



E3

Equipment Energy
Efficiency

Consultation Regulation Impact Statement – Refrigerated display and storage cabinets

**Aligning with international standards to reduce cost
and simplify compliance**

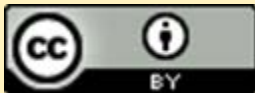
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**A joint initiative of Australian, State and Territory
and New Zealand Governments**

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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
Commercial cabinets	Inclusive term for both refrigerated display and storage cabinets
COAG	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
NFEE	National Framework on Energy Efficiency
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 2011-2016
NZES	New Zealand Energy Strategy
Refrigerated cabinets	Inclusive term for both refrigerated display and storage cabinets
Display cabinets	Refrigerated Display Cabinets
RIS	Regulatory Impact Statement
Storage cabinets	Refrigerated Storage cabinet (also referred to as Service Cabinets or professional Storage cabinet)
SCER	Standing Council on Energy and Resources
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

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

- Refrigerated display cabinets - commercial fridges, including those with transparent doors or lids and drinks chillers, all of which display food for sale.
- Refrigerated storage cabinets - a sub-category of commercial cabinets (also known as professional or service cabinets) that are often used behind the scenes in kitchens or by catering companies.

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 and greenhouse gas emissions. Refrigerated display cabinets are typically used in supermarkets, corner stores, bakeries etc to keep food and beverages cool or frozen. Many are open-fronted (to allow customer or staff access), spilling cold air into the shop. These cabinets have been regulated for their energy use since 2004 in both Australia and New Zealand, using a Minimum Energy Performance Standard (MEPS) AS 1731.2003. Refrigerated storage cabinets (or professional cabinets) are often closed with solid doors, used in hot kitchen environments. They are not intended to display food for sale. They have not been regulated for energy efficiency even though they use very similar components as display cabinets.

Energy use from commercial refrigeration is growing in both Australia and New Zealand due to increased demand for ready-to-eat food, increased population growth and replacement of cabinets. Annual energy use from commercial cabinets is estimated to be 6327GWh for Australia and 1216GWh in New Zealand as at 2015. By 2035, sales of refrigerated commercial cabinets are expected to triple, resulting in 2.5 times more energy use, despite general improvements from existing regulation.

This consultation RIS looks at several policy proposals to address issues with the current regulations and to update and revise the existing Standard to reflect the growing commercial cabinet market. While the current regulations have gone some way to achieving their objective by promoting and developing more energy efficient commercial cabinets, there is significant scope to simplify and revise the existing requirements to improve energy efficiency and reduce associated greenhouse gas emissions.

These proposals are being developed through the Equipment Energy Efficiency (E3) Program, which aims to increase the energy efficiency of products used in the residential, commercial and manufacturing sectors in Australia and New Zealand. Minimum Energy Performance Standards and labelling can help reduce energy use and greenhouse gas emissions by setting upper limits on how much energy these products should use. Energy labelling also enables customers to choose an efficient appliance, if energy use and running costs are important to them. Ultimately, MEPS are a policy tool designed to remove the least efficient items from the market so that, irrespective of what cabinet features are chosen by buyers, they pay less in running costs than before regulatory intervention.

The objective of the proposed government action is to address the existing regulatory and market failures including:

- Confusion arising from the complexity of the current Australian Standard, AS 1731.2003 (AS 1731).¹
- The significant gap in the coverage of AS 1731, which does not apply to the majority of storage cabinets (used for food storage and catering purposes) which occupy an increasing share of the commercial cabinet market.
- MEPS test methods that do not align with internationally accepted standards.

¹ Australian Standard AS 1731.1-2003 “Refrigerated Display Cabinets” parts 1-14 (first published on 1 October 2013).

- Unavailability of information about energy efficiency.
- The absence of any labelling to assist consumers with assessing energy efficiency.

A number of policy options have been identified in this document to address these problems and improve the energy efficiency of commercial cabinets. The three regulatory options involve bringing a wider range of cabinets into the energy efficiency regulation – and – mandatory labelling. These are modelled for discussion, to consider adopting them in principle only from the proposed date (2017). The actual date of implementation will be further afield. In addition, three MEPS options are presented.

There are five options outlined in total:

- Option 1: Business as Usual (BAU) – no change to current MEPS requirements that primarily covers display cabinets.
- Option 2: Adopting ISO (international) test method for display cabinets and EN (European) test methods for other display cabinet types and storage cabinets. Australasian MEPS are developed to affect the least efficient 10% of cabinet models, based on groups of similar cabinet types. Modelled as though implemented in 2017, with mandatory labelling.
- Option 3: Adopting ISO and EN test methods. Australasian MEPS increased to affect 30% of the least efficient cabinet models per group, from 2017. Mandatory labelling is added.
- Option 4: Adopting ISO and EN test methods and European Commission MEPS, from 2017. Mandatory labelling is added. Approx. 14% of the market is affected although some groups of cabinets are more affected than others.
- Option 5: Non- regulatory options in addition to BAU.

Option 4 gives the best cost-benefit ratio and net-present value.²

This option looks at adopting the test methods ISO 23953 for Refrigerated display cabinets and EN 16825 for Refrigerated storage cabinets (when published), modelled from 2017. It also involves adopting related display cabinet standards for gelato cabinets, beverage 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 irrespective of operating temperature). It also introduces mandatory labelling based on the European Commission's labelling scheme, translated into star-rating labels.

There are considerable benefits from moving away from the complexity of AS 1731. Adopting the European approach to both test methods and MEPS will provide a simpler regime that will be relatively easy to transition to and promotes international harmonisation.

It is estimated that even under BAU, there will be some improvement in efficiency due to changes in technology and increased user awareness of the cost of energy. However all regulatory options (options 2 to 4) will result in increased energy savings and greenhouse gas reductions when compared with BAU. These will save cabinet buyers and users from significant running costs because less electricity is used to deliver their chilled food or drink. Options 3 and 4 have the most significant overall energy efficiency gains: in Australia the estimated Net Present Value (total benefits less the total costs) of option 4 (EC MEPS) would be \$1,523 million, compared with \$1,430 million from option 3 (improving the least efficient 30% of models). In New Zealand, the estimated Net Present Value from option 4 would be \$349 million, compared with \$328 million from option 3.

If delays occur in Europe with implementing MEPS levels and publishing standards, the estimates used for this RIS can be updated to check if option 4 remains the most cost-effective option. There are several pathways to accommodating European delays – such as delaying implementation or reducing MEPS requirements (relative to our modelling). Feedback is sought from industry whether the AU-NZ governments should consider creating localised MEPS values until alignment is possible (if this is industry's overall favoured option). 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, local MEPS levels are developed.

² modelling is just one tool to help government decide how to proceed. Industry feedback is sought.

Consultation

Consultation

Stakeholder feedback is sought on the policy options presented in this consultation RIS. It is intended that any of the proposals or recommendations to change the current energy efficiency requirements are based on an understanding of stakeholder views, taking into account any previous consultation within the industry.

The closing date for any written submissions is **2nd September 2016**.

- New Zealand submissions should be emailed to: regs@eeca.govt.nz.
- Australian submissions should be emailed to: energyrating@industry.gov.au.

Note: Submissions will be published on the [energy rating](#) website, as will the names of all stakeholders who have made submissions. If you do not want your submission to be published, please advise in the covering email that the submission is to be treated as confidential.

Consultation meeting dates:

- **Melbourne August 9th**
- **Sydney August 10th**
- * **Brisbane August 11th**
- **Auckland August 16th**
- * **Christchurch August 17th**
- **Adelaide August 24th**
- * **Perth August 25th**

(* = optional meetings depending on level of demand. Adelaide has been confirmed).

Note: A technical working group will be called together to consider if any technical alterations to the proposed standards are required, including labelling algorithms. This joint technical working group will also develop Au-NZ specific MEPS levels if necessary. We seek expressions of interest from experienced technical members of industry. Please email regs@eeca.govt.nz (for both countries) as it will be coordinated from New Zealand.

Consultation meetings will be held in Sydney, Melbourne, Adelaide, Auckland and at other possible locations. Details of meetings and invitations will be emailed to a generic contact list for both countries. Please email regs@eeca.govt.nz if you are interested in being put on this list.

Guiding Questions

You are invited to give us feedback on this RIS, and any matter referred to in it, or arising from previous consultation on the product profile, including whether your position has changed (and why). This will help us develop a robust and useful regulatory regime.

These questions are designed to enable us to better understand the impact of our market and modelling assumptions, analysis and impacts on industry, energy use, greenhouse gas emissions and trade implications. We would be grateful if you could provide us with any relevant data or evidence that you may have to support your submissions.

Status quo

1. Do you think further regulatory intervention is needed to make energy efficiency changes in the market? Please explain.
2. If you answered 'yes' – which option suits you best, and why?

Buyers/users

3. Do you think we have adequately captured the major factors that buyers consider when buying commercial cabinets?
4. Are buyers optimising their ownership costs (including running costs?) If not – why not?
5. We assume that buyers don't know how much saving they could achieve from using a more efficient cabinet. Do you agree, if not, please explain.
6. What impact would efficiency labelling of cabinets in literature/websites/on the cabinet itself, have on buyers and users?
7. What portion of cabinet buyers *actively consider energy use* in their search for cabinets, or their choice criteria when looking for cabinets?
8. What proportion of buyers could *benefit* from considering energy use in their purchase decision?
9. What are the most important things that buyers search for in cabinets? (Please explain and rank).

Cabinet price

10. We assume that the price of cabinets won't change significantly from proposed changes to regulation. Do you agree with this assumption? If not why not? Please explain.
11. We assume that suppliers sell into a 'cabinet-type-price' bracket – meaning that suppliers market similar types of cabinets at a similar cost, irrespective of whether they contain potentially more expensive, efficient components. Do you agree with this assumption? If not please provide evidence if possible.
12. Are there types of cabinets or situations where improving efficiency of a cabinet would significantly change the cabinet purchase price? Please explain.

Unintended consequences of regulation

13. What unintended outcomes might arise from improving the efficiency requirements for refrigerated cabinets? Please explain and give examples if possible.
14. We have assumed that changes in energy efficiency will be largely invisible to buyers (behind the scenes in components, apart from LED lighting). Cabinets will remain user-friendly and won't (for example) change their functionality and safety (e.g. won't force all open cabinets off the market so that only those with doors remain, won't compromise cooling ability, won't diminish support industries). Please comment on this assumption.
15. What impact do you think labelling would have on product costs and consumer choice?

Custom-built cabinets or low-volume supply

16. What issues might arise for you (or your competitors) if you supply custom-made cabinets?
17. What might help you easily comply with the proposed regulations, if you supply built-in, custom-made, or a small number of cabinets?
18. Please suggest how we could define 'custom-made', 'built-in' or low-number-of supply cabinets (if different from the suggested wording in the EC regulations).

Labelling

19. How would mandatory labelling of cabinets (incl. use in websites/literature) affect your business, and your competitors'?
20. What impact do you think a 'high efficiency' label would have on the market, buyers and users?

Market data

21. We have used European market data and collected NZ sales data to estimate sales of cabinets in Australia. Do you accept this as a viable approach to estimating sales in Australia?
22. Can you provide more accurate market data including the stock and sales estimates?

The current standard and MEPS/High Efficiency levels

23. Can you provide information that would help us identify the size of the issues with the current Standard? If so, please provide.
24. How have you been affected by the complexity of the current Standard AS1731? What were the consequences?
25. What changes would you like to see made to the current Standard, and MEPS, if we don't align with international standards and MEPS? What effect do you think this would have on the Au-NZ market?
26. We assume that aligning with the EC MEPS levels and ISO/EN test standards would simplify your ability to comply – and our ability to check and enforce – compliance. What comment can you make on this?

Non-regulatory options

27. Can you outline any other non-regulatory options to significantly impact on cabinet efficiency, that industry, government, or partnerships could develop (to avoid the need to change the energy efficiency regulations?)

Implementation timeframe/other compliance pathways

28. We have modelled 2017 as the indicative implementation date – what would hold up your ability (or your competitors') to comply with regulations coming into force in 2017?
29. Can you give us details on alternative ways and means that you could comply with regulations, for example:
 - staggered implementation dates whereby the least efficient cabinet models must comply soonest?
 - 'deemed to comply' options based on rated components – where MEPS are significantly more stringent if the cabinets cannot be physically purchased and/or tested?

Previous consultation

As a result of the joint Australia-New Zealand efficiency programme (the "E3 program"), refrigerated cabinets have been extensively researched and the industry has been consulted with. Past activities include:

- Commercial Refrigeration - Refrigerated Display and Storage cabinet, "*Product Profile*" (E3 2013).
- "*In from the Cold*" - Strategies to Increase Energy Efficiency of Non-domestic refrigeration in Australia and New Zealand, Background Technical Report Volume 1 (E3 2009).
- Review of Standard AS 1731:2003 and Amendments indicating issues and their suggested solutions, "*Technical Discussion Paper*" (E3 2008a).

Feedback from industry over the product profile

A range of market research was carried out for the purposes of this Consultation RIS, including 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-company buyers for their own use.

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.³

Submissions from the product profile were then reviewed and can be summarised as follows:

- There was consensus from submitters 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.
- Almost half of the written responses received commented on an aspect of MEPS which would apply to small production runs and custom made cabinets under the EN approach: all submitters offered support for 'deemed to comply' provisions for low volume production of cabinets.⁴ Under a 'deemed to comply' proposal a supplier could avoid laboratory testing by providing a signed declaration that would demonstrate that the product complied with relevant efficiency levels (e.g. by using very efficient components). If a 'deemed to comply' pathway could be formulated, it could demonstrate compliance with MEPS where testing in a laboratory setting may be too difficult or expensive. Additional comments were made regarding the need for an agreed modelling platform, and on the need for the program to be well policed and regulated. No submitters opposed the 'deemed to comply' policy option.
- There was also support from submitters 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. This included extending MEPS (and therefore the local standards) to cover storage cabinets, 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).
- Feedback from both suppliers and manufacturers indicated that they did not tend to consider energy over price and sold certain types of cabinets into 'type-price' brackets which did not differentiate between their respective efficiency.
- There was broad support for a mandatory energy rating label of some kind (preferably in electronic form on-line or in the literature).
- No interest was expressed in a voluntary 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. However, 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 (temperature of operation, configuration) would use far less electricity.
- It was considered that labelling alone would not add much costs but 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.

³ Other sources of information include: EcoDesign (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 Environment in Australia for pre-charged equipment and Energy Efficiency and Conservation Authority for amalgamated unattributed sales data.

⁴ 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.

- If European MEPS levels and labelling were adopted, HEPS could easily be defined as the top two or three levels on the label. Suppliers also wanted a mechanism to encourage the update of products well above the minimum, including 'intelligent' controllers such as using devices that 'learn' about patterns of use and adjust the cabinet's energy consumption to suit. 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 good vs less efficient models.

Several suppliers commented that they wanted beverage vending machines to be investigated for MEPS. However these are out of scope for this current 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. Therefore the need for *regulatory* intervention was comparatively low. We may investigate MEPS for these at a later date if we become aware that industry is no longer driving the need for highly efficient models.

1. Introduction

While existing regulation has established a baseline of energy efficiency for refrigerated display cabinets, the market has changed and energy use has grown due to demand for ready-to-eat food. International standards have been developed which could reduce the need for testing to local standards and thereby reduce the cost to business of having to meet local requirements in a global market.

This consultation RIS will consider changes in the commercial cabinet market since the implementation of AS 1731 in 2004 and how those changes mean the existing requirements are no longer effective. Alignment with international standards would better reflect the current market and achieve the policy aims of government intervention.

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, including those with transparent doors or lids and 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 or RDCs. It also covers Refrigerated storage cabinets (also known as professional or service cabinets), a sub-category of display cabinets that 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 dairies through to larger companies such as supermarket chains

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 has an associated impact on greenhouse gas emissions.

Energy use from commercial refrigeration is growing in both Australia and New Zealand due to increased demand for ready-to-eat food, with growth in the food sector and demand for cabinets expected to continue at a rate of 2.0% per annum. By 2035, sales of refrigerated commercial cabinets are projected to triple and energy use will increase more than 2.5 times, despite general improvements in these cabinets from past regulatory action. It is estimated that annually commercial cabinet energy use is 6327 GWh for Australia and 1216 GWh for New Zealand (in 2015). For scale, the New Zealand portion is similar to electricity used each year by the number of households in Auckland City.

Examples of Refrigerated display and storage cabinets are shown in **Figure 1** and **Figure 2** below.

Figure 1: Examples of refrigerated display cabinets.



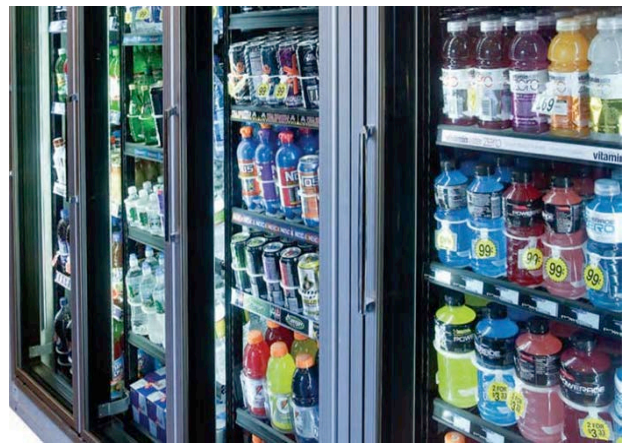
Horizontal, frozen, open-top, island cabinet



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

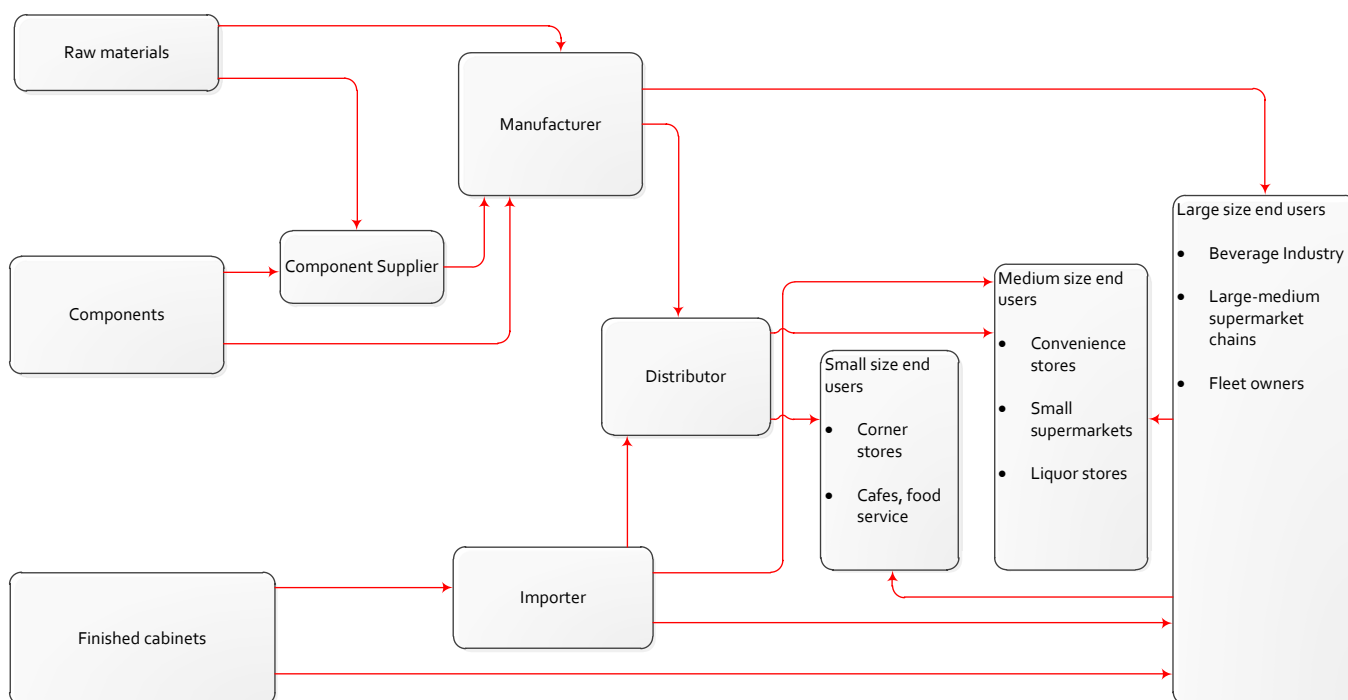
The supply chain for these types of products and ownership arrangements is complex and varied. Suppliers can be manufacturers and/or importers. Larger companies may buy direct from factories without a “middleman” – or may become fleet owners (for example, beverage companies) who either hire out cabinets or install them for free. The buyer or hirer of the product may be predominantly motivated by factors other than energy efficiency such as up-front cost and may not be responsible for paying the electricity bill.⁵

The purchasing power of the larger corporates drives the market to a great extent. 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/hospitality) are estimated to count for approximately 20% of the display cabinet market.

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.

See **Figure 3** below which shows that in a number of 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” display cabinets.

Figure 3: Refrigerated commercial cabinet supply chain.



The majority of the product is imported with more than 80% coming from Asia, notably China. The same factories manufacture for Europe⁶. Approximately 15% is imported from Europe, 2% from North America and 0.5% from South Africa. Factories can make to Australasian specifications (regulatory requirements or supplier’s design etc).

⁵ See the discussion in the Problem section of this document as to split-incentives arising from this aspect of the market.

⁶ Product Profile: Commercial Refrigeration - Refrigerated Display and Storage Cabinets. 28/08/2013. Energyrating website.

Feedback from the product profile consultation showed that importers believe it would not be economic to manufacture/import to an Australian standard and harmonisation is realistic. They want assurance that an international efficiency standard is actually being met and do not want to incur factory costs for “small runs” manufactured specifically for the Australasian market.

Aligning with international standards would reduce the cost of complying with a local standard for the majority of suppliers. 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 alone. Out of that total number of 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 characteristic 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 E** for a full list of Australian and New Zealand manufacturers and importers.

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/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. Over recent years, local manufacturers of display cabinets have claimed more challenging business conditions and increasing competition from imported products. Supermarkets and, to a lesser extent, convenience stores are usually supplied by companies in long term relationships as preferred suppliers.

Both countries trade refrigerated cabinets with each other, with the overwhelming majority being traded from New Zealand to Australia. This is important when considering where the costs of regulation for business, administration, and compliance tests will be borne.

Stock and sales

The stock of display cabinets and storage cabinets is estimated to grow from around 760,000 units in 2013 to approximately 1.25 million units in 2030 in Australia. In New Zealand stock is expected to increase by 20% from around 150,000 to 240,000 cabinets by 2030.

See **Attachments B, C and D** 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 Australian and New Zealand, making use of industry knowledge and previous reports. These methods were:

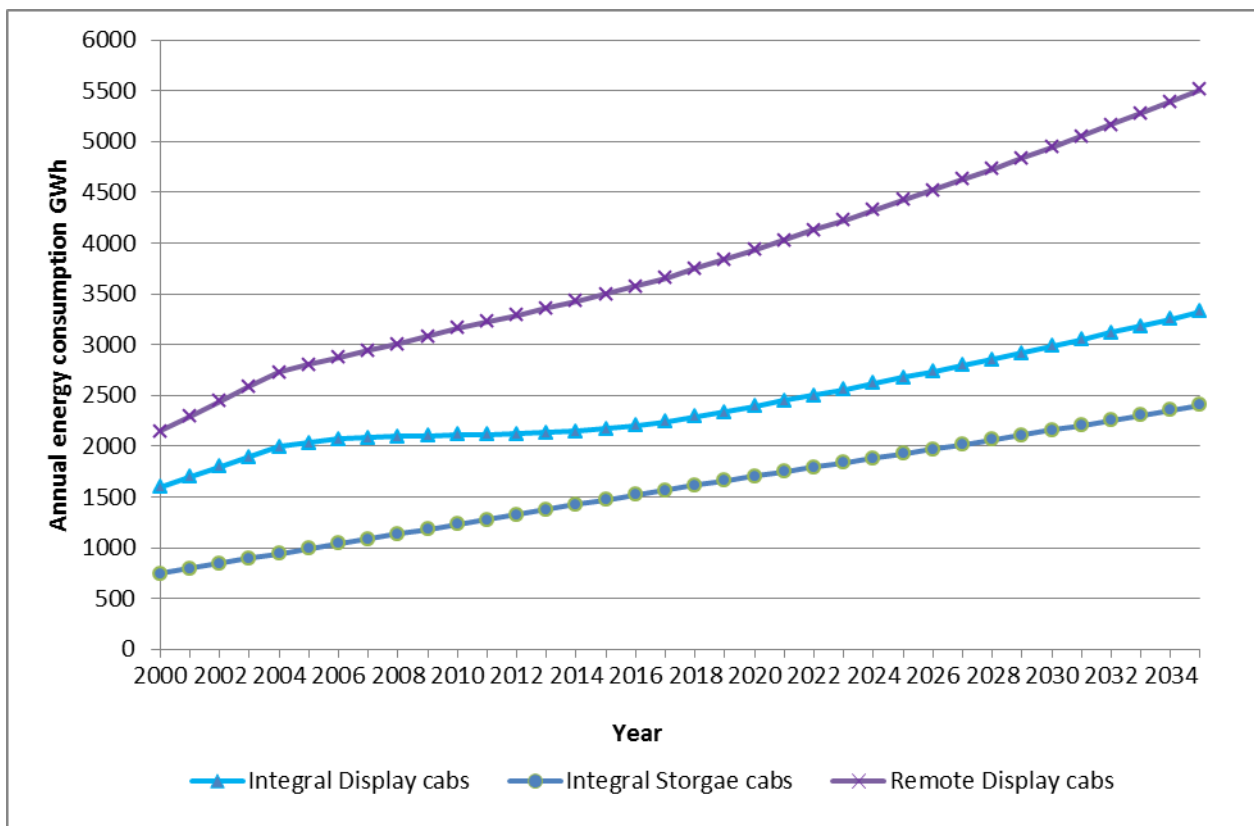
- Modelling aggregated sales data estimates by cabinet type, average lifespans and growth rates to predict stock from 2000 to 2030 (This is considered to be the most reliable estimate available.)
- Stock estimated using the number of outlets where these cabinets are used, multiplied by the number of 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 cabinets use?

Display cabinets have been regulated since 2004 and their energy use and sales have been tracked in New Zealand under the sales collection legislation. This enabled cross-checking and standardising of baseline energy use modelling and graphs.

In December 2014, the display and storage cabinet stock was estimated to be using approximately 5,800 GWh per year. See **Figure 4** below.

Figure 4: 2014 estimated energy use of Refrigerated display and storage cabinets in Australia and New Zealand. (the abbreviation 'cab' = cabinet)



Australian market sales, stock and applications

The estimates of Australian stock using aggregated sales data shows there were 759,000 display cabinets and storage cabinets in 2013. (Note: This estimate is significantly less than that in the Product profile (E3 2013)). Sales and stock data were derived from a large company’s knowledge of their display cabinets for beverages, and the total number of these – and the pre-charged imports of commercial refrigerated cabinets.

The two other methods of estimating stock corroborated this estimate: 758,000 (stock estimated from outlets – see **Figure 5** and **Figure 6** below) and 768,704 (proportional estimate using EU data). Further details of these methods are given in attachments A and C.

Sales have slowed since the 1990s from around 7% per annum to 4% over the past decade to around 2.5% per annum now and medium term future (Figure 4). The high growth in the 1990s was largely due to food retail stores adapting to changing consumer preferences (i.e. convenience meals, variety, etc.) that required more refrigeration per trading floor. Current sales now are primarily driven by replacement demand, and growth linked to population growth.

Figure 5: 2013 Refrigerated Cabinet Stock in Australia (estimate based on outlets).

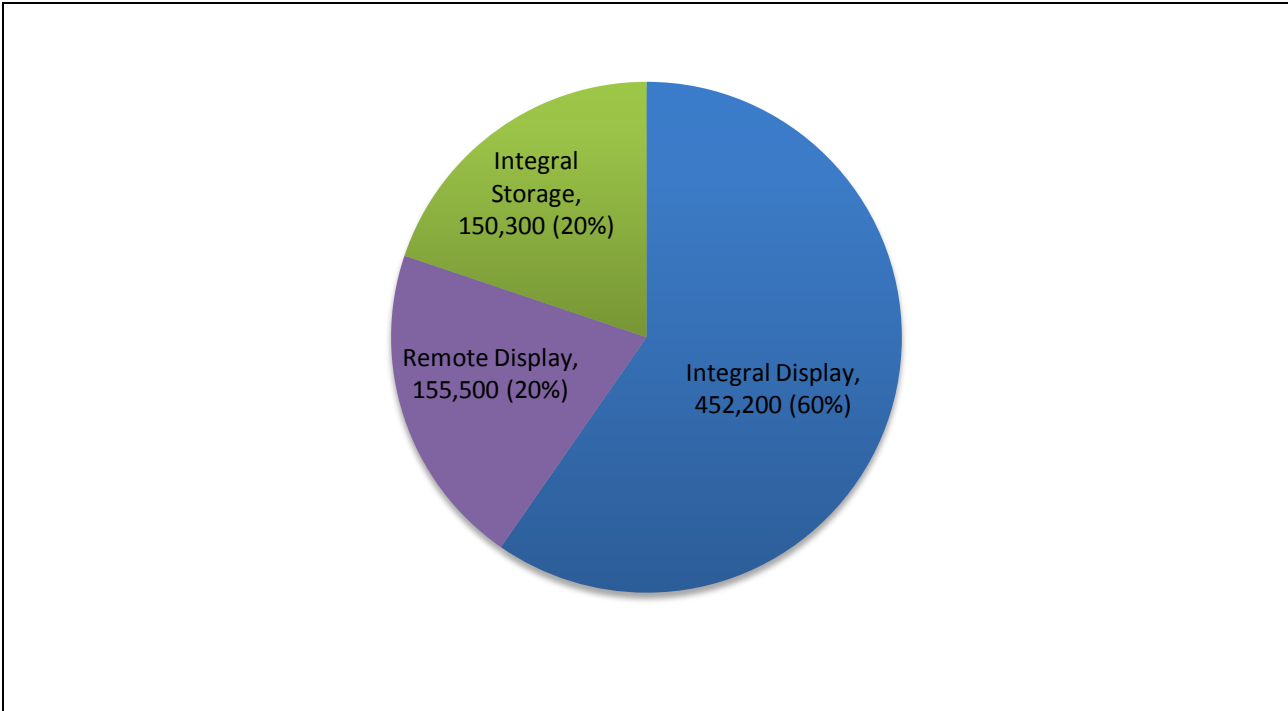
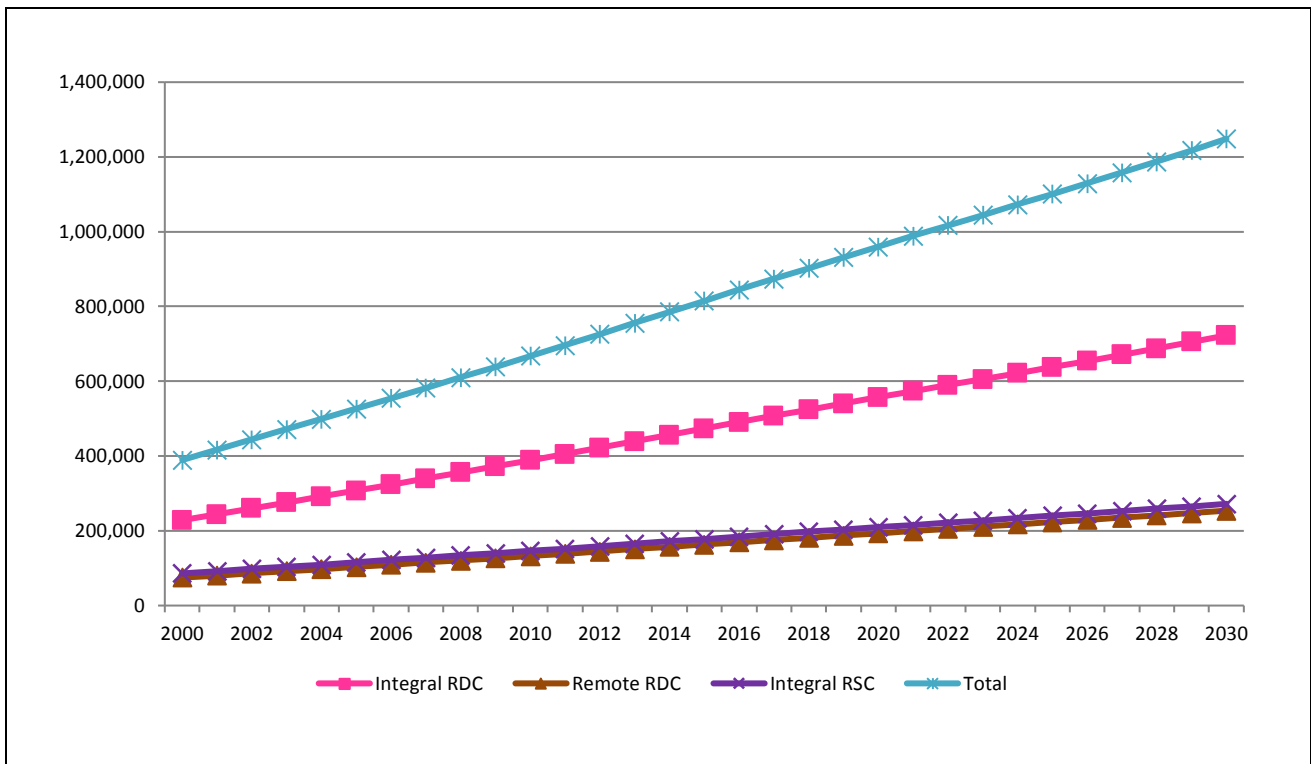


Figure 6: Projected stock in Australia from 2000 to 2030.



New Zealand market sales, stock and applications

New Zealand stock is estimated at 146,000 display cabinets and storage cabinets in 2013. Sales and stock data were derived from the annual data collected by the New Zealand government agency Energy Efficiency and Conservation Authority (EECA). These data have 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 energy performance characteristics of their stock.

There are five sub-types within these 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. Several of the sub-types have consistently showed zero sales over a number of years.

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

In 2013 in New Zealand, the total sales of Refrigerated display cabinets and storage cabinets were estimated to be 15,000 and the total stock was estimated to be 146,000 cabinets. (**Figure 7**)

The other two methods for deriving stock and sales estimates differed slightly: 177,000 (stock estimated from outlets) were 20% higher than the more reliable estimate based on sales. However the estimate from the EU information was relatively similar: 148,361 cabinets. When looking at the split between main types of cabinets – integral Display vs remote Display vs Storage types – all 3 methods gave similar proportional market share. Integral display types cornered about 60% of the market while Storage types and Remote Display types about half each of the remainder. **Figure 8** below shows the split based on outlet estimates, for interest.

Figure 7: Projected stock in New Zealand from 2000 to 2030.

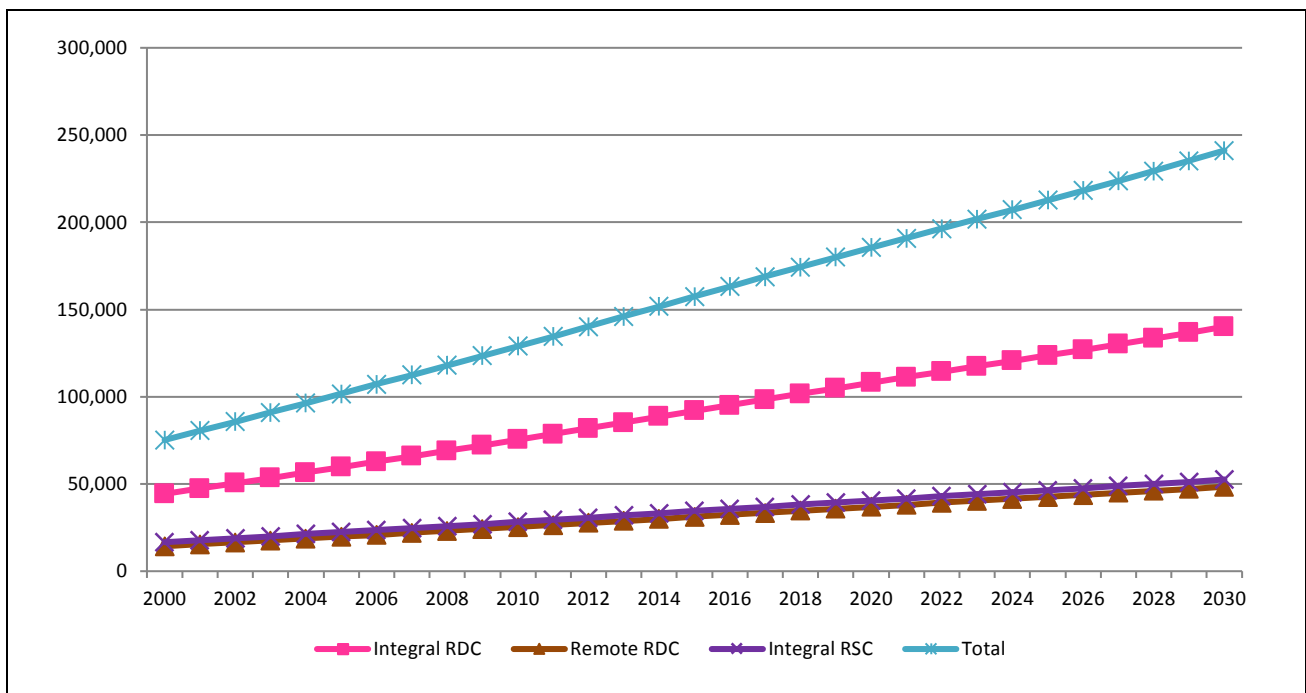
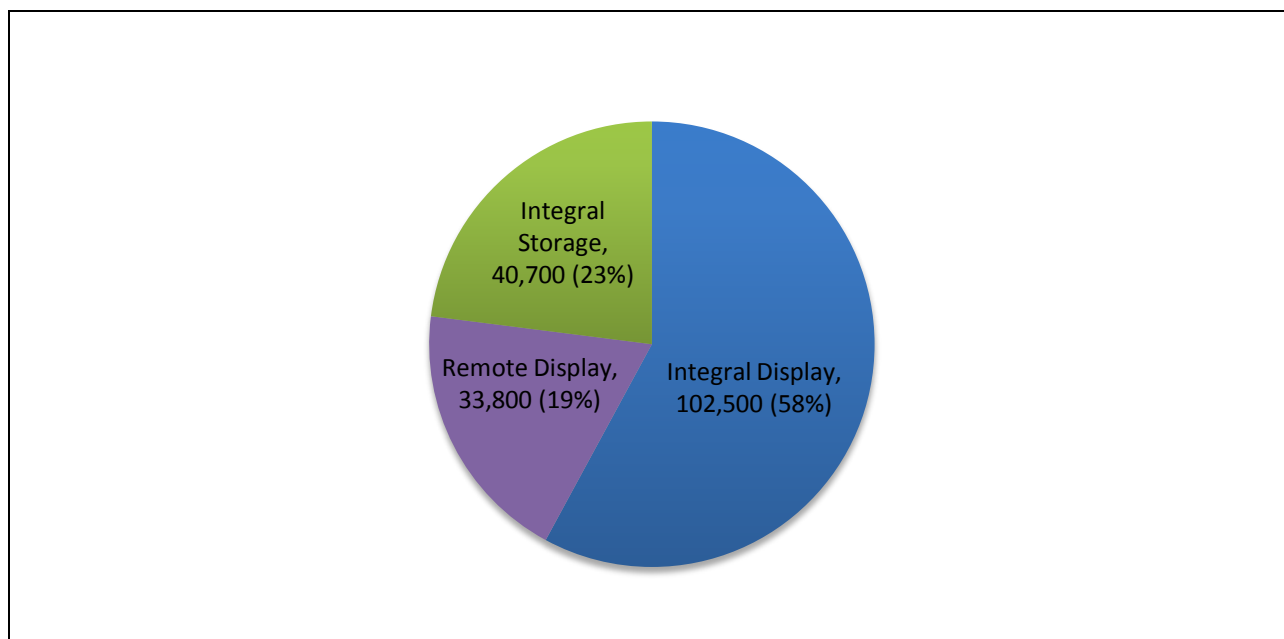


Figure 8: 2013 Refrigerated Cabinet Stock in New Zealand (estimated based on outlets – note this overestimated stock by 20% but the proportions of each type were roughly similar).



Current regulations and requirements

In both Australia and New Zealand, refrigerated display cabinets are regulated for their energy efficiency using the Australian Standard AS 1731.2003. The relevant regulations that call up the Australian Standard, are these: the *Energy Efficiency (Energy Using Products) Regulations 2002* in New Zealand and the *Greenhouse and Energy Minimum Standards Act 2012* in Australia.

AS 1731.2003 specifies the general mechanical, physical and test requirements to check the energy efficiency performance of commercial refrigerators that are used for the sale or display of food products, including beverages.⁷ There are 14 parts to the standard (all sold separately)

Part 14 of AS 1731 defines energy efficiency is expressed 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/m²).

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 temperatures use more electricity.)

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 specifically excludes cabinets *intended for use* in catering and similar non-retail applications.⁸ As will be discussed in this document, this “intended situation of use” exemption operates to exclude most storage cabinets, a sub-category of Refrigerated display cabinets. Storage cabinets are therefore largely unregulated by MEPS despite using significant amounts of electricity and using the same refrigeration mechanisms as display cabinets. See **Figure 9** (next chapter) as to the grey area in interpretation of AS 1731 which can result.

⁷ 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*).

⁸ AS 1731.1 – Part 1.1.

Significantly, 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 of this document, there are both regulatory issues and market/information barriers that constrain buyers from choosing a more energy efficient cabinet. Updating the regulations to reflect a global trade in cabinets and to encompass a much broader range of models and could yield significant electricity savings and greenhouse gas reductions for buyers and users.

Policy context

Over the past decade New Zealand and Australia have both 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).

The policy context for the proposals in this document is referred to below. For more detailed information about the E3 Program and policy environment in both countries, see **Attachment A**.

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 2011-2021*. This 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 2011-2016*, sets an economy-wide target to continue to improve New Zealand's energy intensity by 1.3 percent per annum and supports this with sector-specific objectives and targets. These include the objective "Greater business and consumer uptake of energy efficient products" and the accompanying target out to 2016 to "extend minimum energy performance standards (MEPS)" and labelling "to remain in line with major trading partners⁹."

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 CO₂ emissions (MBIE 2012, 2014).

Greater uptake of energy efficient products could result in significant energy savings for New Zealand against the forecast demand. The Energy Efficiency Conservation Authority (EECA) has identified 109 PJ in potential energy savings and 5.17 million tonnes of CO₂ 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 will reduce running costs and improve business competitiveness and profit. It will also help 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/or 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.

⁹ The New Zealand Minister of Energy and Resources has announced that the NZEECS will be refreshed. It is likely that this will be published in 2017. [The NZ Government Beehive website](#).

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 EEAT Committee 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 Competitiveness 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 emissions targets.

The combination of addressing standards and labelling has been shown to have had a substantial impact on energy efficiency gains. A global assessment of national Energy Efficiency Standards and Labelling (EESL) programs which operate in more than 80 countries has established that:¹⁰

- 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 extremely favourably with the cost of other clean energy options and supports the conclusion from the International Energy Agency that end-use efficiency measures offer the least cost pathway to energy and CO₂ 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 small changes in prices close to the implementation of new energy efficiency measures, they appear to have had little long-term impact on appliance price trends.

¹⁰ *Achievements of appliance energy efficiency standards and labelling programs – A Global Assessment – 4E Energy Efficient End-use Equipment* International Energy Agency.

2. The Problem

Refrigerated display cabinets have been subject to Minimum Energy Performance Standards (MEPS) set by the Australian and New Zealand governments since 2003.¹¹ They were first introduced because some buyers did not consider energy use as a primary factor in their purchase decision. This meant they bought models that cost them more to run (even though more efficient models were available with lower whole-of-life costs). Since then, general efficiency has improved. However the scheme no longer serves the market as well as it once did without labelling, nor keeping pace with a wider range of cabinets now available, and without revisions to efficiency levels to keep improving the least efficient cabinets.

There are also some problems with the current Standard. AS 1731 does not apply to an estimated 20% of commercial cabinet models sold in New Zealand and Australia. In addition, AS 1731 is both complex and confusing. These issues are explored in more detail below.

The current Standard is complex and confusing

There are 14 parts to AS 1731, specifying test parameters, cabinet types (classes) and efficiency values. Not every cabinet class has a MEPS level (only 34 have MEPS although there are more than 50 classes defined, across different operating temperatures, with different MEPS levels and test procedures).

As a buyer or supplier, the only way to know whether a cabinet has an allocated MEPS value is to buy the entire Standard which is relatively expensive: each part costs approximately AUD\$120. A supplier may find it difficult to demonstrate to compliance officers that their cabinet is exempt from MEPS. Equally, it is an expensive and time consuming exercise for a supplier to discover that a cabinet did not need to comply with the Standard, either because it is exempt under the 'intended situation of use' clause (see below) or because the cabinet was not allocated a MEPS level to comply with.¹²

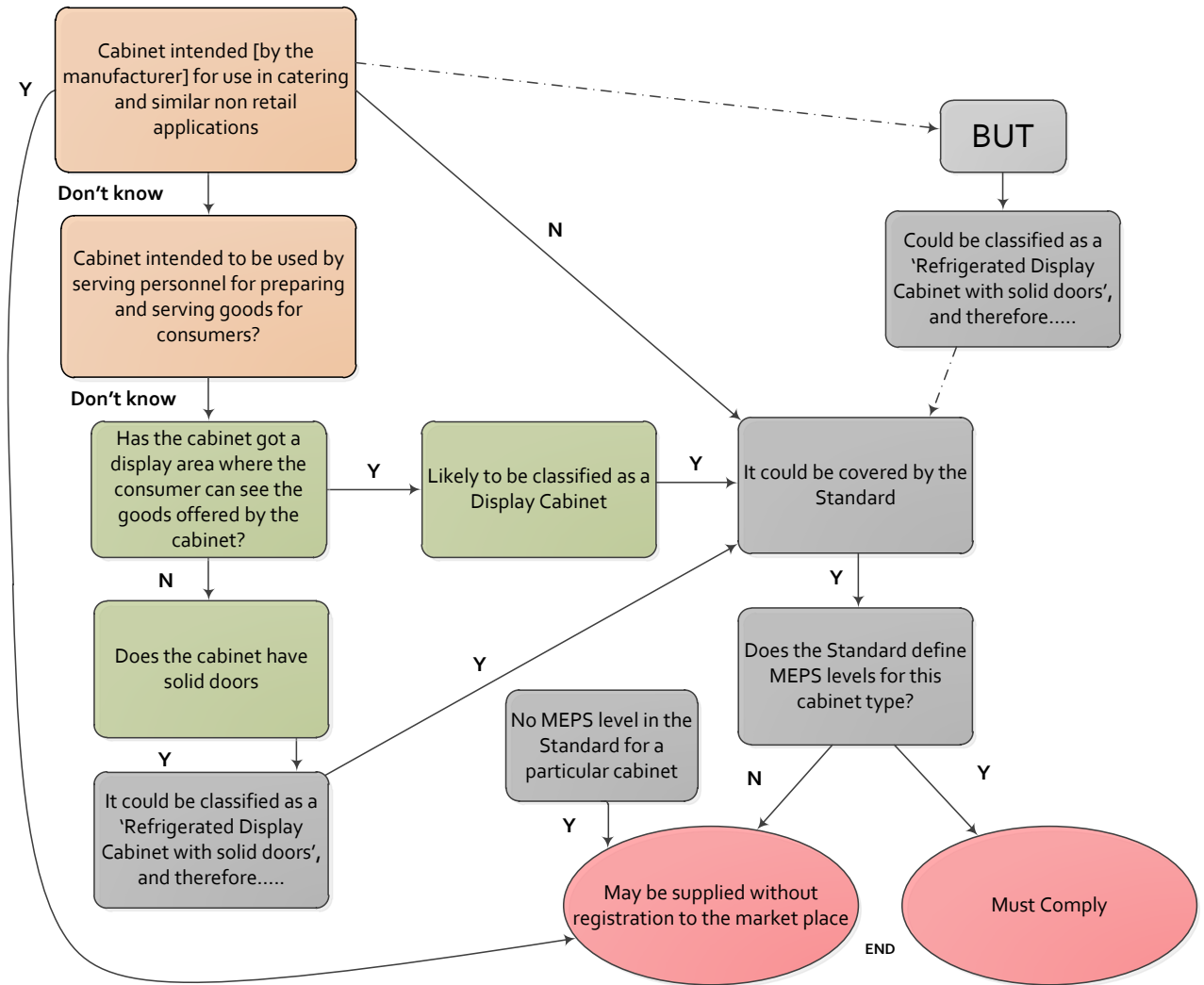
AS 1731 has very specific definitions of cabinets across a variety of sizes, temperatures and configurations - from multi-door types that are several meters long for large supermarkets, to counter-top glass cabinets designed to display cakes. Some definitions are 'fictional', devised to cater for types of cabinets that might be invented one day, in an attempt to future-proof the Standard. In addition, some of the terms in the Standard are confusing e.g. the definition of 'a family' of models is open to interpretation - it could refer to individual sections of cabinets (built as clip-on units stacked side by side) or the total size of the resulting cabinet once these units put together.

The resulting Standard is complex and confusing to suppliers and regulators alike. Feedback from the Product Profile consultation confirmed that manufacturers, despite having a vast amount of technical knowledge, had difficulty interpreting the current Standard and were able to outline several inconsistencies. The feedback obtained also supports simplification of the standards.

¹¹ 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).

¹² If they have no MEPS value, regulators can interpret this to mean that cabinets are exempt from testing and registration requirements.

Figure 9: Process map for the Interpretation of AS 1731



Key:

■ =Mandatory clauses

■ =suggested interpretation

■ =grey area in interpretation, where cabinet could be included or absent from the standard.

The Standard does not provide complete coverage of the market

The Standard applies to commercial refrigerators and freezers used for the sale or display of food products. It does not, however, apply to the majority of storage cabinets: a sub-category of Refrigerated commercial cabinets which are intended for use in catering or similar non-retail uses. Storage cabinets are not covered by AS 1731 unless they can be regarded as falling outside this exclusion.¹³

This “intended situation of use” exemption was intentionally written into AS 1731 as they were using comparatively less energy than Refrigerated display cabinets of equivalent size and function and made up only a small part of the market for refrigerated cabinets at the time when the Standard was created. However, it is no longer the case that storage cabinets are rare – they now make up an estimated 20% of the market for refrigerated commercial cabinets.¹⁴

This gap in the coverage of the Standard creates inconsistency and confusion within the display cabinet category, by creating a distinction between cabinets which may otherwise be identical in appearance and have

¹³ 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.

¹⁴ This percentage is taken from Australian data and is estimated from the proportion of stock in Europe and stock count by outlet type.

similar uses. 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 which may be identical in appearance to a display cabinet but is intended to be used for food storage purposes may be exempt. This creates a significant grey area in the interpretation of AS 1731 and how it is to be applied.

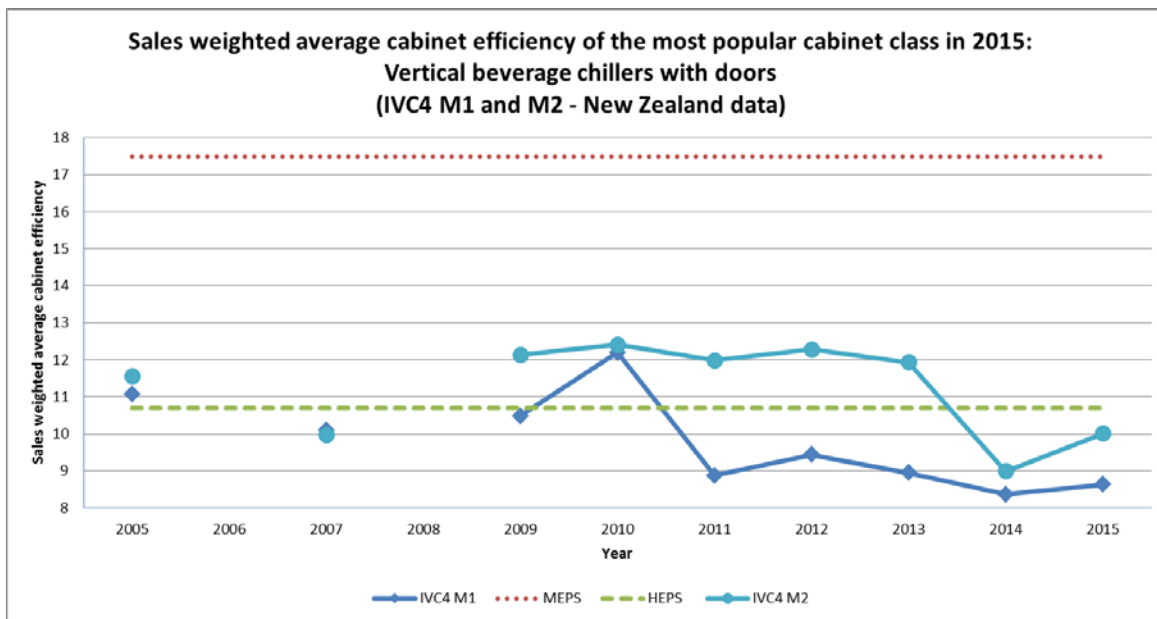
If the gap in coverage of the Standard means that buyers are unable to distinguish a relatively inefficient commercial cabinet from an efficient one, they could potentially be locked into higher running costs for the lifetime of the cabinet (12 years on average). Feedback obtained on the product profile supported the proposal that buyers should have the ability to identify cabinets for their energy efficiency.

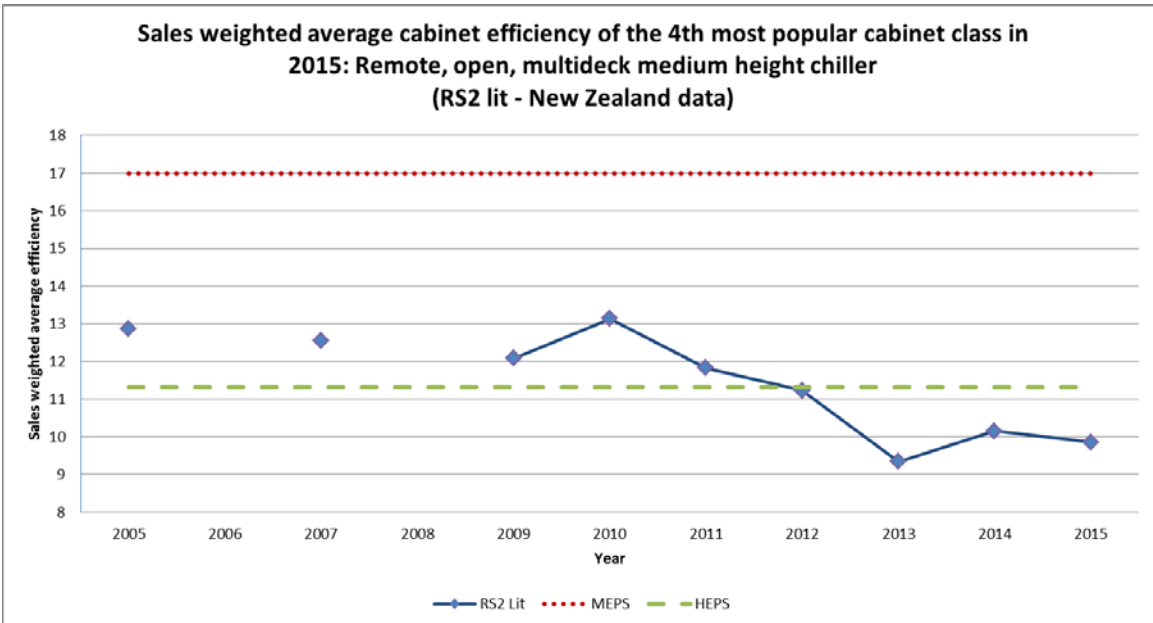
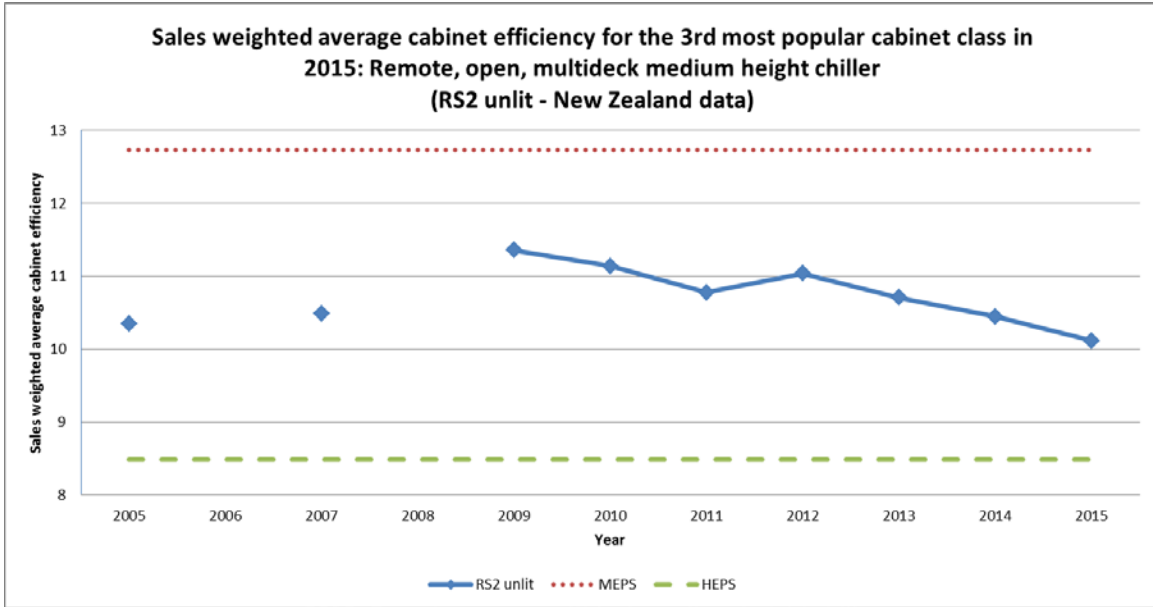
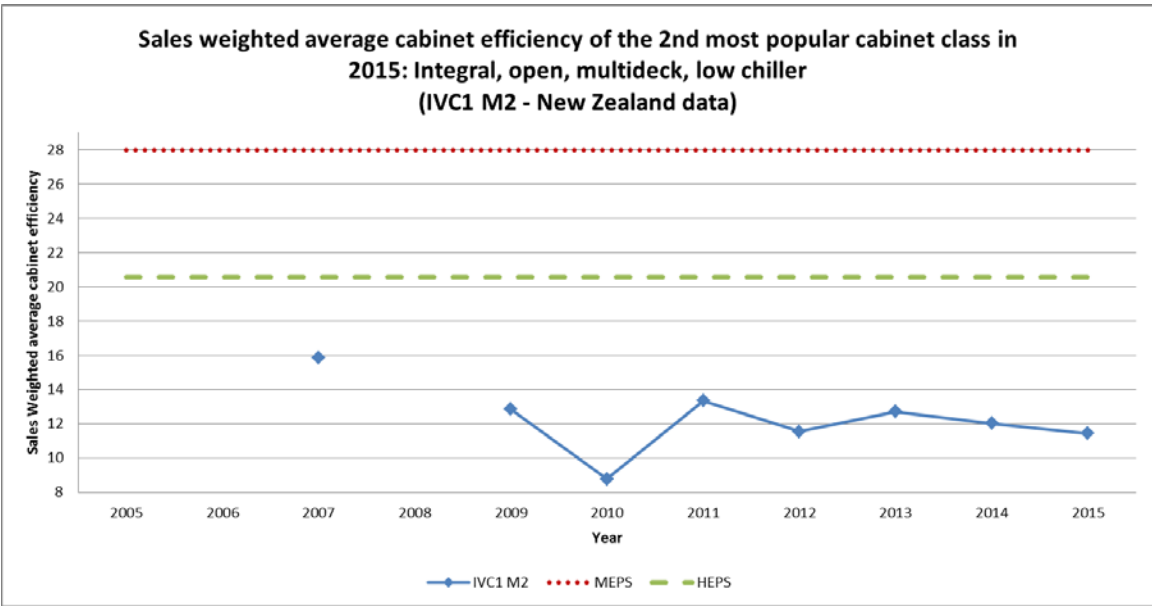
It is estimated that in 2020, approximately 24,000 'storage' cabinets will be sold in Australia and New Zealand. Because of the 'intended situation of use' exclusion, the majority of those storage cabinets may be exempt from, and therefore not comply with, the current MEPS.

MEPS/HEPS levels no longer protect buyers

As shown in **Figure 10** below, sales data from New Zealand suggests that efficiency levels are not strongly influencing buyers' choice or suppliers' ability to upsell more efficient display cabinets. Despite high efficiency levels (HEPS) being specified in the Standard, available for marketers to promote, the sales weighted average efficiency for the most common classes is approaching or surpassing the current HEPS levels. HEPS no longer provides a stretch target for some models (in fact models exceeded HEPS soon after the scheme was implemented).

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



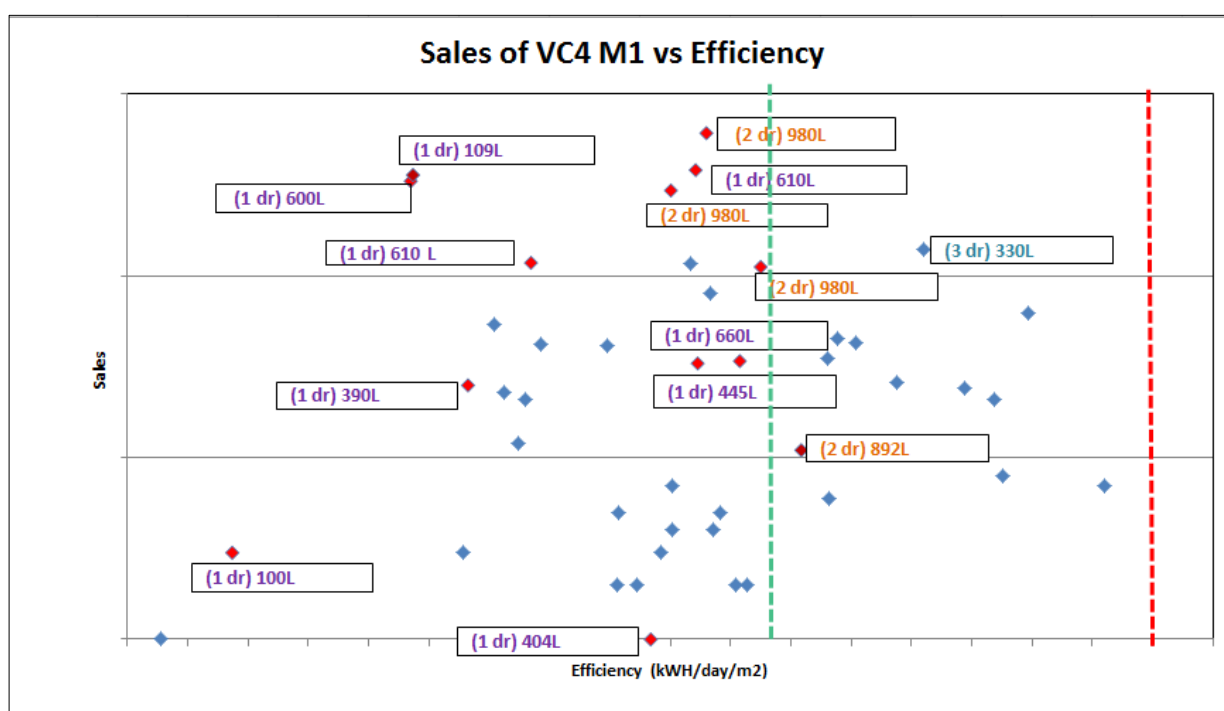


It is apparent that for some classes, the majority of the cabinets sold are clustered around the HEPS line and suggests that in some cases MEPS levels may be of little relevance to the actual levels of cabinet efficiency in the market.

Sales data for the New Zealand market also shows that 28% of the units sold in 2015 were of models registered in or before 2006 and only 12% were of models registered in the last three years. By comparison, for domestic fridge freezers, 40% of units sold were of models registered in the last three years, and only 2 units were sold of models registered prior to 2006. If suppliers of commercial cabinets had made significant improvements in recent years, it could be expected that sales of models registered in the last few years would dominate.

Buyer behaviour is also important. An analysis of New Zealand sales data on the top selling cabinet type in 2015 (self-contained beverage cabinets (IVC4 temperature class M1) shows no trend for buyer preference when sales are plotted against efficiency, or when price is plotted against efficiency. See **Figure 11** below which shows that neither the cheapest models nor the most efficient models were favoured.¹⁵ If the lowest total cost of ownership was an important consideration, buyers could be expected to favour these two factors.

Figure 11: Analysis of sales vs price of the most commonly sold cabinet type in New Zealand in 2015. (IVC4 M1 - Integral Vertical Chiller type 4, temperature range +5 to -1°C). Green dash line at middle-right = HEPS level, red dash line at right = MEPS level. Relative positions are shown here because the scales of the axis have been removed to protect confidentiality.



It is no longer clear what advantage the current HEPS levels provide to both suppliers and buyers. While the majority of some cabinet types are now registered as high efficiency:

- There is uneven coverage of HEPS (not every regulated cabinet has a HEPS specification);
- Not all models that qualify for HEPS are actually registered by suppliers as HEPS compliant; and
- There are several models of some cabinet types that exceed the current HEPS levels, providing buyers with no additional information or guidance as to which are the most energy efficient cabinets in each class.

¹⁵ The limitation of this analysis is that within this this particular category of cabinets there are many sub-types so the sample size is limited.

For example, for the VC4 M1 class (shown above), the majority of the cabinets sold are above the HEPS level, with only a few of the models sitting between the MEPS and HEPS levels. This provides support for the suggestion that HEPS levels could be updated to provide more meaningful information to buyers.

Similarly, in 2015 the class IVC1 M2 (semi-vertical, self-contained display cabinets at M2 temperature class – graph not shown) 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 could indicate that only half of the suppliers were aware that a HEPS declaration applied to their cabinets or it could indicate that suppliers saw little advantage in seeking to identify and register their models as meeting current HEPS levels.

While suppliers may not see a benefit from registering a HEPS-compliant model as HEPS-compliant, doing so could influence buyers' behaviours and result in reduced energy use over time. Looking at NZ sales data, every buyer of an IVC1 M2 class cabinet that selects a HEPS-compliant model could potentially save approx. NZD \$820 every year (\$9,100 over the cabinet's lifetime) instead of one that merely passes MEPS. There are likely to be similar benefits for Australian buyers based on market share and cabinet type.

The combined effect of not updating the MEPS and HEPS levels and government regulation is that there is no accurate and relevant regulatory 'stick in the sand' for both suppliers and buyers. Having this would assist those suppliers who are not aware of the value of HEPS level models and, when combined with other possible measures such as education awareness and labelling (see below), would allow buyers to properly assess the comparative efficiency of different cabinet types. Feedback from the product profile consultation has shown that there would be advantages to HEPS relating to MEPS as a fixed proportion and that, particularly if the MEPS were clarified, labelling could assist with educating buyers as to efficiency of the products.

MEPS levels and Test Methods are not aligned with international standards

Australia and New Zealand together are a small market globally. As a large proportion of cabinets are imported, having to comply to specific Australian/New Zealand test methods and MEPS levels adds a level of complexity and cost to suppliers, and may possibly reduce the range of products available in the market.¹⁶

If local test methods were aligned with international test methods, there may be reduced costs for suppliers. Aligning local MEPS levels with international MEPS levels may also reduce complexity and hence some costs. But increasing domestic MEPS levels to align with levels set in other jurisdictions may also increase costs for local buyers of refrigerated commercial cabinets.

Market barriers/failures

Difficulties with the application and coverage of AS 1731 are compounded by market barriers or failures which may prevent buyers from making informed decisions about energy efficiency when making their cabinet selections:

- Refrigerated commercial cabinets are not labelled for their energy efficiency
- Information about energy efficiency may be unavailable or difficult to access, or may be difficult to independently assess, reducing its value to buyers.

Absence of labelling

Refrigerated commercial cabinets are not labelled for their energy use. The way they are marketed also tends to disrupt a buyer's ability to obtain this information. Unlike domestic fridges, cabinets are not sold from a retail outlet where a range of models can be compared side by side. Rather they are sold via catalogues, websites, at auction or as recommended by refrigeration installers.

Feedback from the Product Profile consultation favoured mandatory labelling and will be discussed further in the Consultation section of this RIS.

Having labels on refrigerated commercial cabinet marketing material could partially address the information barrier by achieving two things – firstly, it could raise awareness that energy use/running cost is a factor to

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.

consider and, secondly, it would summarise complex information into a simple graphic to enable comparison with other models.

However there are other barriers/failures in the market (below) which prevent labelling from being a complete solution to issues with the availability of information. The introduction of labelling may not resolve the inability for buyers to obtain information about the comparative running costs of cabinets: some buyers may remain unaware that they could save significant running costs 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 it¹⁷. Because running cost is invisible to buyers, they may be missing out on potential financial gains that could have been reinvested.

Lack of information about and focus on energy efficiency

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 may include factors such as cabinet size, appearance, energy use, quality and whole-of-life cost.

But there are costs associated with obtaining 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, buyers will use rules of thumb, such as knowledge of past purchases, to help them decide. While governments can reduce costs for buyers by providing information on energy use, such as through the Energy Rating database, such databases may not provide a reliable or complete source of information – and still impose costs on users. For example, searching the database for a specific cabinet type can be very time consuming process for buyers and requires the relevant model to have been registered by the supplier. In addition, the buyer would need to have an understanding of the Standard to know what type of cabinet they are searching for.

Even if a buyer was motivated to learn more about energy use, calculating running costs could be difficult and time consuming (and therefore less likely to occur). Understanding how test results in a laboratory could translate into actual energy use in a given situation may further discount the value a potential buyer would place on such information. Not all types of cabinet available on the market are required to be registered.

Feedback on the product profile confirmed that there is an apparent lack of attention to energy efficiency: both suppliers and manufacturers indicated that they sell certain types of cabinets into 'type-price' brackets which do not differentiate between their respective efficiency.

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 keywords such as high, outstanding or quality refrigerating efficiency or low energy consumption. Only seven companies actively promoted the energy efficiency of their cabinets, or identifying ways the companies could meet their emissions targets or improve their refrigeration systems.¹⁸

A lack of attention to energy efficiency has a cumulative effect. For example, an estimated 105,000 cabinets are expected to be sold across Australia and New Zealand in 2015. These will have used over 7651 GWh that year and every year. If the least efficient 10% of cabinets were required to be more efficient from 2017, the dollar savings in NZD could be in excess of \$20 million *each year* (AUD \$18m) and every year just from reduced electricity use. Each person who bought a cabinet in this improved 10% bracket would save more than NZD\$1,200 (AUD \$1,100) on electricity, *every year*.¹⁹ It would also reduce emissions of CO_{2-e} by 159 kt, per year, every year (both countries).

¹⁷ 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.

¹⁸ These companies included: Coca-Cola Amatil, Frigoglass, Huxford-Orford, McAlpine Hussmann, Sanden International, Skope and Stoddart (Koldtech).

¹⁹ Based on an average national commercial electricity price of \$47/GJ - MBIE "Energy in New Zealand 2014" (June 2015). New Zealand is estimated to account for approx. 16% of the energy use across both countries - or 122.4 GWh for that year.

Some buyers aren't the users

Another barrier to buyers selecting energy efficient cabinets is the issue of split-incentives: where the person who pays for the running of an appliance was not involved in the decision to buy a particular cabinet. A typical example occurs in relation to refrigerated beverage cabinets, where companies hire out or courtesy-supply branded product-specific fridges but do not pay for the electricity. Only a minority of companies are believed to ensure that their fridges for hire seek to maximise energy efficiency.

All remote display cabinets and many integral (self-contained) display cabinets must be installed by a licensed refrigerant handler. The use of specialist suppliers further adds to the separation of the owner from the equipment purchase decision. It also adds to the other issues with MEPS not achieving their intended purpose: while imposed to improve the efficiency of the least efficient models on the market, end-users may incur excessively high running costs, even when they are not directly involved in the purchasing decision.

Price of electricity doesn't reflect total emissions

The price of electricity doesn't reflect the whole environmental costs of using it. Buyers' behaviours have a consequence on others. There are significant greenhouse gas and other atmospheric emissions (Nitrogen oxide, Sulphur oxide etc) produced from generating and using electricity (especially in Australia, less so in New Zealand because of the significant hydro/renewable component). Without a carbon price in Australia, the cost of abatement from more stringent regulations is cheaper than the Australian government's current spending (around \$13/tonne) to buy abatement.

In the absence of specific measures to address this, buyers have little incentive to take such factors into account when determining what equipment to purchase and use.

3. Objective

Why is government action needed?

The purpose of this consultation RIS is to present policy options to address the regulatory failures and market barriers described in the Problem section. These issues prevent buyers from making informed decisions about the running costs of a refrigerated cabinet that could save them money in the long term. This would benefit buyers who would otherwise purchase a low efficiency cabinet, and yield electricity savings and reduced emissions.

Regulatory and market failures include:

- The complexity of the Australian Standard AS 1731 – it is confusing and difficult to interpret.
- The significant gap in the coverage of AS 1731 - which does not apply to the majority of storage cabinets (used for food storage and catering purposes).
- Unrevised MEPS which do not align with the internationally accepted standards being adopted by other significant economies within the cabinet market.
- MEPS and HEPS levels which do not provide a meaningful point of reference against which cabinet efficiency can be marketed, should suppliers wish to do so.
- 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).
- Refrigerated cabinets are not labelled for their energy efficiency, meaning buyers have little opportunity to compare model efficiency. The introduction of labelling as a regulatory specification would (depending on supplier compliance) assist with the ability for consumers to identify and understand the energy efficiency of different cabinet models.

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 markets and keeping businesses competitive with overseas markets, so as to:

- Encourage more efficient refrigerated cabinets to enter the stock, with efficient new technologies becoming main stream within the industry.
- Enable buyers/users to identify efficient units and have confidence in their cabinet selections.
- Reduce the cost of compliance for suppliers, by removing the need to test to a local Australian Standard. Upgrading the energy efficiency test methods and minimum performance levels for refrigerated cabinets would achieve alignment with major trading partners, cover a much wider range of cabinets which function in a similar way and 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. It will also help curb growth in energy demand thereby deferring the need to invest in new energy supply infrastructure, helping New Zealand to continue to meet most of its stationary energy needs from renewable and/or low emissions energy sources. The energy use of these products could potentially be reduced by a fifth so continued growth could double current energy use figures.
- ensure that regulation remains relevant and effective over time.

Without government action, the regulatory and market failures identified in this consultation RIS will continue.

4. Options

The policy proposals considered in this document incorporate Business as Usual (BAU), regulatory and non-regulatory options. The introduction of labelling is also considered.

In many countries, policy interventions such as MEPS and mandatory energy labelling programs have been highly effective at tackling market failures and yielding significant benefits to consumers and businesses compared to their costs and burden 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 competency and incentives to develop energy efficient products.

All regulatory options include adopting the ISO test method for Refrigerated display cabinets (ISO 23953), and European test methods for storage cabinets (EN 16825) and other cabinet types (ice-cream, gelato, beverage coolers) from 2017 (modelled date only). If adopted these standards would cover a much wider range of refrigeration equipment that perform similar functions and would have similar characteristics to those already regulated in Australia and New Zealand. Regulatory options also include developing localised Au-NZ MEPS levels for this wider range of cabinets – or adopting/aligning with the European Commission MEPS levels (EC MEPS)²⁰.

Policy options under consideration

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

Option 2 looks at 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. Labelling is mandatory.

Option 3 considers 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. Labelling is mandatory.

Option 4 considers adopting the ISO and EN test methods and adopting the EC MEPS levels (posed per group) from 2017. Overall this approach affects approximately 14% of cabinets but some types are more affected than others (the impact is not evenly spread across the sector). Labelling is mandatory.

Option 5 considers the alternative of non-regulatory intervention, in addition to Business as Usual.

The options are summarised in **Table 1** overleaf.

²⁰ 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 (Australia) and testing.

Table 1: Options Summary

Option	Option 1 – BAU	Option 2 – EN and ISO test methods, AU/NZ MEPS 10%, labelling	Option 3 – EN and ISO test methods, AU/NZ MEPS 30%, labelling	Option 4 – EN and ISO test methods, EC MEPS, labelling	Option 5 – non-regulatory options (in addition to BAU) ²¹
Move to International ISO and EN test methods	*	✓	✓	✓	*
New AU/NZ MEPS levels	*	✓	✓	*	*
EC MEPS levels	*	*	*	✓	*
Labelling	*	✓	✓	✓	✓
Modelled date of implementation	N/A	2017	2017	2017	2017

EN standards and indicative MEPS implementation dates proposed in Europe

To avoid confusion, the following table (**Table 2**) shows the status of the proposed standards and when EC MEPS levels and standards are likely to be finalised. Although we have modelled implementation of regulatory options from 2017, meeting this date is indicative only. Therefore the impacts represent the ‘worst’ case scenario. This table also outlines aspects of these standards that we have not analysed and therefore do not consider for adoption under this RIS.

Table 2: Publication dates for EN standards and EC MEPS levels, and parts of these standards not currently being considered for adoption in Au and NZ

	Standards publication date	MEPS levels publication date in Europe	MEPS regulation date in Europe	Parts of standards or regulations that are not being considered for Au and NZ under this current proposal
ISO 23953 Refrigerated Display Cabinets	published	mid 2018	mid 2019	Beverage Vending machines
EN 16825 Refrigerated storage cabinets and counters for professional use	published	Published	July 2016	Blast cabinets, condensing units and process chillers
EN 16902 Commercial beverage coolers	January 2017	mid 2018	mid 2019	
EN 16901 Small ice-cream freezers	January 2017	mid 2018	mid 2019	
EN 16838 Refrigerated display scooping cabinets for gelato (soft scoop)	published	mid 2017	mid 2019	

Option 1: Business as Usual

Option 1 is Business As Usual (BAU): the “no intervention” approach with no change in standards, scope or test methods. It involves the continued use of AS 1731 as the applicable standard in Australia and New Zealand. AS 1731 currently defines the energy efficiency test procedure for Refrigerated display cabinets in both 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.²²

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 legislation in Australia and New Zealand for Refrigerated commercial cabinets.

²¹ Option 5 includes incentive schemes and buyer education campaigns which were not modelled for the purposes of this consultation RIS but are explained under the non-regulatory part of this section.

²² Cabinets are defined into more than 50 different classes across four operating temperatures, with different MEPS levels and test procedures.

- AS 1731 does not apply to most storage cabinets that are intended for use in catering and similar non-retail applications (food storage purposes), approx. 20% of the market.
- The MEPS and HEPS levels remain unchanged, do not provide meaningful parameters for relative energy efficiency of different cabinet models and do not align with internationally accepted standards.
- Refrigerated cabinets are not subject to labelling requirements.

Regulatory Options

Test Methods

All the regulatory interventions look at adopting (modelled from 2017):

- the ISO standard 23953 for *Refrigerated Display Cabinets*
- the European standard EN 16825 for *Refrigerated storage cabinets and counters for professional use* – the standard is in draft however the ECodesign (MEPS) regulations have already been enacted and compliance is required from 1st July 2016²³.
- the (draft) EN 16901 Small ice-cream freezers
- the (draft) EN 16902 Commercial beverage coolers; and
- the (draft) EN 16838 Refrigerated display scooping cabinets for gelato.

Essentially, these standards cover a much wider range of refrigeration equipment that performs similar functions or have similar characteristics as those already regulated in Australia and New Zealand. These are a complementary suite of test methods that cover much of the refrigerated cabinet market (previously these were sub-sets in AS 1731). The ISO standard is widely used in Europe as the preferred test method for display cabinets (and very similar to AS 1731) and other countries have or will be looking to adopt or adapt it. 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. Not so for the Storage cabinet standard.

The other test methods are developed using the ISO as a parent standard. The storage cabinet and gelato standard are due for publication in early July 2016. The beverage cabinet and ice-cream standards are still in draft (as of June 2016).

MEPS levels – either Au-NZ or EC

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

Three MEPS level scenarios are explored in this document:

- Revising local Australia-New Zealand MEPS levels to affect the least efficient 10% of cabinets, per group of similar cabinet types, or
- 30% of cabinets per group of similar cabinet types (Options 2 and 3), or
- Adopting EC MEPS levels (Option 4) with approximately 14% of all cabinet models affected but with some sub-sets of cabinets are more affected than others.

The two local MEPS levels were devised by looking at local registration data, overseas data and sales weighted data (from New Zealand data, assumed to be the same in Australia, where no local sales data exists.)

For ease of interpretation, we have divided into 15 groups of similar types, to distinguish high selling types (beverage cabinets) and those that would need to comply with distinct standards (ice-cream, beverage, gelato, storage). MEPS levels are imposed per group – an approach which is simpler to understand and enforce. These five groups have distinct efficiency levels and dates of implementation. **Table 3** (overleaf) outlines the groups for the purpose of setting MEPS in Australia and New Zealand.

²³ [Status of products under the EU Ecodesign Directive](#)

Table 3: 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	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	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	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		

MEPS levels in Europe are imposed per group irrespective of cabinet type (remote or integral, closed or open). Having broad definitions based on cabinet groups and group-level MEPS - rather than very specific class and MEPS definitions in AS 1731. Separate class 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 4 (below) shows a sales profile of grouped cabinet types, including a comparison of E3 registered cabinets and Storage types, versus the European sales profile of broader categories (EC 2014b and EC 2012). Sales of integral display cabinets are slightly higher in the EU than Australia/New Zealand, and remote types are slightly lower. Storage types are similar (**Figure 12**).

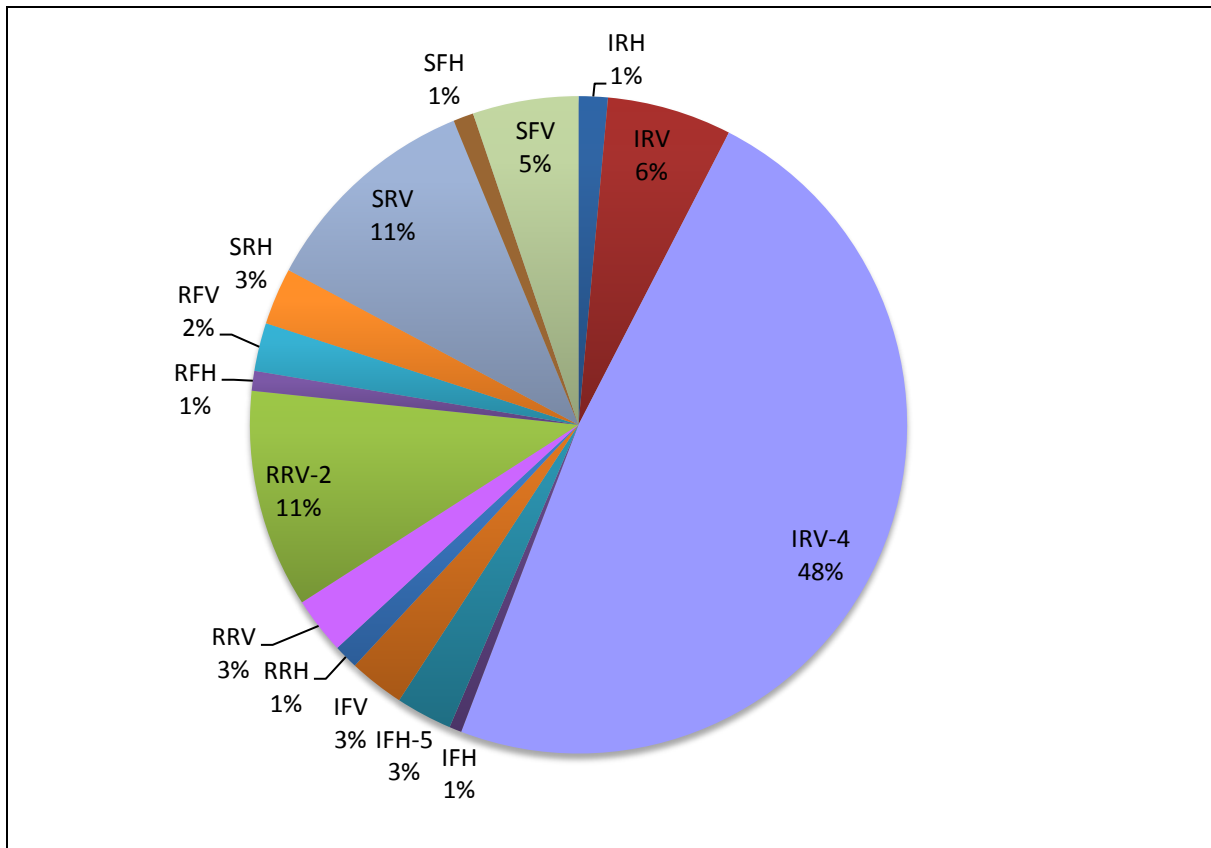
Table 4: Proportion of cabinet types per group, estimated from European data vs local sales data.

Application	Temperature	Configuration	AS 1731.14 Types	Dissection by type and sub-type		
				EU	Local ⁽¹⁾ ²⁴	
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⁾ ²⁵	1.4%
		Vertical				5.9%
	Freezer	Counter (Horizontal)				46.5%
		Vertical				0.6%

²⁴ The ECCA 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.

²⁵ 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 2013, based on 15 groups of cabinet types.



European Energy Efficiency Index calculation for MEPS

The European approach uses a simple Energy Efficiency Index (EEI) – a linear equation based on the tested efficiency of a cabinet, in relation to its group-based MEPS level (Standard Annual Energy Consumption (SAEC)). The EEI score shows how much more efficient a cabinet model is than its MEPS level.²⁶

Note – The term of “MEPS” is not used in the ISO or EN standards. Rather they use the term “efficiency grade” to refer to two concepts - the actual efficiency grades A to G (or equivalent for storage cabinets), but also the *requirement to meet a better* efficiency grade. To keep these two concepts clear in this report, we use “MEPS level” to refer to the efficiency level that a cabinet must pass – and – the “Efficiency Grade” as the grade from A-G (or equivalent) that is shown on the label, as a result of the EEI calculation.

The European Commission has specified a range of grades of EEI that must be achieved by specific years, for all cabinet types. Their intent is to phase out the lowest efficiency grades over time. These have been signalled well in advance by publicising the simple index levels and dates when they will come into force. See **attachment F** for more information about European test methods, the EEI and MEPS levels.

When using the EEI with E3 registration data, this index is not designed to show whether some models or classes are “better” than others, rather how effective their original MEPS levels were and if/how the market forces have worked. For example, a cabinet class with many models in efficiency grade A, shows that either the initial MEPS were very achievable/too low or that purchasing forces have pushed for more efficient models. In contrast, classes that do not show much improvement above the lowest efficiency grades, may have a technical reason why higher scores cannot be achieved or a price reason – that is, models may be chosen because they are cheap and using better components may price them out of the normal market bracket. Both these reasons are typically why MEPS

²⁶ 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.

are introduced (given enough lead in time) – to encourage innovations in high energy using items or to swap to more efficient components.

European Efficiency grades

The EN has also devised a series of efficiency grades (A – G or similar) where, over a specified timeframe, the lowest grades are periodically required to improve. In tandem with this is 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. **Table 5** shows implementation dates in Europe.

Increasing stringency of MEPS is achieved by requiring that all cabinets must meet a moving efficiency score by a certain date. Note – at present, the efficiency grade G covers all cabinets with an EEI higher than 130 or 140, (for display types) depending on the type. In 2019 all cabinets will have to score an EEI less than 130, and by 2021, all types will have to perform better than an EEI score of 110 (draft provisions).

Table 5: European introduction dates and MEPS for storage cabinets, and draft 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.

Draft efficiency grades and MEPS levels for display cabinets:

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 (**Table 6**). (Note the EEI requirements and labelling grades are still subject to industry-government discussion in Europe, so likely to change.)

Table 6: Proposed efficiency grades for Refrigerated Display Cabinets.

Energy Class	Efficiency	Commercial Cabinets	Display	Beverage Coolers	Small Ice-cream freezers	Gelato cabinets	scooping
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 7 below shows the proposed efficiency grades for the storage cabinet labelling scheme. There are different MEPS and implementation dates for heavy duty storage cabinets.

Table 7: Proposed “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	-

European Labelling

In Europe storage cabinets have been regulated to be labelled from 1 July 2016 and display cabinets from 2017 Also different labelling scales depending on the date – scale either A to G or A+++ to G until June 2019, then the latter only) **Table 8**.

A generic example of the label is shown in **Figure 13** below.

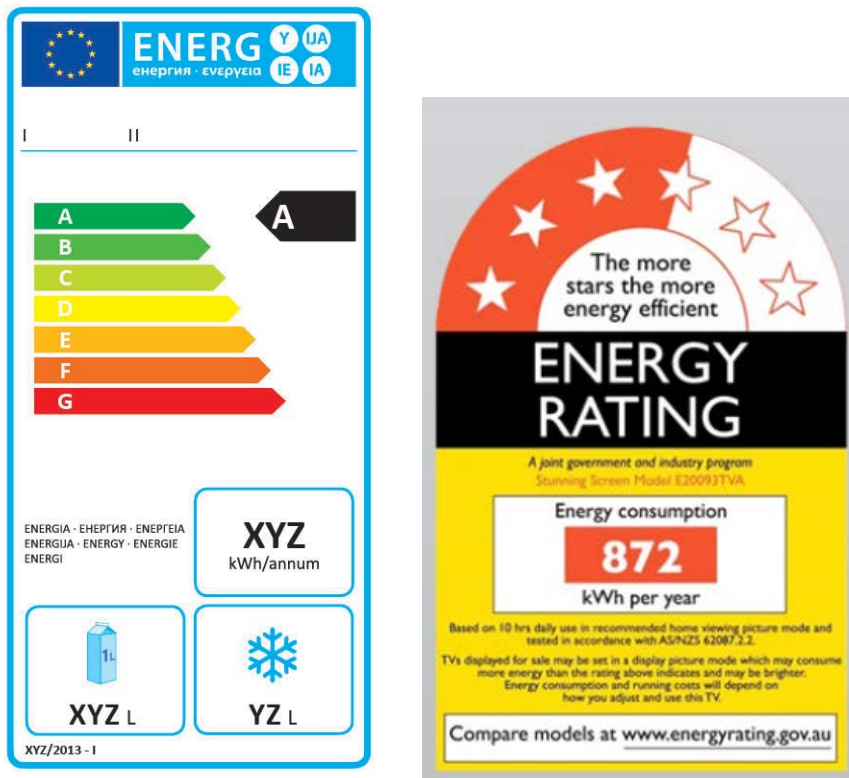
Table 8: Energy Efficiency classes for labelling of storage cabinets from:

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

Considering labelling for Au and NZ

There is currently no labelling of Refrigerated cabinets in Australia or New Zealand. Mandatory labelling is considered in this RIS for all regulatory options (2, 3 and 4). Generic examples of the European and Star rating labels are shown in **Figure 13** below. It would be beneficial to use the star rating label instead of the grading A to G, because this is familiar to buyers in Au and NZ. The actual number of stars could be equivalent to the highest grade that the appliance meets. E.g. 6 stars for a grade A model. Actual label specifications would need to be developed for Australia and New Zealand by a working group of government and industry experts.

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



The advantage of using star rating labelling is that it is familiar to Australian and New Zealand consumers. The style of label used in Europe would need to be adapted for use. Mandatory labelling could be required at the point of sale or supply (depending on the applicable Australian or New Zealand legislation).

Labelling could be adaptable to a high efficiency specification: it would be useful in designating the HEPS levels for each group of cabinets. This level would be based on the most efficient 3 or 4 grades or star rating equivalent.

Note: this consultation will deliver a recommendation on whether labelling could be worthwhile for refrigerated cabinets. If so, the algorithm to translate the European label into a star rating label will be developed by a technical working group.²⁷

Definition of 'family of models' for display cabinets

There is confusion in the *current* standard AS 1731 about what a 'family' of models represents. Clause 4.6.1 of part 1: A 'family' of models is defined as:

²⁷ 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 displayed online according to specifications set out in each agreements. This is the principle behind ENERGY STAR® in New Zealand. For more information on voluntary online labelling, go to [labelling resources on the energy rating website](#).

“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’.”

The confusion would be avoided whether this represents identical ‘clip together units’ or the resulting array of units in a cabinet bank, by moving to the ISO Standard 23953 (display cabinets) and other related standards.

For example, 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 – meaning that suppliers must define their cabinets into master groups irrespective of size, shape, dimensions etc. See **Figure 14** below.

Figure 14: Extract from the efficiency standard ISO 23953 for display cabinets – designation of cabinet ‘families’ (groups of models, Table D.1).

Application To be used for	Temperature positive		Temperature negative	
	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.

Alternate Components for storage cabinets.

No provisions are made for alternate components in the storage cabinet regulations nor the Storage cabinet standard. Further investigation will be made to see if these can be extended to all regulated cabinets in Australia and New Zealand (i.e. also storage cabinets). If so, these will need to be written as specific, localised regulations.

Readers are encouraged to comment on whether using some of the same terms and exclusions for storage cabinets as display cabinets, and vice versa, would be beneficial/simplify compliance.

'Built in' display cabinets.

In the draft 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.

Wine storage appliances.

Wine storage appliances are also exempt from the display cabinet regulations – although these are captured by the storage cabinet regulations [clauses (a) and (b) of Article 2 Definitions].

The definition of a ‘professional refrigerated storage cabinet’ is:

“an insulated refrigerating appliance integrating one or more compartments accessible via one or more doors or drawers, capable of continuously maintaining the temperature of foodstuffs within prescribed limits at chilled or frozen operating temperature, using a vapour compression cycle, and intended for the storage of foodstuffs in non-household environments but not for the display to or access by customers.”

“Foodstuffs” are further defined as:

“ food, ingredients, beverages, including wine [emphasis added], and other items primarily intended for consumption which require refrigeration at specified temperatures”.

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. Mandatory labelling is added. Implemented in 2017.

Option 2 proposes Australasian-specific MEPS set at an amalgamated group level to affect the least efficient 10% of cabinet models per group. Mandatory star rating labelling is also proposed.

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. Mandatory labelling is added. Implemented in 2017.

Option 3 is the same as option 2 (including mandatory labelling), 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.

Option 4

Adopt ISO and EN test methods for display, storage and related cabinets. Adopt EC 2017 MEPS levels. Mandatory labelling is added. Implemented in 2017

Option 4 is the same as options 2 and 3, (including mandatory labelling), except it proposes the introduction of EC MEPS levels per group rather than a revision of existing local MEPS levels.

Storage cabinet suppliers are most affected under this scenario: their cabinets will have to meet more onerous levels than previously (currently most storage cabinets are not subject to MEPS). In Europe, the pending regulation of storage cabinets has been signalled for some time.

Option 5: Non-Regulatory Options in addition to BAU.

Option 5 looks at possible non-regulatory options for refrigerated commercial cabinets, in addition to BAU. 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 options were modelled for cost-benefit analysis – a discussion about their impact is shown in the next “Impacts” chapter.

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. New Zealand does not have an incentive scheme.

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.²⁸ 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 (such as ENERGY STAR®) or dis-endorsement programmes rely on equipment suppliers agreeing to meet certain criteria in the absence of regulation. Voluntary high efficiency levels can subsequently be used to develop rebates, incentives, white certificate schemes or similar.²⁹

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

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 simply with education may be limited.

²⁸ [UK Government Energy Technology List](#)

²⁹ In New Zealand the government led ENERGY STAR® is a voluntary endorsement scheme to promote high-efficiency appliances. The scheme is not considered as part of the current proposals.

5. Impacts

This section identifies how the community is likely to be affected by each policy option. It also outlines the costs and benefits of each option and the distribution of those costs and benefits³⁰.

The full methodology and analysis, including modelling assumptions, is available at **Attachment D**.

The estimated 'regulatory cost burden' on Australian companies is required to be shown (**Table 9**). 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 costs consist of the additional cost for administration time spent to register a product, additional testing costs and the additional capital cost of a product which meets the new MEPS; it does not include the cost of registration itself. The vast majority of these regulatory costs are attributed to the additional capital costs of products to meet the new MEPS, as shown in the last column.

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

- only the costs to Australian businesses are shown here (does not include NZ companies)
- includes the capital cost to improve efficiency – from Table D 4 and Table D 5 – technological improvements and their costs; and
- the cost per registered model can be the full cost or much lower because a large number of units may be sold against each registered model.

These total regulatory costs represent between 0.2 % and 3.1% of the sales weighted average equipment cost (of AUD\$5,185). These costs have been acknowledged by the Australian Office of Best Practise Regulation.

Table 9: Estimated regulatory burden cost (excluding cost to register in Australia) – for Australian businesses (in \$AUD)

	Option	Per Business Cost - Annualised	Cost per registered model	Share of Regulatory Costs due to additional Capital Cost
1	Refrigerated Display Cabinets - Business as Usual	\$16,764.41	\$11.31	NA
2	Refrigerated Display Cabinets - New MEPS 10% impact + labelling	\$53,949.13	\$36.41	66%
3	Refrigerated Display Cabinets - New MEPS 30% impact + labelling	\$225,763.93	\$152.37	85%
4	Refrigerated Display Cabinets - European MEPS in 2017 + labelling	\$236,250.45	\$159.44	86%

³⁰ By the consultancy firm Expert Group.

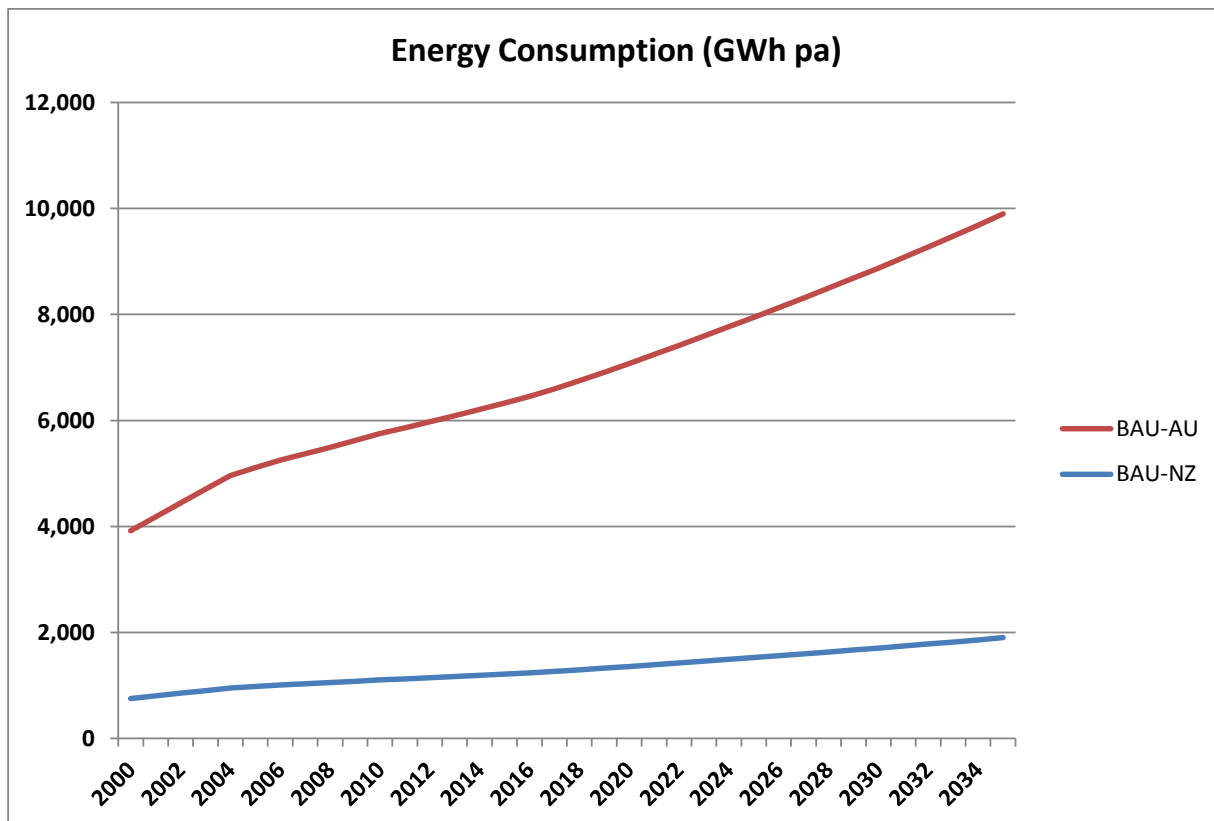
Option 1: Business as Usual (BAU)

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.

An efficiency improvement of 0.3% pa (based on sales weighted efficiency from 2008 – 2012 from actual NZ sales data) was assumed. This improvement in efficiency can be expected to continue, given ongoing changes in technology and increased user awareness of the cost of energy (for example, supermarkets) and international demand for greenhouse gas reduction affecting corporate behaviour. 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.

Figure 15 below shows the annual energy consumption for all types of Refrigerated display cabinet under the existing requirements with no policy intervention.

Figure 15: Annual Energy Consumption from display cabinets under the BAU scenario.



However, under BAU, the existing market barriers, confusing and complex standards arising from the current requirements will continue:

- Manufacturers, suppliers and regulators will continue to encounter problems with the confusing, complex and outdated AS1731 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.
- 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 may 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 (see the cost-benefit analysis below which shows that regulating these cabinet types yields a significant amount of energy savings and greenhouse gas reductions.)
- The unrevised MEPS and HEPS levels will not prevent buyers from purchasing less efficient cabinets.

- 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 (which allows for comparisons to be made on the shop floor or online) and lack of information will continue to prevent consumers from assessing the relative energy efficiency of different display cabinets and they may incur higher running costs than necessary

Regulatory Options

All regulatory options (2, 3 and 4) propose to adopt, from 2017, regulations to cover a much wider range of cabinet types. These cabinets will be classified into 15 different groups (grouping similar types together) and mandatory labelling is added. Three different MEPS scenarios are proposed:

- Au-NZ MEPS to affect the least efficient 10% of cabinets per group
- Au-NZ MEPS to affect the least efficient 30% of cabinets per group
- EC MEPS levels (approx. 14% of models however some groups affected more than others)

All these options have possible pros and cons:

Pros:

- Issues with the coverage of AS1731, including outdated definitions, will be addressed.
- Setting local Australia-New Zealand MEPS enables 'entry level' (10%) MEPS to be allocated to those cabinets that have never been regulated for efficiency.
- In contrast, setting a high MEPS stringency to affect the least efficient 30% of models per group would significantly improve the benefit for cabinet buyers (and result in significantly reduced running costs).
- Display cabinets with solid doors will be reclassified as "storage cabinets" and, along with all storage cabinets, will be given MEPS values based on volume.
- However, imposing local MEPS levels still imposes costs on suppliers (even if these are just administrative).
- Aligning MEPS levels with Europe means that over time it would be easier for suppliers to source and export stock to and from the European market.
- Display cabinets that currently have "no value" will have MEPS values. All cabinet types, included storage and other 'rare' types will be subject to increased MEPS levels and require testing to pass the new MEPS levels.
- Any changes to Australasian MEPS and HEPS levels would need to be planned ahead with a staged introduction of revised levels. This would give stakeholders known targets to be able to work towards for future developments of products.
- Overall, it is expected that the transition to international standards and MEPS will be easily achieved and, once adopted, will be easier to understand and enforce.

Cons:

- Setting a group level MEPS affects each class of cabinets differently, depending on how energy efficient they are in relation to the *group* average. Some classes will be unaffected while other classes must improve to meet the group level MEPS. In general, suppliers of storage cabinets and those cabinet types that previously had no allocated MEPS value will need to source more efficient stock.
- A fundamental issue with increasing Australasian MEPS levels is that there are few "public" test facilities for energy efficiency testing of refrigerated cabinets in both Australia and New Zealand. While there are several private test laboratories set up by manufacturers to develop and test their own products, these are generally not accessible to other suppliers or manufacturers. Obtaining a test report would depend (at present) on overseas laboratories.

- By aligning test standards with major markets such as Europe, suppliers are more likely to find compliant stock and also test to Australasian-specific levels at the same time they are satisfying MEPS requirements for Europe.
- Aligning with Europe would reduce the cost of local testing and reduce the cost of trading.
- The storage cabinet sector (and those cabinet types that have not previously been regulated) will be most affected. Suppliers will have to source more efficient appliances, produce a test report, and pay to have their models registered (in Australia). Initially this may compromise small companies, however, as better performing models are now available in the market in Europe, sourcing compliant stock should not be an issue.

A comparison between the energy savings from European MEPS levels and Australasian MEPS set at 30% showed that European MEPS produced slightly greater savings and slightly higher BCR. However the savings are very much greater for storage cabinets compared to display cabinets, with storage cabinets providing over 80% of the total savings. This is due to the much more stringent MEPS levels for these in Europe, compared to the situation in AU/NZ where the majority of storage cabinets have not been subjected to any MEPS.

Assumptions about the impact of a changed regime, on cabinets and the market

Because there are *already* cabinets on the Au-NZ market that exceed the proposed efficiency levels – and that the proposed test methods are similar to AS 1731, we have made assumptions about the impacts that a changed regulatory regime would have on cabinet attributes. These can't be quantified in a statistical comparison (cost-benefit analysis) so we summarise them here.

These features (below) of the market and cabinets, would not be compromised for the customer:

- Cabinet's ease of use.
- Cabinet's function – to chill food or beverages.
- Cabinet safety.
- Cabinet structure – because efficiency is largely from improved components (invisible to users, except lights).
- Purchase price – because suppliers sell into type-price brackets.
- Range of cabinet types on the market.
- Competition between suppliers.

By grouping cabinet types, and allocating MEPS – wine and chocolate cabinets will be covered

Because the MEPS specifications (proposed or 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) irrespective of them being remote or integral – and – therefore 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 in the **Table 10** below.

Table 10: Summary structure of EU combined group classifications.

Medium Temperature (Refrigerators) Mean storage temperature above 0°C Class M, M0, M1, M2, H1, H2, S				Low temperature (Freezers) Mean storage temperature below 0°C Class L1, L2, L3					
Display cabinets		Storage cabinets		Display cabinets		Storage cabinets			
Vertical		Horizontal	Vertical	Horizontal	Vertical	Horizontal		Vertical	Horizontal
Beverage	Others					Small Ice-cream	Others		
Note: (1) Temperature Classes, M, M0, M1, M2, H1, H2, S, L1, L2 and L3 are all defined in ISO 23953.2:2015.									

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 and they could be disadvantaged by being subjected to identical test methods and maximum energy consumption requirements as 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.

While the European proposals and test methods for “Beverage Cabinets” have not yet been finalised there is no valid reason why such cabinets cannot continue to be included in any MEPS programme as a refrigerated cabinet operating at mean temperature above zero or as a Class S special temperature cabinet.

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, from 2017. Mandatory labelling is added.

The anticipated impacts of the policy proposals under option 2 include:

- All cabinets covered by the wider scope of the standards, would need to provide a test report and (in Australia) registered.
- In this manner, all groups of cabinet types would be affected by MEPS (compared with simply adopting the EC MEPS scenario where certain types are affected more than others).
- Consumers will be assured that similar cabinet types are subject to the same test methods, standards and minimum performance requirements.
- Increased MEPS levels will enable consumers to purchase more efficient cabinets and remove the current risk that they will be unaware they are purchasing less efficient unregulated cabinets.
- More stringent MEPS requirements will provide the incentive for suppliers to source more efficient models and to improve on them.
- Increased benefits from the introduction of labelling.

As shown in **Table 11**, **Figure 16** and **Figure 17** below, an increase in MEPS to affect the least efficient 10% of models per group of cabinets would result in some improvement in energy savings and further reductions in greenhouse emissions when compared with BAU, but these would not be significant when compared with other scenarios (see options 3 and 4 below).³¹

The Benefit Cost Analysis takes the costs (in **Table D 2**, Attachment D), adds them to the costs to improve 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.

³¹ See the attached Glossary for relevant terms, including Net Present Value (NPV) or Benefit Cost Ratio (BCR).

Figure 16: Annual energy consumption from display and storage cabinets from MEPS affecting least efficient 10% per group (labelling is included).

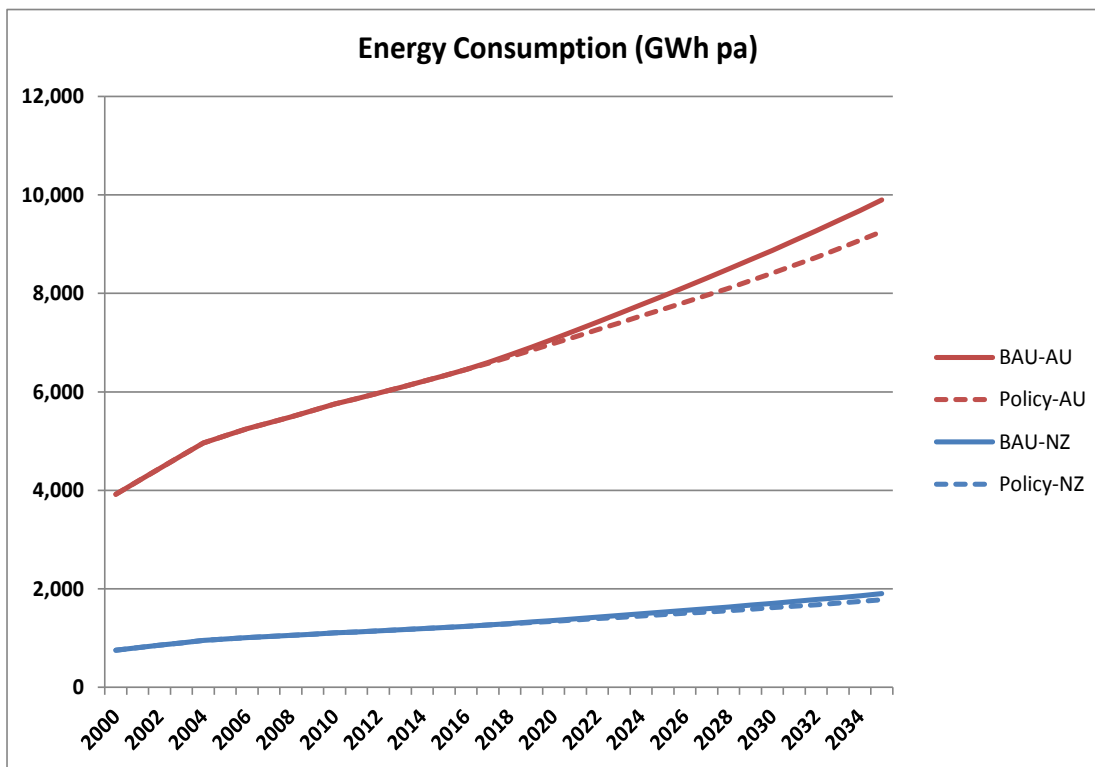


Table 11: Costs, benefits, energy savings and greenhouse emission reductions analyses for MEPS affecting least efficient 10% per group.

Period	CBA Summary AU		CBA Summary NZ ³²	
	2014 - 2035		2014 - 2035	
Costs (\$M)		\$58		\$15
Benefits (\$M)		\$606		\$142
NPV ³³ (\$M)		\$548		\$127
BCR		10.5		9.3

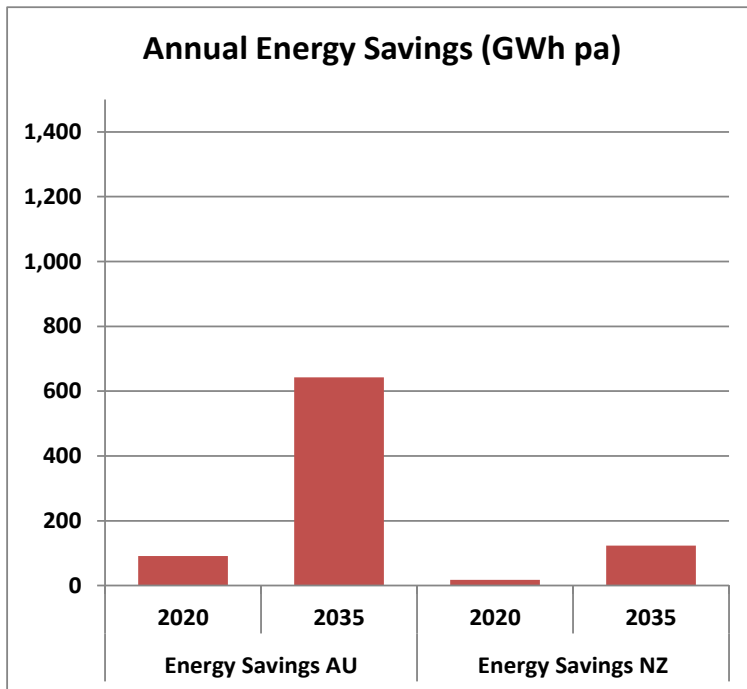
Year	Energy Savings (GWh)			
	Energy Savings AU		Energy Savings NZ	
	2020	2035	2020	2035
Annual	91	643	17	123
Cumulative	210	5,976	40	1,146

Year	GHG Emission Reduction (kt CO ₂ -e)			
	GHG Reduction AU		GHG Reduction NZ	
	2020	2035	2020	2035
Annual	85	583	2	11
Cumulative	200	5,481	5	108

³² Based on consumer electricity price

³³ 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

Figure 17: Energy savings from MEPS affecting least efficient 10% per group.



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, from 2017. Mandatory labelling is added.

Option 3 is the same as option 2 except the local MEPS levels would be set at a more stringent level. The impacts are more than for option 2:

- A further increase in MEPS to cover an additional 20% of the least efficient cabinet models.
- Significant benefits.

As shown by **Table 12**, **Figure 18** and **Figure 19** below, option 3 would result in significant energy savings, greenhouse gas reductions and costs benefits, when compared with BAU and option 2.

Figure 18: Annual Energy Consumption from display and storage cabinets from MEPS affecting the least efficient 30% per group (labelling is included).

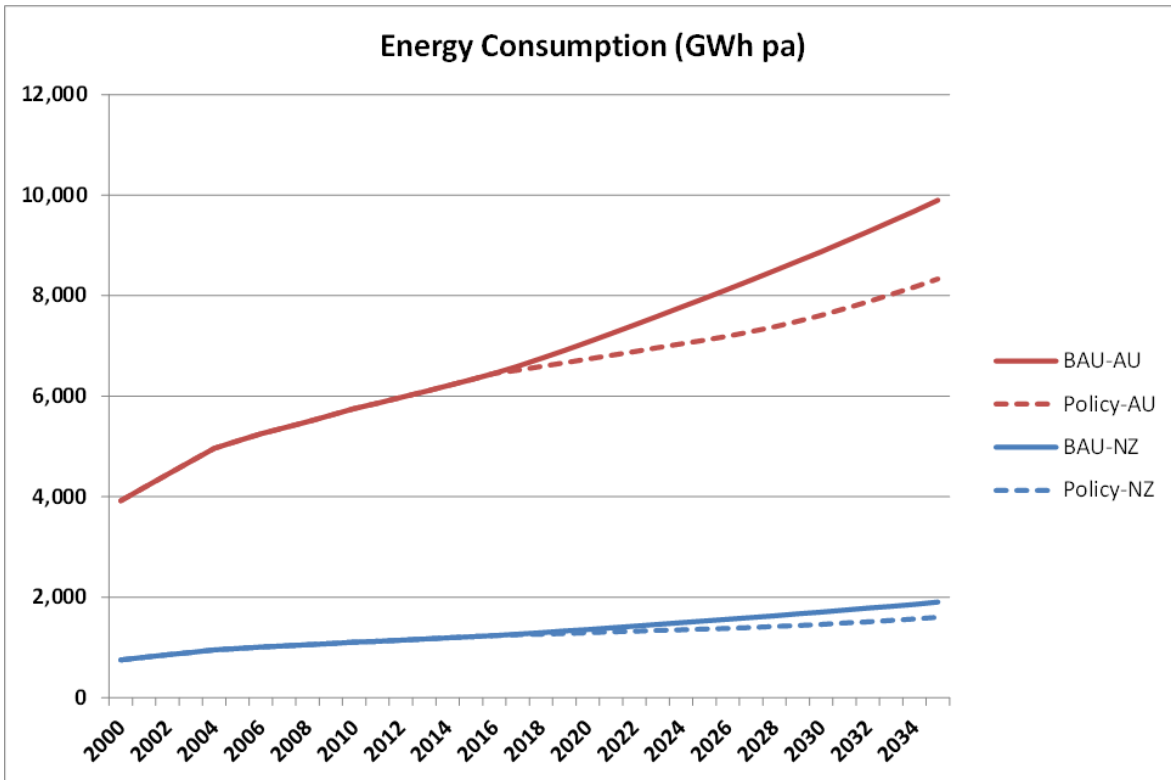


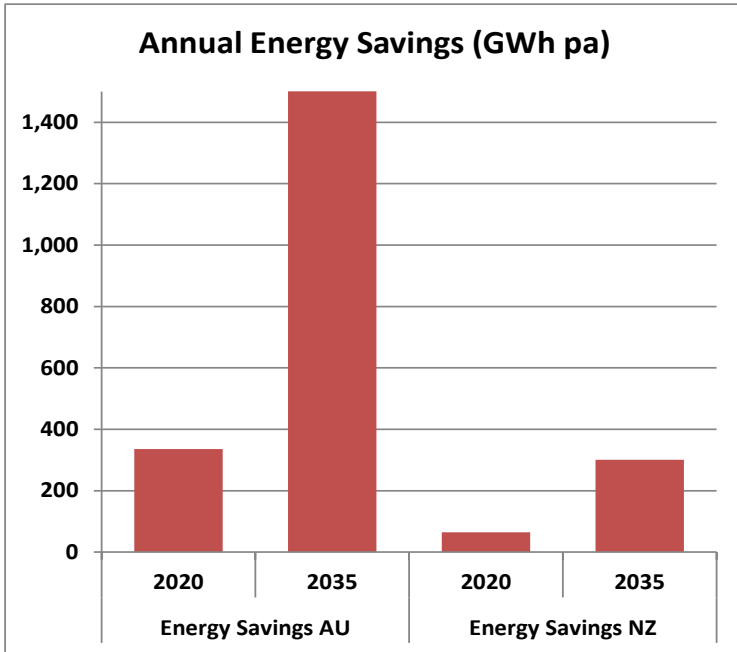
Table 12: Costs, benefits, energy savings and greenhouse emission reductions for MEPS affecting the least efficient 30% per group.

Period	CBA Summary AU		CBA Summary NZ	
	2014 - 2035		2014 - 2035	
Costs (\$M)	\$211		\$55	
Benefits (\$M)	\$1,641		\$383	
NPV (\$M)	\$1,430		\$328	
BCR	7.8		6.9	

Year	Energy Savings (GWh)			
	Energy Savings AU		Energy Savings NZ	
	2020	2035	2020	2035
Annual	336	1,564	65	301
Cumulative	817	16,749	157	3,223

Year	GHG Emission Reduction (kt CO ₂ -e)			
	GHG Reduction AU		GHG Reduction NZ	
	2020	2035	2020	2035
Annual	313	1,420	8	27
Cumulative	779	15,381	21	306

Figure 19: Energy savings from MEPS affecting least efficient 30% per group.



Option 4

**Adopt ISO and EN test methods for display, storage and related cabinets.
Adopt EC 2017 MEPS levels, from 2017. Mandatory labelling is added.**

Option 4 is the same as options 2 and 3 except that, rather than revising local MEPS levels the EC MEPS levels are adopted. It is expected therefore, that the additional impacts and benefits are significant energy savings and greenhouse gas reductions for both Australia and New Zealand –**Figure 20** below and **Table 13** and **Figure 21** overleaf.

Figure 20: Annual energy consumption from display and storage cabinets with EC MEPS from 2017 (including labelling)

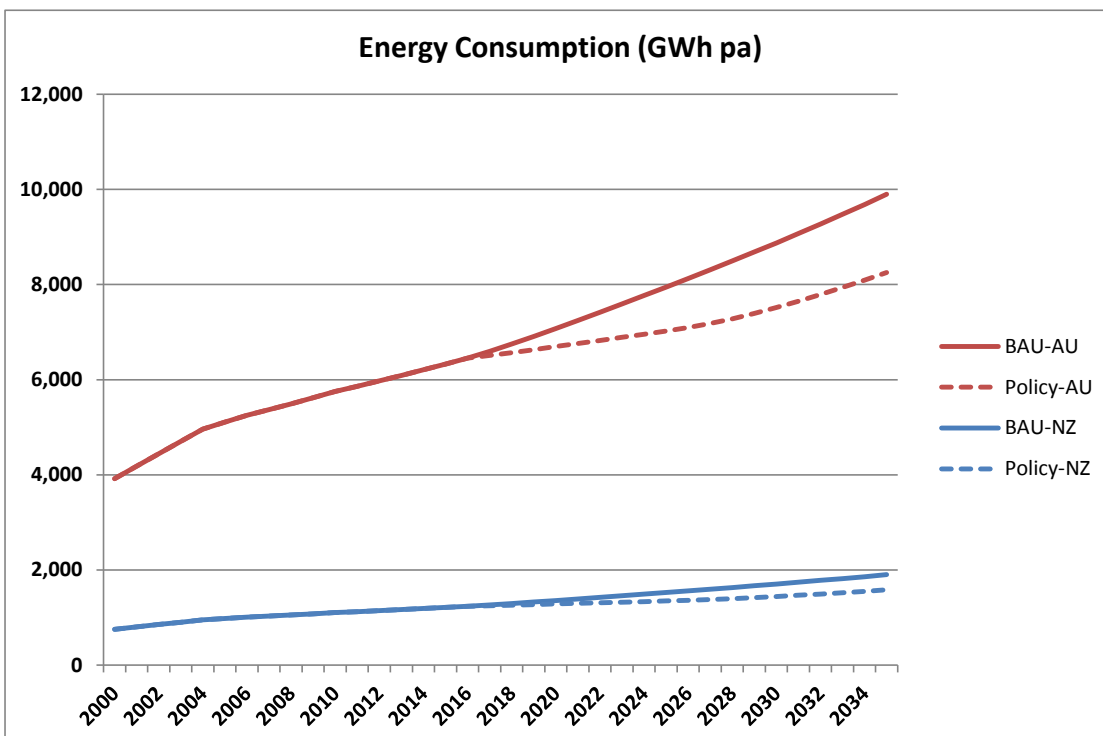


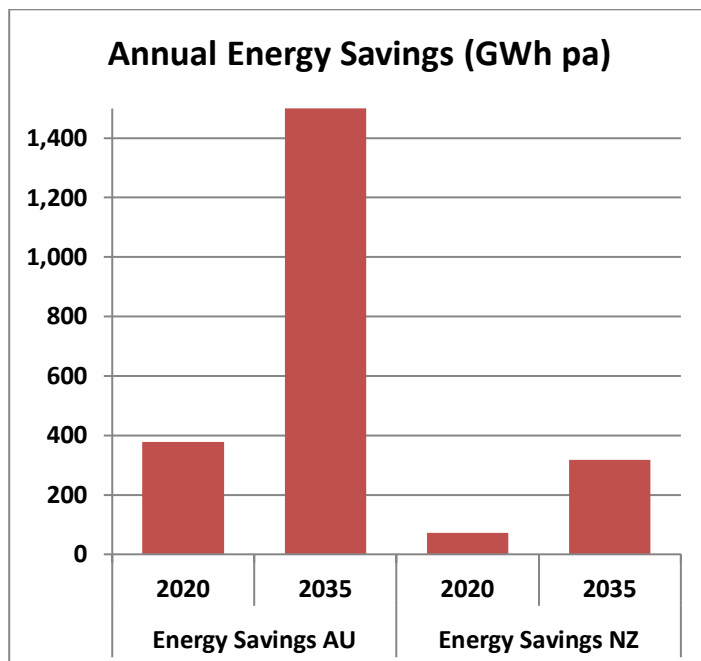
Table 13: Costs, benefits, energy savings and greenhouse emission reductions analyses for EC 2017 MEPS levels, including labelling, from 2017

Period	CBA Summary AU		CBA Summary NZ	
	2014 - 2035		2014 - 2035	
Costs (\$M)		\$255		\$59
Benefits (\$M)		\$1,748		\$408
NPV (\$M)		\$1,523		\$349
BCR		7.8		6.9

Year	Energy Savings (GWh)			
	Energy Savings AU		Energy Savings NZ	
	2020	2035	2020	2035
Annual	378	1,646	73	318
Cumulative	921	18,130	178	3,501

Year	GHG Emission Reduction (kt CO ₂ -e)			
	GHG Reduction AU		GHG Reduction NZ	
	2020	2035	2020	2035
Annual	352	1,494	9	28
Cumulative	878	16,653	24	333

Figure 21: Energy Savings from EC MEPS 2017



This is the preferred option to align with European MEPS levels and ISO/EN test methods from 2017 (pending all timelines/approvals being met).

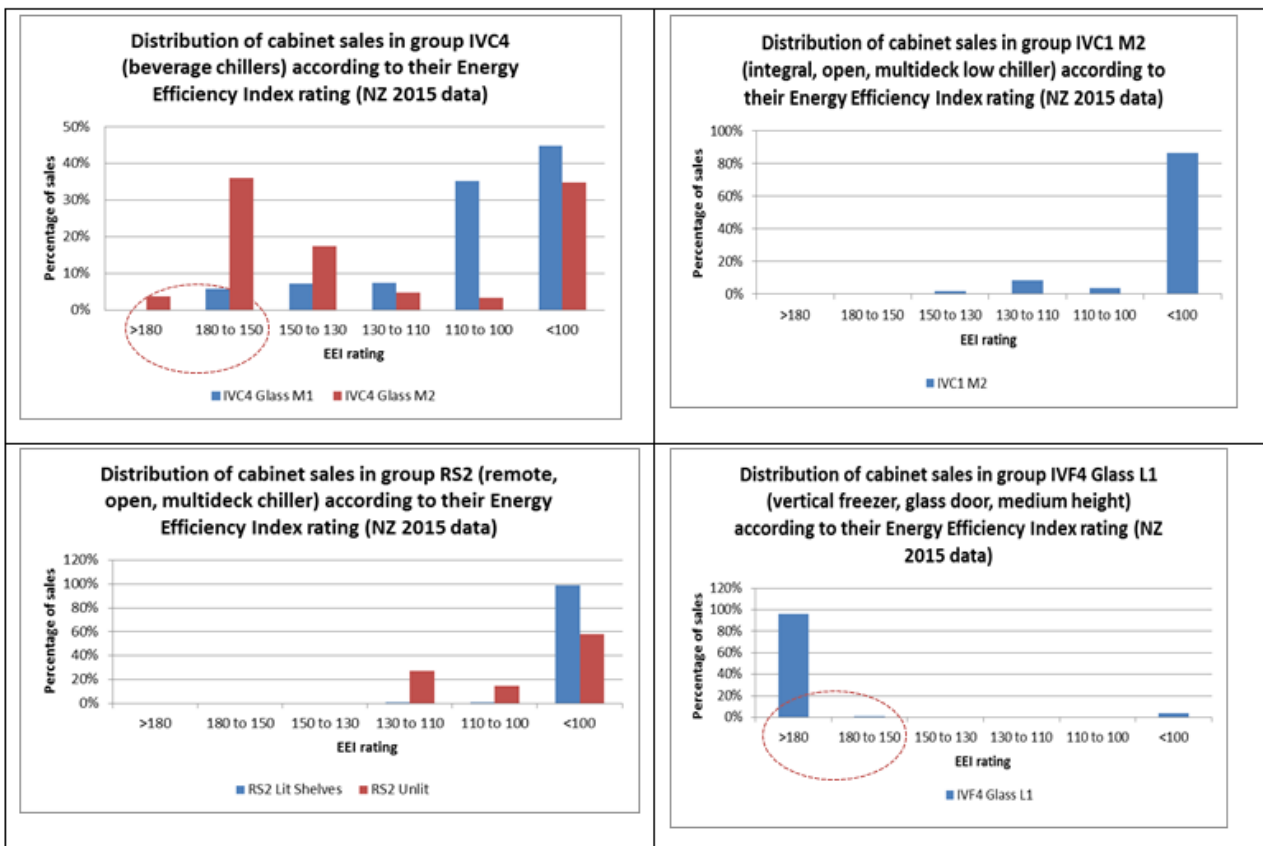
Some cabinet types will be affected more than others using EC MEPS levels.

Under the previous options, every cabinet group would be affected by either 10% or 30%.

However under this option to align with EC MEPS levels – for display cabinets, their draft EEI is 150. Cabinets that have a higher EEI will be required to improve on their energy efficiency.

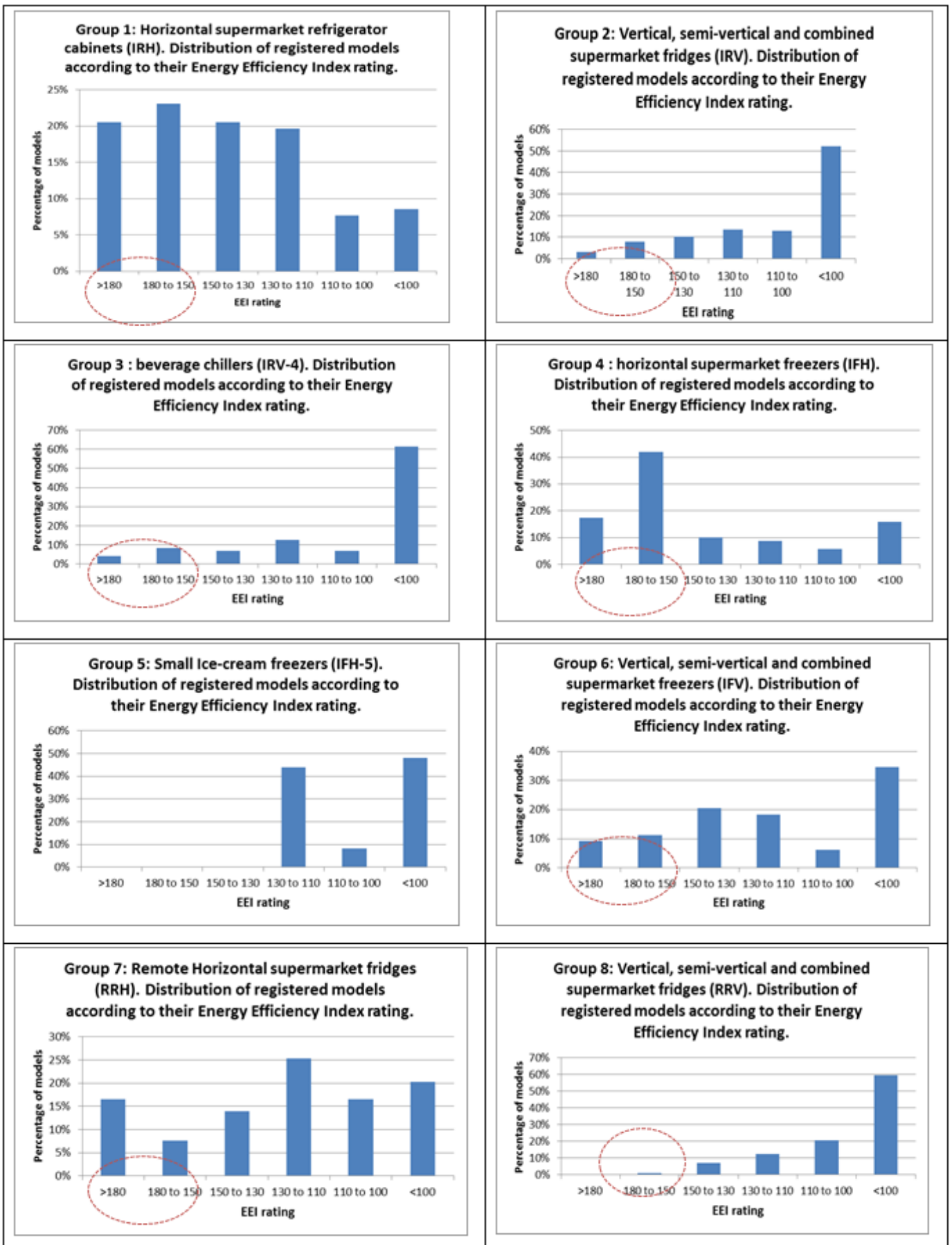
If we look at the top four categories of cabinets sold in New Zealand in 2015, some of these sales would need to be of improved efficiency– notably beverage cabinet sales and vertical freezers. See **Figure 22** below. Red circles indicate the percentage of sales of models that would be affected by EC MEPS levels.

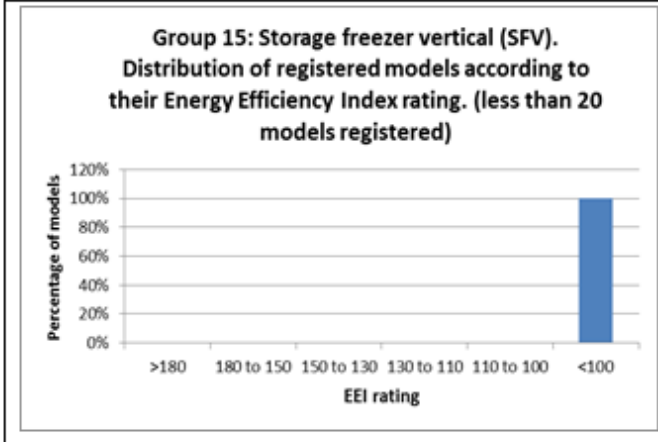
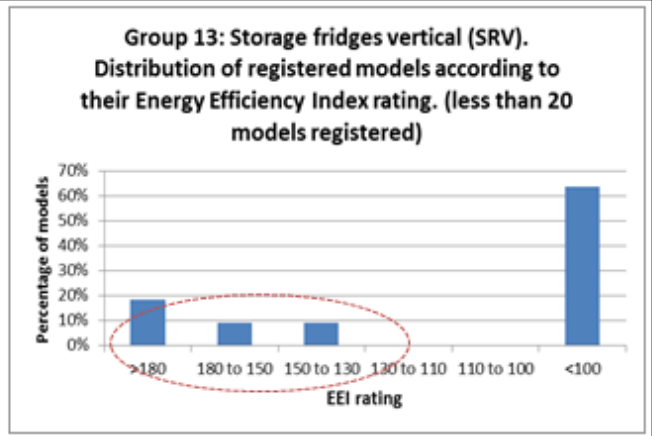
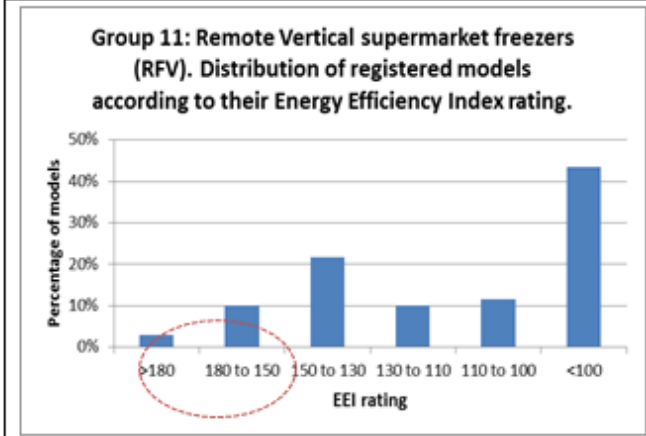
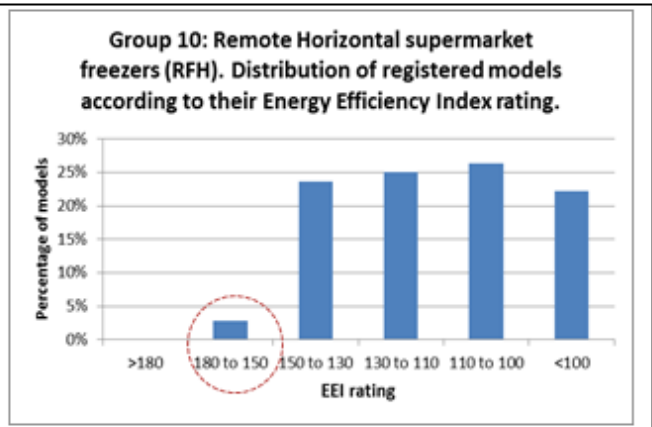
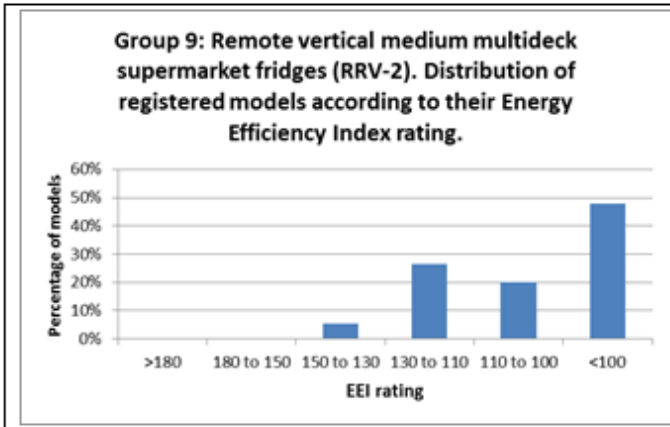
Figure 22: Comparison of four top selling classes of cabinets using European Energy Efficiency Index (NZ data). Distribution of sales of cabinets according to their European Energy Efficiency Index, for the top four selling cabinet categories based on NZ data from 2015



Using the Energyrating database as a source of models and rated efficiency, the EEI for current stock and the impacts of EC MEPS levels, can be shown (see **Figure 23** below). Note from 2017 if the EC MEPS levels are adopted, cabinets with an EEI of more than 150, will be required to improve on their energy efficiency to meet the EC MEPS levels. Storage cabinets will have to achieve an EEI of less than 115.

Figure 23: Distribution of cabinet models registered in the Energyrating database according to their European Energy Efficiency Index, per group of cabinet types.





Group 12 – none registered. (Storage fridges, horizontal – SRH)
 Group 14 – none registered. (Storage freezer, horizontal – SFH).

Groups 1, 2, 3, 4, 6, 7, 10 and 11 have to meet more stringent MEPS levels, and of these, some products in groups 2 and 7 would be subject to more onerous requirements than current HEPS levels. Whereas groups 5, 8 and 9 would have less onerous efficiency levels.

If the group categories are broken down into the current AS 1731 sub-types, certain models stand out as being more affected than others. The sub-types where more than 25% of registered models fail to meet the equivalent of the EC MEPS 2017 efficiency levels are shown in Table 14 below.

Table 14: Sub-categories of cabinets that will have more than 25% of registered models affected, by adopting the EC MEPS regime

AS 1731 type	Group name	Group code	Description
IHC2 M1, M2	Group 1	IRH	Integral Refrigerated Horizontal Cabinets
IHC4 M1, M2			
IVC1 M1	Group 2	IRV:	Integral Refrigerated Vertical Cabinets
IVC4 Glass door M2	Group 3	IRV-4	Integral Refrigerated Vertical Cabinets with Glass Doors
IHF4 L2	Group 4	IFH	Integral Freezer Horizontal
IVF4 L2	Group 6		Integral Freezer vertical
RS6 Gravity Coil	Group 7	RRH	Remote Refrigerated Horizontal Cabinets
RS7 Fan Assisted Coil			
RS8 Gravity Coil			
RS18 Glass Door	Group 11	RFV	Remote freezer Vertical
Storage Refrigerators Horizontal	Group 12	SRH	Service Cabinets, Refrigerated, Horizontal with solid door
Storage Refrigerators Vertical	Group 13	SRV	Service Cabinets, Refrigerated, Vertical with solid door
Storage Freezers Horizontal	Group 14	SFH	Service Cabinets, Freezer, Horizontal with solid door
Storage Freezers Vertical	Group 15	SFV	Service Cabinets, Freezer, Vertical with solid door

When the unaffected groups (i.e. 5, 8 and 9) are assessed at sub-group level there are some cabinet types affected minimally whereas the large majority are either equivalent EC MEPS 2017 levels or less onerous than current MEPS levels.

When display cabinets are simply grouped into their respective groups according to the ISO standard, the group HEPS levels for groups 3, 5, 8, 9, 10 are less stringent than the current HEPS levels. Groups 4, 6 and 11 are very similar. A number of sub-types would be subject to more stringent efficiency requirements in groups 1, 2, 6, 7 and 11. The cabinets possibly affected the greatest in addition to those not currently subject to MEPS are storage cabinets (i.e. groups 12, 13, 14 and 15). Previously the measures were limited to a small number of solid door versions of glass door cabinets whereas the EC MEPS levels would subject storage cabinets to strong measures. These regulations are due to come into force in Europe in July 2016.

While some local manufacturers may be affected, the large majority of the cabinet types requiring efficiency improvements are imported, typically from Europe and Asia. Irrespective of whether certain models appear to be affected or not, attempting to identify individual suppliers creates the risk missing others (i.e. current or proposed cabinets). Essentially all 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.

Value of mandatory labelling

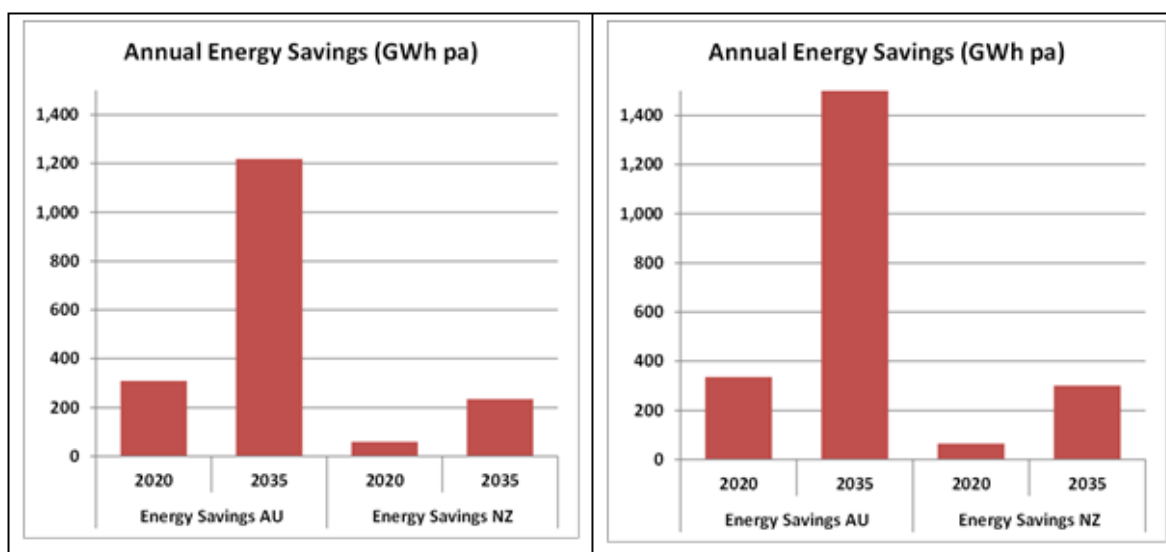
Although labelling does add a (small) cost to industry per model, the benefit of mandatory labelling is highlighted by comparing the 30% MEPS scenario with, and without, mandatory labelling (see **Table 15**). Without labelling the energy use and greenhouse gas production increases by more than a fifth.

Table 15: The percentage contribution to the overall cost-benefit analysis, that labelling makes. The scenario is for MEPS affecting the least efficient 30% of models per group.

	CBA Summary AU		CBA Summary NZ	
Period	2014 - 2035		2014 - 2035	
Cost		6%		6%
Benefit		18%		18%
NPV		19%		20%
BCR		12.7%		12.9%
Energy Savings (GWh)				
	Energy Savings AU		Energy Savings NZ	
Year	2020	2035	2020	2035
Annual	8%	22%	8%	22%
Cumulative	7%	17%	7%	17%
GHG Emission (kt CO₂-e)				
	GHG AU		GHG NZ	
Year	2020	2035	2020	2035
Annual	8%	22%	8%	22%
Cumulative	7%	17%	6%	16%

Figure 24 shows the size of the difference that labelling makes for the MEPS 30% scenario. It is assumed the same scale of benefit would occur in the other scenarios.

Figure 24: The difference that labelling makes (without labelling left, with labelling right).



Although MEPS has a positive benefit, having labelling and MEPS revision together creates a larger benefit – because for minimal cost, the benefits of including labelling are significant. However the benefits of labelling alone is undermined without the underpinning regulatory structure that MEPS provides.

The value of mandatory labelling, added to MEPS includes:

- Adding another level of information about new and currently registered and approved models which would apply to all cabinet models.³⁴
- 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.
- Generating consumer awareness of energy efficiency.
- All models would have to be displayed with a label (in literature and on or nearby the appliance) and compliance activity would have to include whether labelling was shown correctly.

NOTE: 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 displayed online according to specifications set out in each agreement. This is the principle behind ENERGY STAR® in New Zealand. 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 association with existing MEPS regulations, to fix 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 and are run by regulatory agencies with auditing programmes. These schemes are only as 'good' as their underpinning 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.

ENERGY STAR® voluntary endorsement would assist with promoting the energy efficiency of products.

It requires a robust compliance regime to be effective, with the potential for cost to members of the industry who choose to take part. Voluntary labelling could help a buyer make a more informed choice where a buyer perceives energy use as important, and labels are most effective when used on consumer-goods that can be compared side by side. Because of the way that cabinets are marketed (not through major retail on-floor comparisons), voluntary labelling alone would not be the most effective and immediate way to drive efficiency improvements in refrigerated commercial cabinets. Suppliers could choose not to label their cabinets in favour of promoting other features.

³⁴ 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.

Feedback from submissions on the Product Profile suggested that increased policing would be needed with voluntary labelling.

A voluntary scheme would not address split-incentives, whereby the buyers are not the end-users and do not pay the electricity bill.

Unless all cabinet types available on the market (and suppliers of these) took part in the scheme, it would still be confusing for cabinet buyers, with some cabinets are labelled while others remain bare.

Summary of impacts, costs and benefits

This cost benefit analysis has considered five options.

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 options – option 5 - were 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.

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

A summary of the estimated impacts of each policy option are shown below in **Table 16** below. See **Attachment D** for more details as to the cost/benefit results and analysis.

Table 16: Summary of cost-benefit analysis of regulatory options for Australia and New Zealand (from 2014 to 2035).

AUSTRALIA							NEW ZEALAND																														
Option 2							3																														
10% + labelling from 2017							Au/NZ MEPS 30% + labelling from 2017																														
4							2																														
EC from 2017+ labelling							10% + labelling from 2017																														
3							4																														
Au/NZ MEPS 30% + labelling from 2017							EC from 2017+ labelling																														
Costs (\$M)	\$58						\$211						\$225						Costs (\$M)	\$15						\$55						\$59					
Benefits (\$M)	\$606						\$1,641						\$1,748						Benefits (\$M)	\$142						\$383						\$408					
NPV (\$M)	\$548						\$1,430						\$1,523						NPV (\$M)	\$127						\$328						\$349					
BCR	10.5						7.8						7.8						BCR	9.3						6.9						6.9					
Energy savings (GWh)														Energy savings (GWh)																							
Year	2020	2035	2020	2035	2020	2035	Year	2020	2035	2020	2035	2020	2035	Year	2020	2035	2020	2035	2020	2035	2020	2035															
Annual	91	643	336	1,564	378	1,646	Annual	17	123	65	301	73	318	Annual	17	123	65	301	73	318	Annual	17	123	65	301												
Cumulative	210	5,976	817	16,749	921	18,130	Cumulative	40	1,146	157	3,223	178	3,501	Cumulative	40	1,146	157	3,223	178	3,501	Cumulative	40	1,146	157	3,223												
GHG Emission reduction (kt CO _{2-e})														GHG Emission reduction (kt CO _{2-e})																							
Year	2020	2035	2020	2035	2020	2035	Year	2020	2035	2020	2035	2020	2035	Year	2020	2035	2020	2035	2020	2035	2020	2035															
Annual	85	583	313	1,420	352	1,494	Annual	2	11	8	27	9	28	Annual	2	11	8	27	9	28	Annual	2	11	8	27												
Cumulative	200	5,481	779	15,381	878	16,653	Cumulative	5	108	21	306	24	333	Cumulative	5	108	21	306	24	333	Cumulative	5	108	21	306												

This shows that in both Australia and New Zealand, option 4 has a slightly greater overall net-present-value and size of the benefits: in Australia the Net Present Value (the total benefits less the total costs) is estimated to be \$M

1,523, compared with \$M 1,430 from option 3. In New Zealand, the estimated NPV is \$M 349, compared with \$M 328 in option 3.

While option 2 has the greatest Benefit Cost Ratio (BCR) in both countries, the costs are comparatively less, resulting in a lower overall cost to benefit ratio. The costs of option 4 are higher but the benefits from this option significantly outweigh option 2 and are better than option 3.

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 mandatory labelling) – 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 reduced 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. There are considerable consumer benefits to be gained from a consistent approach to the problems with AS1731; adopting the European test methods, and: adopting European MEPS from 2017. This provides a simpler regime that will be relatively easy to transition to.

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, and suppliers have indicated they sell into a type-price bracket – meaning that costs won't exceed a usual amount for certain appliance types, irrespective of its efficiency. 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.

Sensitivity analysis – what if costs increase?

Various sensitivity analyses were undertaken to show the impact of changing costs on the modelling outcomes.

The sensitivity analysis from Option 3 (MEPS at 30% + labelling from 2017) is representative of all the policy options modelled. It shows:

even if the costs were increased, there is still a substantial national benefit of 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.

A benefit to cost ratio of around 8 was the mid-point of all policy options modelled (for every dollar of costs the benefits are eight times higher).

What this means is:

even if the cost to make improvements increased four-fold, the national benefits still outweighs the costs to companies that this intervention might affect . Or... 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, 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 1.9 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%, 5%, 8%
- Price efficiency ratios – 0.5, 1.0, 1.5, 2.0

6. Consultation questions

You are invited to give us feedback on this RIS, and any matter referred to in it, or arising from previous consultation on the product profile, including whether your position has changed (and why). This will help us develop a robust and useful regulatory regime. We would be grateful if you could give us relevant data or evidence to support your submissions.

The closing date for any written submissions is 2nd September 2016.

Please send replies to:

New Zealand submissions should be emailed to: regs@eeca.govt.nz.

Australian submissions should be emailed to: energyrating@industry.gov.au.

Note: Submissions will be published on the [energy rating](http://energyrating.govt.nz) website, as will the names of all stakeholders who have made submissions. If you do not want your submission to be published, please advise in the covering email that the submission is to be treated as confidential.

Consultation meeting dates:

- **Melbourne August 9th**
- **Sydney August 10th**
- *** Brisbane August 11th**
- **Auckland August 16th**
- *** Christchurch August 17th**
- **Adelaide August 24th**
- *** Perth August 25th**

(* = optional meetings depending on level of demand. Adelaide has been confirmed).

Note: A technical working group will be gathered to consider if alterations are needed in the proposed standards, including labelling algorithms. This joint technical working group will also develop Au-NZ specific MEPS levels if necessary. We seek expressions of interest from experienced technical members of industry. Please email regs@eeca.govt.nz (for both countries) as it will be coordinated from New Zealand.

Consultation meetings will be held in Sydney, Melbourne, Adelaide, Auckland and at other possible locations. Details of meetings will be emailed to a contact list for both countries. Please email regs@eeca.govt.nz if you are interested in being put on this list.

Summary of options:

- Option 1: Business as Usual (BAU) – no change to current MEPS requirements that primarily covers display cabinets.
- Option 2: Adopting ISO (international) test method for display cabinets and EN (European) test methods for gelato cabinets, beverage cabinets, small ice-cream cabinets and storage cabinets. Australasian MEPS levels developed to affect the least efficient 10% of models, based on groups of similar cabinet types. Mandatory labelling based on the European Commission's labelling scheme, translated into star-rating labels. Modelled as though implemented in 2017.

- Option 3: As above except Australasian MEPS increased to affect 30% of the least efficient cabinet models per group, from 2017. Mandatory labelling is added.
- Option 4: As above except adopting the European Commission MEPS levels, from 2017. Mandatory labelling is added. Approx. 14% of the market is affected although some groups of cabinets are more affected than others.
- Option 5: Non- regulatory options in addition to BAU.

Option 4 gives the best benefit-cost ratio and net-present value, energy savings and greenhouse gas reduction potential. It resolves many of the issues with the market that hinder buyers from making an informed decision about the energy that cabinets use, and the impact on a cabinet's life-cycle cost (should they wish to consider this). It also aligns energy efficiency specifications with major trading partners and as such, keeps Au and NZ companies competitive.

Guiding Questions

Status quo

1. Do you think further regulatory intervention is needed to make energy efficiency changes in the market? Please explain.
2. If you answered 'yes' – which option suits you best, and why?

Buyers/users

3. Do you think we have adequately captured the major factors that buyers consider when buying commercial cabinets?
4. Are buyers optimising their ownership costs (including running costs?) If not – why not?
5. We assume that buyers don't know how much saving they could achieve from using a more efficient cabinet. Do you agree, if not, please explain.
6. What impact would efficiency labelling of cabinets in literature/websites/on the cabinet itself, have on buyers and users?
7. What portion of cabinet buyers *actively consider energy use* in their search for cabinets, or their choice criteria when looking for cabinets?
8. What proportion of buyers could *benefit* from considering energy use in their purchase decision?
9. What are the most important things that buyers search for in a cabinets? (please explain and rank).

Cabinet price

10. We assume that the price of cabinets won't change significantly from proposed changes to regulation. Do you agree with this assumption? If not why not? Please explain.
11. We assume that suppliers sell into a 'cabinet-type-price' bracket – meaning that suppliers market similar types of cabinets at a similar cost, irrespective of whether they contain potentially more expensive, efficient components. Do you agree with this assumption? If not please provide evidence if possible.
12. Are there types of cabinets or situations where improving efficiency of a cabinet would significantly change the cabinet purchase price? Please explain.

Unintended consequences of regulation

13. What unintended outcomes might arise from improving the efficiency requirements for refrigerated cabinets? Please explain and give examples if possible.
14. We have assumed that changes in energy efficiency will be largely invisible to buyers (behind the scenes in components, apart from LED lighting). Cabinets will remain user-friendly and won't (for example) change their functionality and safety (e.g. won't force all open cabinets off the market so that only those with

doors remain, won't compromise cooling ability, won't diminish support industries). Please comment on this assumption.

15. What impact do you think labelling would have on product costs and consumer choice?

Custom-built cabinets or low-volume supply

16. What issues might arise for you (or your competitors) if you supply custom-made cabinets?
17. What might help you easily comply with the proposed regulations, if you supply built-in, custom-made, or a small number of cabinets?
18. Please suggest how we could define 'custom-made', 'built-in' or low-number-of supply cabinets (if different from the suggested wording in the EC regulations).

Labelling

19. How would mandatory labelling of cabinets (incl. use in websites/literature) affect your business, and your competitors'?
20. What impact do you think a 'high efficiency' label would have on the market, buyers and users?

Market data

21. We have used European market data and collected NZ sales data to estimate sales of cabinets in Australia. Do you accept this as a viable approach to estimating sales in Australia?
22. Can you provide more accurate market data including the stock and sales estimates?

The current standard and MEPS/High Efficiency levels

23. Can you provide information that would help us identify the size of the issues with the current Standard? If so, please provide.
24. How have you been affected by the complexity of the current Standard AS1731? What were the consequences?
25. What changes would you like to see made to the current Standard, and MEPS, if we don't align with international standards and MEPS? What effect do you think this would have on the Au-NZ market?
26. We assume that aligning with the EC MEPS levels and ISO/EN test standards would simplify your ability to comply – and our ability to check and enforce – compliance. What comment can you make on this?

Non-regulatory options

27. Can you outline any other non-regulatory options to significantly impact on cabinet efficiency, that industry, government, or partnerships could develop (to avoid the need to change the energy efficiency regulations?)

Implementation timeframe/other compliance pathways

28. We have modelled 2017 as the indicative implementation date – what would hold up your ability (or your competitors') to comply with regulations coming into force in 2017?
29. Can you give us details on alternative ways and means that you could comply with regulations, for example:
 - staggered implementation dates whereby the least efficient cabinet models must comply soonest?
 - 'deemed to comply' options based on rated components – where MEPS are significantly more stringent if the cabinets cannot be physically purchased and/or tested?

7. Conclusion

Recommended option

Based on the current analysis and feedback obtained to date, our recommended policy option is option 4. This option involves adopting the test methods ISO 23953 for refrigerated display cabinets and EN 16825 for refrigerated storage cabinets, from 2017, and related standards for gelato cabinets, beverage cabinets and small ice-cream cabinets. It also involves adopting the European Commission's MEPS levels for these cabinet types (developed by groups) and the introduction of mandatory star rated labelling.

Option 4

This option offers the greatest net benefit to both the Australian and New Zealand communities if implemented from 2017: in Australia the estimated Net Present Value (total benefits less the total costs) of option 4 (EC MEPS) would be \$1,523 million, compared with \$1,430 million from option 3 (improving the least efficient 30% of models). In New Zealand, the estimated Net Present Value from option 4 would be \$349 million, compared with \$328 million from option 3.

In addition to achieving significant gains in energy savings and greenhouse gas reductions for both governments, option 4 is considered the best option to address the problems identified in this consultation RIS – a combination of confusion, complexity and inadequate coverage of the current Standard, outdated MEPS and high efficiency specifications require revision, information and other market barriers that are preventing purchasing from buying the most energy efficient cabinets.

The adoption of EC MEPS will achieve consistency in approach, allowing for the adoption of a simpler compliance regime and will avoid current inequalities and grey areas in approach to different products. A move to EC MEPS also has support from the industry (based on feedback on the product profile to date) due to inconsistencies with the current requirements– including the 'deemed to comply' issue. The addition of labelling will enhance the ability of purchasers to compare the relative energy efficient of different cabinet models.

It is to be noted that Option 4 (as with other proposals) is made up of various individual policy changes. Consultation with stakeholders through this RIS process may identify issues not yet considered in relation to the individual aspects of the proposals. This may result in changes to the recommendations to be made in a Decision RIS (proposal put to ministers). Any significant changes may need further consultation with industry.

8. Implementation and review

Implementation – next steps

There are many more stages to complete before regulations are changed (the process from here could take up to 2 years).

Once submissions have been gathered from this consultation process, they will be analysed with any new data assessed. Fundamental changes as a result of comments or new data can be discussed again with industry.

A technical working group will be called together to consider if any technical alterations to the proposed standards are required, including labelling algorithms to transform the EN labels into a star rating labels for the Au-NZ market. If necessary, this group will also help develop local Au-NZ MEPS levels. We seek expressions of interest from experienced technical members of industry, to contribute to this working group.

Submissions will be summarised and rebutted in a private (for ministers only) as a “Decision RIS” report after further analysis (if required). This is assessed through a chain of command including other government agencies responsible for e.g. appliance safety, trade etc.

The Decision RIS will be considered by Energy ministers in both New Zealand and Australia. It will outline relevant issues raised by industry and how government can/should address them. Industry will be informed on recommended option(s) and expected implementation dates and any changes decided by Ministers.

To enhance trade, the World Trade Organization will be notified to ensure that no other country has an issue with Australasia changing their trading requirements. Then various law-writing/law checking committees are deployed to present new laws into office/parliament. (In New Zealand, approval of Ministers is required for any proposed regulatory option). Once agreed, the laws are notified to the public for a month and then implemented. In New Zealand there is also a 6 month delay from notification until the law becomes into force. It is anticipated that the whole process may take 2 – 3 years. That timeframe may need to be extended if there are issues/delays at any point and will include the time needed for the industry to be notified of any changes to regulations, once implemented.

Given the E3 program’s experience with implementing or revising energy efficiency requirements, the risks associated with implementation are considered low. Any transitional arrangements will be developed by close consultation with the industry.

Australia

- Following stakeholder feedback on this Consultation RIS, the comments and feedback received will be considered before proceeding to a Decision RIS.
- If the policy proposal in the Decision RIS is approved by the COAG Energy Council, the GEMS Determinations will be revised.
- Once Ministerial approval is provided for the revised Determinations, there will be a period before any policy change comes into force.

New Zealand

- Any policy proposals will need to be approved by Cabinet before they can be adopted under the *Energy Efficiency (Energy Using Products) Regulations 2002*.
- Approval of Cabinet is required for any proposed regulatory option. For these sorts of changes, there is a requirement to wait for 6 months after they are written into law, before they can come into force.

The timeframe may need to be extended if there are issues/delays at any point. If Europe delays implementing MEPS levels and publishing standards, the estimates used for this RIS can 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 don't meet the new requirements may still be supplied until stock is depleted. Their registrations will be grandfathered (status changed to “Superseded” in the registration system). New import or manufacture of these cabinets from the date of the law change is not permitted.
- Registered cabinets imported or manufactured prior to the law change that already meet the new requirements, may continue to be supplied. Their registrations will be re-validated and updated to the new GEMS determination.
- Suppliers wishing to import or manufacture models that are not already registered, but meet the new requirements, will need to complete a registration application, pay the registration fee and lodge the application with the GEMS Regulator.
- 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.

In New Zealand, once the changes are in force:

- Registered cabinets imported or manufactured prior to the law change that don't meet the new requirements may only be sold until stock is depleted. New import or manufacture of these cabinets is not permitted.
- Registered cabinets imported or manufactured prior to the law change that already meet the new requirements, may continue to be supplied. Their registrations will be re-validated and updated.
- Suppliers wishing to import or manufacture models that are not already registered, but meet the new requirements, will 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 these new laws, cabinet suppliers are requested for sales data on how many cabinets they sold and various energy efficiencies, so that energy savings can be tracked against predictions.

The E3 Program uses various sources of information to evaluate both 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 the 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 – policy context

The trans-Tasman Equipment Energy Efficiency Program

In Australia, regulatory intervention in the market for energy-using products began in 1986 with mandatory appliance energy labelling introduced by the NSW and Victorian Governments. Between 1986 and 1999, most state and territory governments introduced legislation to make energy labelling mandatory. New Zealand introduced energy efficiency regulations in 2002.

The Equipment Energy Efficiency Program (E3) Program was established in 1992 to coordinate the mandatory MEPS and mandatory ERLs. Over the past decade New Zealand has worked with Australia to monitor and co-fund the E3 Program, and has been involved as a partner in decision making since 2005. The E3 Program operates under national legislation and is administered by the Australian Government, with input from state and territory governments and the New Zealand Government.

The policies that support the E3 Program differ in the two nations but drive towards a common goal of improving the energy efficiency of appliances and products in Australia and New Zealand. The aim is to increase the energy efficiency of products used in the residential, commercial and manufacturing sectors in Australia and New Zealand.

E3 is managed under both Australia's National Framework for Energy Efficiency (NFEE) and the New Zealand Energy Efficiency and Conservation Strategy (NZEECS). It is organised as follows:

- Implementation of the program in Australia is the direct responsibility of the Energy Efficiency Advisory Team (the "EEAT Committee") which comprises officials from Australian federal, state and territory and New Zealand government agencies. These officials are responsible for implementing product energy efficiency initiatives in their jurisdictions.
- The EEAT Committee reports to the Council of Australian Governments Energy Council and ministers of parliament in both Australia and New Zealand.
- National Australian legislation has recently been enacted by Determinations. National legislation performs this task in New Zealand by regulation.

History of E3 Intervention

The introduction of MEPS for display and storage cabinets in Australia and New Zealand was first considered in 2000-2001 with the publication of several Technical Reports (Australian Greenhouse Office (AGO) 2000a, AGO 2000b, AGO 2001a, AGO 2001b). After consultation with stakeholders, the Australia and New Zealand Governments implemented MEPS for display cabinets only, used in Australia and New Zealand. Storage cabinets were originally excluded from regulation because they were estimated to contribute less to total energy consumption compared to display cabinets. Australian Standard AS 1731:2003 defined both the test methods and the MEPS requirements for display cabinets. These requirements came into force in 2004. There are currently no MEPS for storage cabinets. However, as many storage cabinets are now supplied by manufacturers and importers of display cabinets, there appears to be a case for revisiting this exemption.

AS 1731 was reviewed in 2008. Strong stakeholder support for improvements to the current MEPS for display cabinets encouraged the EEAT Committee to commit to a 10-year strategy to increase the energy efficiency of commercial refrigeration appliances. The preparatory work for the strategy was documented in the "In from the Cold" reports (E3 2011). Specific recommendations included adopting international standards to broaden the scope of MEPS to include storage cabinets, strengthening MEPS to reflect improvements in performance since 2004, and adopting the international test method for the equipment. Since the review undertaken in 2008, AS 1731

has not been updated to take into account any of the recommendations from 'In From The Cold - a 10-year strategic plan for non-domestic refrigeration'.

The proposals in this consultation RIS are being developed through the E3 Program. The broad policy mandate of E3 has been regularly reviewed over the last decade and was most recently modified in 2004. Any equipment that uses energy is a candidate for regulation provided such intervention can be justified after study and finalisation of a RIS that demonstrates cost-effectiveness.

To be included in the program, appliances and equipment must satisfy certain criteria relating to the feasibility and cost-effectiveness of intervention. These include potential for energy and greenhouse gas emissions savings, environmental impact of the fuel type, opportunity to influence purchase, existence of market barriers, access to testing facilities, and considerations of administrative complexity. Policy measures are subject to a cost-benefit analysis (CBA) and consideration of whether the measures are generally acceptable to the community. E3 processes provide stakeholders with opportunities to comment on specific measures as they are developed.

New Zealand Policy Context

Relevant New Zealand policies & drivers for improving the energy efficiency of products

Energy efficiency and conservation play an important role in promoting economic growth and helping New Zealand meet its energy challenges, such as enhancing security of supply and reducing greenhouse gas emissions from energy.

The government's direction for the energy sector is outlined in the New Zealand Energy Strategy 2011-2021.³⁵ This sets out the role that energy will play in the economy, with "Achieving efficient use of energy" one of the priorities which requires "better consumer information to inform energy choices". In association with Australia, New Zealand is committed to informing consumer choices by providing energy efficiency labelling and standards for products.

The New Zealand Energy Efficiency and Conservation Strategy 2011-2016 (NZECS)³⁶ is a companion to the Energy Strategy. This is a statutory document prepared under the Energy Efficiency and Conservation Act 2000. Objectives of this strategy include "greater business and consumer uptake of energy efficient products" through "extending minimum energy performance standards" and labelling coverage to "remain in line with major trading partners."

The following benefits arise from more energy efficient technology and practices, energy conservation, and renewable sources of energy:

- Enhanced economic growth through increased productivity
- Improved energy security by reducing energy demand
- Improved energy affordability by reducing business energy costs
- Deferred need for more expensive energy supply by making better use of existing energy resources
- Improved consumer health, well-being and productivity through warmer and more energy efficient homes.

The NZECS promotes a mix of interventions, which include providing information to target consumer and business needs, and implementing codes and standards to allow for industry confidence in energy efficient products and practices. It also affirms that, "Having common standards and energy labelling information supports closer economic relationships with Australia. It reduces compliance costs for product manufacturers and suppliers who are often trading in both countries."

Reducing greenhouse gas emissions from energy

The New Zealand Government has four national targets for reducing New Zealand's greenhouse gas emissions that cover both the medium and long term:

- a provisional post-2020 target of 30 per cent below our 2005 greenhouse gas emissions levels by 2030
- an unconditional target of five per cent below our 1990 greenhouse gas emissions levels by 2020

³⁵ More information on the New Zealand Energy Strategy is available from: www.med.govt.nz/sectors-industries/energy/strategies

³⁶ Ibid

- a long-term target of 50 per cent below our 1990 greenhouse gas emissions levels by 2050
- a conditional target range of 10 to 20 per cent below our 1990 greenhouse gas emissions levels by 2020, if there is a comprehensive global agreement.

The New Zealand Emissions Trading Scheme is currently the primary intervention to reduce emissions across all sectors of the economy, including the energy sector. A price on carbon emissions is already a feature of investment decisions and a factor in improving the competitiveness of low emissions alternatives³⁷.

Additional policies to help lower emissions in New Zealand involve focusing on developing more renewable energy in all forms, including for electricity, biofuels and direct heating. These are also outlined in the Energy Strategy. One aim is that 90% percent of New Zealand's electricity needs come from renewable resources by 2025, as long as this does not disrupt the security and reliability of supplying electricity. Around three quarters of New Zealand's electricity is currently generated from renewable, low emissions sources. This means that electricity generation contributes proportionately less to New Zealand's emissions profile than generation does in Australia.

EECA estimates that New Zealand could cost-effectively save around \$2.4 billion a year from the approximately \$18 billion spent each year on energy. In addition, energy efficiency can also unlock a range of other benefits across the whole economy, including:

Economic

- a stronger economy – through improved productivity, reduced health costs, and greater participation in work and education.
- more competitive businesses – which can invest energy cost savings in growth, and create a competitive advantage from improved environmental performance.
- stronger tourism and export branding – based on lower emissions.
- lower electricity infrastructure costs – by deferring the need for new generation plant to be built.
- increased energy security – including reduced exposure to volatile oil prices, through less reliance on fossil fuels.

Environmental

- reduced greenhouse gas emissions and better air quality – from reduced use of fossil fuels, which currently comprise 69% of New Zealand's total energy consumption.

Social

- healthier households – because warmer, drier homes are known to reduce illness, particularly for young and old people who are at most risk from cold-related illness.
- reduced poverty – because healthy families are better placed to take part in education and work
- improved transportation safety – fuel efficient drivers are also safer drivers.

EECA implements the Government's energy priorities in the areas of energy efficiency, energy conservation and renewable energy. MBIE is the policy advisor to the government on the energy sector, including energy efficiency.

EECA's long-term strategy is framed by the New Zealand Energy Efficiency and Conservation Strategy (NZECS). The NZECS is required by the Energy Efficiency and Conservation Act 2000 and is a companion document to the New Zealand Energy Strategy (NZES). The current NZECS covers the period August 2011 to August 2016.

The NZES sets out the government's strategic direction for the energy sector and the role energy plays in the New Zealand economy. The 'Areas of focus' in the NZES include:

- warm, dry, energy efficient homes
- reducing energy-related greenhouse gas emissions
- developing renewable energy resources
- enhancing business competitiveness through energy efficiency
- better consumer information to inform energy choices

³⁷ [Participating in the NZ emissions trading scheme](#)

- an energy efficient transport system
- embracing new energy technologies
- oil security and transport.

The NZEECS provides further detail on government agencies' agenda in relation to energy efficiency, energy conservation and renewable energy, including objectives and targets for transport, business, homes, products, the electricity system, and the public sector.

Australian Policy Context

In December 2015 meeting, the Council Of Australian Governments (COAG) agreed it had a significant contribution to make in a national, cooperative effort to better integrate energy and climate policy. A key part of this effort is the Council's National Energy Productivity Plan (NEPP) 2015–2030 to get more value from consumed energy.

The Council agreed that improving the national energy productivity would be important in delivering greater value from the energy that Australians use. Better energy productivity will boost Australia's competitiveness, help consumers manage their energy costs and reduce Australia's greenhouse gas emissions.

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.

As part of its Industry Innovation and Competitiveness Agenda, the Australian Government is committed to removing inefficient regulation, simplifying compliance and improving regulator responsiveness 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.

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.

All Australian jurisdictions have also signed a National Partnership Agreement on Energy Efficiency to deliver a nationally-consistent approach to energy efficiency through a range of energy efficiency initiatives, including nationally consistent energy efficiency standards for appliances and equipment and a process to enable industry to adjust to increasingly stringent standards over time.

From October 2012, regulation of the Australian MEPS has been undertaken at a national level, under the *Greenhouse and Energy Minimum Standards Act 2012* (GEMS Act 2012). This Act harmonised state legislation and regulations previously used for compliance, and established a consistent, national legislative footing. Subordinate to the GEMS Act 2012 are Determinations to manage individual products (for instance the *Greenhouse and Energy Minimum Performance Standards (Refrigerated Display Cabinets) Determination 2012* (Display cabinet Determination)).

National Electricity Market rule change for cost reflective network prices

In November 2014, the Australian Energy Market Commission (AEMC) announced a rule change that requires regulated network companies to structure their prices to better reflect the consumption choices of individual users. Under the changes, network prices will better reflect the actual costs of providing electricity to consumers at different times and in different locations.

These changes should enable consumers to see the value of their choices – such as decisions to purchase more energy efficient appliances, particularly energy intensive appliances like air conditioners. The AEMC rule change positively supports the objectives of this RIS. Network businesses are required to have the new price structures start no later than 2017. The pricing structures and prices must be approved by the Australian Energy Regulator (AER) to ensure that they adequately manage the transition of customers to the new prices, have been developed with effective customer consultation and meet other related requirements.

Emissions Reduction Fund

The Emissions Reduction Fund (ERF) commenced in late 2014. The ERF is designed to provide incentives for achieving lowest cost emissions reduction activities across the Australian economy. These methods ensure that emissions reductions are genuine—that they are both real and additional to business as usual operations. More new methods are now being developed to further expand the coverage of the ERF, such as methods to incentivise more energy efficient commercial appliances (including air conditioners and chillers). These methods have the potential to positively influence the adoption of energy efficient products by increasing the sales of these products above what would have otherwise occurred (BAU), however the methods will not address the issues identified in this RIS.

The role for 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) and a lack of awareness by energy users and decision-makers in firms about why they should act (the size and nature of the opportunity, including true lifetime costs and benefits), what action is best for them, and where they can get help to make it happen.
- 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 household pressures.
- capital constraints – which mean that a business or household 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.
- split incentives – e.g. many landlords will opt not to invest in energy efficiency measures (such as insulation) because it is their tenants – not them – who will benefit (through increased reduced energy costs).
- lack of security of a product or service availability – e.g. concerns about ongoing security of supply are often cited as a reason why businesses do not upgrade from diesel- to wood-fuelled boilers.

Attachment B – Australian stock by major sectors

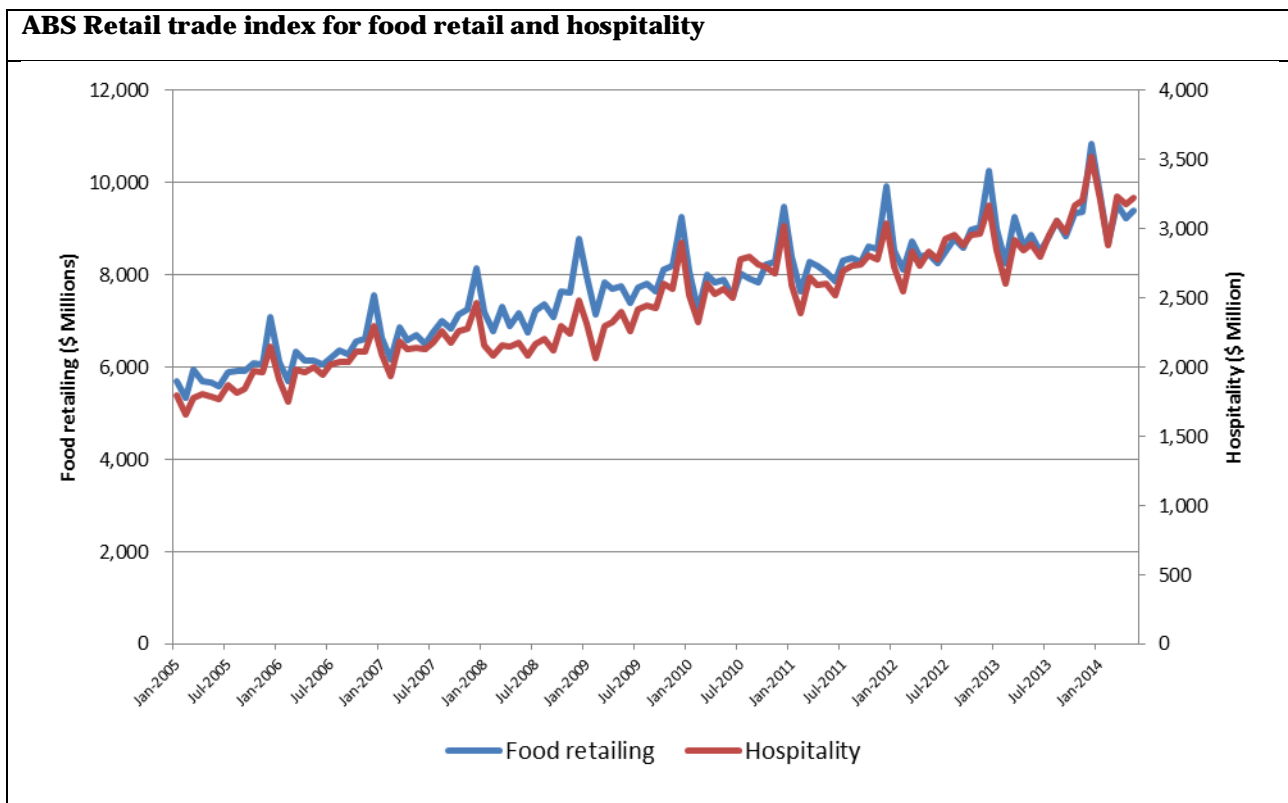
Retail and food services channels

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.

The performance of these major channels is illustrated **Figure B 1** 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 Woolworths with 920 stores, and Coles with and Woolworths with more than 750 stores each, Aldi an international supermarket chain around 339 stores on the eastern sea board, and around 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, Mobil, etc.).

Table B 1 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 m².

Table B 1: Summary of Australian supermarkets and convenience stores dissected by trading floor.

Brand	Nominal Quantity	Trading floor (m ²) ⁽¹⁾				
		≥2,750	≥1,500 ≥2,750	and	<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 supermarket industry contains around 25% of all cabinets, and a wide variety with an estimated 116,000 remote display cabinets and 70,000 integral. In convenience stores we estimate there to be 6,000 remote display cabinets and 65,000 integral.

The number of small food retail outlets is summarised in **Table B 2** below. In each sector there are some large businesses that will 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 coolroom with glass doors or panels plus 4 or more Glass Door Merchandisers and sometimes open multideck cases. If we assume the average liquor outlet has 1 remote display cabinets and 6 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 coolrooms, and may typically have 2 to 4 integral display cabinets, equating to around 17,000 integral display cabinets as well as some remote units and storage cabinets. Other food retailing have much smaller requirements for display cabinets and account for a further 7,000 integral display cabinets.

Table B 2: 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 stock of cases in the supermarkets, convenience stores and small retail sector is over 129,000 remote display cabinets, 184,000 integral display cabinets and 3,000 storage cabinets or 316,000 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 canteens/private, charitable organisations and Government canteens (i.e. prisons, military);
- **Commercial** including restaurants, cafes, hotels/motels, fast food/take-away, clubs, caterers, function centres, fresh meat fish and poultry retailing; fruit and vegetable retailing, and liquor retailing.

There is an estimated 15,500 institutional establishment 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**.³⁸

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.

³⁸ 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.

Attachment C – 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 owning and operating 166 Countdown stores (including former Foodtown and Woolworths stores) throughout New Zealand. They are also the franchise co-ordinator for around 59 Freshchoice and Supervalu stores. The other main chain is Foodstuffs which comprises three regional co-operatives supplying around 471 major stores (i.e. New World, PAK'nSAVE and Four Square) and around 152 convenience stores. Independently owned stores such as Night and Day and Bin Inn also operate, but in smaller numbers with around 60 stores.

The supermarket industry in New Zealand typically has smaller stores with similar styles and variety to Australia. There are an estimated 22,300 remote display cabinets and 5,000 integral display cabinets in supermarkets. In convenience stores we estimate there to be 2,250 remote display cabinets and 17,300 integral display cabinets (including around 1,172 petrol stations, mini-markets and small stores, etc.).

The total estimated stock of cases 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 the similar store formats, brands and types of devices just on a smaller scale.

There is almost 1,000 institutional establishment including private and public hospitals, aged persons homes, primary schools through to tertiary institutions and canteens that contain an estimated 2,300 integral display cabinets and 2,800 storage cabinets. Larger quantities of devices are found in the commercial channel, containing 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 in **Table C 1**.

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

(Source: RANZ 2013)

Attachment D – stock modelling and assumptions

Stock Analysis

Table D 1 below provides the number of refrigeration cabinets estimated for each type of outlet in order to undertake 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⁾	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
Food service channel: Institutional ⁽²⁾			
Hospitals	5	0	5
Aged care	2	0	3
Schools	1	0	1
Canteens	1	0	2
Food service channel: Commercial			
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.

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, then maintenance and operating environment. The average lifespans of equipment used in the RIS model were display cabinets Integral 11 years, display cabinets remote 13 years, and storage cabinet 11 years.

The second hand market and/or refurbishing cabinets, effectively extending the lifespan of equipment, sometimes complicate the understanding of typical lifespans. The effects of these factors are difficult to capture, as there is no second hand sales data is available, and anecdotal evidence of second hand sales and refurbishments can be peaky. Large operators of integral cabinets can refurbish their equipment in large batches. Similarly, they can undertake

replacement programs in large volumes flooding the market with second hand cabinets in a short period. Some of these are then purchased and used in Australia, but many are shipped to the Pacific Islands.

Test and registration costs

Key assumptions for calculating the incremental costs of the test and registration program for a changed regime are:

- 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 over 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 that make up a significant portion of 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 is a cost to both Government and industry to introduce and operate an energy efficiency testing and registration program that need to be 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 - \$23 each sale

Note: This table shows a lower incremental cost per sale than in **Table 9: Estimated regulatory burden cost (excluding cost to register in Australia) – for Australian businesses (in \$AUD).** because – it includes the cost to all business, not just Australian business; it does not include capital cost – and – the cost per sale can be much lower than the cost per registered model, depending on how many units of each model are sold.

The assumptions about these costs, and estimates, have been made as follows:

- **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 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 has the widest range of prices average prices 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 = 0.9 AUD.

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

Grouped cabinet types	Average prices		Weighted average prices (Based on local sales profile)	
	AUD	\$NZ	AUD	\$NZ
IRH	\$8,800	\$9,778	\$3,201	\$3,556
IRV	\$5,326	\$5,918		
IRV-4	\$2,796	\$3,107		
IFH	\$5,815	\$6,461		
IFH-5	\$1,470	\$1,633		
IFV	\$4,843	\$5,381		
RRH	\$13,000	\$14,444	\$12,432	\$13,814
RRV	\$16,000	\$17,778		
RRV-2	\$10,601	\$11,779		
RFH	\$13,000	\$14,444		
RFV	\$16,000	\$17,778		
SRH	\$3,300	\$3,667	\$4,620	\$5,134
SRV	\$4,210	\$4,678		
SFH	\$4,250	\$4,722		
SFV	\$6,270	\$6,967		

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. **Table D 4** shows the initiatives grouped into EE complementary energy efficiency activities I to V, and circumstances where they can be applied. There are some instances where interventions are not applicable – for example applying translucent or HE doors or controlled LED lighting to cabinets with solid doors, makes no sense. 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.

Combination of energy efficiency measures assessed					
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				√	
Circumstances where the above groups of EE interventions would be suitable					
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 see **Table D 5** below. This information was used in the RIS analysis in the calculation of costs of changing MEPS requirements.

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

EE Grouping	I	II	III	IV	V					
Grouped cabinet types	Percentage improvement and incremental cost									
	%	\$	%	\$	%	\$	%	\$	%	\$
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%. Another 145 cabinets would need an improvement of 8% to 16% and the final 145 more significant improvements of between 16% and 24%. The higher the level of improvement required, the greater the number of significance changes required, however the cost 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 hence the larger the “efficiency gap” between a product and any MEPS levels, then 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, have been adopting the newer 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 product that has been in the market for some time and is using less advanced and lower cost components.

LED lighting that of 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 but other sectors are still use magnetic ballasts and large diameter fluorescent lamps. Upgrading from older and less expensive technologies to LEDs will be a greater cost step than 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	
Fan motors		Shaded Pole
	↓	Permanent Split Capacitor (PSC)
	↓	Electronically commutated (EC) or Brushless dc (BLDC)
Cabinet lighting		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 but in other instances 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 the 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

Therefore the estimated typical cost increases that have been used in the calculation of efficiency improvement are 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 in this report 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 improvement based, for medium temperature, on double glazed glass door unit 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 analysis of the different policy options is outlined in this section.

The options discussed above 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 are presented in the summary tables are based on Australia using 7% discount rate and New Zealand with a 5% 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 earlier air conditioner RISs. 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 (as per RIS guidelines)

- Labelling:
 - 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).³⁹
 - 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.
- The incremental capital (purchase) costs from the increased MEPS were summed from the period 2017 to 2026 (undiscounted) and divided by 10 (years) to estimate the annual costs. These were then reduced by 50% to account for the retail mark-ups.

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 a consumer of society perspective. 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 eg. 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.

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 the 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).

³⁹ Evidence of labelling impacts in the business sector is not available.

Therefore in this context the 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 (i.e. cookers, etc.). 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°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 the 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: Residential electricity prices (real 2014 cents/kWh) for Australia and New Zealand

Region/year	2013	2014	2015	2016	2017	2018	2019	2020
NSW	30	30.31	27	27.25	27.5	27.96	28.45	28.99
ACT	20.1	20.31	18.09	18.25	18.43	18.74	19.06	19.42
NT	NA	27.13	25.6	26.92	26.91	26.78	25.78	25.29
QLD	25	28.36	26.69	30.06	29.96	27.74	28.23	28.81
SA	32.5	31.21	28.93	29.14	29.34	29.76	30.26	30.8
TAS	29	28.18	25.86	26.15	26.39	26.87	27.39	27.94
VIC	30	30.82	28.41	28.57	28.82	29.29	29.8	30.33
WA	NA	27.27	24.6	25.86	25.86	25.73	24.77	24.3
NZ (NZ cents)	25.91	25.94	26.4	26.45	26.87	26.87	27.78	27.78
Region/year	2013	2014	2015	2016	2017	2018	2019	2020

Region/year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
NSW	29.44	31.12	31.44	31.68	31.97	32.25	32.51	32.68	32.94	33.21
ACT	19.73	20.85	21.06	21.23	21.42	21.61	21.78	21.9	22.07	22.25
NT	25.98	25.87	25.75	25.37	25.27	25.23	25.22	25.23	25.23	24.82
QLD	27.67	29.16	29.52	29.83	30.23	30.63	30.95	31.23	31.51	31.86
SA	31.26	32.35	32.56	32.66	32.89	33.2	33.45	33.61	33.82	34.17
TAS	28.4	29.71	29.96	30.1	30.4	30.77	31.09	31.29	31.52	31.83
VIC	30.79	32.12	32.34	32.46	32.73	33.1	33.38	33.57	33.77	34.07
WA	24.96	24.86	24.74	24.38	24.28	24.24	24.23	24.24	24.24	23.85

Region/year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
NZ (NZ cents)	27.77	27.77	27.77	27.72	27.71	27.71	27.71	27.71	27.98	28.04
Region/year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030

The electricity prices and forecasts used in the CBA are taken from the documented research conducted by EnergyConsult for the Residential Baseline Study.

- in Australia they are based on (Residential + Business) Electricity price index (AEMO 2014)
- in New Zealand they are based on Energy Information & Modelling Group's 2011 Energy Outlook results, Reference Scenario. (MBIE 2011)

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

Model parameters and key assumptions

The assumptions about the model parameters are outlined below.

Table D 8 Model parameters and key assumptions.

KEY FEATURES	MODEL PARAMETER
Scenarios	<p>Several policy options (shown below) were combined in multiple scenarios;</p> <ul style="list-style-type: none"> • 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 mandatory. From 2017; • 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 mandatory. From 2017; • Copy European MEPS levels for display and storage cabinets, using ISO and EN test standards, labelling is mandatory. From 2017; • Non-regulatory options.
Sales	<p>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.</p> <p>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.</p>
Projection Period	<p>17 years (2017-2035)</p> <p>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.</p>
Efficiency	<p>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.</p> <p>Sales weighted efficiency is 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). Evidence of labelling impacts in the business sector is not available.</p>
Capital Costs	<p>The incremental capital (purchase) costs from the increased MEPS were summed from the period 2017 to 2026 (undiscounted) and divided by 10 (years) to estimate the annual costs. These were then reduced by 50% to account for the retail mark-ups.</p>
Registration Admin costs and Costs of Compliance	<p>Total incremental cost to Government per annum for Australia and New Zealand ranged between \$240,000 per annum to \$290,000 per annum.</p> <p>Establishment cost to government in Australia and New Zealand to prepare the RIS and introduce the new regime are assumed to be \$250,000.</p>
Energy Consumption	<p>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</p>

KEY FEATURES	MODEL PARAMETER
	calculated and compared to the BAU consumption.
GHG emissions	<p>Australia: Projected Factors from 2014 - derived from 2013 NGA factors but varied by trends in Electricity Sent out emission intensity by state, the No Carbon Scenario, from The Treasury and DIICCSRTE, 2013.</p> <p>New Zealand: Ministry of Business, Innovation and Employment, New Zealand's Energy Outlook Electricity Insight, June 2013. Historical values to 2012 and Forecast is the data from Mixed Renewables Scenario from 2013</p>
Industry costs	<p>Incremental cost per supplier per year ranged from \$18,000 to \$35,000 (approx. \$12 – \$23 per sale)</p> <p>Model test cost is around \$6,500.00 each.</p> <p>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.</p> <p>Additional number of registrations is 35% to 40% of the existing number.</p> <p>The incremental cost to industry is shared across 75 suppliers in Australian and New Zealand.</p> <p>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.</p>
Sensitivity Analysis	<p>The sensitivity of the results was tested under the following cases:</p> <p>Discount rates - Australia = 0%, 3%, 7%, 11%; New Zealand = 0%, 3%, 5%, 8%</p> <p>Price Efficiency ratios – 0.5, 1.0, 1.5, 2.0</p>
Key Assumptions	<p>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 5% discount rate.</p>

Attachment E – 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 supply¹

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	Beercool, 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
Central West Refrigeration	-
Commercial Fridge & Freezer Sales Australia	(Distributor and reseller)
Complete Beverage Services	Crystal Cooler
Cyberchill Refrigeration	Cyberchill
Delta Refrigeration Services	-

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.

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
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, Mafinol, 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,
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 F – Australasian Standards vs international

Current AU/NZ test and performance Standard, AS 1731

Most display cabinets are required to be registered and pass MEPS levels, and have been since 2004. AS 1731:2003 *Refrigerated Display Cabinets* defines the test procedure for display cabinets in both Australia and New Zealand. 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 large supermarkets, to counter-top glass cabinets designed to display cakes.

Storage cabinets are mentioned in this Standard (cabinets with solid doors) but were not assigned MEPS values (“no value”) meaning that they don’t have to comply with a MEPS level nor be registered. Other cabinet types that were not assigned MEPS values, include ‘combination’ cabinets and wine cabinets. These types of fridges perform similar functions to or have similar 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, in a laboratory or 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 – eg 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, revised in 1975, 1983 and 2000, updated and published in 2003 (as AS 1731: 2003) and 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).

The various parts of AS 1731 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) and mandatory labelling.

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 mandatory 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 and widely used in Europe as the preferred method of test 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. (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 in a storage cabinet method of test (draft EN 16825). There are also a few more cabinet types covered and a couple left off because presumably there have never been any made (never any registrations for them through E3).

Draft EN for storage cabinets EN 16825, and other display cabinet standards

Based on the ISO 23953 standard, the storage cabinet draft 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 CECEC 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).

The standard is/was due for publication in July 2016. European “MEPS” regulations for storage cabinets have already been enacted and will become mandatory from July 2016 also.

European Union - labelling

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 could 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.

Refrigerated Display Cabinet MEPS

These will all be required to have an Energy Efficiency Index calculated and graded, shown on a mandatory label.

Efficiency grades and MEPS levels for display cabinets:

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 earlier (in **Table 5**, main document). Note – 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 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 Class	Efficiency	Commercial Cabinets	Display 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

Note – the “MEPS” EEI levels and labelling grades for display cabinets are still in draft and likely to change pending the outcome of the European Labelling review (potentially will be known by December 2017).

Draft equation to calculate the EEI of display cabinets ⁴⁰

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:

$$EEI = (AEC/SAEC) \times 100$$

Where:

$$AEC = E_{24h} \times 365$$

- AEC = Annual Energy Consumption of the cabinet in kWh/year, which is the sum of the AEC of all compartments of the cabinet,
- E_{24h} = 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.

⁴⁰ (from April 2016 draft not publically available)

- 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 (m²).
- M and N are defined values – see table below.

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	$C = 1 + \frac{7 - T_1}{25}$
supermarket freezer	$C = 1 + \frac{(-15) - T_1}{25}$
beverage cooler	$C = 1 + \frac{5 - T_c}{25}$
small ice-cream freezer	$C = 1 + \frac{(-18) - T_1}{30}$
vending machine	$C = 1 + \frac{12 - T_v}{25}$
other refrigerated commercial display cabinets	$C = 1$

Where, when testing the appliance, T₁ 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 a European EN 16825 (draft due to be published July 2016). 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 won't recognise cabinets with remote condensing units (because as far as we know, all storage cabinets are integral), open cabinets (these are considered to be display cabinets).

Heavy duty vs light duty operating situations:

The storage cabinet Standard 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°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°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 (AEC), the Standard Annual Energy Consumption (SAEC). 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:

$$AEC = E_{24h} \times af \times 365$$

- AEC = Annual Energy Consumption of the cabinet in kWh/year
- E_{24h} = energy consumption of the cabinet over 24 hours
- af = adjustment factor to be applied only for light-duty cabinets

$$SAEC = M \times V_n + N$$

- SAEC = Standard Annual Energy Consumption of the cabinet in kWh/year
- V_n = 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

The implementation dates for more stringent MEPS are shown in Error! Not a valid bookmark self-reference.. Note – at present, the efficiency all cabinets with an EEI higher than 115. However in 2016 all storage cabinets will have to score an EEI of less than 115. In 2018 the EEI ramps down to less than 95, and 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	-

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/levels have a forward looking direction i.e. efficiency limits are progressively ramped down and signalled to industry well in advance.

USA

- The USA and Canada have efficiency levels aligned in some product groupings. However these are different categories from the EU and AU/NZ regime. 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.⁴¹

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 AU/NZ, 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 using 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 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, this too occurs for 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, 25oC 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.

⁴¹ 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.

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%



**Consultation Regulation Impact Statement – Refrigerated
display and storage cabinets
www.energyrating.gov.au**