technical requirements that suppliers would need to comply with would be written into a Determination in Australia and this content would be referenced in New Zealand. The Determination would reference the various ISO and EN test methodologies, with variations as agreed by the technical working group. Details of the technical working group outputs can be found in Attachment F. The MEPS levels, which are based on European levels, would be directly written into the Determination.

Australia

- If Option 4 in this RIS is approved by the COAG Energy Council, a replacement for the current *Greenhouse and Energy Minimum Standards (Refrigerated Display Cabinets) Determination 2012* would be prepared for approval by the Commonwealth Minister for the Environment and Energy.
- Once Ministerial approval is provided for the replacement Determination, the policy change would come into force no earlier than 1 December 2019. The current Determination would be revoked when the replacement Determination comes into force.

New Zealand

- Any policy proposals would need to be approved by Cabinet before they can be adopted under the *Energy Efficiency (Energy Using Products) Regulations 2002*.
- In New Zealand, approval of Cabinet is required for any proposed regulatory option. Following Cabinet approval, there would be at least 6 months' notice period, before the regulatory amendments would come into force.

- The final implementation date should coincide with the determination coming into force in Australia.

Industry would be kept informed in the lead up to the expected implementation dates.

Timeframes and transitional arrangements

A similar approach would be taken to transitional arrangements in Australia and New Zealand, given the agreed implementation date of no earlier than 1 December 2019. This is considered to provide sufficient lead in time for compliance with the new requirements. All classes of cabinet would be required to comply by that date, with no exceptions. It is anticipated that at least six months prior to this date, suppliers would be able to voluntarily register compliant products to the new test standards. Test reports using the new test methods would be required in order to register cabinets from the implementation date. Fees for registrations are under review with a view to making GEMS fully cost-recoverable, however it is likely to remain approximately $700 - $800 for this product class.

Products that are registered under the existing test methodology, would be able to vary their registrations at a reduced cost ($250) in Australia, provided that the products are able to meet the new MEPS. Suppliers would be required to show evidence that the product is compliant, and upgraded registrations would be valid until the original expiry date of the registration (a maximum of five years).

In New Zealand, suppliers would be able to update existing registrations until 1 December 2019, if they wish to demonstrate performance under the new rating system. After this point, a test report to the new test method would be required. No fee is charged for registrations in New Zealand.

Upgraded registrations will be clearly identified on the energy rating database as having been tested under the old system.

Overall, it is expected that 1,485 display cabinet models currently registered for Australia and New Zealand, around 425 – 440 of these will not meet the new standard (approximately 25%), all others would be eligible for upgrading. All storage cabinets would require a new registration, and it has been estimated that a similar proportion of these products would meet the requirements. A total of 200 – 220 new registrations may be required for storage cabinets.

Implementation risks

Implementation risks which may arise from the proposed regulatory changes are:

- Insufficient time for industry to adjust to the new testing, labelling and MEPS requirements. This could affect product availability, market competition and compliance with the regulations.
- A lack of familiarity with new star rating system may create potential for non-compliance. It is anticipated that this will be used mainly in sales literature. While this is voluntary, use of energy rating information still needs to be correct to maintain integrity in the overall system.

- The proposal is to align with the EU approach. There is some uncertainty caused by proposed alignment with EN Standards that are yet to be finalised and published: commercial beverage coolers (draft EN 16902) and small ice-cream freezers (draft EN 16901) and refrigerated display scooping cabinets for gelato, soft scoop (draft EN 16838).
- Delays in implementing the MEPS levels of the published standards in Europe.
- Increased compliance costs from meeting new regulatory requirements (in particular, to local manufacturers).

These risks would be reduced by:

- Keeping industry updated and informed of the proposed regulatory changes and any associated changes to Standards, compliance or labelling requirements.
- Setting a timeframe that allows industry to adapt to any changes.
- Extending the timeframe, if there are any issues or delays at any point. The implementation date will not be prior to 1 December 2019, but may be later than this if issues arise.
- Adopting small technical differences that arise between any published EU test methods, and the published drafts up where practical. Any changes would be communicated to industry.
- Guidelines for use of energy rating information will be developed during the implementation phase to insure any use of labels or rating information, such as the energy rating icon is correctly applied.

Given the E3 program's experience with implementing or revising energy efficiency requirements, the risks associated with implementation are low. The membership of the TWG represented circa 70% of industry by volume and consensus was reached on the proposed implementation timeline.

The main implementation risk is that there may be delays with the implementation of the new MEPS levels in Europe, but this has been mitigated by introducing the EU 2015 (announced) MEPS levels in 2019. The proposed timeframe provides sufficient time for trans-Tasman industry to improve product supply, prior to future alignment with EU MEPS, when they become available.

Our lowest scenario modelled (local MEPS level to affect the least efficient 10%, adding labelling and storage cabinet regulation) shows that improved energy efficiency regulation is cost-effective, even if low level, local MEPS levels are developed.

The transitional arrangements proposed have been developed in consultation with the industry. E3 would also assist by consulting with industry through the process to ensure that parties understand the new regulations and what is expected of them.

The timeframe may need to be extended, if there are issues or delays at any point. If there are any delays in Europe with implementing MEPS levels and publishing standards, the estimates used for this RIS could be updated and re-analysed. Different options are available to the governments to accommodate European delays – such as delaying implementation or setting localised MEPS, as an interim measure, until alignment is possible (if favoured). Our lowest scenario modelled (local MEPS level to affect the least efficient 10%, adding labelling and storage cabinet regulation) shows that improved energy efficiency regulation is cost-effective, even if local MEPS levels are developed.

Review

In Australia, once the changes are in force:

- Registered cabinets imported or manufactured prior to the law change that do not meet the new requirements may still be supplied until stock is depleted. Their registrations would be grandfathered (status changed to "Superseded" in the registration system). Import or manufacture of these cabinets from the date of the law change would not be permitted.
- Registered cabinets imported or manufactured prior to the law change that already meet the new requirements, may continue to be supplied. Their registrations would be re-validated and updated to the new GEMS determination, as described in the section above on transitional arrangements.
- Suppliers wishing to import or manufacture models that are not already registered, but meet the new requirements, would need to complete a registration application, pay the registration fee and lodge the application with the GEMS Regulator.

In New Zealand, once the changes are in force:

- Registered cabinets imported or manufactured prior to the law change that do not meet the new requirements may only be sold until stock is depleted. New import or manufacture of these cabinets would not be permitted.
- Registered cabinets imported or manufactured prior to the law change that already meet the new requirements, may continue to be supplied. Their registrations would be re-validated and updated. A new test report would be required.
- Suppliers wishing to import or manufacture models that are not already registered, but meet the new requirements, would need to complete a registration application and lodge it with the New Zealand Regulator (EECA).
- Unregistered cabinets that fall within the scope of the law, are not permitted to be supplied, or used for any commercial purpose at any time.

Australian and New Zealand regulators undertake compliance activities, involving education, surveys, store inspections and checking claims in media. They also purchase cabinets, using a risk based approach, for the purpose of laboratory check testing, to assess whether efficiency claims made in registrations are accurate.

Evaluation

In New Zealand, after a year of trading under the new regulations, cabinet suppliers would be requested to provide sales data on how many cabinets they sold and comparable energy efficiencies, so that energy savings can be tracked against predictions.

The E3 Program uses various sources of information to evaluate the effectiveness of the program and product category requirements. This includes retrospective reviews to compare the effect of policies versus what was projected in RIS analysis; analysing sales data to understand consumer awareness and usage of energy efficiency labelling; tracking hits on the Energy Rating website; and utilising ABS and other surveys of consumer intent and consideration of energy efficiency in purchase decisions.

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Attachment A- Australian stock by major sectors

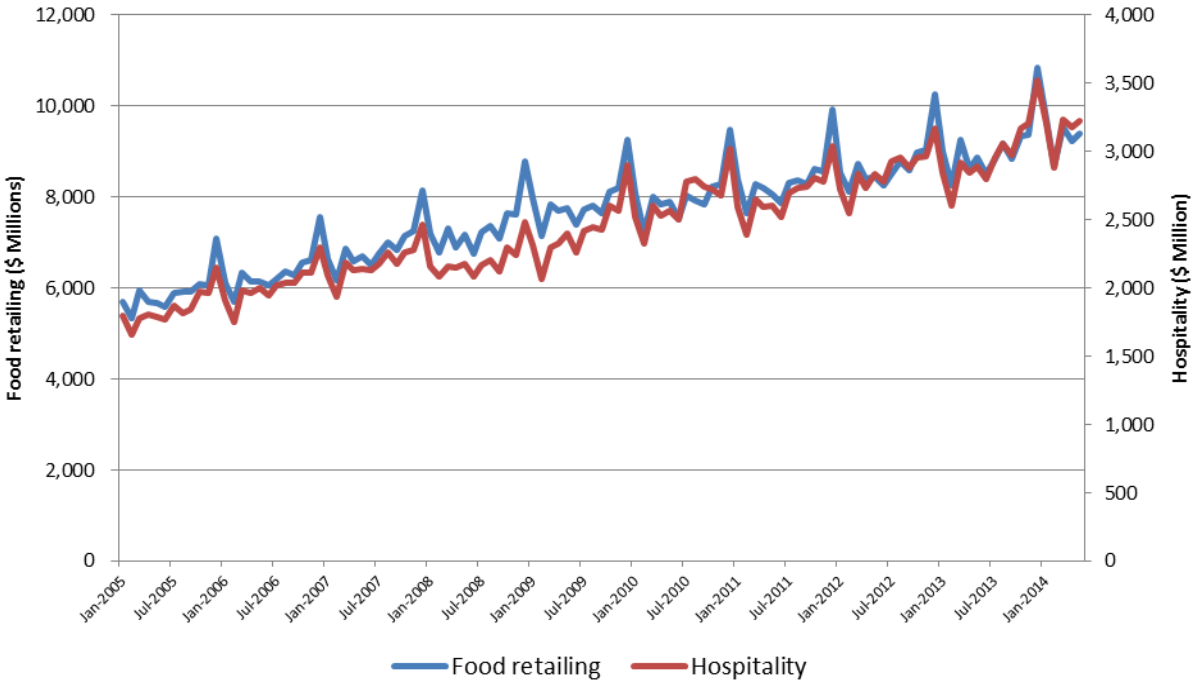
Retail and food services channels

The sales of display cabinets and storage cabinets are largely driven by requirements in two major sectors:

1. Food retail comprising supermarkets, convenience stores, liquor retailing and small food retail (i.e. fresh meat, fish and poultry; fruit and vegetable and specialised foods); and,
2. Food service channels which includes catering and hospitality.

Figure B 1 (below) which shows the trend of the overall trade figures in millions of dollars. These sectors closely track each other, except in 2008 and 2009 where the foodservice market was one of the first market sectors to feel the impact of the economic downturn, and commercial foodservice expenditure suffered two successive years of decline. One exception to this dip was Quick Service Restaurants (QSRs) that were not affected by the Global Financial Crisis. Overall expenditure of food service equipment for the next five years is expected to grow at around 2% per annum.

Figure B 1: ABS Retail trade index for food retail and hospitality (in millions of dollars of turnover per month).



(Source: ABS Cat No. 8501: Table 1, Updated May 2014)

Supermarkets, convenience stores and small retail

The Australian industry structure consists of large national supermarket chains, including Woolworths which has 920 stores and the international supermarket chain Aldi which was around 339 stores on the eastern sea board. There also approximately 2,500 independent stores comprising independent supermarket chains (i.e. IGA branded chains such as Ritchies, Foodland and Cornett's, and AUR-Foodworks) and individually owned and controlled stores. Costco is a new corporate participant with large general merchandise stores with supermarket style refrigeration in Melbourne, Sydney, Canberra and Brisbane. Aldi have announced $2 Billion of expansion plans into other regions including SA and WA, with other European discount operators (i.e. Lidl, Netto, etc.) planning or considering opening stores in Australia.

There are almost 6,000 convenience stores comprising around 650 7-Eleven, 496 Woolworths Petrol, 750 New Sunrise, 207 BP Petrol, 637 Coles Express, 476 Caltex (excluding Woolworths co-branded sites), 737 United (including distributors), 700 independents, and over 1,100 UCB stores, plus others including AA Holdings, Apco, Matilda, Reliance, Night Owl and Mobil. Table B1 summarises the estimated stock of supermarkets and convenience stores in Australia at the end of 2013 dissected into large, medium and small supermarkets, plus convenience stores and extra small supermarkets with a trading floor less than 400 m^2.

Table B1: Summary of Australian supermarkets and convenience stores dissected by trading floor.

Brand	Nominal Quantity	Trading floor (m^2) (1)			
		≥2,750	≥1,500 and ≥2,750	<1,500 and ≥400	<400
Coles-Bi Lo	762	152	381	229	0
Woolworths-Safeway	920	184	460	276	0
Aldi	339	0	0	339	0
IGA	1,393	0	139	1,114	139
IGA (Friendly Grocer/Eziway)	348	0	0	0	348
AUR-Foodland branded	439	0	44	263	132
AUR-Foodland (un-branded)	179	0	0	0	179
Costco	6	6	0	0	0
SPAR	135	0	0	27	108
Convenience stores	5,992	0	0	0	5,992
		342	**1,024**	**2,248**	**6,898**

(Sources: WF 2014, WW 2014, MET 2014, and industry informants)

1. *Dissection of trading floor is estimated following discussions with industry informants.*

The Australian supermarket industry accounts for around 25% of all cabinets. These are of a wide variety with an estimated 116,000 remote display cabinets and 70,000 integral. It is

estimated that in convenience stores there are 6,000 remote display cabinets and 65,000 integral.

The number of small food retail outlets is summarised in **Table B2** below. In each sector there are some large businesses that have multiple outlets and larger fleets of equipment. For example, Woolworths has 345 freestanding liquor outlets (including Dan Murphy's) and 534 ALH Retail liquor outlets (including BWS); Coles liquor has 98 1st Choice, 78 Vintage Cellars and 648 Liquorland; and IGA-Metcash have 2,262 liquor outlets (including Cellarbrations, Bottle-O, Club Partners, Liquor @ and 457 liquor outlets branded IGA Liquor).

A wide variety of refrigeration equipment can be found in liquor outlets, for example some may contain as many as 15 integral units whilst others may have a walk-in cool room with glass doors or panels plus 4 or more Glass Door Merchandisers and sometimes open multi-deck cases. If it is assumed that the average liquor outlet has one remote display cabinet and six integrals over 4,000 liquor outlets, this equates to around 4,000 remote and 24,000 integral display cabinets.

Fresh meat, fish and poultry retailing will store most of their produce in cool rooms, and may typically have two to four integral display cabinets, equating to around 17,000 integral display cabinets as well as some remote units and storage cabinets. Other food retailers have much smaller requirements for display cabinets and account for a further 7,000 integral display cabinets.

Table B2: ABS count of small retail food and liquor retailing businesses in Australia.

	Sum of employees in business			Totals
	1 to 19	20 to 199	200 plus	
Fresh meat, fish and poultry retailing	3,534	154	6	3,694
Fruit and vegetable retailing	1,527	191	0	1,718
Liquor retailing	1,341	116	6	1,463
Other specialised food retailing	3,263	206	3	3,472
Totals				10,347

(Source: ABS 8165.0 2013)

The total estimated cabinet stock in Australian supermarkets, convenience stores and in the small retail sector is over 129,000 remote display cabinets, 184,000 integral display cabinets and 3,000 storage cabinets or 316,000 cabinets in total.

Food service channels

The food service channels include catering, hospitality and small retail outlets that are generally dissected into two broad categories:

- **Institutional** including hospitals, nursing homes, tertiary institutions, schools, work or private canteens, charitable organisations and Government canteens (i.e. prisons, military).

- **Commercial** including restaurants, cafes, hotels/motels, fast food or take-away outlets, clubs, caterers, function centres, fresh meat (including fish and poultry retailing); fruit and vegetable retailing and liquor retailing.

There is an estimated 15,500 institutional establishments containing a mix of display cabinets and storage cabinets in a variety of formats including upright refrigerators (upright with 1, 2 and 3 doors, and under bench), freezers (upright with 1, 2 and 3 doors, and under bench) plus chest freezers. The estimated number of refrigeration cabinets in the institutional channel is 23,500 integral display cabinets and 30,250 storage cabinets.

The commercial food service channel is much larger than the institutional channel, containing around 26,500 remote display cabinets, 244,600 integral display cabinets and 117,100 storage cabinets, which include an allowance of 15,000 integral display cabinets and 5,000 storage cabinets found in other locations. This estimate covers all of the business types listed in

Table B 3.[53]

Table B 3: ABS count of catering and hospitality businesses in Australia.

Type of business	Sum of employees in business			Totals
	1 to 19	20 to 199	200 plus	
Cafes and restaurants	24,217	2,115	50	26,382
Catering services	1,847	265	22	2,134
Clubs (hospitality)	1,771	652	31	2,454
Pubs, taverns and bars	3,094	1,257	22	4,373
Takeaway food services	14,996	1,065	91	16,152
Hotels and motels	-	-	-	4,000
Grand total				55,495

(Source: ABS 8165.0 2013)

The total estimated stock of display cases in the food service channel is 26,500 remote display cabinets, 268,100 integral display cabinets and 147,400 storage cabinets totalling to 442,000 cabinets. This stock count is slightly higher than a similar count undertaken by BIS Shrapnel in 2012 as part of a Foodservice Equipment Study that estimated around 337,000 equivalent devices.

The historical stock and sales figures were updated to 2016 values for this Decision RIS, based on updated sales estimates and other data sources.

The sales of RDCs and RSCs is largely driven by requirements in two major sectors:

[53] ABS 8165.0 2013 provides business counts for business with and without employees. The counts for businesses without employees have been excluded as they are generally considered to be double counts and/or business that may no longer be operating.

- Food retail comprising supermarkets, convenience stores, liquor retailing and small food retail (i.e. fresh meat, fish and poultry; fruit and vegetable and specialised foods); and,
- Food service channels which includes catering and hospitality.

The performance of these major channels is reported in Australia in the ABS Retail trade index for food retail and hospitality in millions of dollars of turnover per month where both sectors have grown by more than 3% per annum over the last decade.

In Australia, this growth in food retail revenue is supported by growth in infrastructure where supermarkets including extra small stores with a trading floor less than 400 m^2 have grown from 4,205 in 2012 to 4,810 today equating 3% growth over the period. Convenience stores including Petrol Stations have not seen as much growth. In 2012 there were 5,817 compared to 6,100 today. The softer growth of convenience stores of around 1% per annum is possibly due to acquisitions, fleet mergers and industry rationalisation.

In 2012 the pre-charged equipment imports were reviewed to establish sales levels of RDCs and RSCs in Australia. At the time industry participants considered the increase in imports in 2010 and 2011 as an extraordinary sales event (i.e. beverage company activity) and that import quantities from 2006 to 2009 were more indicative of the 2012 levels in Australia. The average imports through the 2006 to 2009 period equated to around 63,000 integral RDC and RSCs imported, then allowing for remote RDCs and local manufacturing during this period equated to an estimated sales value of 75,000 to 80,000 pieces per annum.

Analysis of pre-charged import data since 2012 has become more difficult as around 25% of RDC and RSCs have transitioned to hydrocarbon refrigerants which is not reported. Since 2012 there has been strong growth in food retail and the food service channels (i.e. commercial including hospitality and institutional) and a slowdown in the beverage market as the key market beverage companies Coca-Cola Amatil and Asahi Beverages (Schweppes) undertook major refurbishments of their fleets from 2010 to 2013. The pre-charged import data from 2012 to 2016 provides sound evidence of sales in access of 100,000 pieces per annum particularly when units charged with hydrocarbon are added as well as local manufacturing. A conservative sales growth of 2.5% per annum from the 77,500 pieces per annum baseline has been assumed from 2014 to 2020, followed by 2.0% growth per annum from 2020 to 2030, and 1.5% out to 2035.

The detailed data collected by ECCA via the Energy Efficiency (Energy Using Products) Regulations was reviewed to assess sales growth in New Zealand and was found to be relatively flat over the period from 2012 to 2015. The New Zealand economy has also experienced growth in food retail and food service channels. The supermarket fleet in New Zealand has grown from 642 in 2012 to 724 today, equating to around 3% growth per annum. A sales growth rate of 1.5% per annum in New Zealand is assumed from 2014 to 2035.

The Consultation RIS assumed a growth rate of 2.5% per annum for both Australia and New Zealand from 2014 to 2035. Considerable analysis was undertaken to estimate the sales and stock of RDCs and RSCs in 2013. The latest evidence obtained from various sources described above for the Decision RIS has been used to review these growth rates and hence estimate stock and sales values in 2015.

Attachment B - New Zealand stock by major sectors

Supermarkets, convenience stores and small retail

The New Zealand industry structure is similar in some ways to that of Australia. Progressive Enterprises is an Australian owned company and a subsidiary of the Australian retail group Woolworths. It owns and operates approximately 166 Countdown stores (including former Foodtown and Woolworths stores) throughout New Zealand. They are also the franchise co-ordinator for around 59 Freshchoice and Supervalue stores. The other main chain is Foodstuffs which comprises three regional co-operatives supplying around 471 major stores (i.e. New World, PAK 'n' SAVE and Four Square) and around 152 convenience stores. Independently owned stores such as Night and Day and Bin Inn operate in smaller numbers, with around 60 stores.

The supermarket industry in New Zealand typically has smaller stores which are of a similar style and variety to Australia. There are an estimated 22,300 remote display cabinets and 5,000 integral display cabinets in supermarkets. It is estimated that convenience stores (which include 1,172 petrol stations, mini-markets and small stores) account for around 2,250 remote display cabinets and 17,300 integral display cabinets.

The total estimated stock of cabinets in the supermarkets, convenience stores and small retail sector is over 25,800 remote display cabinets, 31,600 integral display cabinets and 1900 storage cabinets (or 59,300 in total).

Food service channels

The structure of the New Zealand food service channels are similar to Australia containing similar store formats, brands and types of equipment, just on a smaller scale.

There are almost 1,000 institutional establishments, including private and public hospitals, aged persons homes, primary schools through to tertiary institutions and canteens which have an estimated 2,300 integral display cabinets and 2,800 storage cabinets. Larger quantities are found in the commercial channel, which accounts for an estimated 68,500 integral display cabinets, 8,000 remote display cabinets and 35,900 storage cabinets.

A Hospitality Report undertaken by Restaurant Association of New Zealand (2013) was one source used to estimate the number of businesses in this sector. A summary of the number of business types and cabinets (i.e. display cabinets and storage cabinets) is provided below.

Table C 1: Estimate of catering and hospitality businesses in New Zealand.

Type of business	Number of businesses	Display cabinets and Storage cabinet by business type
Cafes and restaurants	7,172	46,618
Catering services	732	3,660
Clubs (hospitality)	439	2,634
Pubs, taverns and bars	1,610	8,050
Takeaway food services	4,684	30,446
Hotels and motels	2,376	10,692
Other (i.e. miscellaneous locations such as hardware stores, airports, sports centre, etc.)	450	2,250
Grand total	17,013	104,350

Attachment C- Stock modelling, assumptions / Cost-Benefit methodology

The stock modelling and assumptions and Cost-Benefit methodology were provided by the consultancy firms Expert Group and Energy Consult who have expertise in this area. Stock Analysis

Table D 1 below shows the number of refrigerated commercial cabinets estimated for each type of outlet, for the purpose of undertaking a stock calculation for each major channel, and outlet type.

Table D 1: Typical number of refrigeration cabinets by outlet for each major category.

Type of outlet	Display cabinets		Storage cabinets
	Integral	Remote	
Food retail			
Supermarket: Large [(1)][54]	22	58	0
Supermarket: Medium	20	43	0
Supermarket: Small	15	18	0
Supermarket: Extra small	9	13	0
Convenience stores	11	1	0
Fresh meat, fish and poultry retailing	3	0.5	0.5
Fruit and vegetable retailing	3	0.5	0.5
Liquor retailing	6	1	0
Other specialised food retailing	2	0	0
Hospitals	5	0	5
Aged care	2	0	3
Schools	1	0	1
Canteens	1	0	2
Cafes and restaurants	5	0.5	1.5
Catering services	1	1	4
Clubs (hospitality)	4	1	2
Pubs, taverns and bars	3	2	2
Takeaway food services	4	0	2.5
Hotels and motels	2	0	2.5

1. *Average supermarket case is 2.5 meters long.*

[54] A large supermarket is ≥ 2,750 m2

2. *Food service channel counts are slightly higher than those used in the survey and assessment conducted by Sustainability Victoria in 2009 (SV 2009).*

Average lifespans of equipment

In general, the quality of cabinet is the greatest determinant of cabinet life, followed by maintenance and operating environment. The average lifespans of equipment used in the RIS modelling were: display cabinets integral, 11 years, display cabinets remote, 13 years, and storage cabinets, 11 years.

The second hand market and/or the refurbishing of cabinets, effectively extends the lifespan of the equipment and can complicate the assessment of typical lifespans. The effects of these factors are difficult to capture, as there is no second hand sales data available. Anecdotal evidence of second hand sales and refurbishments can be unreliable. Large operators of integral cabinets can refurbish their equipment in large batches. Similarly, they can undertake replacement programs in large volumes and flood the market with second hand cabinets within a short period of time. Some of these are then purchased and used in Australia, but many are shipped to the Pacific Islands.

Test and registration costs

The following key assumptions were made for calculating the incremental costs of the test and registration program for a changed regime:

- Individual test cost is around $6,500.00 each.
- Current number registered is 1,485, assumed around 50 may need to be tested under a changed regime as they may have just passed MEPS under the existing regime and no longer meet the changed regime.
- Additional number of registrations is 35 to 40% of the existing number.
- The incremental cost to industry is shared across 75 suppliers in Australian and New Zealand.
- Many opportunistic suppliers importing small quantities of refrigeration cases will no longer consider this viable.
- Government test 2% of registrations per annum (i.e. 30 units under current regime), at an average purchase cost of $5,000 per unit incurring individual test costs of $6,500 plus $1,500 for further evaluation.

A comprehensive list of the major Australian and New Zealand manufacturers and importers by company name, brand and country of origin is shown in **Attachment E**. There are many additional companies that import small quantities of cabinets.

In Australia there were more than 500 different companies that imported refrigeration cases over the last 6 to 8 years.

- The top 10 importers made up around 60% of imports.
- The top 20 accounted for more than 75%.

- There was a very long tail of around 250 companies that imported less than 20 units of which 200 companies imported less than 10 units.

The New Zealand market characteristic is similar, just on a smaller scale, with a core group of committed industry participants making up a significant portion of the market plus a long tail of miscellaneous importers.

There are several regimes and commercial barriers that already restrict opportunistic importers. These 'barriers' include electrical safety and EMC requirements, product support necessary to comply with consumer laws as well as the cost penalty of part loading shipping containers to Australia or New Zealand.

There are incremental costs to both Government and industry from introducing and operating an energy efficiency testing and registration program. This has been taken into account in the Cost Benefit Analysis of the RIS modelling (see **Table D 2** below).

Table D 2: Incremental costs of changed regime.

Incremental cost to Government (AUD)	
Establishment cost to Govt. to prepare RIS, and introduce new regime	$250,000
Current program running costs per annum	$125,000
Incremental program costs for changed regime (35% to 40% increase if more stock covered)	$50,000 – $100,000
Current check testing costs per annum (2% of registrations)	$390,000
Incremental check testing costs for changed regime (35% to 40% increase)	$190,000
Total incremental cost to Government per annum	$240,000 - $290,000
Incremental cost to industry (excluding capital costs of efficiency improvements and registration fees of $780 per model)	
Incremental testing costs under an expanded scope per annum	$1.2M - $2.2M
Incremental cost per supplier per annum	$18,000 - $35,000
Approximate incremental product cost per sale	$12 - $16 each sale

Regulatory cost burden

The estimated 'regulatory cost burden' on Australian companies also needs to be factored in to the analysis (see **Table D3** below). The extra costs are shown for the three regulatory proposals vs Business As Usual. The table shows the annual total regulatory costs per business and per product. These consist of the additional cost for administration time spent to register a product and additional testing costs, but does not include the cost of registration itself.

Table D3: Estimated regulatory burden cost (excluding cost to register in Australia) – for Australian businesses (in $AUD).

	Option	Per Business Cost - Annualised	Cost per registered model
1	Refrigerated Display Cabinets - Business as Usual	$16,764.41	$11.31
2	Refrigerated Display Cabinets - New MEPS 10% impact + vol labelling	$19,528.21	$13.18
3	Refrigerated Display Cabinets - New MEPS 30% impact +vol labelling	$23,663.95	$15.97
4	Refrigerated Display Cabinets - European MEPS in 2019 + vol labelling	$22,735.07	$15.34

These calculations appear different from those in **Table D 2** (incremental costs of a changed regime) because:

- Only the costs to Australian businesses are shown here (NZ companies are not included).
- The cost per registered model can vary from the full cost to much less because a large number of units may be sold against each registered model.

These total regulatory costs represent between 0.2 % and 0.3% of the sales weighted average equipment cost (of AUD$5,185).

The following assumptions have been made about these costs and estimates:

- **Incremental cost per supplier:** this has been calculated based on the additional cost of current products that may need to be retested, plus the additional test costs under an expanded scope, divided by 75 suppliers in total. It is based on the broad assumption that each product is registered every three years and therefore there are over 2,000 products that incur testing costs of $6,500. The registration fee of $780 (in Australia only) is excluded from the calculation as this is treated as a pass-through item in the analysis (i.e., it is not included in the benefits to the government or as a cost to industry).

- **Approximate incremental product cost per sale:** this is calculated based on the above costs, divided by 300,000 sales (i.e. 3 years at 100,000 sales per annum).

Costs of improvements

A comprehensive desktop review of over 20 brands was undertaken in 2014 of the typical sell prices (or cost to end user) of the sub-types of cabinets. This information was averaged for each group type (**Table D 3**).

Integral cabinets have the widest range of prices, with prices averaging from AUD $8,800 for an Integral Refrigerated Horizontal (IRH) cabinet to as low as AUD $1,470 for an Integral Freezer Horizontal type IFH-5 with the weighted average by local sale quantity of around $3,200. The New Zealand prices are estimated from the Australian prices based on an exchange rate of 1 $NZ = 0.85 AUD. Prices for 2016-17 used in the CBA were inflated to 2016-17 dollars by CPI (1.032).

Table D 3: Estimated average prices by grouped cabinet type.

Grouped cabinet types	Average prices (2016/17 dollars)		Weighted average prices (2016/17 dollars) (Based on local sales profile)	
	AUD	$NZ	AUD	$NZ
IRH	$9,081	$10,683	$3,351	$3,943
IRV	$5,496	$6,466		
IRV-4	$2,885	$3,394		
IFH	$6,000	$7,059		
IFH-5	$1,517	$1,785		
IFV	$4,997	$5,879		
RRH	$13,415	$15,782	$12,829	$15,093
RRV	$16,510	$19,424		
RRV-2	$10,939	$12,870		
RFH	$13,415	$15,782		
RFV	$16,510	$19,424		
SRH	$3,405	$4,006	$4,768	$5,609
SRV	$4,344	$5,111		
SFH	$4,386	$5,159		
SFV	$6,470	$7,612		

Energy efficiency opportunities and complementary activities

Current cabinet designs use a variety of technologies depending upon supplier preferences and the price points for the markets they are serving. For example, a top of the line model may already incorporate most of the latest technology, such as EC motors, LED lighting and high efficiency compressors while another model targeted at the low end of the market will be more basic. It should be noted that the price differences for some manufacturers' model ranges do not necessarily reflect the technology used but rather the market tier that they are sold into. As a result, identifying the characteristics of a 'standard' cabinet, the potential for improvement and associated costs is complex; however, the conclusions of studies in Europe (EU 2007, EU 2011, EU 2014), which have had substantial involvement from industry, provide a sound indication of potential EE improvements and associated costs.

The key EE opportunities assessed in this report were:

1. Upgrade T8 fluorescent lamps with electromagnetic ballasts to LED lamps.
2. Controlled LED lighting (i.e. 12 hour LED lamps instead of 24 hour T8 fluorescent lamps).
3. Improve fan-motor(s) efficiency and reduce heat load by switching from shaded pole to EC motors.
4. Electronic thermostat with Energy Management capability replacing mechanical thermostat.
5. Night blinds on open display cabinets.
6. High efficiency doors on cabinets fitted with transparent doors.
7. Fitting doors or lids on open display cabinets.

A thorough review was undertaken of the EU information, plus local costing of key initiatives grouped into typical or complementary packages by cabinet application.

s and an electronic thermostat.

Table D 4 shows the initiatives grouped into the complementary energy efficiency activities EEI to EEV, and circumstances where they can be applied. There are some instances where interventions are not applicable – for example it does not may sense to apply translucent or HE doors or controlled LED lighting to cabinets with solid doors. Whereas cabinets with closed solid doors could achieve efficiency gains by using EC fan motors and an electronic thermostat.

Table D 4: Combination of energy efficiency improvement measures by cabinet application.

EE Interventions	I	II	III	IV	V
Controlled LED lighting		√	√	√	√
EC fan motor(s)	√	√	√	√	√
Electronic thermostat	√	√	√	√	√

Night blinds			√		
Fit doors on open display cabinets					√
High efficiency doors				√	

EE Interventions	I	II	III	IV	V
Closed solid door cabinets	√				
Supermarket – Plugins		√	√	√	√
All cabinets except solid door		√	√	√	
Storage cabinet		√			√

Estimated costs for energy saving technologies

The percentage improvement and incremental cost for energy efficiency groupings was estimated for each cabinet group as shown by

Table D 5 below. This information was used in the costs analysis and in the calculation of the costs of changing the MEPS requirements.

Table D 5: Percentage improvement and incremental cost for energy efficiency groupings by cabinet type

EE Grouping	I		II		III		IV		V	
	%	$	%	$	%	$	%	$	%	$
IRH	-	-	14%	$266	28%	$733	40%	$3,508	17%	$437
IRV	-	-	16%	$384	36%	$714	51%	$4,209	-	-
IRV-4	-	-	42%	$399	-	-	-	-	45%	$713
IFH	-	-	11%	$310	28%	$589	40%	$3,529	12%	$426
IFH-5	-	-	18%	$175	-	-	-	-	28%	$490
IFV	-	-	12%	$261	35%	$551	45%	$4,046	18%	$657
RRH	-	-	19%	$317	-	-	-	-	22%	$947
RRV	20%	$128	19%	$539	30%	$1,255	46%	$6,217	47%	$976
RRV-2	-	-	12%	$512	37%	$1,172	47%	$6,249	-	-
RFH	-	-	8%	$299	26%	$959	38%	$5,204	-	-
RFV	2%	$126	6%	$479	31%	$1,061	41%	$6,138	8%	$1,135
SRH	14%	$179	-	-	-	-	-	-	-	-
SRV	20%	$179	-	-	-	-	-	-	-	-
SFH	9%	$137	-	-	-	-	-	-	-	-
SFV	14%	$165	-	-	-	-	-	-	-	-

Cost of improving efficiency with current registered models

Improving the MEPS levels has the effect of removing the least energy efficient registered models and encourages suppliers to introduce performance enhancements to satisfy the more onerous MEPS levels.

If the MEPS levels were made 24% more onerous, around 425 to 440 currently registered models would be affected and become non-compliant. The potential level of efficiency improvement required where approximately 145 of these products (33% of non-compliant products) would require energy efficiency improvements of between 0% and 8%. A further 145 cabinets would need an improvement of 8% to 16% and the final 145 would require more significant improvements of between 16% and 24%. The cost of higher level improvements will vary considerably depending on the type of product and the market it is sold into.

One of the objects of MEPS is to drive the lower efficiency refrigeration equipment to adopt the newer more efficient technologies. This means that the greater the "efficiency gap" is between a product and MEPS levels, the higher the cost of bringing the low performing product up to a new standard.

Overseas studies both in the US and Europe have produced information showing the efficiency improvements and the cost incurred as well as payback periods. However due to the considerable time frames involved in developing this data, technology has moved forward rapidly. The products at the top end of the market tend to be more sophisticated in the technology being incorporated and so in general, this part of the market has seen the adoption of newer and more advanced technologies. Those products at the lower end of the market tend to be slower in the uptake of new technology partly in an effort to keep manufacturing and development costs down.

Thus some of the claims of the efficiency gains from new technology appear to relate to products that have been in the market for some time and are using less advanced, lower cost components.

LED lighting that by necessity uses electronic power supplies is a case in point. As an example, fluorescent lighting with smaller diameter higher efficacy lamps powered by electronic ballasts has been widely used for some time in sectors of the refrigerated display cabinet market in Australia and New Zealand, while other sectors still use magnetic ballasts and large diameter fluorescent lamps. Upgrading from older and less expensive technologies to LEDs will be a greater cost step then upgrading from T5 to LEDs, see **Table D 6** below.

Table D 6: Energy efficiency and technology upgrade potential of fan motors and cabinet lighting

Product	Technological improvements	
		Shaded Pole
	↓	Permanent Split Capacitor (PSC)
	↓	Electronically commutated (EC) or Brushless dc (BLDC)
		T12 (38 mm diameter) fluorescent lamps with magnetic ballasts
	↓	T8 (25 mm diameter) fluorescent lamps with magnetic ballasts
	↓	T8 (25 mm diameter) fluorescent lamps with energy efficient magnetic ballasts
	↓	T8 (25 mm diameter) fluorescent lamps with electronic control gear
	↓	T5 (16 mm diameter) fluorescent lamps with electronic control gear
	↓	LED lamps with electronic control gear

1. *In 2003 MEPS was introduced into AU and NZ for fluorescent lamp ballasts.*
2. *In 2004 MEPS was introduced into AU and NZ for fluorescent lamps.*

This is similar to the scenario with electric motors driving fans. EC and brushless DC motors are now widely used both as original equipment and in the replacement market. In some instances these are taking the place of low efficiency, lower cost, shaded pole motors. However in other cases suppliers had already moved to more efficient motors such as PSC motors, thus an EC motor does not bring the same efficiency gains.

Assumptions relating to cost of efficiency improvement

The costs of components incorporated into a refrigerated cabinet are subject to a number of variables that can have a considerable effect on price. These include:

- Buying power of the purchaser.
- Quantity purchased.
- Source of supply.
- Size, duty and capacity of the component.
- Maturity of the technology.
- Development cost in applying the technology.
- Testing costs.
- Assembly costs.
- Type and complexity of the component.
- Type and complexity of the refrigerated product involved.

The estimated typical cost increases that have been used in the calculation of efficiency improvement are therefore based on multiple purchases and the substitution of one technology with another rather than retrofitting to existing products. No development, testing or registration costs have been allowed for or apportioned. Due to the wide range of

equipment in the market and the varying degrees of uptake of the efficient technologies it is not possible to specify exact costs for improving each sub-type or product group. However every effort has been made to ensure the estimates are as realistic and accurate as can be established.

It has been assumed that:

- Remote cabinet types have a standard length of 2.5 to 3.0 meters, and typical closed integral cabinets have 1 or 2 doors.
- Similarly the direct energy savings for electrical components are based on manufacturer's data and known information.
- Lighting is based on replacing standard T8 1200 mm fluorescent lamps with electromagnetic ballast progressing to time controlled LEDs with electronic power supply.
- Fan motor improvements are based on 10 Watt output shaded pole motor(s) progressing to an equivalent EC motor(s).
- Thermostat improvement is based on a mechanical thermostat progressing to a simple electronic controller.
- High efficiency glass doors improvements are based, for medium temperature, on double glazed glass door units progressing to a reflective film, inert gas filled door unit and for low temperature based, on reflective film, and low energy, inert gas filled door triple pane unit.
- Improvements from the addition of night blinds are based on manually operated blinds being applied to an open display cabinet.
- Glass door improvements for open display cabinets are based on replacing an air curtain with glass doors (i.e. standard or HE).

Cost Benefit Analysis

The cost benefit estimates have been prepared to cover the range of potential policy options consistent with international developments, stakeholder feedback and the current market and regulatory environment.

Method and Key Assumptions

The cost benefit analysis was undertaken by first modelling the current and future stock of Refrigerated display cabinets/storage cabinets. This stock model also contained information on the numbers, capacity, efficiency and energy consumption of the cabinets, as well as dividing the stock by cabinet type. Estimates of future sales and the operating life were assumed to drive the stock model.

The stock model was used to develop energy usage estimates based on the number and characteristics of the display cabinet stock. Energy consumption estimates for Business as Usual (BAU) were established, and then the energy consumption under the different policy options was calculated and compared to the BAU consumption.

Benefits, such as reduced energy consumption and carbon emission reductions, were calculated and assigned monetary values, so the total aggregate cost savings could be calculated. Both government and private costs were calculated and aggregated. All Net Present Value (NPV) costs and benefits, which are presented in the summary tables, are based on Australia using a 7% discount rate and New Zealand a 6% discount rate.

Developing the policy options for modelling purposes involved:

- Efficiency impacts were derived from the lowest MEPS level to remove 10% and 30% of current registrations. The resultant sales weighted efficiency of the remaining products sold in NZ over the period 2011 and 2012 was used as the basis of calculating the policy intervention impacts.
- Cost impact was derived from the price versus efficiency data developed for all the units. A price efficiency ratio of 0.5 was found (i.e., incremental prices are increased by 5% for each 10% improvement in efficiency). This is very comparable to the earlier air conditioner RIS. A reduction in the incremental costs of efficiency measures of 5% pa was applied to account for the learning effect (the ability of the manufacturers to improve the supply processes and reduce costs of the efficiency measures).
- Benefits are based on savings from forecast tariffs for Australia (as per RIS guidelines).
- Online energy rating information:
    - Sales weighted efficiency was assumed to increase above BAU by 0.5% pa for 5 years post label introduction, then by 0.2% above BAU for following years (similar to post impact evaluations from refrigerator studies).[55]
    - Costs impact for labelling is as derived for MEPS (price efficiency ratio of 0.5), however the learning effect was assumed to be higher due to competition and purchaser demand for higher efficiency products. The learning/ competition effect was assumed to reduce the incremental efficiency costs by 33% p.a. for labelling induced efficiency improvements. The cost of labelling products is estimated to be $2.50 per product sold.
- The business costs from the regulatory burden (RB) calculations were taken from the spreadsheet developed by the Department of Industry for these products. The business costs were found by the following formula: CBA Business Costs = RB Incremental Business Costs – RB Purchase Costs.
- These annualised costs from the RB calculation were input for each year for the life of the option being examined (until 2035). The Regulatory Burden calculations assumed only ten years. The CBA examines the costs over the entire period.

[55] Evidence of labelling impacts in the business sector is not available.

- The model was then run to determine the BAU energy consumption and greenhouse emissions of the BAU baseline scenario and then modified to model each of the policy scenario options.

In addition to the financial analysis, the costs and benefits of the policy proposals have also been considered from the perspective of society and the consumer. The following costs and benefits have been factored into the analysis:

Costs

- To the consumer, due to the upfront price of products reflecting costs passed on by suppliers;
- To government, as a result of implementing and administering the requirements,
- To the product supply businesses, as a result of complying with the new or modified regulatory requirements of the proposals (for example testing, administration and training).

Benefits

- To the consumer, due to improving the information available for comparing the energy efficiency of products and from improved energy efficiency (and flow-on consequences such as lower long-term running costs);
- To government and suppliers from simplification of the regulatory frameworks;
- To society from energy savings and reduced greenhouse gas emissions.

It is necessary to approach the cost-benefit analysis from either a consumer or societal perspective. The social approach is the appropriate methodology for the analysis, but the consumer approach can be used where it approximates the results that would be obtained from the societal perspective. An analysis from a consumer perspective involves the use of retail product prices and marginal retail energy prices. Since the objective is to assess whether product buyers (consumers) as a group would be better off, transfer payments such as taxes are included. The analysis includes retail mark-ups and taxes that are passed onto the consumer and including these in the costs will simplify the analysis process, while still remaining appropriate.

The New Zealand analysis has been undertaken to also approximate the societal perspective, using the long run marginal cost of electricity (required by their cost benefit methodology) and wholesale product prices (including quantifying the benefits of reduced emissions). A higher discount rate has also been used (6% rather than 5% in the Consultation RIS). The CBA figures for New Zealand are therefore lower.

All Net Present Value (NPV) figures are real 2016/17 dollars.

Heat rejection considerations

In some instances different equipment configurations such as external (i.e. remote condensing unit) or internal (i.e. integral cabinet) heat rejection may impact on refrigeration loads, equipment operating times and energy consumption values.

If an integral display cabinet that rejects heat into the conditioned space were compared to a display case of equal duty and function with a remote condensing unit that rejects heat externally; an allowance for the heat rejection treatment would need to be included in the total energy calculation. This allowance may take into account the additional air conditioner operating time or energy required to remove the heat added by the integral display cabinet on hot days less the energy savings or free heating on cold days (AIRAH 2012).

Therefore in this context heat rejection is not relevant for remote display cabinets, and in the case of storage cabinets, many of them operate in non-conditioned spaces such as kitchens where there are extraction fans and many other sources of heat, such as cookers. In the case of integral display cabinets the energy penalty would be higher in hotter climates where there is more operating hours above air conditioning design conditions (i.e. 24^{o}C) than below. The energy efficiency model used in this study comprises national models for Australia and New Zealand where the colder climates would cancel out the hotter climates, and removal of the heat is often relatively efficient so this assessment assumes the heat rejection portion to be insignificant.

There is another heat rejection consideration that is associated with the cold air spilling into supermarkets or conditioned spaces from open display cases, however this is far more complicated and outside the scope of this assessment. The heat rejection effects were not included in the Ecodesign energy consumption assessments of display cabinets and storage cabinets throughout their product life cycles. Rather, there was some mention of the benefit of managing the interaction of refrigeration and HVAC systems relative to the specific climatic conditions or application in order to harness heat recovery and/or utilise free energy from either system (EC 2011).

Potential Impacts on peak demand electricity

The potential peak demand impacts of all the policy cases were also modelled. The average power reduction was calculated in the model by assuming that the improved efficiency as a result of the policy case translated to a reduction in the average power demand. As display cabinets/storage cabinets are operating 100% of the time, the average power is determined by dividing the daily energy consumption by 24 hours. Also due to the continuous nature of the operation, the power demand of the equipment is assumed to be coincident with system summer peaks, but the contribution to winter peaks will be less as the power demand of the equipment will be much lower when external temperatures are lower.

Electricity tariffs used in this cost-benefit analysis

The electricity tariffs are outlined below (

Table D 7).

Table D 7: Business electricity prices (real 20116/17 cents/kWh) for Australia and New Zealand

NSW	19.61	20.47	21.28	22.12	22.91	23.77	24.44	25.21	25.79	25.96	26.31
ACT	25.03	26.13	27.16	28.23	29.24	30.35	31.20	32.18	32.92	33.14	33.59
NT	32.32	33.13	33.95	34.80	35.67	36.56	37.48	38.42	39.38	40.36	41.37
QLD	17.61	18.47	19.15	19.70	19.97	20.28	20.73	21.27	21.68	21.88	22.05
SA	18.29	17.80	18.51	19.29	20.09	21.07	22.05	22.53	22.66	22.86	23.43
TAS	13.49	14.05	14.81	15.72	16.72	18.11	19.34	19.60	19.33	19.21	19.52
VIC	18.94	19.63	20.26	21.11	22.01	23.21	24.22	24.55	24.67	25.07	25.80
WA	29.74	30.48	31.25	32.03	32.83	33.65	34.49	35.35	36.24	37.14	38.07
NZ (NZ cents)	16.62	16.62	16.62	16.62	16.62	16.62	16.62	16.62	16.62	16.62	16.62
NZ Long run marginal cost	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79
Region/year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030

The electricity prices and forecasts are based on.

- In Australia, Electricity price index for Australia, from the Australian Energy Market Operator (AEMO). These were updated to 2016/17 real dollars, based on AEMO projections.
- In New Zealand they are based on the long run marginal cost of electricity provided by EECA. The business retail price is not used for the cost benefit modelling but provided for cases where the benefits to the business are calculated.

The electricity price index for businesses was not published in the AEMO 2014 report, but was provided by the Department of the Environment and Energy in confidence, and therefore cannot be published.

Greenhouse gas factors

Updated projected emission factors for Australia and New Zealand have been included. In Australia they are based on the Scope 3 emission factors for the consumption of electricity by the consumer. The projected Scope 1 emission factors (of electricity sent out by State) were provided by the Department of the Environment and Energy (March 2017). The New Zealand estimates were provided by the Ministry of Business, Innovation and Employment.

For New Zealand, a carbon price of $25 per tonne of CO2-e has been used to estimate the benefits of lower levels of greenhouse gas emissions.

Table 8 shows the emissions factors used in the model.

Table 8 Emission factors for electricity (kg CO2-e/kWh) - Australia and New Zealand

Year	NSW	ACT	NT	QLD	SA	TAS	VIC	WA	NZ
2020	0.841	0.841	0.929	0.901	0.195	0.003	0.896	0.706	0.1287
2021	0.84	0.84	0.905	0.899	0.196	0.003	0.886	0.698	0.1287
2022	0.831	0.831	0.888	0.892	0.192	0.003	0.88	0.694	0.1287
2023	0.812	0.812	0.883	0.89	0.208	0.003	0.877	0.691	0.1287
2024	0.796	0.796	0.878	0.885	0.206	0.003	0.867	0.689	0.1287
2025	0.792	0.792	0.874	0.885	0.204	0.003	0.859	0.688	0.1287
2026	0.791	0.791	0.87	0.879	0.203	0.003	0.849	0.686	0.1287
2027	0.785	0.785	0.867	0.877	0.206	0.003	0.84	0.684	0.1287
2028	0.781	0.781	0.862	0.869	0.214	0.003	0.832	0.682	0.1287
2029	0.777	0.777	0.858	0.867	0.226	0.003	0.829	0.677	0.1287
2030	0.776	0.776	0.851	0.859	0.231	0.003	0.827	0.672	0.1287

Model parameters and key assumptions

The assumptions about the model parameters, including the sensitivity analysis, are outlined in **Table D 8** below.

Table D 8 Model parameters and key assumptions.

KEY FEATURES	MODEL PARAMETER
Scenarios	Several policy options (shown below) were combined in multiple scenarios; • BAU; • Au-NZ MEPS for display and storage cabinets, using ISO and EN test standards, MEPS to affect the least efficient 10% of models, labelling is voluntary. From 2019; • Au-NZ MEPS for display and storage cabinets, using ISO and EN test standards, MEPS to affect the least efficient 30% of models, labelling is voluntary. From 2019; • Copy European MEPS levels in 2019 for display and storage cabinets, using ISO and EN test standards, labelling is voluntary. From 2019; • Non-regulatory options.
Sales	Sales data for Australia for display cabinets were not available. However New Zealand has been collecting mandatory sales data since 2005 under the Energy Efficiency (Energy Using Products) Regulations 2002. Australian sales patterns are assumed to closely match New Zealand's and these data was used to devise a local sales profile for groups of cabinets. Stock models were devised by three methods: aggregated sales data, lifespans and growth rates; using the number of outlets with an estimate of cabinet numbers per outlet – and estimates according to European data on a per capita basis.
Projection Period	17 years (2017-2035) The model uses survival functions with average lifespans for 11 years for integral display cabinets, 13 years for remote display cabinets and 11 years for storage cabinets. The sales growth has slowed from around 7% per annum throughout the 1990s to 4% over the past decade to around 2.5% per annum now and medium term future.
Efficiency	Efficiency impacts were derived from the lowest MEPS level to remove 10% and 30% of current registrations. The resultant sales weighted efficiency of the remaining products sold in NZ over the period 2011 and 2012 was used as the basis of calculating the policy intervention impacts. Sales weighted efficiency is assumed to increase above BAU by 0.3% pa for 5 years post label introduction, then by 0.2% above BAU for following years (similar to post impact evaluations from refrigerator studies). Evidence of labelling impacts

KEY FEATURES	MODEL PARAMETER
	in the business sector is not available.
Registration Admin costs and Costs of Compliance	Total incremental cost to Government per annum for Australia and New Zealand ranged from $240,000 per annum to $290,000 per annum. Establishment cost to government in Australia and New Zealand to prepare the RIS and introduce the new regime are assumed to be $250,000.
Energy Consumption	The stock model used contained information on the numbers, capacity, efficiency and energy consumption of display and storage cabinets. Energy consumption estimates for the business as usual (BAU) baseline established, and then the energy consumption under different policy options are calculated and compared to the BAU consumption.
GHG emissions	Scope 3 emission factors for the consumption of electricity by the consumer. The projected Scope 1 emission factors (of electricity sent out by State) were provided by the Department of the Environment and Energy (March 2017). The New Zealand estimates were provided by the Ministry of Business, Innovation and Employment..
Industry costs	Incremental cost per supplier per year ranged from $18,000 to $35,000 (approx. $12 – $23 per sale) Model test cost is around $6,500.00 each. Current number registered is 1,485, assumed around 50 may need to be tested under a changed regime as they may have just passed MEPS under the existing regime and no longer meet the changed regime. Additional number of registrations is 35% to 40% of the existing number. The incremental cost to industry is shared across 75 suppliers in Australian and New Zealand. Government test 2% of registrations per annum (i.e. 30 units under current regime), at an average purchase cost of $5,000 per unit incurring individual test costs of $6,500 plus $1,500 for further evaluation.
Sensitivity Analysis	The sensitivity of the results was tested under the following cases: Discount rates - Australia = 0%, 3%, 7%, 11%; New Zealand = 0%, 3%, 5%, 8% Price Efficiency ratios – 0.5, 1.0, 1.5, 2.0 Caron price - Australia = $0, $11.82, $35; New Zealand = $0, $25, $50
Key Assumptions	Energy consumption estimates for the business as usual (BAU) baseline is established, and then the energy consumption under different policy options are calculated and compared to the BAU consumption. Benefits, such as reduced energy consumption and carbon emission reductions are calculated and can be assigned monetary values, so the total aggregate cost savings can be calculated. Cost, both government and private costs are also calculated and aggregated. All net present value costs and benefits presented in the summary tables are based on Australia using 7% discount rate and New Zealand with a 6% discount rate.

The following sensitivity testing was carried out as part of the sensitivity analysis.

Sensitivity test – discount rates

The impact on the cost benefit estimates of varying the discount rate for the recommended option 4 are shown in **Table D 9 and Figure D 1**.

Table D 9 – discount rates for Australia and New Zealand.

Sensitivity: Discount Rates

Discount Rate is 7% for Australia and 6% for New Zealand

Scenario 4: MEPS EU 2019 with Labelling

Sensitivity by Discount Factor and Demand Reduction Summary Results

	CBA Summary AU				CBA Summary NZ			
Period	**2017 - 2035**				**2017 - 2035**			
Discount Rate	0%	3%	**7%**	11%	0%	3%	**6%**	8%
Costs ($M)	$383	$280	**$193**	$138	$43	$31	**$24**	$20
Benefits ($M)	$4,780	$2,850	**$1,532**	$882	$293	$176	**$111**	$84
NPV ($M)	$4,398	$2,570	**$1,339**	$744	$250	$145	**$87**	$64
BCR	12.5	10.2	**7.9**	6.4	6.8	5.6	**4.7**	4.2

Demand Reductions

	Demand Reductions (MW)			
	Demand Reductions AU		**Demand Reductions NZ**	
Year	**2025**	**2035**	**2025**	**2035**
Cumulative	59	132	11	23

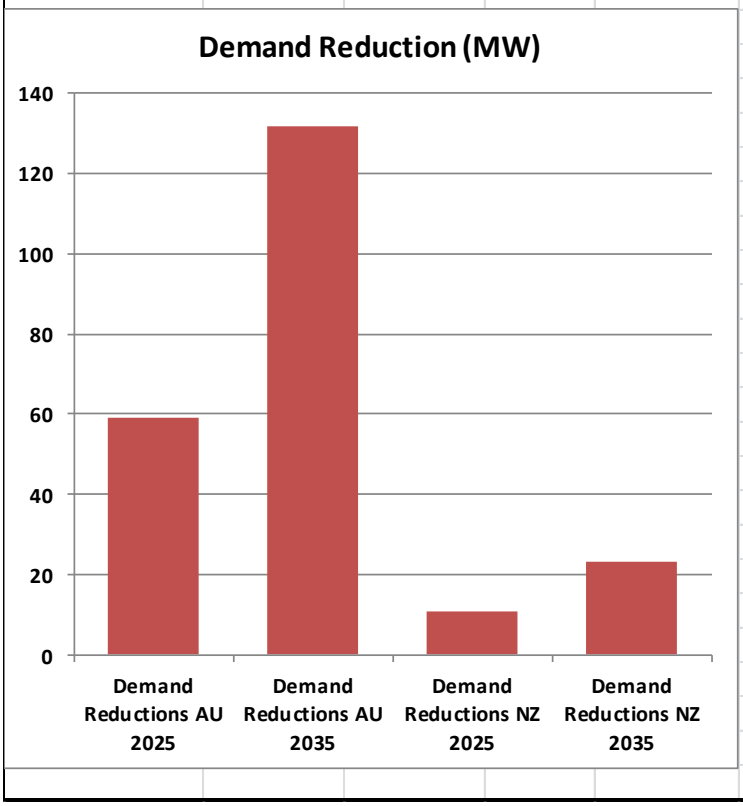


Figure D 1 – Demand reductions for Australia and New Zealand.

Sensitivity test: Price Efficiency Ratio

The impact on the cost benefit estimates of varying the price efficiency ratio (which shows the cost impact of efficiency improvement on the price of the product to the consumer) is shown in **tables D10, D11 and D12** below.

Tables D10, D11 and D12 – Summary results of varying the Price Efficiency Ratio.

Sensitivity: Price Efficiency Ratio

Scenario 4: MEPS EU 2019 with Labelling

PE Ratio = 1.0

Summary Results by Discount Factor

	CBA Summary AU				CBA Summary NZ			
Period	2017 - 2035				2017 - 2035			
Discount Rate	0%	3%	**7%**	11%	0%	3%	**6%**	8%
Costs ($M)	$737	$540	**$372**	$266	$80	$59	**$44**	$37
Benefits ($M)	$4,780	$2,850	**$1,532**	$882	$293	$176	**$111**	$84
NPV ($M)	$4,044	$2,310	**$1,160**	$616	$213	$117	**$67**	$46
BCR	6.5	5.3	**4.1**	3.3	3.7	3.0	**2.5**	2.3

PE Ratio = 1.5

Summary Results by Discount Factor

	CBA Summary AU				CBA Summary NZ			
Period	2017 - 2035				2017 - 2035			
Discount Rate	0%	3%	**7%**	11%	0%	3%	**6%**	8%
Costs ($M)	$1,091	$800	**$551**	$394	$117	$86	**$65**	$54
Benefits ($M)	$4,780	$2,850	**$1,532**	$882	$293	$176	**$111**	$84
NPV ($M)	$3,689	$2,050	**$981**	$488	$175	$90	**$46**	$29
BCR	4.4	3.6	**2.8**	2.2	2.5	2.0	**1.7**	1.5

PE Ratio = 2.0

Summary Results by Discount Factor

	CBA Summary AU				CBA Summary NZ			
Period	2017 - 2035				2017 - 2035			
Discount Rate	0%	3%	**7%**	11%	0%	3%	**6%**	8%
Costs ($M)	$1,445	$1,060	**$730**	$522	$155	$114	**$86**	$72
Benefits ($M)	$4,780	$2,850	**$1,532**	$882	$293	$176	**$111**	$84
NPV ($M)	$3,335	$1,790	**$802**	$360	$138	$63	**$26**	$12
BCR	3.3	2.7	**2.1**	1.7	1.9	1.6	**1.3**	1.2

Sensitivity test: Learning Effect

The impact on the cost benefit estimates from applying a 0% learning rate (the rate at which costs reduce) compared with a varied learning rate is shown by **Table D13 and D 14** below.

Table D13

Sensitivity: Learning Effect

Scenario 4: MEPS EU 2019 with Labelling

Learning Effect = 0%

Summary Results by Discount Factor								
	CBA Summary AU				CBA Summary NZ			
Period	2017 - 2035				2017 - 2035			
Discount Rate	0%	3%	**7%**	11%	0%	3%	**6%**	8%
Costs ($M)	$547	$389	**$258**	$178	$60	$43	**$31**	$26
Benefits ($M)	$4,780	$2,850	**$1,532**	$882	$293	$176	**$111**	$84
NPV ($M)	$4,233	$2,461	**$1,274**	$704	$233	$134	**$80**	$58
BCR	8.7	7.3	**5.9**	4.9	4.9	4.1	**3.5**	3.2

Table D 14

Sensitivity: Carbon Price

Scenario 4: MEPS EU 2019 with Labelling

Values used for DRIS are shown shaded blue

AU = $0, NZ = $0

Summary Results by Discount Factor								
	CBA Summary AU				CBA Summary NZ			
Period	2017 - 2035				2017 - 2035			
Discount Rate	0%	3%	**7%**	11%	0%	3%	**6%**	8%
Costs ($M)	$383	$280	**$193**	$138	$43	$31	**$24**	$20
Benefits ($M)	$4,780	$2,850	**$1,532**	$882	$285	$172	**$108**	$81
NPV ($M)	$4,398	$2,570	**$1,339**	$744	$242	$140	**$84**	$61
BCR	12.5	10.2	**7.9**	6.4	6.6	5.5	**4.6**	4.1

AU = $11.82, NZ = $25

Summary Results by Discount Factor								
	CBA Summary AU				CBA Summary NZ			
Period	2017 - 2035				2017 - 2035			
Discount Rate	0%	3%	**7%**	11%	0%	3%	**6%**	8%
Costs ($M)	$383	$280	**$193**	$138	$43	$31	**$24**	$20
Benefits ($M)	$4,900	$2,922	**$1,571**	$905	$293	$176	**$111**	$84
NPV ($M)	$4,517	$2,642	**$1,378**	$767	$250	$145	**$87**	$64
BCR	12.8	10.4	**8.1**	6.6	6.8	5.6	**4.7**	4.2

AU = $35, NZ = $50

Summary Results by Discount Factor								
	CBA Summary AU				CBA Summary NZ			
Period	2017 - 2035				2017 - 2035			
Discount Rate	0%	3%	**7%**	11%	0%	3%	**6%**	8%
Costs ($M)	$383	$280	**$193**	$138	$43	$31	**$24**	$20
Benefits ($M)	$5,135	$3,064	**$1,648**	$950	$300	$181	**$114**	$86
NPV ($M)	$4,752	$2,783	**$1,455**	$812	$258	$150	**$90**	$66
BCR	13.4	10.9	**8.5**	6.9	7.0	5.8	**4.8**	4.3

Other inputs

Australia requested that as part of the modelling savings be provided through to 2030, see **table D 15** below.

Table D 15

Australia: Annual and Cumulative Savings to 2030

Scenario 4: MEPS EU 2019 with Labelling

Australia has requested that the savings be provided to 2030

	Energy Savings (GWh)			
	Energy Savings AU		Energy Savings NZ	
Year	**2025**	**2030**	**2025**	**2030**
Annual	517	940	93	168
Cumulative	1,774	5,672	322	1,021

	GHG Emission Reduction (kt CO2-e)			
	GHG Reduction AU		GHG Reduction NZ	
Year	**2025**	**2030**	**2025**	**2030**
Annual	391	693	12	22
Cumulative	1,360	4,258	41	131

Attachment D- Manufacturers and importers

Businesses in Australia that manufacture and may import refrigerated equipment for supply.

Manufacturer/Supplier	Brands include
Advanced Refrigeration Technology	JCM Industries, Maslen
Arcus	Arcus
Channon Refrigeration	Channon
Lazco	
McAlpine Hussmann (Panasonic Corp)	Hussmann, Austral, Hussmann ICE, Hussmann Impact, Hussmann Specialty, McAlpine Hussmann
Practical Products	Practical Products
Spilsbury & Wenzel	Spilsbury & Wenzel
Stoddart	Stoddart, Woodson, Culinaire, Adande, Koldtech
Trent Refrigeration	Trent
Williams Refrigeration	Williams

Businesses in Australia that import refrigerated equipment for supply[1]

Importer/supplier	Brands include
888 Importing (see Kitchen Equipment Australia)	Mitchel Refrigeration, KEA
A J Baker & Sons	Vienna, Bonnet Neve, IARP
Able Products	Afinox
Adgemis (Albany Refrigeration Australia)	(Distributor and reseller)
Alpha Catering Equipment	Alpha Catering Equipment
Anaconda Wholesale	Beerkool, Norsk
Arneg Oceania	Arneg
Artisan Group	Artisan, Coldmart
Austwide	Tropicale , ASR and Shamrock
Avem	Fri-Jado
Bevwizz Group	Bevwizz
Bromic	Bromic, Jordao, Ugur
Bryry Pty Ltd	Turbo Line
Carrier Australia (United technologies)	Carrier
Coca-Cola Amatil	Coca-Cola Amatil

[1] Local manufacturing, importation and distribution supply lines are constantly evolving and are subject to change. In addition, some companies trade under multiple company entities, and relationships between importers/suppliers and brand names constantly change.

Importer/supplier	Brands include
Central West Refrigeration	-
Commercial Fridge & Freezer Sales Australia	(Distributor and reseller)
Complete Beverage Services	Crystal Cooler
Cyberchill Refrigeration	Cyberchill
Delta Refrigeration Services	-
Exquisite Marketing Australia	Liebherr, Exquisite, Exquisite Marketing Australia
Food Equipment Distributors	Bellevista, FED, Thermatech Temperate
Frigoglass	Frigorex
Frigrite Refrigeration International	Frigrite International
GAF Controls	GAF
Global Karma	Global Karma
Golden Bear Enterprises	Bar Fridges Australia
Gren Innovation	Gren, Kinco
HEC Cater	HEC
Hill Equipment (AJ Baker & Sons)	-
Hoshizaki Lancer	Hoshizaki, Lancer Beverage, AHT
Hospitality & Beverage Solutions	HAB
Huxford Refrigeration	Huxford
ICS Pacific	ICS Pacific
International Catering Equipment	ICE, Polariz, Inomak
K Refrigeration Group Australia	Koxka, Kobol
Kingloc Commercial Refrigeration	Kingloc
Kitchen Equipment Australia	KEA
Lazco	Afinox
Maurice Kemp & Associates	GRAM, Gram Commercial
Milan Refrigeration	Milan Refrigeration, Lassele, Staycold
Nisbets Australia	Polar Refrigeration
The Orford Group	Orford Group
Quality Traders	Berjaya
Quirks	ISA, Quirks, Sight
Red Bull Australia	AHT, Liebherr, Frigoglass, Baixue, Red Bull
Refrigeration Rentals and Sales (Zero Commercial Refrigeration)	-
Rhino Equipment	Rhino
Roband Australia	Roband
Roller Grill Australia	Roller Grill Australia
Ruey Shing Australia	Ruey Shing Australia
Sanden International	Sanden, Sanden Intercool
SCSR Pty Ltd	SCSR
Skope Australia Pty Ltd	SKOPE several products
Southern Hospitality	Southern Hospitality, Leader
Specialised Refrigeration Services	-
TME Refrigeration	Silfer
True Food International	True Food International, True Manufacturing
Turbo Air Refrigeration (BaySupply Food Service Equipment & Supply)	Turbo Air Refrigeration

Importer/supplier	Brands include
Tu's Brothers (Allcater Pty Ltd)	Iceblue, Supertron
United Refrigeration	-
Unilever Australia	Unilever
Wellkart	Wellquip, Quipwell

Businesses in New Zealand that manufacture and may import refrigerated equipment.

Distributor	Brands include
Commercial refrigeration Wholesale Ltd (Commercial Catering/Hirecool)	Debonair, Koxka, SKOPE, FED, Frigrite
Coldmaster Products NZ	
Cooling Equipment Ltd	
Cossiga	Cossiga
Cuddon	
Debonair	Debonair
Festivé	Festive
Future Products Group	FPG
Jones refrigeration Services Ltd	
Hamill Refrigeration Ltd	Skope, Hoshizaki, Bunn,
Hawke's Bay Refrigeration	
Local Refrigeration & Air Conditioning	
McAlpine Hussmann	Hussmann Ice; Speciality; Impact, Excel; Austral
Philip Smith Electrical & Refrigeration	
Refrigeration Consulting Ltd	
Refrigerated Displays Ltd	
Skope Industries Ltd	SKOPE
Southern Hospitality Ltd	Cossiga, Delta, EuroChill, Festive, Mafirol, Mercatus, Skope
Stainless Kitchens Pacific Ltd	
Technicool	
Temprite Refrigeration Auckland Ltd	
Thompson's refrigeration & Air conditioning.	

Businesses in New Zealand that import refrigerated equipment.

Distributor	Brands include
ARE Services Ltd	
Absolute Control	Dellware, Unifrigor, Interfridge, Sanyo, Tefcold, AHT Rio, ISA, Sevel, Scaiola, Oscartielle, Austral
Aitkens Hospitality Solutions	Skope, Turbo Air, FPG,
Arrow Refrigeration	Bonnet Neve, Framec, Liebherr, Mondial
Blue Ribbon	Frigrite, Dellware, Exquisite
BrianMillen Auctions	Skope, Electrolux, Alpeninox
Catering Hardware Ltd	Kayman, Bellevista, FED, Thermaster, Skope
Choice Catering Equipment Ltd	Skope, Electrolux, Polar,
Coca Cola	Coca Cola
CoSell Commercial refrigeration Solutions	Frigrite,

Distributor	Brands include
Cowley Refrigeration Ltd/Interfridge	AHT, Tefcold, Staycold, Luckdr, Sanyo, Interfridge, De Rigo, Coolhead,
Ecochill	Afinox, Arneg, Incold, Oscartielle
FEDeral Hospitality Equipment	Grand,
FridgeFreezer	Skope
Frigie King Ltd	
Frozen Napoleon	
Happy Kiwi Shop	
Hardy trade	Festivé
Heatcraft	
Hitchon International/ TomaQ	Firscool, Dukers,
Honar Refrigeration	Apollo, Honar, Pesso
Impact Refrigeration	Framec, Husky, Jordao, Sanden, Skope, Vestfrost,
KeriRefrigeration Ltd	Orford,
LKK Food Equipment Ltd	Berjaya
Majors group	ISA, Carpigiani, Technogel, Tekna, Compacta, Gemm, Rubicone, Sencotel, Silikomart, Gelmatic
Midway catering Equipment	Festivé, Bellavista, Frigrite
Refrigerated Cabinet Sales	Amatis, Apollo, Arneg, Bahia, Beverage Air, Bonnet Neve, Carrier/Linde, CoolHead, Dellware, De Rigo, EXPO, Exquisite, Framec, Frigrite, IARP, ICCOLD, ISA, Kalanar, Mafirol, Mercan, Mini Bali, Oscartielle, Procool, Skope, Staycold, Tyler, Verco
SaveBarn	CaterChill,
Southern Chill	Glacier, Caravell, FPG, Skope, Tefcold, Cossiga,
Surplus Brokers Ltd	
Temperature Solutions Ltd	
Thermo Tech	Vestfrost, Envichill, Envifreeze, Indigochiller, Friulinox

Attachment E - Australasian vs International Standards

Current AU/NZ test and performance Standard, AS 1731

Most display cabinets in Australia and New Zealand are required to be registered and pass MEPS levels, and have been since 2004. The Australian Standard AS 1731 defines the test procedure for display cabinets in both countries. It also outlines the requirements for classification, installation and maintenance, user guides and MEPS levels.

Cabinets are defined into more than 50 different types (classes) across four operating temperatures, with different MEPS levels and test procedures. Forty four classes have MEPS levels defined. A range of cabinet sizes and configurations are regulated, from multi-door types that are several meters long for use in large supermarkets, to counter-top glass cabinets designed to display cakes.

Storage cabinets are mentioned in AS 1731 (as cabinets with solid doors) but they are not assigned MEPS values. These means they have "no value" and do not have to comply with a MEPS level nor be registered. Other cabinet types are not assigned MEPS values under AS 1731, including 'combination' cabinets and wine cabinets. These types of fridge have similar functions or characteristics to display cabinets but did not occupy much of the market share when MEPS were first devised (despite the fact that they use refrigeration technologies).

Tests for the energy performance of cabinets are carried out in a controlled environment such as a laboratory or a company's private test room. Climate classes are defined whereby certain cabinets must perform to specific efficiency levels depending on their intended situation of use – in a kitchen they must keep food cold despite the warm kitchen environment. Cabinets are pre-loaded with specific heat-holding packages that simulate a cabinet's contents. Energy consumption is monitored and a formula is used to calculate the efficiency, with factors that vary the score depending on characteristics that affect how well the internal chill is retained and maintained.

The standard AS 1731 has been around in industry since 1966. It was revised in 1975, 1983 and 2000, then updated and published in 2003 as AS 1731: 2003. It came into force in 2004 under the joint E3 program in both countries. Only minor amendments have occurred since. Up until then it kept pace with improvements in the original European

standard EN 441. This was a pre-cursor to the much simpler, ISO two part standard that E3 is looking to align with (23953 *Refrigerated Display Cabinets*.)

AS 1731 still has 14 parts (sold separately) which are shown below. The relevant energy efficiency Parts are shown in bold.

- Part 1: Terms and definitions
- Part 2: General mechanical and physical requirements
- Part 3: Linear dimensions, areas and volumes
- **Part 4: General test conditions**
- **Part 5: Temperature test**
- **Part 6: Classification according to temperatures**
- Part 7: Defrosting test
- Part 8: Water vapour condensation test
- **Part 9: Electrical energy consumption test**
- Part 10: Test of absence of odour and taste
- Part 11: Installation, maintenance and user guide
- Part 12: Measurement of the heat extraction rate of the cabinets when the condensing unit is remote from the cabinet
- Part 13: Test report
- **Part 14: MEPS and HEPS requirements and the appropriate methods for determination of display areas of a number of common varieties of display cabinets**

Europe

The European Commission is implementing a regulated efficiency regime that covers display and storage cabinets. This is a two part scheme of mandatory efficiency grades (based on results of specific methods of tests).

The mandatory energy test involves comparing actual energy consumption measured under test conditions with a "standard" energy consumption amount – and the result is re-worked into an index score called an Energy Efficiency Index. A cabinet that used electricity exactly equal to the "standard" efficiency would have an efficiency index equal to 100% and a product that used half of the standard energy would have an EEI of 50%. For labelling, the efficiency index score is slotted into a number of efficiency grades, depending on different cabinet types and sizes. The efficiency grade must be marked on each product (EC 2014a) and in literature.

Over time, the least efficient grades of cabinets will be phased out.

ISO 23953 – Refrigerated Display Cabinets

ISO 23953 *Refrigerated Display Cabinets* is widely used in Europe as the preferred test method for display cabinets, including open cabinets and those with glass doors. Amendments were made to it in 2012 to accommodate different test packages (e.g. the Australian filler packs).

MEPS levels are being developed separately by the European Commission and will become local (European) regulations.

The technical details of AS 1731 and ISO 23953 are essentially the same. The operating temperature classifications are similar with some extra temperatures defined by ISO 23953 (these will not affect the parameters for determining the cabinet efficiency).

There are several minor technical points of difference from AS 1731 that slightly affect the energy efficiency test.

ISO 23953 does not include storage cabinets because these will be treated separately under the storage cabinet test method EN 16825. It also covers a few more cabinet types than AS 1731 and only a couple are excluded (presumably because there have never been any made and there have not been any registrations for them through E3).

EN 16825 for storage cabinets and other display cabinet standards

Based on the ISO 23953 standard, the storage cabinet standard EN 16825 is essentially the same as for display cabinets but with a proposed modified door opening sequence (Ita 2012). This work is undertaken by CECED Italia, a membership body representing over 100 companies within the Domestic and Professional Appliance sector in Italy. The refrigerated *net volume* is a preferred metric (not Total Display Area TDA).

EN 16825 has been published and European "MEPS" regulations were enacted for storage cabinets from July 2016.

For each product group the efficiency grade is determined by use of a linear equation with set coefficient values that calculate the standard consumption using a metric such as display area or volume. A product that has a measured consumption exactly equal to the standard efficiency would have an efficiency index equal to 100% and a product that used half of the standard energy would have an EEI of 50%.

The series of efficiency grades established can then be used with MEPS regulation to phase out products that do not meet the relevant efficiency grade at any given time, with more stringent efficiency grades. This progressive introduction of more stringent MEPS means that over a specified timeframe the worst performing grades can be progressively eliminated from the market.

In tandem with this is the mandatory labelling scheme which obligates suppliers to have a label on their products depicting the efficiency grade of the product and also stating other relevant efficiency details. The online energy rating information to be added to these regulatory proposals will be based on the EEI.

Refrigerated Display Cabinet MEPS

Refrigerated display cabinets will all be required to have an Energy Efficiency Index calculated and grades.

The EU will grade the efficiency of display cabinets into 7 groups (A – G) based on their EEI score (**Table F 1** and **Table F 2**). Group A is the highest efficiency grade, where they

achieve a score that means their energy use is 70% better than the Standard Annual Energy Consumption. The levels are currently outlined in the 2014 public drafts however may be updated once their regulations are published.

Increasing stringency of MEPS is achieved by requiring that all cabinets must meet a moving efficiency score by a certain date. These dates are shown below (see also main document).

Table 9: European introduction dates and MEPS for storage cabinets, and draft MEPS for display cabinets.

Introduction date	Refrigerated storage cabinets	Refrigerated display cabinets
From 1 July 2016	EEI < 115	
From 1 January 2018*		EEI < 150
From 1 January 2018	EEI < 95	
From 1 January 2019*		EEI < 130
From 1 July 2019	EEI < 85	
From 1 January 2021*		EEI < 110

* Dates for cabinets other than storage cabinets, and MEPS EEI levels – are indicative only. These were taken from the April 2016 EU documents and are not publically available for comment.

At present, the efficiency grade G covers all cabinets with an EEI higher than 130 or 140, depending on the type. In 2019 all cabinets will have to score an EEI of less than 130, and by 2021, all types will have to perform better than an EEI score of 110.

Table F 1: Draft efficiency labelling grades for refrigerated display cabinets.

Energy Efficiency Class	Commercial Display Cabinets	Beverage Coolers	Small Ice-cream freezers	Soft scoop ice cream cabinets
A	EEI < 30	EEI < 30	EEI < 40	EEI < 40
B	30 ≤ EEI < 50	30 ≤ EEI < 50	40 ≤ EEI < 70	40 ≤ EEI < 60
C	50 ≤ EEI < 80	50 ≤ EEI < 80	70 ≤ EEI < 90	60 ≤ EEI < 80
D	80 ≤ EEI < 110	80 ≤ EEI < 110	90 ≤ EEI < 110	80 ≤ EEI < 100
E	110 ≤ EEI < 120	110 ≤ EEI < 130	110 ≤ EEI < 130	100 ≤ EEI < 120
F	120 ≤ EEI < 130	130 ≤ EEI < 140	130 ≤ EEI < 140	120 ≤ EEI < 140
G	130 ≤ EEI	140 ≤ EEI	140 ≤ EEI	140 ≤ EEI

Table F 2: Draft "MEPS" improvement implementation dates for refrigerated display cabinets.

Introduction	EEI score ("MEPS" grade)
From 1 January 2018	EEI < 150
From 1 January 2019	EEI < 130
From 1 January 2021	EEI < 110

The "MEPS" EEI levels and labelling grades for display cabinets are still in draft and are likely to change pending the outcome of the European Labelling review (this will potentially be known by December 2017).

Draft equation to calculate the EEI of display cabinets

For most display cabinets (not beverage coolers & small ice-cream freezers):

The EEI of display cabinets is a ratio of their Annual Energy Consumption compared to a Standard Annual Energy Consumption, to 1 decimal place: [56]

$EEI = (AEC/SAEC) \times 100$

Where:

$AEC = E24h \times 365$

AEC = Annual Energy Consumption of the cabinet in kWh/year, which is the sum of the AEC of all compartments of the cabinet,
E24h = the energy consumption of the cabinet over 24 hours)

$SAEC = (M + N \times Y) \times 365 \times C$

SAEC = Standard Annual Energy Consumption of the cabinet in kWh/year.
Y = volume of the appliance, which is the *sum of volumes* of all compartments of the cabinet, expressed in litres. For beverage coolers, the gross volume shall be used, for all other cabinets, the net volume. For vending machines, only those compartments are to be considered that are directly available for vending without service visit.

For all other refrigerated commercial display cabinets:
Y = total display area, which is the sum of the display areas of all compartments of the cabinet, expressed in squared meters (m^2).
M and N are defined values – see table below.

[56] From April 2016 – this is in draft and is not publically available.

In the case of combined [access] cabinets, the SAEC is calculated separately for each cabinet compartment and added together to obtain the total SAEC of the combined [access] cabinet.

Specific M and N and C coefficients for display cabinets:

The M, N and C coefficients were devised by an industry-government working group to add correction factors to the display cabinet EEIs. These are shown in

Table F 3 and **Table F 4.** [Tables are all extracted from the draft European Commission regulations, April 2016.]

Table F 3: Draft M and N coefficients for Refrigerated display cabinets.

Category	Value for M	Value for N
Beverage Coolers	1.0	0.013
Small Ice-cream freezers	1.0	0.009
Gelato scooping ice-cream cabinets	10.4	30.4
Vertical, semi-vertical and combined supermarket refrigerator cabinets	9.1	9.1
Horizontal supermarket refrigerator cabinets	3.7	3.5
Vertical, semi-vertical and combined supermarket freezer cabinets	1.6	19.1
Horizontal supermarket freezer cabinets	4.2	9.8

Table F 4. Coefficient values.

Category	Value for C
supermarket refrigerator	$\mathbf{C = 1 + \frac{7 - T_1}{25}}$
supermarket freezer	$\mathbf{C = 1 + \frac{(-15) - T_1}{25}}$
beverage cooler	$\mathbf{C = 1 + \frac{5 - T_C}{25}}$
small ice-cream freezer	$\mathbf{C = 1 + \frac{(-18) - T_1}{30}}$
vending machine	$\mathbf{C = 1 + \frac{12 - T_V}{25}}$
other refrigerated commercial display cabinets	$\mathbf{C = 1}$

Where, when testing the appliance, T_1 is the highest temperature of the warmest test package, T_C the average compartment classification temperature, and T_V the maximum measured product temperature. For multi-temperature vending machines, T_V shall be the average of T_{V1} (the maximum measured product temperature in the warmest compartment) and T_{V2} (the maximum measured product temperature in the coldest compartment). For other types of cabinets where compartments are set to different temperatures, the SAEC is calculated separately for each cabinet compartment and added together to obtain the total SAEC of the cabinet (Note the EC regulators are still investigating details of how to apply the coefficient values).

Refrigerated Storage Cabinet MEPS

A similar approach is planned for storage cabinets, based on the standard EN 16825. Refrigerated storage cabinets will be categorised into four main groups, representing the main characteristics of the cabinet: vertical or horizontal (counter) and refrigerator or freezer. This test standard includes classes/models previously defined in AS 1731 with a solid door – and multi-use (combination) cabinets.

The energy efficiency levels for these types of cabinets are defined as a ratio of the theoretical (tested) energy consumed in relation to the volume.

The EN regulations for storage types will not recognise cabinets with remote condensing units (because as far as we know, all storage cabinets are integral) and open cabinets (these are considered to be display cabinets).

Heavy duty vs light duty operating situations:

The storage cabinet standard EN 16825 also distinguishes between light duty and heavy duty cabinets taking into account the conditions that these cabinets can be expected to be capable of operating in. Light duty cabinets are those that cannot operate above *Climate Class 3 (25^{o}C and 60% RH)* conditions and must be labelled as such. Heavy Duty cabinets have the ability to operate in conditions corresponding to *Climate Class 5 (40^{o}C and 40% RH).*

All cabinets (except light duty cabinets) are tested at *Climate Class 4* and they are subject to the same efficiencies. For light duty cabinets, their efficiency scores are also subjected to normalising factors (adjustment factors) of 1.2 and 1.1 for refrigerators vs freezers, to take into account the less onerous test conditions.

The EEI is calculated in a similar manner as for display cabinets, requiring the Annual Energy Consumption (AEG), the Standard Annual Energy Consumption (SAEG). Instead of the Total Display Area, the *net Volume* is used (in litres). Labelling and calculating an EEI score is also required, and similar to display cabinet MEPS – efficiencies will need to improve by certain dates, to remain viable for trade.

Equation to calculate the EEI of storage cabinets

The Energy Efficiency Index (EEI) is calculated as:

$$EEI = (AEC/SAEC) \times 100$$

Where:

$$AEC = E24h \times af \times 365$$

AEC = Annual Energy Consumption of the cabinet in kWh/year
E24h = energy consumption of the cabinet over 24 hours
af = adjustment factor to be applied only for light-duty cabinets

$$SAEC = M \times Vn + N$$

SAEC = Standard Annual Energy Consumption of the cabinet in kWh/year

Vn = net volume of the appliance, which is the sum of net volumes of all compartments of the cabinet, expressed in litres.

Specific M and N coefficients:

Similar to display cabinets, storage cabinets have defined M and N coefficients for different types of cabinet– see
Table F 5.

Table F 5: M and N coefficients for refrigerated storage cabinets.

Category	Value for M	Value for N
Vertical Chiller (VC)	1.643	609
Vertical Frozen (VF)	4.928	1472
Horizontal counter, Chilled (HC)	2.555	1790
Horizontal counter, Freezer (HF)	5.84	2380

Efficiency labelling levels for storage cabinets:

In a similar manner to display cabinets, the EU propose to grade the efficiency of the storage cabinets based on their EEI score. These will have up to 10 grades (A^{+++} through to G) see

Table F 6.

Table F 6: Efficiency labelling grades levels for storage cabinets:

Proposed EU energy efficiency levels for refrigerated storage cabinets	
Energy Efficiency Class	Refrigerated storage cabinets
A+++	EEI < 5
A++	5 ≤ EEI < 10
A+	10 ≤ EEI < 15
A	15 ≤ EEI < 25
B	25 ≤ EEI < 35
C	35 ≤ EEI < 50
D	50 ≤ EEI < 75
E	75 ≤ EEI < 85
F	85 ≤ EEI < 95
G	95 ≤ EEI < 115

As shown by **Table F 7**, the first implementation date for more stringent MEPS for storage cabinets was in July 2016. Prior to that date cabinets were able to have an EEI higher than 115. Now storage cabinets have to score an EEI of less than 115. In 2018 the EEI ramps down to less than 95, and in 2019, less than an EEI of 85.

Table F 7: "MEPS" improvement implementation dates for refrigerated storage cabinets.

Proposed EU energy efficiency levels for refrigerated storage cabinets		
Introduction	Refrigerated storage cabinets	Heavy duty cabinets
From 1 July 2016	EEI < 115	EEI < 115
From 1 January 2018	EEI < 95	-
From 1 July 2019	EEI < 85	-

Impact of the regulatory proposals

Adoption of the ISO Standard 2395 and associated Standards will incorporate cabinets not previously allocated a MEPS value or excluded by definition or cabinet type under AS 1731.

Definition of 'family of models' for display cabinets

Currently it is unclear what a 'family' of models represents in AS 1731. Clause 4.6.1 of part 1 of the standard defines a 'family' of models as:

"A range of models of the one brand, for which a single set of test reports is applicable and where each of the models has the same relevant physical, characteristics, comparative energy consumption, energy efficiency rating and performance characteristics. The term 'model' is synonymous with 'family of models'."

Any confusion as to whether this definition is intended to refer to identical 'clip together units' or the resulting array of units in a cabinet bank, would be avoided by moving to the ISO Standard 23953 (display cabinets) and other related Standards.

The ISO definition of family is "groups of cabinets" (clause 3.7.1 Part 1 Vocabulary).

These are further designated into broad types (vertical, horizontal, frozen or chilled) in **Annex A** of ISO 23953 – meaning that suppliers must define their cabinets into master groups irrespective of factors such as size, shape and dimensions, see **Figure 15** below.[57]

[57] The use of refrigerated display cabinet families will reduce the overall number of models registered by an estimated 20%.

Figure F 2: Extract from the efficiency standard ISO 23953 for display cabinets – designation of cabinet 'families' (groups of models, Table D.1).

Table D.1 — Designation of refrigerated display cabinet families (Informative Annex A of ISO 23953-1)

Application	Temperature positive		Temperature negative	
To be used for	Chilled foodstuffs		Frozen, quick frozen foodstuffs, and ice cream	
Horizontal	Chilled, serve-over counter open service access	HC1	Frozen, serve-over counter open service access	HF1
	Chilled, serve-over counter with integrated storage open service access	HC2		
	Chilled, open, wall site	HC3	Frozen, open, wall site	HF3
	Chilled, open, island	HC4	Frozen, open, island	HF4
	Chilled, glass lid, wall site	HC5	Frozen, glass lid, wall site	HF5
	Chilled, glass lid, island	HC6	Frozen, glass lid, island	HF6
	Chilled, serve-over counter closed service access	HC7	Frozen, serve-over counter closed service access	HF7
	Chilled, serve-over counter with integrated storage closed service access	HC8		
Vertical	Chilled, semi-vertical	VC1	Frozen, semi-vertical	VF1
	Chilled, multi-deck	VC2	Frozen, multi-deck	VF2
	Chilled, roll-in	VC3		
	Chilled, glass door	VC4	Frozen, glass door	VF4
Combined	Chilled, open top, open bottom	YC1	Frozen, open top, open bottom	YF1
	Chilled, open top, glass lid bottom	YC2	Frozen, open top, glass lid bottom	YF2
	Chilled, glass door top, open bottom	YC3	Frozen, glass door top, open bottom	YF3
	Chilled, glass door top, glass lid bottom	YC4	Frozen, glass door top, glass lid bottom	YF4
	Multi-temperature, open top, open bottom			YM5
	Multi-temperature, open top, glass lid bottom			YM6
	Multi-temperature, glass door top, open bottom			YM7
	Multi-temperature, glass door top, glass lid bottom			YM8

R Remote condensing unit	V Vertical
I Incorporated condensing unit	Y Combined
A Assisted service	C Chilled
S Self-service	F Frozen
H Horizontal	M Multi-temperature

General classification can be used as follows: HC1, VF1, YM5. When necessary, the classification can be more precise, for example, RHC1A, IVF1S.

NOTE Serve-over counters are primarily in assisted service but can be in self-service. Chilled multi-deck cabinets are primarily in self-service but can be in assisted service.

Alternate Components for display cabinets.

Under ISO 23953, the Standard enables calculation of Revised Refrigeration Energy Consumption. All things being identical, rated components can be substituted in models that have already been tested for efficiency.

This means that cabinet models do not need to be re-tested or re-registered as long as, if required, the supplier can prove the components rate as efficiently as those in the original model.

'Built in' display cabinets.

In the EC regulations (from April 2016) for display cabinets, there is an exemption for 'Built in' cabinets. These are further defined as:

"..a fixed insulated refrigerating appliance intended to be installed in a prepared recess in a wall or similar location, and requiring furniture finishing" [clause 1(h) of Article 2 Definitions]

'Built in' storage (professional) cabinets.

As with display cabinets, there is an exemption for 'built-in' storage cabinets from complying with the energy efficiency levels. These are defined in a very similar way as the draft EC regulations for display cabinets:

"...a fixed insulated refrigerating appliance intended to be installed in a cabinet [emphasis added], in a prepared recess in a wall or similar location, and requiring furniture finishing." [clause (c) Article 2 Definitions].

'Custom made' and one-off storage (professional) cabinets.

Custom made storage cabinets are exempt from the scope of the storage cabinet regulations: these are defined in Article 1 clause 3(i) as:

"...made on a one-off basis according to individual customer specification and not equivalent [emphasis added] to other professional refrigerated storage cabinets as described in definition 10 of Annex 1."

'Equivalent' is further defined in Annex 1 as:

"a professional refrigerated storage cabinet model placed on the market with the same net volume, same technical, efficiency and performance characteristics, and same compartment types and volumes as another professional refrigerated storage cabinet model placed on the market under a different commercial code number by the same manufacturer." [clause 10 of Annex 1]

This would mean that in an Australasian scheme, both built in, custom made storage cabinets and one-off cabinets, would also be exempt from MEPS compliance.

Custom-made or one-off display cabinets.

Custom made display cabinets are also exempt from the scope of the EC regulations: these are defined in Article 1 clause 2(h) as:

"...made on a one-off basis according to individual customer specification and not equivalent [emphasis added] to other refrigerated commercial display cabinets as described in definition 18 of Annex 1."

'Equivalent' is further defined in Annex 1 as:

"a refrigerated commercial display cabinet placed on the market with the same net volume, or total display area, same technical, efficiency and performance characteristics, and same compartment types, display areas and volumes as another refrigerated commercial display cabinet model placed on the market under a different commercial code number by the same manufacturer." [clause 18 of Annex 1]

This would mean that in an Australasian scheme, both built in, custom made storage cabinets and one-off cabinets, would also be exempt from MEPS compliance.

By grouping cabinet types, and allocating MEPS – wine and chocolate cabinets are covered

Because the MEPS specifications (implemented or to be introduced in Europe) are proposed to be based on groups of cabinet types – all cabinets must be tested to a specified holding temperature (M, L or S). This is irrespective of them being remote or integral. Wine cabinets, chocolate cabinets and other 'special' temperatures must then comply with the relevant MEPS levels. Specific mention is made of 'wine STORAGE applications' (emphasis added) being *excluded* from the draft *display* cabinet EC regulations however these are specifically captured in the *storage cabinet* standard (classified as cabinets containing 'foodstuffs'. The definition of 'foodstuffs' specifically includes wine).

Cabinets with non-standard storage temperatures

Cabinets can be split into two broad operating temperature classes, those with mean storage temperatures:

- Below zero, or low temperature cabinets such as freezers; and
- Above zero, or medium temperature cabinets such as chillers and refrigerators.

Grouping commercial refrigeration products into several broader classifications rather than a multitude of specific types and sub-type means there is less scope for cabinets to be excluded because they may not exactly fit a specific definition or sub-type.

Specific cabinets with "non-standard" product storage temperatures such as those intended to store chocolate or wine can be included in the broad group with mean storage temperatures above zero.

Currently AS 1731 specifies MEPS levels for storage temperature classes L1, L2, M1 and M2 for integral cabinets but not for remote cabinets. Irrespective of the temperature class of a remote cabinet it is assumed that the MEPS level will apply to all the medium temperature classes and to all the low temperatures classes.

Thus cabinets falling outside of these temperature ranges or those that do not fall within the definitions of the various sub-types are not subject to maximum energy consumption limits.

However a refrigerated cabinet intended to store and display wine is a refrigerated cabinet with a mean storage temperature above zero and therefore should be included in this grouping, although they may need to be subject to a specific definition and modified test requirements.

The performance standard for household refrigerating appliances AS/NZS 4474 incorporates very specific requirements in Clause 1.3.18 (e) covering the definition of cabinets specifically designed exclusively for the storage and/or long term maturation of wine. This includes the ability to keep products above the ambient temperature if such circumstances occur, maintain temperatures within a 0.5 K tolerance, control of humidity and construction to reduce vibration. While cabinets or compartments meeting this criteria are specifically excluded by the scope of this particular performance standard, household

refrigerating appliances that may be used to store wine are still covered by this standard, although when tested do not have to meet all of the test requirements.

In terms of refrigeration capacity a refrigerating appliance, such as a wine cabinet, storing product at temperatures above that required for the normal safe storage of foodstuffs, would be less demanding than a cabinet storing product at safe storage temperatures and therefore would have a lower daily energy consumption requirement.

Such cabinets would, without doubt, meet any universal minimum energy performance standards applied to commercial refrigerating appliances intended for operation at mean storage temperature above zero, should undergo testing at the intended storage temperature, and apart from an exclusion from meeting the door opening requirements, be subject to regulation, without exception.

Basically an all-encompassing structure should be used to apply minimum efficiency levels to all commercial refrigerating appliances regardless of storage temperature. The basic structure of the European combined group classification is shown by **Table 10** below.

Table 10: Summary structure of EU combined group classifications.

<table>
<tr><th colspan="4">Medium Temperature (Refrigerators)
Mean storage temperature above 0°C
Class M, M0, M1, M2, H1, H2, S</th><th colspan="4">Low temperature (Freezers)
Mean storage temperature below 0°C
Class L1, L2, L3</th></tr>
<tr><td colspan="3">Display cabinets</td><td colspan="2">Storage cabinets</td><td colspan="3">Display cabinets</td><td colspan="2">Storage cabinets</td></tr>
<tr><td colspan="2">Vertical</td><td rowspan="2">Horizontal</td><td rowspan="2">Vertical</td><td rowspan="2">Horizontal</td><td rowspan="2">Vertical</td><td colspan="2">Horizontal</td><td rowspan="2">Vertical</td><td rowspan="2">Horizontal</td></tr>
<tr><td>Beverage</td><td>Others</td><td>Small Ice-cream</td><td>Others</td></tr>
<tr><td colspan="10">Note: (1) Temperature Classes, M, M0, M1, M2, H1, H2, S, L1, L2 and L3 are all defined in ISO 23953.2:2015.</td></tr>
</table>

Beverage Cabinets

In the Australian and New Zealand market there has been little or no distinction on the specific application of display cabinets and it is usually assumed that a refrigerated display cabinet is universally intended to display foodstuffs of any type whether it be food, beverages or a combination of both. While beverages are generally defined as a foodstuff there are beverages that do not require refrigerating for food safety reasons but rather for consumer preference. Most dairy products and some juices are required to be kept at chilled temperatures to avoid deterioration. The application can have an impact on the energy consumption of a cabinet and when determining efficiency levels it is desirable to achieve the best individual savings that can be made in relation to the variety of products in the market.

The Europeans have recognised that there are large numbers of self-contained display cabinets, often with fleet ownership, that are designed with a “pull-down” capability rather than a simple “holding” capability and have created a designated classification that these cabinets can be grouped into.

Often these “pull-down” cabinets fulfil the specific requirements of bottling or beverage companies in that a cabinet must be able to achieve the correct product storage temperature within a set time frame when loaded with product at ambient temperature. Additional refrigeration load is required to bring the stored product down to an acceptable temperature. These cabinets are also normally specified for operation in onerous climatic conditions because they may be required to operate in unknown locations globally.

A holding cabinet is normally loaded with product close to or already at the desired storage temperature and therefore does not require additional refrigeration load to cool down the product.

Due to these differences in refrigeration load the performance of the refrigeration system can be considerably greater than a holding cabinet. Despite these differences, “beverage” cabinets are currently subject to the same test methods and maximum energy consumption requirements which apply to a holding cabinet.

In the Australian and New Zealand markets, self-contained “beverage” cabinets comprise the largest individual sector in the market and subjecting them to different treatment could offer greater potential benefits than if they were treated in the same way as larger capacity remote supermarket cabinets.

Due to the nature of the stored product most beverage cabinets can also be temperature controlled in a manner that might otherwise create a health risk in a cabinet solely containing food. Electronic controls can raise the storage temperature at night or at times of low use in order to save energy and may require different test methods to measure “normal” energy consumption. Specific test requirements to cover the operation of such controls when measuring energy consumption would enable the value of such controls, in reducing energy consumption, to be recognised.

Beyond Europe – other efficiency regimes for refrigerated cabinets

The most significant regimes (other than Europe) in terms of energy efficiency measures are North America (USA and Canada) and China. Apart from the USA, other economies tend to align closely with Europe. Both the US and EU efficiency methods and levels have a forward looking direction i.e. efficiency limits are progressively ramped down and signalled to industry well in advance.

The USA and Canada have efficiency levels aligned in some product groupings. However these are different categories from the EU and AU/NZ regimes. The test methods, while similar, do not align with AS 1731. This includes number of door openings and test packs. Treatment of display area is also different and volume is used instead of Display area, for some categories.

The USA uses the efficiency standard ANSI/AHRI 1200 *Performance Rating of Commercial Refrigerated Display Merchandisers and Storage cabinet*. The maximum daily energy consumption requirements are published by the US Department of Energy

(DOE). There are 50 individual equipment families each with a unique code describing the application and including food storage cabinets.

The standard uses Imperial units (Inch-Pound (I-P)), refers to and requires the use of several other standards. The method of calculating Total Display Area (TDA) has changed over time however the light transmission factor of the glazing material is not taken into account (i.e. different from AS 1731.14). This increases their TDA in relation to the Australian TDA. It also differs from the AS 1731 and ISO 23953 in the door opening sequence (eight hour door opening test for closed cabinets while Europe, China, Australia and New Zealand all require a twelve hour opening period.) In addition North America is for the most part using a refrigerated volume metric for closed display cabinets and display area metric for open cabinets. The USA is about to start developing their beverage vending machine MEPS.[58]

Canada

Canada no longer fully aligns with the USA and has a regime that covers self-contained refrigerators and freezers and combination cabinets. Equipment is segmented into very broad groups compared basically by temperature above or below freezing and whether the display face is transparent, has solid doors or drawers. Testing is carried out according to the AHRI Standard 1200-2008 Performance Rating of Commercial Refrigerated Display Merchandisers and Storage cabinets and refers to other standards. It covers ice-cream freezers, Wine chillers or floral storage cabinets.

The volume is used as part of the performance metric (in litres) calculated in accordance with CSA C300: 2008 Energy Performance and Capacity of Household Refrigerators, Refrigerator-Freezers, Freezers and Wine Chillers. Door openings are the same standard as the USA.

The performance levels cover all self-contained refrigerators, freezers and refrigerator freezers manufactured since 2010 and are aligned with the USA for similar self-contained equipment although use metric units instead of Imperial units.

China

China has closely followed the test methods and MEPS levels applied in Australia and New Zealand, however at this stage only remote equipment has been covered.

China is globally significant because of its large manufacturing base, huge local market with considerable exports to Europe and Australasia.

China brought in regulations in 2012 to cover remote display cabinets. These used standards based on the Australian Standard AS 1731 and the International Standard ISO 23953. Their GB/T21001.1 and GB/T21001.2 standards approximately equate to ISO

[58] Note that E3 investigated the energy efficiency of vending machines in 2009 in Australia and New Zealand. At that time, most of the stock was at the USA ENERGY STAR® level (highly efficient) so, despite publishing an energy efficiency standard for these machines, the Standard (i.e. regulation for efficiency) was not implemented.

23953.1 and ISO 23953.2. They contains the type classifications and definitions and the MEPS levels or Energy Consumption Coefficients (ECC) along with specifications for efficiency grades called Minimum allowable values of energy efficiency and energy efficiency grades of commercial refrigerating appliances – Part 1: Refrigerated display cabinets with remote condensing unit.

The classifications for the various types of equipment families basically align with the Australian categories for remote cabinets, however in some instances they have expanded their technical definitions. For the most part the Chinese ECCs align with AS 1731 MEPS for cabinets with the lowest temperature ranges but are more stringent than AS 1731 for cabinets working at higher temperatures. Where "no value" exists for the Australian MEPS, the same applies to the Chinese standard.

Energy Efficiency Grades from 1 to 5 are applied to the level of efficiency with 1 being the highest and representing a product that is better than 55% of the set ECC level and 5 being the lowest and representing a product that complies and up to 90% of the ECC level

Testing is carried out at Climate Class 3, 250C and 60% RH and with identical test conditions, M-packages and door openings as AS1731 and ISO 23953:2005 however the "Australian" Filler packages are not included. The TDA is currently also subject to the glazing light transmission factors as set out in the Australian Standard.

It was expected that a standard GB 26290.2 would be introduced in 2014 to cover self-contained refrigerated cabinets but as yet this does not appear to have progressed.

The Peoples Republic of China (PRC) has introduced a graded rating and labelling scheme similar to the program proposed for the EU (

Table F 8). The PRC scheme is based on an Energy Efficiency Index with each tier representing a percentage range of the efficiency versus the allowable Base Energy Consumption (BEC) or MEPS level. The program only has five energy efficiency classes and is limited to remote condensing units whereas the EU proposal has seven classes for display cabinets and ten for storage cabinets.

Table F 8: PRC Energy efficiency grades of refrigerated display cabinets with remote condensing units.

Energy Efficiency Grade	Energy Efficiency Index range
1	EEI ≤ 55%
2	55% < EEI ≤ 65%
3	65% < EEI ≤ 80%
4	80% < EEI ≤ 90%
5	90% < EEI ≤ 100%

Attachment F – Technical Working Group Recommendations

Overview

The Technical Working Group (TWG) was formed on behalf of E3 to discuss technical issues which arose following consultation on the Consultation RIS and to make recommendations in relation to the proposed policy options. The TWG was made up of industry representatives, regulators and independent experts.

The TWG has considered whether any technical adjustments are required in order to achieve alignment with the European Standards and Test Methods as proposed under the preferred option 4. There was consensus among TWG members that a move to adopt international standards was the best policy option and that the same policy measures should be extended to both refrigerated display and storage cabinets.

An important aspect of the TWG recommendations relates to alternative channels of registration for refrigerated commercial cabinets. In particular, the feedback from industry supported a 'deemed to comply' pathway to demonstrating compliance and the need to clarify the definition of families of cabinets. Both of these issues have been addressed by the TWG recommendations.

The TWG recommendations have been the subject of a consultation paper that has gone out to industry for further feedback. The full consultation paper (and technical appendix) can be viewed on the Energy Rating Website (www.energyrating.gov.au). The TWG recommendations are referred to below.

Recommendation 1: Adoption of EU efficiency levels for refrigerated display cabinets.

The proposed AU/NZ efficiency levels for Refrigerated Display Cabinets are based on minimum efficiencies aligned with previously published European levels (with adjustments to one cabinet category). These are shown in the appended summary table. The intention is to base the efficiency requirements on the EU Efficiency Regulations (See Option 4: Consultation RIS July 2016 Page 27).

Proposed efficiency levels follow the policy option 4 proposals apart from IRV-4 (Integral Refrigerated Vertical Cabinet with Glass doors) that follows a modified policy option 4 to take into account the change from a volume based metric back to a TDA based metric. The efficiency level based on an Energy Efficiency Index (EEI), together with the proposed date of introduction, are shown in the **table** below. Efficiency levels for the majority of

refrigerated display cabinets will be covered by the test methods set out in ISO 23953:2015.

Proposed EU energy efficiency level for refrigerated display cabinets	
Introduction	Specific refrigerated display cabinets
From 1 December 2019	EEI < 130

Recommendation 2: Adoption of EU efficiency levels for refrigerated storage cabinets.

The TWG recommends the adoption of EU efficiency levels for Refrigerated Storage Cabinets. The proposed efficiency levels for Refrigerated Storage Cabinets are those currently applying in Europe which were implemented under Commission Regulation (EU) 2015/1095 on 5 May 2015 (see Consultation RIS July 2016 Page 27).

The efficiency levels based on an Energy Efficiency Index (EEI), and the proposed date of introduction, are shown in the table below.

Proposed EU energy efficiency level for refrigerated storage cabinets		
Introduction	Refrigerated storage cabinets Light and Normal Duty	Heavy duty cabinets
1 December 2019	EEI < 95	EEI < 115

For regulatory purposes, Refrigerated Storage Cabinets are grouped into four categories based on physical characteristics:

- Vertical Chilled
- Vertical Frozen
- Counter Chilled
- Counter Frozen

These products are then further classified by a Duty Rating based on the ambient conditions in which the cabinets are intended to operate:

- Light duty
- Normal duty
- Heavy duty

The Standard detailing the test method for these cabinets is EN 16825:2016, *Refrigerated storage cabinets for professional use – Classification, requirements and test conditions.* Temperature performance and energy consumption are tested to determine energy

efficiency in the form of an Energy Efficiency Index (EEI), with the EEI calculated using formulae prescribed by EU Regulations.

Recommendation 3: Three defined registration channels

The TWG identified three defined registration channels:

1) Single model registrations.
2) Family model registrations - in a 'family' registration the maximum energy consumption and minimum energy efficiency performance will be evidenced by a certified performance test conducted on the worst performing cabinet model. The worst performing model will be designated as the "parent" model in a family registration.
3) Deemed to Comply registrations – reserved for low volume bespoke/custom units that cannot be tested in a standard testing facility. This channel will have prescribed technical information required at the point of registration to enable a (ISO 23953 based) calculated efficiency level.

Family of models – definition

A family of models is a range of models of the same brand.[59] Each family is based on a 'parent' model that has undergone a certified performance test and is registered on the energyrating.govt.au website. All other models in the family must have the same or better energy rating characteristics than the 'parent' model. The parent model's certified performance test documentation is required to be uploaded at the point of registration, along with (physically identifiable) model number variations for all other models that are being registered as members of the same family. The TWG recommended that a maximum of 20 family member models be permitted in a family registration.

Models that are part of a family

To be included as a member of a family, it is proposed that all of the following conditions must be met:

1. At the point of registration the least efficient model is selected as the parent model and the registration individually identifies all other same or better efficiency models in the family; and,

[59] For registration purposes, an identical energy rating specification cabinet can be given an alternative trading brand and model number provided that the manufacturer supplies a declaration stating the products are identical in energy rating performance and identical to the model in test report number XYZ. This declaration must be on the product manufacturer's letter head, dated and signed in PDF electronic format and uploaded on the product registration website page along with the test documentation.

2. Family member models must not exceed the allowable maximum energy consumption[60] (TEC/TDA) in kWh/day/m^2 or (TEC/V_N) in kWh/day/m^3 of the parent model; and,
3. Family member models must have an identical or warmer product temperature range (M-package temperature) than the parent model; and,
4. Family member models must be of an identical cabinet type and use the same method of access to products being displayed or stored as the parent model (either all open or all closed cabinets).

To assist in determining the model to be selected as the 'parent' of a family of self-contained cabinet models or remote cabinet models, criteria can be applied to identify the model that will produce the highest allowable maximum energy consumption and thus be the least energy efficient (refer **Technical Appendix** for criteria: http://energyrating.gov.au/document/industry-update-refrigerated-display-and-storage-cabinets-technical-working-group).

Alternate components are permitted to be substituted in a cabinet that is part of a family registration provided the components have the same or better specification and performance. Compliance activity and check testing will be used to ensure registered performance is maintained.

Deemed to comply registrations

Deemed to comply is an alternative registration method for cabinets that are produced in low quantities (i.e. one-offs, bespoke/custom or built in) that cannot be tested in a standard testing facility.

A certified performance test to the recognised Standard is the most certain method for a risk free registration but the practicalities and relative costs are prohibitive with low volume cabinets, and generally outweigh the overall benefits. In this scenario, a simple method of analysing the energy characteristics of a design to demonstrate the energy efficiency of a cabinet, relative to the regulated minimum efficiency level, is considered to be a more viable approach.

ISO 23953.2:2015 (Annex D) sets out a method for establishing data requirements for Standard Ratings and evaluating alternative components for both remote and self-contained refrigerated display cabinets based on the AHRI 1200 Standard.[61] This method

[60] Minimum energy performance requirements in terms of the 'maximum allowable energy consumption' of a model expressed as the total energy consumption (TEC) per 24 hours of total display area (TDA) (Units: kWh/24h/m2) or net volume (Units kWh/24h/m^3). An energy efficiency factor of a particular model can be determined by comparing the actual total energy consumption per unit display area or unit volume with the maximum allowable energy consumption as specified by regulation.

[61] Air-Conditioning, Heating and Refrigeration Institute (US) – Performance Rating of Commercial Refrigerated Display Merchandisers and Storage cabinets.

is also incorporated into Annex B of EN 16838:2016 (Refrigerated display scooping cabinets for gelato).

These methods have conditions. For example, if an electrical component increases energy consumption then the cabinet efficiency must be revised based on actual measurements. If there has been an energy reduction, the calculation or measurement method can be used.

When submitting efficiency data for a commercial cabinet that has been calculated rather than physically tested, it is expected that a calculation adjustment factor of an additional 15% would be added to the claimed energy consumption to take into account real-world operation.

Registration costs

The TWG had broad representation from local manufacturers, importers and companies who have experience in both manufacturing and importing in the Australian and New Zealand markets. Extensive discussion and debate was directed at ensuring that registration costs would be fair and equitable under the new regulatory structure. Provision of wider registration channels through the 'family of models' and 'deemed to comply' pathways was accepted as providing industry with the means to comply with legal requirements at a fair and reasonable cost.

Recommendation 4: Voluntary online labelling

While a mandatory labelling system was not supported by industry, there was consensus by industry and regulators at TWG meetings that there was still a compelling case for labelling which should be online and voluntary (however, some manufacturers may still choose to apply physical labels to cabinets under a online energy rating information scheme).

The cabinet efficiency characteristics shall be provided online, and in a standardised star rating format. The development of a star rating label (and the transition to the European Energy Efficiency Index) will require labelling algorithms to be developed by consultants (and published prior to implementation of the new MEPS scheme) in conjunction with New Zealand and Australian regulators.

Recommendation 5: Adoption of ISO 23953 (Refrigerated Display Cabinets) with minor amendments

The TWG noted that the light transmission factor and the change to the higher frequency of door openings for closed chillers are the main test differences between ISO 23953 and AS 1731.

It was agreed a key performance aspect is to ensure that a closed cabinet maintains the specified temperature when subject to door openings.

The TWG accepted the ISO inclusion of a sneeze guard. However, the ISO dimensional limit of not less than 1500mm may not be appropriate for all commercial cabinet types. Specific dimensions may be required in certain jurisdictions. The wording on sneeze guards as used in AS 1731 is preferred.

The TWG accepted ISO 23953 Annex A which effectively removes the light transmission factor.

Recommendation 6: Adoption of ISO 23953.1 (Vocabulary) – concerning groups of cabinets as classified by type.

The TWG accepted ISO 23953.1 which concerns groups of cabinets as classified by Type (see **table** below).

ISO 23953-1:2015 ANNEX A (informative)
Designation of refrigerated display cabinet families

Application	Temperature positive		Temperature negative	
To be used for	Chilled foodstuffs		Frozen, quick frozen foodstuffs and ice cream	
Horizontal	Chilled, serve-over counter open service access	HC1	Frozen, serve-over counter open service access	HF1
	Chilled, serve-over counter with integrated storage open service access	HC2		
	Chilled, open wall site	HC3	Frozen, open wall site	HF3
	Chilled, open island	HC4	Frozen, open, island	HF4
	Chilled, glass lid, wall site	HC5	Frozen, glass lid, wall site	HF5
	Chilled, glass lid, island	HC6	Frozen, glass lid, island	HF6
	Chilled, serve-over counter closed service access	HC7	Frozen, serve-over counter closed service access	HF7
	Chilled, serve-over counter with integrated storage closed service access	HC8		
Vertical	Chilled, semi-vertical	VC1	Frozen, semi-vertical	VF1
	Chilled, multi-deck	VC2	Frozen, multi-deck	VF2
	Chilled, roll in	VC3		
	Chilled, glass door	VC4	Frozen, glass door	VF4
Combined	Chilled, open top, open bottom	YC1	Frozen, open top, open bottom	YF1
	Chilled, open top, glass lid bottom	YC2	Frozen, open top, glass lid bottom	YF2
	Chilled, glass door top, open bottom	YC3	Frozen, glass door top, open bottom	YF3
	Chilled, glass door top, glass lid bottom	YC4	Frozen, glass door top, glass lid bottom	YF4
	Multi-temperature, open top, open bottom			YM5
	Multi-temperature, open top, glass lid bottom			YM6
	Multi-temperature, glass door top, open bottom			YM7
	Multi-temperature, glass door top, glass lid bottom			YM8

R Remote condensing unit	V Vertical
I Incorporated condensing unit	Y Combined
A Assisted service	C Chilled
S Self service	F Frozen
H Horizontal	M Multi-temperature

General classification can be used as follows: HC1, VF1, YM5. When necessary, the classification can be more precise for example, RHC1A, IVF1S

NOTE Serve-over counters are primarily in assisted service but can be in self-service. Chilled multi-deck cabinets are primarily in self-service but can be in assisted service.

Recommendation 7: Adoption of ISO 23953.2 (Refrigerated Display Cabinets – Classifications, Requirements and Test Conditions)

The TWG recommends that ISO 23953.2 be adopted in relation to Refrigerated Display Cabinets, including minor amendments to clauses concerning controls, closed chiller loading heights and component substitution.[62]

The TWG also accepted clause 5.3.2.7 and 5.3.2.8 (requirements for cabinet lighting controls). However, cabinets from Europe always contain a switch. To ensure the full interpretation of the ISO standard, and to encourage energy savings, it was recommended that AS 1731 wording be included to allow an automatic switch to be fitted.

The TWG accepted clause 5.3.2.3.2 (loading heights of closed cabinets), with a suggested variation to revert to the half-height loading of test packages using wording from AS 1731 (that provides clarity for the trans-Tasman market).

The TWG accepted ISO 23953 Annex D, which defines the various components that determine the energy consumption and performance of a refrigerated cabinet. This allows the ability to substitute components and calculate the difference using the technical standard methodology. The TWG suggested clarity be provided to ensure Annex D is clearly translated into regulation.

The TWG also accepted the Table 1 M-Package temperature classifications and the Table 3 Climate Classification of ISO 23953:2015, both of which incorporate additional classifications that were not present in AS 1731 (reproduced below).

[62] The classification of a refrigerated cabinet is defined by the storage temperature of the product (or M-package temperature class) which it can achieve and by the ambient conditions, or climate class, in which it is designed to operate at, and achieve the required storage temperature. Similarly the climate class classification defines ambient operating conditions that are used in establishing the test room conditions for refrigerated equipment, to determine the electrical energy consumption.

TABLE 1 (ISO 23953.2:2015)

Table 1 - M-Package temperature classes

Class	Highest temperature, θ_{ah}, of warmest M-package colder than or equal to [ab]	Lowest temperature, θ_b, of coldest M-package warmer than or equal to [b]	Highest minimum temperature, θ_{al}, of all M-package colder than or equal to [a]
	°C		
L1	-15	NA	-18
L2	-12	NA	-18
L3	-12	NA	-15
M0	+4	-1	-
M *	6	-1	
M1	+5	-1	-
M2	+7	-1	-
H1	+10	+1	-
H2	+10	-1	-
S	Special classification		

a See Figure 29a

b See Figure 29b

* For Class M, the highest temperature of warmest package, θah, colder than or equal to 6,1 °C but the average of the warmest M package colder than or equal to 5 °C

Table 3 (ISO 23953.2:2015 modified)

Table 3 - Climate Classes

Test Room climate class	Dry bulb temperature °C	Relative fumidity %	Dew point °C	Water vapour mass in dry air g/kg
0	20	50	9.3	7.3
1	16	80	12.6	9.1
8	23.9	55	14.3	10.2
2	22	65	15.2	10.8
3	25	60	16.7	12
4	30	55	20	14.8
6	27	70	21.1	15.8
5	40	40	23.9	18.8
7	35	75	30	27.3

NOTE The water vapour mass in dry air is one of the main points influencing the performance and the energy consumption of the cabinets. Therefore, the table is arranged in order of the water vapour mass in dry air. See also ISO 23953.2:2015, Annex B to compare lab and store conditions.

Recommendation 8: Adoption of EN 16825:2016 (Refrigerated Storage Cabinets and Counters for Professional Use)

The TWG recommends adopting EN 16825:2016, with minor amendments to clauses concerning climate class testing, and including a specific additional clause regarding test room conditions for the water vapour test.

The TWG noted a light duty cabinet is tested at Climate Class 3, and the efficiency value is multiplied by an Adjustment Factor of 1.2 (stated in Annex IV 2 (b), Page L177/36) to normalise the efficiency rating at Climate Class 4.

The TWG also noted the clause that specifies heavy duty cabinets need to be tested at three different Climate Classes:

- Climate Class 5 to validate that the cabinet could be operated at these conditions.
- Climate Class 4 for efficiency ratings.
- Climate Class 7 to measure water vapour condensation.

The TWG recommended inclusion of an option allowing for alternative Australian/NZ test filler packages as EN 16825 does not have provision for an alternative (as allowed for in ISO 23953).

EN16825:2016 Addition – test room conditions for water vapour condensation test

The TWG noted it is unclear from the wording of EN16825 whether or not the condensation test can result in a pass or fail energy efficiency requirement. There is no logical reason for undertaking the condensation test to Climate Class 7 (as stated in the Standard), as opposed to the Climate Class for which the Light, Normal and Heavy duty cabinets are intended (i.e. classes 3, 4 and 5 respectively). Adopting EN 16825 verbatim would require an additional 24 hours testing time and expense for no quantifiable benefit. Generally cabinets are tested at the climate condition that they are intended to operate at and have been designed for.

This ambiguity was evidenced by an independent MEPS test report to the FprEN16825:2016 test standard by a member of the TWG Committee. The report showed the test cabinet had condensation present during that test, but the result was not a fail.

The TWG agreed to include the condensation test, and also to progress the action point of contacting the EN Standard project team in Europe, passing on the concerns from the TWG and requesting the rationale to rectify the ambiguity and possible contradiction in terms. Local variations will then be considered (i.e. requiring undertaking the test at the intended Climate Class but with the option of a test for information only at Climate Class 6 for Light duty and Normal duty cabinets, and at Climate Class 7 for Heavy duty cabinets). However, this local adaptation cannot occur until agreement is reached and direction obtained from the European Standard Committee.

Recommendation 9: Adoption of EN 16901:2016 (Ice-Cream Freezers – Classifications, Requirements and Test Conditions)

The TWG accepted EN 16901 for small ice-cream freezers subject to a number of minor changes required to clarify definitions and a minor modification to a diagram.

Recommendation 10: Exclusion of EN 16902 (Commercial Beverage Coolers – Classifications, Requirements and Test Conditions).

The TWG considers that this Standard is not currently fit for purpose in the trans-Tasman setting. Instead, the TWG recommends that ISO 23953 be used to test beverage coolers. The TWG discussed the adequacy of adopting EN 16092 Commercial Beverage Coolers (currently all refrigerated display cabinets, including beverage coolers, are regulated by AS 1731).

A separate EN standard for beverage coolers was developed and published due to the requirement of large European based beverage companies specifying canned or bottled carbonated beverages be chilled to a defined temperature at the point of sale. In these dedicated beverage coolers an electronic management device (EMD) was commonly used. An EMD permits the cabinet to reduce refrigeration cooling overnight (i.e. reducing power consumption during non-retail hours by raising the temperature of the displayed goods), before pulling the cabinet temperature back down to the prescribed temperature in time for retail opening hours. Naturally, this was pertinent to cabinets only containing canned or bottled carbonated beverages but was unsuitable for cabinets that could contain perishable beverages or foodstuffs (such as milk or fruit juice based products). A label was often used by beverage companies - 'cabinet not for use with perishable products' to leave discretion and risk to end users.

To adapt these beverage coolers to suit the perishable market, many manufacturers simply shipped them from factory in 'perishable mode' i.e. with the Energy Management Device (EMD) disabled. To enable supply to both markets most beverage coolers had to be tested to both EN 16902 and ISO 23953 (with the EMD enabled). In Australia and New Zealand the majority of these coolers are suitable as display cabinets for both perishable foodstuffs and non-perishable beverages.

From a technical perspective, EN 16902 is about pull down, not testing for energy efficiency. Test results supplied by TWG members showed cases tested under EN 16902, with the EMD enabled, portrayed an artificially low energy consumption measure (i.e. approx. 25% less) compared to actual, or when compared to a cabinet tested under ISO 23953 for refrigerated display cabinets. In addition, EN 16902 does not require a door opening test for closed cabinets to simulate actual use. The difference in energy consumption when comparing cabinets with and without doors was minimised during testing.

The TWG acknowledged that the test conditions in this Standard do not simulate the real world situations beverage cabinets would be subject too. Overall the TWG was concerned that introducing this Standard would add unnecessary registration/compliance complexity and may allow lower efficiency products into the market as it promotes a less onerous test.

From the Government regulators perspective, there is no obvious way to distinguish beverage coolers from refrigerated display cabinets based on their appearance. It is almost impossible to flag a refrigerated display cabinet as a beverage cooler because the EMD can be enabled or disabled before entering the market. It was also noted by regulators that ISO is currently considering an incorporation of EN 16902. It makes sense to assess adoption of the ISO version of this Standard when available.

TWG members therefore unanimously recommended that EN 16902 not be adopted and that ISO 23953 be used as the test Standard for beverage coolers.

Recommendation 11: Adoption of EN 16838:2016 (Refrigerated Display Scooping Cabinets for Gelato – Classification, Requirements and Test Conditions).

The TWG accepted EN 16901 for gelato scooping cabinets without any changes other than the possibility of applying this Standard to ice-cream scooping cabinets.

Recommendation 12: Refrigerants are out of scope.