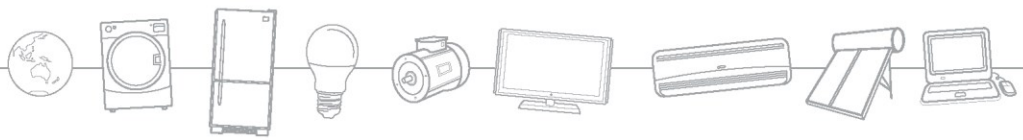
E3
Equipment Energy Efficiency

Decision Regulation Impact Statement on the energy efficiency of digital displays

Televisions, computer monitors and digital signage displays

2024



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Executive Summary

This Regulation Impact Statement for Decision (DRIS) recommends policy options to improve Australia's and New Zealand's television and computer monitor energy efficiency requirements and harmonise these with European requirements. It also proposes the introduction of energy efficiency labelling and standby/networked standby power requirements for digital signage displays to align with the European requirements for electronic displays. The Australian Government Department of Climate Change, Energy, the Environment and Water (the Department) has prepared this DRIS on behalf of the Equipment Energy Efficiency (E3) Program.

There are a range of regulatory and market failures preventing the uptake of more energy efficient televisions, computer monitors and digital signage displays that are contributing to unnecessary electricity use in Australia and New Zealand. Reductions in electricity consumption can lower greenhouse gas (GHG) emissions and help to meet government GHG emission commitments. Reduced electricity use can also lower stress on electricity grids and reduce the risk of load shedding and blackouts, as well as reducing energy costs for end users.

This DRIS presents research, modelling and analysis showing that market failures and consumer behaviour in the electronic display market are acting to constrain the uptake of more energy efficient products and are imposing higher than necessary costs on consumers and society more broadly. These barriers and behaviours are inhibiting the market from moving to more efficient technologies and are contributing to unnecessary externality costs from GHG emissions, peak loads on electricity distribution networks, electricity use and utility bills.

E3 has consulted with a range of stakeholders, including suppliers and retailers, to determine which recommendations to make to overcome market failures and concerns with the implementation of any changes. Updated regulations are proposed to increase the uptake of energy efficient televisions, computer monitors and digital signage displays on a national scale. The discussion and recommendations in this DRIS focus on the European Union (EU regulations) because of feedback provided in response to the *E3 Program Issues Paper – Televisions, Computer Monitors and Digital Signage Displays 2022*[1].

A Consultation RIS detailing the cost-benefit analysis and draft policy proposals was published for consultation on 23 May 2023, with written submissions invited up to 7 July 2023. A public consultation session was held via video conference on 15 June 2023.

[1] E3 Program: televisions, computer monitors and digital signage issues paper (dcceew.gov.au)

A total of 29 stakeholders participated in the consultation session, including industry associations, suppliers and manufacturers.

Industry associations and digital display companies made written submissions. Chapter 6 summarises the responses to each of the questions put to stakeholders in the CRIS. In general, all industry submissions supported the introduction of more stringent MEPS, regrading of the energy rating label (ERL) and updating the energy efficiency test method for televisions and computer monitors. For digital signage displays, there was general support for adoption of the EU requirements as long as there is flexibility for labelling requirements and sufficient time is given for industry to implement the requirements. No comments were received on the cost-benefit analysis for any of the product categories.

Summary of cost-benefit analysis

Below are the central estimates from the cost-benefit analysis for the 2 scenarios analysed in this DRIS, summarised for all 3 types of electronic displays installed up to 2035. Scenario A means adopting the European (EU) 2023 requirements in 2025 and Scenario B means adopting EU 2021 regulations in 2024, followed by the introduction of EU 2023 regulations in 2026. Energy saved, emissions reductions, total benefits and costs are cumulative for the lifetime of all new products purchased between 2025-2035. They are modelled compared to the base case of retaining the current efficiency regulations for televisions and computer monitors, and no regulations for digital signage displays.

Australia

Policy option	A) Adopt EU 2023 Regs in 2025	B) Staged introduction in 2024 and 2026
Energy saved (cumulative GWh)	12,000	11,200
Emissions reduction (cumulative kt CO2-e)	3,130	2,830
Total costs (NPV $m - AUD)	-$355m	-$332m
Total benefits (NPV $m - AUD)	$1,759m	$1,598m
Benefit Cost Ratio	**4.95**	**4.81**

New Zealand

Policy option	A) Adopt EU 2023 Regs in 2025	B) Staged introduction in 2024 and 2026
Energy saved (cumulative GWh)	1,920	1,780
Emissions reduction (cumulative kt CO2-e)	101	94
Total costs (NPV $m - NZD)	-$38m	-$36m
Total benefits (NPV $m - NZD)	$141m	$129m
Benefit Cost Ratio	**3.67**	**3.57**

These results show that there will be an overall net benefit by introducing more stringent MEPS and labelling for electronic displays from Europe compared with keeping the current efficiency regulations in both Australia and New Zealand.

This DRIS also recommends the adoption of a test method equivalent to that used in Europe for any new digital display regulations in Australia and New Zealand. It also recommends adapting the European labelling Grades for the ERL in Australia and New Zealand, along with minor changes to labelling display requirements to reduce the compliance burden for suppliers and retailers.

Recommendations

This DRIS recommends the following be implemented to address the market and regulatory failures as follows.

Recommendation 1 – New MEPS and transition times

Introduce EU 2023 MEPS requirements for televisions and computer monitors to come into force approximately 12 months after the GEMS determination is made. New Zealand will consider whether to align with these new requirements following New Zealand Cabinet consideration of the issue.

Recommendation 2 – High resolution displays – MEPS levels

Introduce a less stringent MEPS level with an energy efficiency index (EEI) of 1.1 for high resolution products[1] such as 8k televisions and some high-resolution computer monitors to ensure that some products in all product categories can meet MEPS. This should be reviewed after several years to determine whether this requirement should be adjusted.

Recommendation 3 – Regrading of energy rating labels

Introduce new star ratings levels for the energy rating label to align with the 7 European label grades and include 3 additional levels to give the full 10 star range for televisions and computer monitors.

Recommendation 4 – Scope of products covered

Match the scope of products covered by the EU electronic displays regulations for the new MEPS and labelling requirements for televisions and computer monitors in Australia and New Zealand.

Recommendation 5 – Test method

Introduce the equivalent of the EU test method for televisions, computer monitors and digital signage displays.

[1] Displays with resolution above 8 294 400 pixels (UHD-4k) and for MicroLED displays

Recommendation 6 – New label design

Introduce a different label design for the new regraded energy rating labels for televisions and computer monitors.

Recommendation 7 – Physical and electronic labelling options

Introduce an option for suppliers and retailers to display the energy rating label electronically instead of using a physical label, if legislative frameworks allow for this. Consider introducing flexible options for the display of physical labels (for example, swing tags). This would apply to televisions and computer monitors.

Recommendation 8 – Standby, networked standby and off-mode energy requirements for digital signage displays

Introduce mandatory power demand limits for off-mode, standby mode and networked standby mode to match the EU regulation requirements for digital signage displays and match the scope of products covered by the EU regulations. This should take effect approximately 12 months after the GEMS determination is made.

Recommendation 9 – Energy rating label for digital signage displays

Introduce mandatory registration for digital signage displays as per the scope of the EU regulations, which will include comparative data to be listed on the public registration database. Use star ratings levels for the energy rating label to align with the 7 European label grades and include 3 additional levels to give the full 10 star range. Introduce optional physical or electronic energy rating labels for digital signage displays, if legislative frameworks allow. Flexible options for physical labels could also be considered for this product.

Contents

1. Background and context

1.1 Decision Regulation Impact Statement

This DRIS makes recommendations to update Australia's and New Zealand's television and computer monitor energy efficiency requirements and harmonise these with European requirements. It also makes recommendations on the introduction of energy efficiency labelling and standby/networked standby power requirements for digital signage displays to align with the new European requirements for electronic displays. Input and submissions from stakeholders have been considered in the development of these recommendations.

This document has been developed by the Australian Government Department of Climate Change, Energy, the Environment and Water (the Department) – on behalf of the Equipment Energy Efficiency (E3) Program[2] - in accordance with the *Regulatory Impact Analysis Guide for Ministers' Meetings and National Standard Setting Bodies*[3] and in consultation with the Office of Impact Assessment (OIA)[4]. The cost-benefit analysis and technical advice were provided by Energy Efficient Strategies (ESS)[5].

This document covers the seven standard RIS questions[6]:

1. What is the policy problem to be solved?
2. Why is government action needed?
3. What policy options are being considered?
4. What is the likely net benefit of each option?
5. Who was consulted and was their feedback incorporated?
6. What is the best option from those considered?
7. How will the chosen option be implemented and evaluated?

The following principles are considered in this DRIS:

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[2] About the E3 program on energyrating website

[3] Regulatory Impact Analysis Guide for Ministers' Meetings and National Standard Setting Bodies June 2023

[4] Office of Impact Analysis OIA was formerly known as the Office of Best Practice Regulation (OBPR).

[5] Energy Efficient Strategies webpage

[6] OIA 7 RIS questions

- Harmonisation with regulatory requirements in the European Union (EU) that could be appropriate in the Australian and New Zealand contexts
- Reducing greenhouse gas emissions
- Reducing the regulatory burden on industry and government
- Enabling effective and efficient compliance.

1.2 Equipment Energy Efficiency Program

The Equipment Energy Efficiency (E3) Program is an initiative of the Australian Government, states and territories and the New Zealand Government. It provides for an integrated program of energy efficiency standards and energy labelling for appliances and equipment in Australia and New Zealand. The E3 Program operates under the *Greenhouse and Energy Minimum Standards Act 2012* (the GEMS Act) in Australia and the *Energy Efficiency (Energy Using Products) Regulations 2002* in New Zealand.

The E3 Program is overseen by Commonwealth, State and Territory Energy and Climate Change Ministers, who are advised on energy efficiency matters by the Energy Efficiency Working Group (EEWG), which is made up of officials from participating jurisdictions and New Zealand. The Australian Government Department of Climate Change, Energy, the Environment and Water (the Department) prepared this DRIS on behalf of EEWG and the E3 Program (E3).

In Australia, televisions are regulated under the provisions of the *Greenhouse and Energy Minimum Standards (Television) Determination 2013 (No. 2)* and computer monitors under the *Greenhouse and Energy Minimum Standards (Computer Monitors) Determination 2014*.

In New Zealand, televisions and computer monitors are regulated under the *Energy Efficiency (Energy Using Products) Regulations 2002* ('the Regulations'). The New Zealand Regulations generally mirror the requirements in GEMS determinations. References to a *determination* in reference to the GEMS Act are assumed to apply in the equivalent manner under the regulations in New Zealand. In this paper, determinations and the regulations are collectively referred to as 'efficiency regulations'.

2. What is the problem?

2.1 Overview

There are a range of regulatory and market failures in the energy efficiency of televisions, computer monitors and digital signage displays that are contributing to unnecessary electricity use in Australia and New Zealand. These failures are described in sections 2.2.3 and 2.3.3 below and include:

- The MEPS levels for televisions and computer monitors in Australia and New Zealand are much less stringent than those in major international markets. This costs the Australian community nearly $250 million every year in energy costs and $13 million every year in New Zealand[7]. Annual electricity consumption is 930 GWh higher in Australia and 148 GWh higher in New Zealand that it otherwise would be.
- There are no requirements for the energy efficiency of digital signage displays in Australia and New Zealand. This costs the Australian community nearly $6 million every year in energy costs and $1 million every year in New Zealand. Annual electricity consumption is 24 GWh higher in Australia and 5 GWh higher in New Zealand that it otherwise would be.
- Televisions and computer monitors are globally traded. The Australian and New Zealand energy efficiency test methods for televisions and computer monitors are out of date. This adds regulatory burden and cost to suppliers who need to undertake additional testing just for the Australian and New Zealand markets, instead of being able to re-use results for markets in other jurisdictions.

The operation of inefficient electrical appliances and equipment increases electricity demand above what it otherwise would be. This increased demand requires increased investment in electricity generation, transmission and distribution, which increases the cost of electricity supplied to all households and businesses. Increased electricity use also contributes to increased greenhouse gas (GHG) emissions, which contributes to climate change. At a consumer level, increased electricity use increases utility bills.

Reductions in electricity consumption can lower GHG emissions and help to meet government GHG emission commitments. Reduced electricity use can also reduce stress

[7] More than 80% of these costs in Australia and New Zealand would be in the residential sector, with the balance in the commercial sector. The calculation for energy costs in Australia is from a consumer perspective and is based on the retail tariffs applicable in the relevant sector (so includes public and private costs). In New Zealand, energy costs are calculated from a total societal perspective (public costs only) and therefore appear relatively lower.

on electricity grids and reduce the risk of load shedding and blackouts. Energy efficiency can help reduce the need to add expensive new power generation or transmission capacity and reduce pressure on energy resources.

Energy efficient appliances use less electricity to achieve the same level of performance as similar models with the same size or capacity. The more energy efficient a model, the less energy it will use and the less it will cost consumers to run. While in Australia, the emissions intensity of electricity has been steadily decreasing with the gradual decarbonisation of the electricity grid, significant emissions reductions can still be made from energy efficiency improvements, particularly where regulatory and market failures exist.

In Australia, the GEMS Act[8] objectives include promoting the development and adoption of products that use less energy or produce fewer greenhouse gases. In New Zealand, the purpose of the *Energy Efficiency and Conservation (EEC) Act 2000*[9] includes the promotion of energy efficiency and energy conservation.

This DRIS assesses and makes recommendations on whether the energy efficiency requirements for televisions and computer monitors should be revised and updated to better meet the policy objectives of the Australian GEMS and New Zealand EEC Acts (see Chapter 3 below), and to harmonise with major international markets. International harmonisation with test method standards reduces costs and trade barriers for manufacturers and suppliers.

This DRIS also includes an assessment and recommendations on whether digital signage displays should be regulated for the first time. The European Commission included regulation of this product in its 2021 regulation for electronic displays. Section 2.3.3 below describes the market failures for this type of display.

2.1.1 European Union electronic displays regulations

The discussion and recommendations in this DRIS focus on the EU regulations based on stakeholder feedback from the Issues Paper published in 2022[10] and the Consultation RIS published in 2023[11]. Stakeholder feedback on the Issues Paper showed a strong preference to align with the EU regulations, rather than other international policies. The CRIS and this DRIS therefore focuses on policy options that align with the EU approach. This section gives a brief overview of these requirements.

The European Commission recently updated its MEPS and energy labelling requirements for televisions and computer monitors. The first of these updates came into effect in 2021 (EU 2021 levels) and were made more stringent in 2023 (EU 2023 levels). A European

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[8] GEMS Act 2012

[9] EEC Act

[10] E3 Program: televisions, computer monitors and digital signage issues paper (dcceew.gov.au)

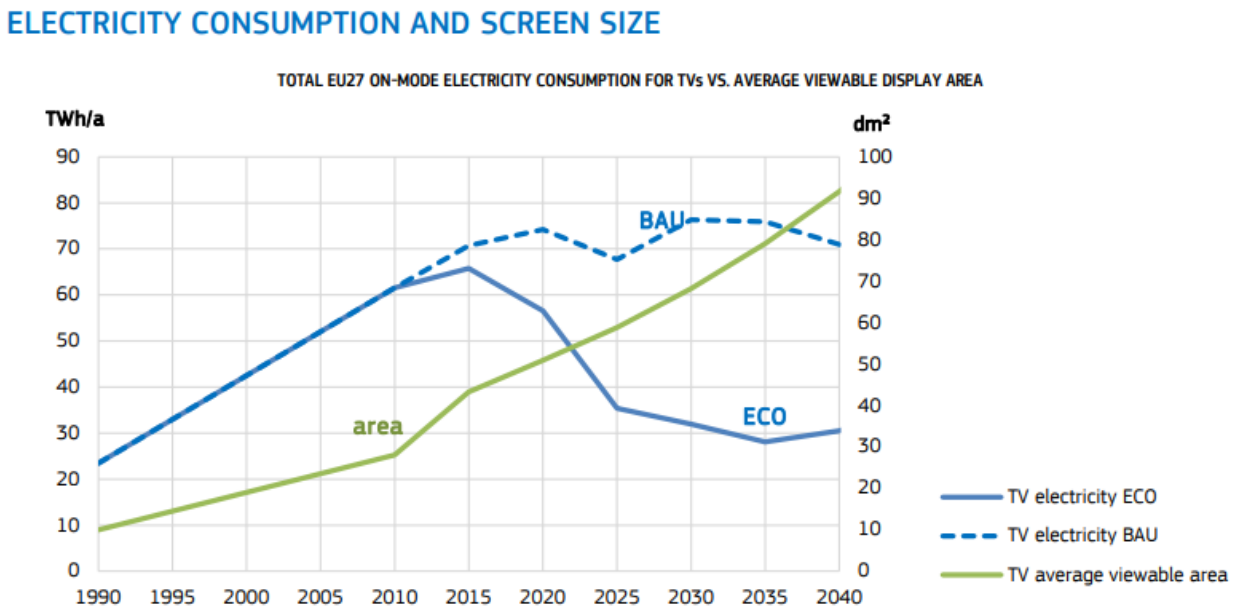
[11] Consultation RIS – Televisions, Computer Monitors and Digital Signage Displays (dcceew.gov.au)

review had previously concluded that there was a need for updated energy-related requirements for televisions and that the same requirements should also apply to other displays, such as computer monitors, because of the increasing functional overlap between these different display types. Digital signage displays must comply with mandatory labelling requirements and mandatory power demand limits for off-mode, standby mode and networked standby mode. Computer monitors and televisions also have mandatory labelling in addition to MEPS requirements.

These requirements are described in more detail in Appendix B and in the Issues Paper. Note that the EU regulations include non-energy requirements (information, recycling, servicing), which are outside of the scope of this DRIS and are excluded from consideration.

Figure 1 shows the EU *EcoDesign Impact Accounting Overview Report 2023*[12] (the Impact Accounting Report) estimated electricity savings for televisions from the implementation of the new EU 2021 and EU 2023 MEPS and labelling requirements. This graph from page 64 shows that electricity use drops despite the increase in screen area, due to the new requirements.

Figure 1



Electricity consumption of televisions from 1990 to 2040 in the EU showing BAU versus the new EU requirements. This also shows the average viewable display area increasing over time. Source: Impact Accounting Report[13].

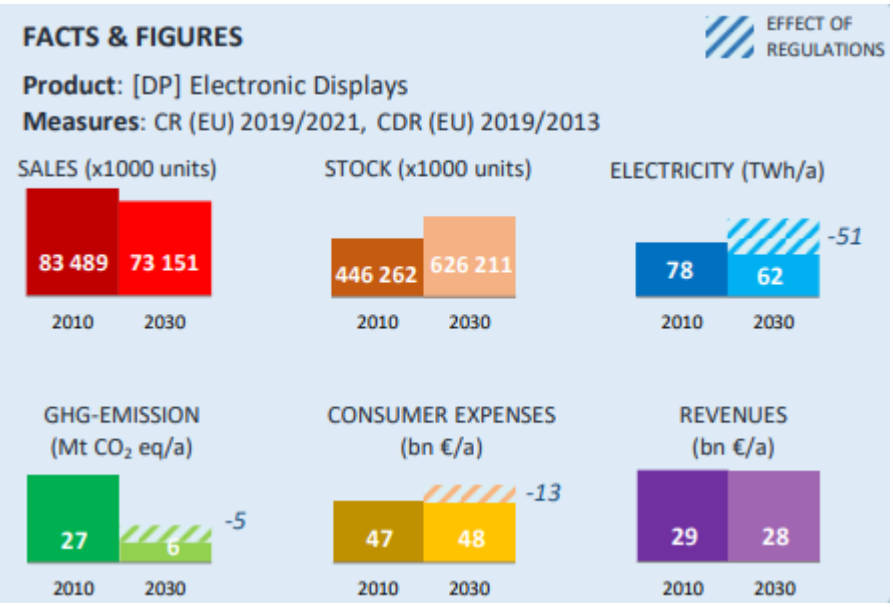
Figure 2 also shows facts and figures from page 65 of the Impact Accounting Report highlighting the effect that the regulations in Europe will have in 2030. This shows the

[12] EcoDesign Impact Accounting Overview Report 2023

[13] EcoDesign Impact Accounting Overview Report 2023

estimated reductions in electricity use, greenhouse gas emissions and consumer expenses by 2030 from the impact of the EU 2021 and EU 2023 requirements. Note that the GHG emissions savings are not directly comparable to Australia and New Zealand due to different emissions intensity of electricity supply.

Figure 2



This shows facts and figures from the Impact Accounting Report showing the effect of the EU regulations on electricity use, GHG emissions and consumer expenses in the EU.

2.2 Televisions and computer monitors

2.2.1 Energy use and greenhouse gas emissions

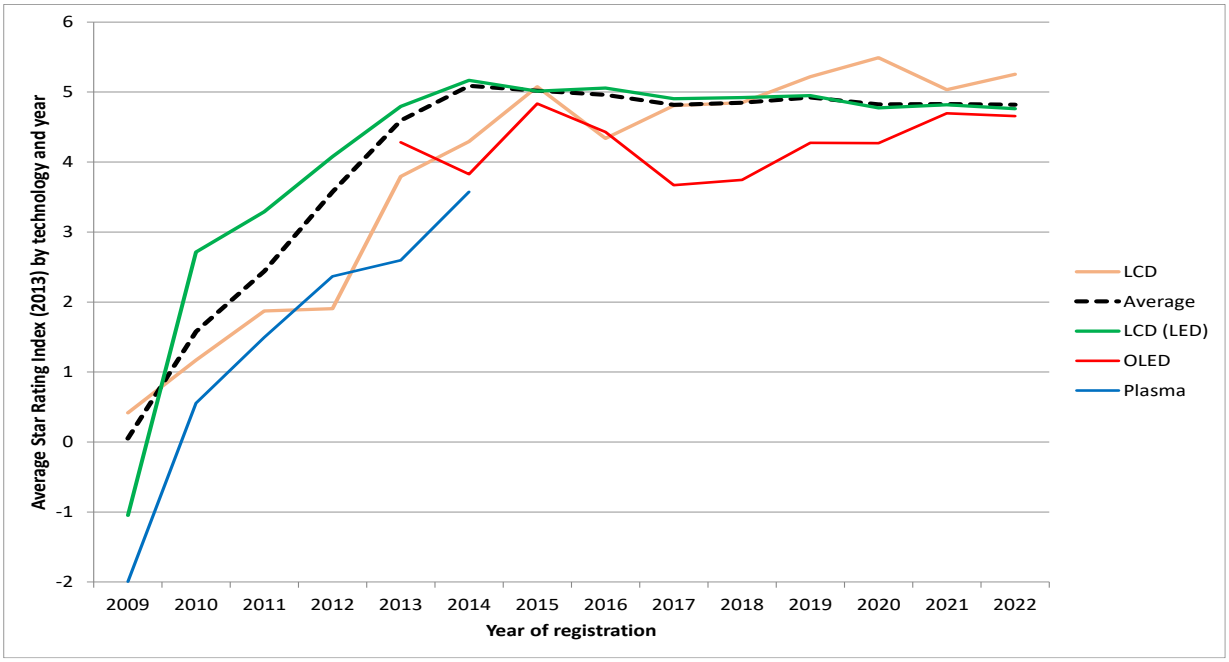
Televisions and computer monitors consume significant quantities of electricity. For example, more than 3% of the electricity use in the European Union in 2016 was from televisions[14]. Electricity usage costs are unnecessarily high because people continue to buy televisions and monitors that are not the most energy efficient on the market. The reasons for this are discussed below.

After the initial introduction of MEPS and energy labelling in 2009 in Australia (2012 in New Zealand), the energy consumption of televisions fell dramatically for the first four years. This was due, in part, to the new labelling and MEPS requirements. The other driver was the rapid transition from fluorescent backlight to LED-backlight LCD technologies.

[14] EU Regulation on electronic displays - Commission delegated regulation 2019/2013

Registration data for televisions shows that energy consumption reached a minimum in 2013 and has been increasing since 2014-15. This is also reflected in the average star rating, which reached an average of 5 stars (2013 algorithm) in 2014, but has since stagnated or deteriorated as illustrated in Figure 3 below. Even though the labelling algorithm for televisions was regraded in 2013, many new products already achieve 5 stars or more, making the label less effective. The 2013 MEPS levels are now weak and ineffective, leading to unnecessary energy consumption by consumers.

Figure 3



Trends in star rating index for different television technologies by calendar year of registration. This shows that star ratings have stagnated since approximately 2013-14.

Electricity use per television has been increasing since 2014-15. Much of this is due to an increase[15] in the average size and resolution of displays. Energy consumption is linked to screen area and resolution. The other contributing factor is increases[16] in screen luminance[17] (screen brightness), because brighter screens use more electricity.

Screen sizes are a major contributor to increased energy consumption and screen sizes are increasing. The current star rating system for televisions is based on a simple power per unit of screen area, which does not place any direct constraints on screen area.[18]

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[15] GEMS registration database

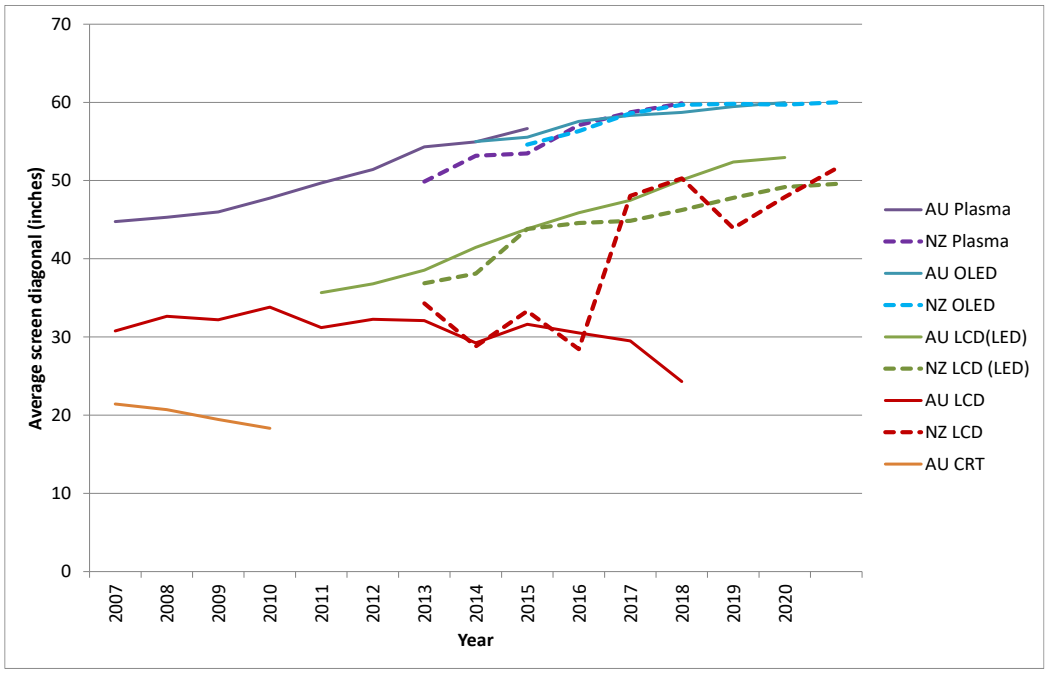
[16] GEMS registration database

[17] 'Luminance' means the photometric measure of the luminous intensity per unit area, expressed in units of candelas per square meter (cd/m^2).

[18] The EU energy labelling and MEPS reference curves (and the previous Energy Star equations to V8) use a so-called progressive efficiency metric for electronic displays, where the screen technology has to effectively become more efficient as screen sizes increase in order to meet the same threshold.

Figure 4 shows the trend in sales-weighted screen size in Australia and New Zealand for each of the different television technologies. Data from both Australia and New Zealand showed a decrease in energy consumption until about 2014, but has shown a steady increase since that time. The energy trends in both countries are similar, but Australia has been approximately 15% higher than New Zealand since 2015, as shown in Figure 5. The increasing screen luminance over time and the rapidly increasing screen size is driving up the energy consumption of televisions. This is an indication that current regulations have become less effective in improving energy efficiency in recent years. This is supported by detailed market research in 2019 that showed that energy consumption and star rating is much less important in the choice of a television, than for other labelled appliances and equipment.[19]

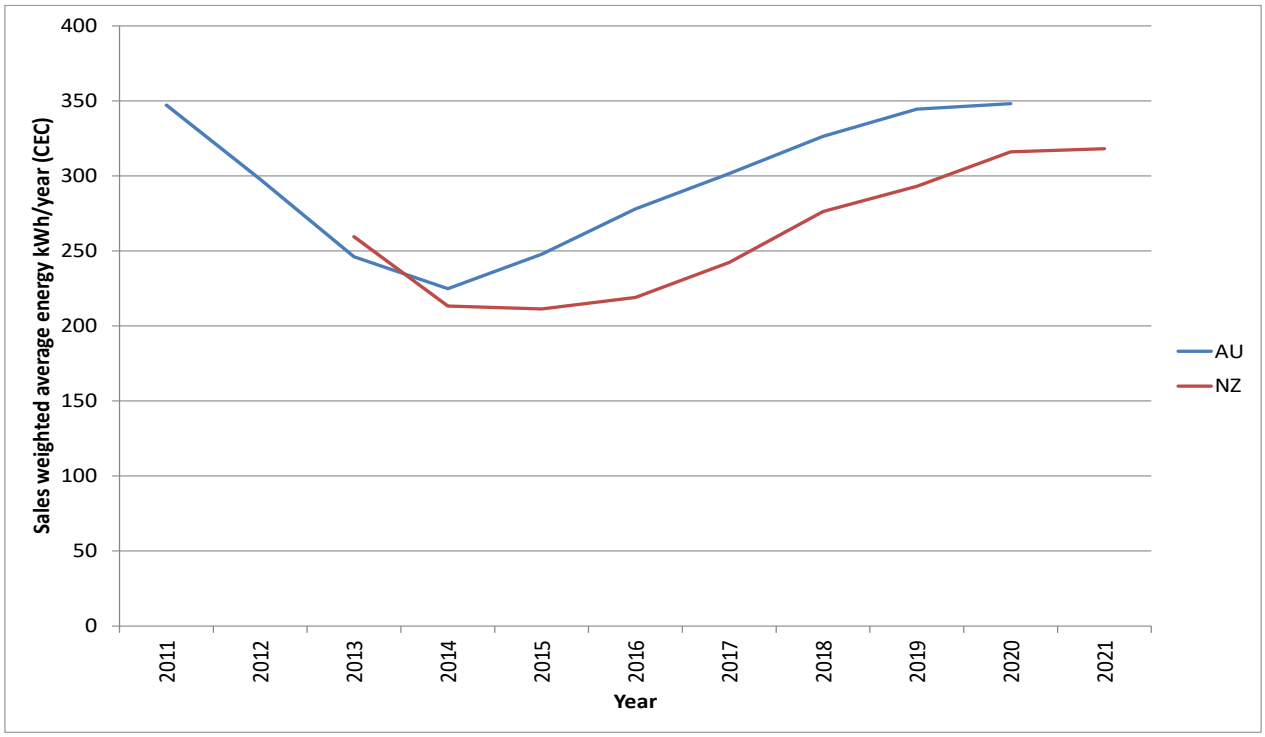
Figure 4



Televisions - trends in sales-weighted screen size in Australia and NZ by screen technology

[19] Market research report titled *Understanding the use of the energy rating label with TVs* commissioned by the Department of the Environment and Energy, April 2019 and undertaken by Instinct and Reason.

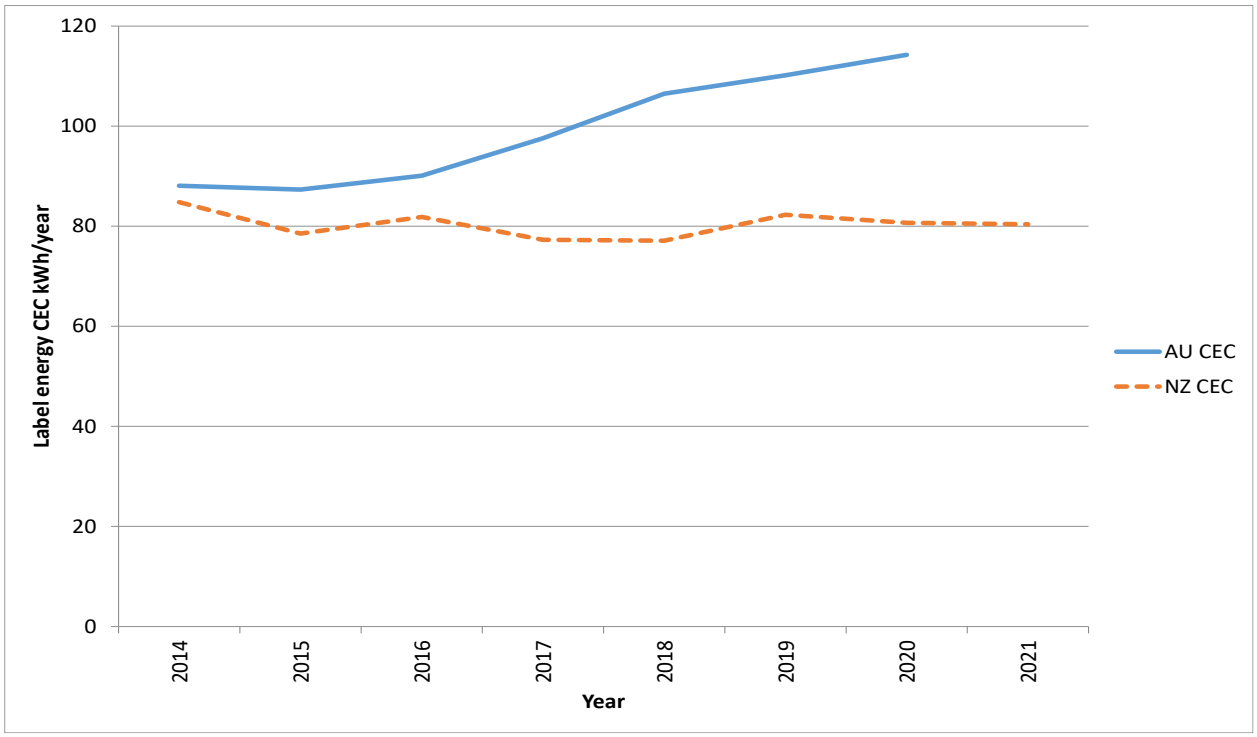
Figure 5



Sales-weighted television energy consumption for Australia and New Zealand, based on analysis of GfK sales data for Australia and EECA registration data for NZ.

Figure 6 shows that the sales-weighted label energy consumption for computer monitors in Australia has increased over time but is stable in New Zealand. Analysis of sales-weighted data has shown that the size and energy characteristics of LCD versus LCD (LED) computer monitors are similar.

Figure 6



Trends in sales-weighted computer monitor energy for Australia and New Zealand

The energy efficiency of computer monitors is important because of the number of monitors sold and the amount of time they are in use. For example, in the Australian commercial sector, computer monitors use the most energy of any office equipment (Figure 7 below)[20]. Monitors are also the third highest use of energy in office buildings after lighting and heating, ventilation and cooling [21].

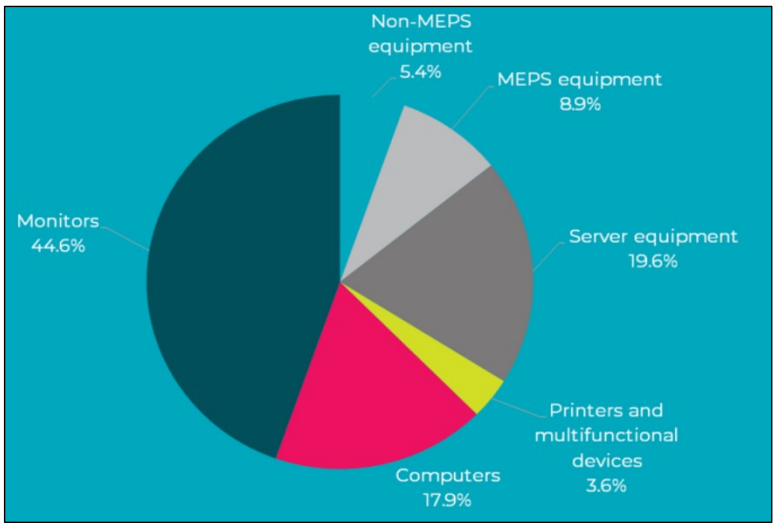
The Department's 2021 review[22] of the computer monitors determination recommended a full analysis be undertaken to determine the costs and benefits of increasing the MEPS and reviewing the energy labelling requirements.

[20] The Energy Efficiency Council, Energy Consumption Research, 2020, Website accessed 3 April 2024

[21] Ibid

[22] E3 Program: GEMS determinations due to expire by 2025 consultation

Figure 7



This graph from Energy Efficiency Council research shows that monitors use the most energy of office equipment in office buildings.

2.2.3 Barriers and behaviours – regulatory and market failures

Consumer behaviour in the television and computer monitor markets act to constrain the uptake of energy efficient products and impose higher than necessary energy costs on consumers and society more broadly. These barriers and behaviours are impeding the television and monitor markets from moving to more efficient technologies and are contributing to unnecessarily high energy bills, high externality costs from GHG emissions and peak loads on electricity distribution networks.

Consumers appear to focus more on price, brand, size, features, resolution and picture quality when purchasing televisions, rather than energy efficiency, which is more prominent in decision making for other appliances and equipment. Televisions are a source of fun, escape, discovery and can also be a status symbol.[23] High performance computer monitors, which are excluded from the current efficiency regulations, are also likely to be purchased in a similar manner to televisions. However, while home television and computer monitor purchasing decisions are unlikely to be made starting with the energy rating label (ERL), when all other things are equal, it is likely to tip the balance in favour of the more efficient product.[24] Market research commissioned by the Department[25] on the use of the ERL for televisions found that purchasing behaviour for televisions was significantly different to other appliances that carry an ERL. Buying a television was generally seen as fun and an escape and allowed the discovery of new technology. The ERL played a smaller role in the purchase process for televisions than for other appliance purchases, such as refrigerators.

[23] Unpublished research by Instinct and Reason for the Department of the Environment and Energy, 2019.
[24] Unpublished research by Instinct and Reason for the Department of the Environment and Energy, 2019.
[25] Understanding use of the energy rating label with TVs – a qualitative debrief, Instinct & Reason, April 2019

Given that consumer behaviour is often driven by factors other than energy costs when purchasing televisions and computer monitors, it is beneficial for consumers to have choices that exclude less energy efficient options. By requiring improvement in the energy performance of high energy use appliances in the market, mandatory MEPS reduces the effect of consumers placing little weight on the energy efficiency of a product. MEPS protects consumers from unnecessarily high running costs and provides the overall benefits associated with reduced total energy use to the whole economy.

There are likely to be different barriers and behaviours in the commercial sector for purchases of computer monitors. For example, the Energy Efficiency Council (EEC) recently surveyed[26] 27 commercial building tenants who were drawn from a group of tenants who are signatories to CitySwitch[27], a voluntary emissions reduction program. The respondents could therefore be assumed to have a higher than average motivation to reduce energy use and a higher than average understanding of energy use and energy efficiency, compared with commercial building tenants as a whole.

Despite this, the survey results demonstrate that the vast majority of respondents did not know the energy star rating of their monitors. The EEC report states that a medium-sized monitor (between 21 inches to 32 inches) with less than three energy stars consumes an average of 181 kWh per annum, while the same-sized monitor with more than six energy stars consumes an average of only 64 kWh per annum; a consumption reduction of nearly two-thirds. This 2021 report concluded that computer monitors represented a significant opportunity to reduce office energy consumption. As such, there is likely to be underinvestment in cost effective energy efficient monitors and hence unnecessary electricity usage and costs.

Australia's and New Zealand's MEPS levels for televisions and computer monitors lag behind prevailing international standards. (See Chapter 3 for details.) The energy rating labelling algorithm is also out of date and doesn't reflect the current international regulatory frameworks or technological developments. Both of these factors are contributing to the regulatory and market failures identified above.

2.2.4 Superseded test methods

Australia and New Zealand have a long-standing policy of harmonising with international energy efficiency standards, wherever it is possible and reasonable to do so. This reduces trade barriers as well as costs to industry and consumers.

The current television test method called up in the energy efficiency regulations was published in 2010 and is based on a now-superseded International Electrotechnical

[26] Determining office tenancies energy end use, Energy Efficiency Council, published by the Australian Government June 2021

[27] City Switch webpage

Commission (IEC) standard[28]. This international test method is frequently reviewed and revised by the international standards committee. The latest edition of the test method standard was published on 17 February 2023. It is the third revision published since the current Australian and New Zealand test method standard (IEC 62087:2008), so is now very out-of-date. The current computer monitor test method was published in 2012[29] and is also out-of-date.

The current Australian and New Zealand test standards for televisions and monitors are not fit for purpose because they require television manufacturers and suppliers to use a unique test method to register and sell their products in Australia and New Zealand; a test method that is not used in comparable markets overseas. For globally traded products, such as televisions and computer monitors, having a unique test method standard in Australia and New Zealand adds to testing costs for suppliers, because they cannot re-use test results that are required in other markets. Use of these out-of-date standards, rather than an updated, internationally recognised and employed test methodology, imposes an unnecessary regulatory burden and cost on manufacturers and suppliers.

2.2.5 Labelling issues

For televisions and computer monitors, it is mandatory for a printed ERL to be displayed on the product at the point of sale, such as in a retail store. Appendix A describes the energy rating labelling requirements for televisions and computer monitors.

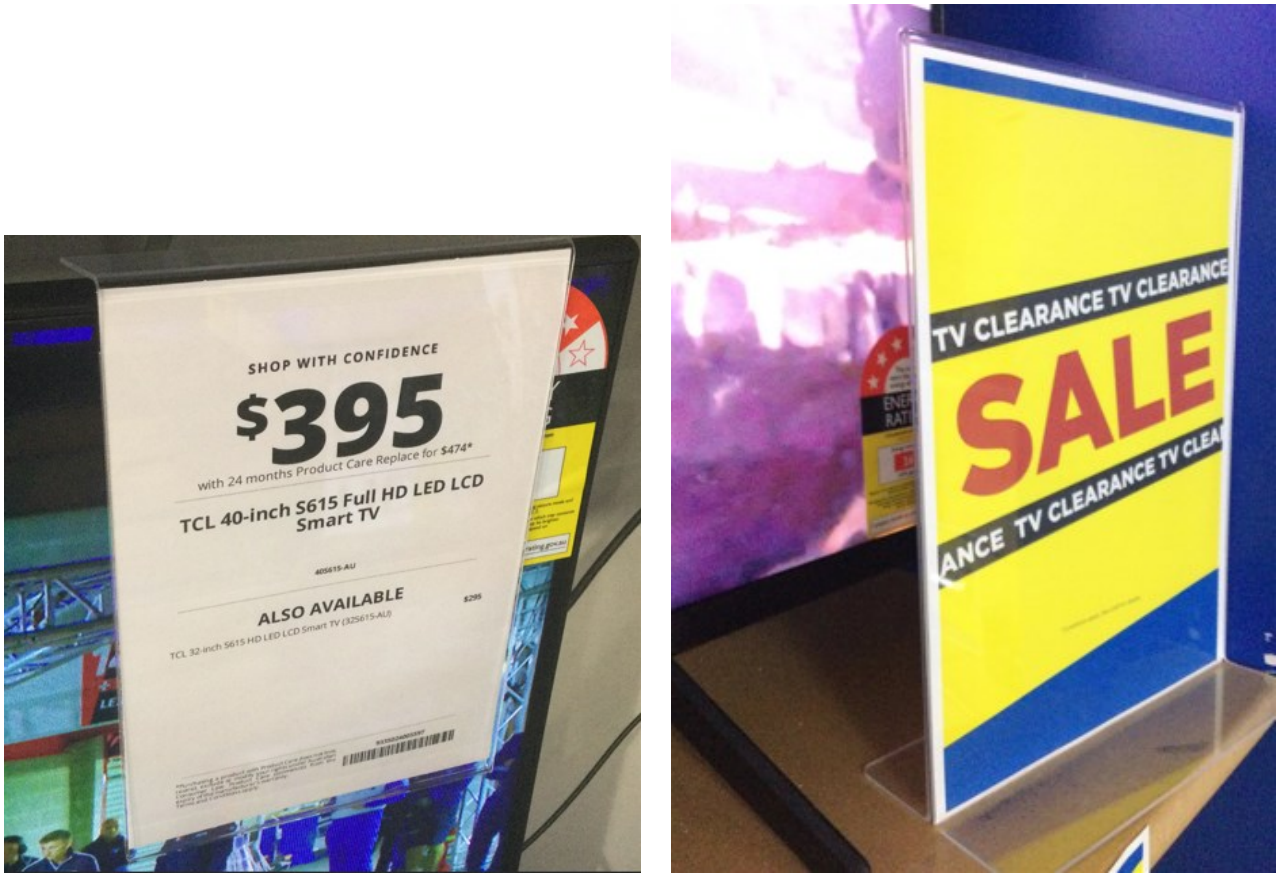
GEMS compliance officers have noted an increasing incidence of problems with the mandatory labelling requirements for televisions and computer monitors in Australian retail stores. These problems have become more common as frame sizes have shrunk or vanished and screen sizes have increased. Most televisions and monitors have narrow frames or are frameless, making it difficult for the printed label to stick and not fall off. While affixing the printed label directly to the screen is an option, it is generally not preferred by retailers because it can damage the screen surface. Other issues include retailers covering the ERL with other store labels and promotional materials. Televisions and computer monitors may also be displayed for sale in the box in which they are supplied.

Figure 8 shows examples of the printed energy rating label on televisions, partially obscured by other promotional materials on display in retail stores.

[28] IEC62087 Edition 2 published in 2008

[29] AS/NZS 5815.1 Information technology equipment — Energy performance of computer Monitors Part 1: Methods of measurement of energy performance

Figure 8 (2 labelling images)

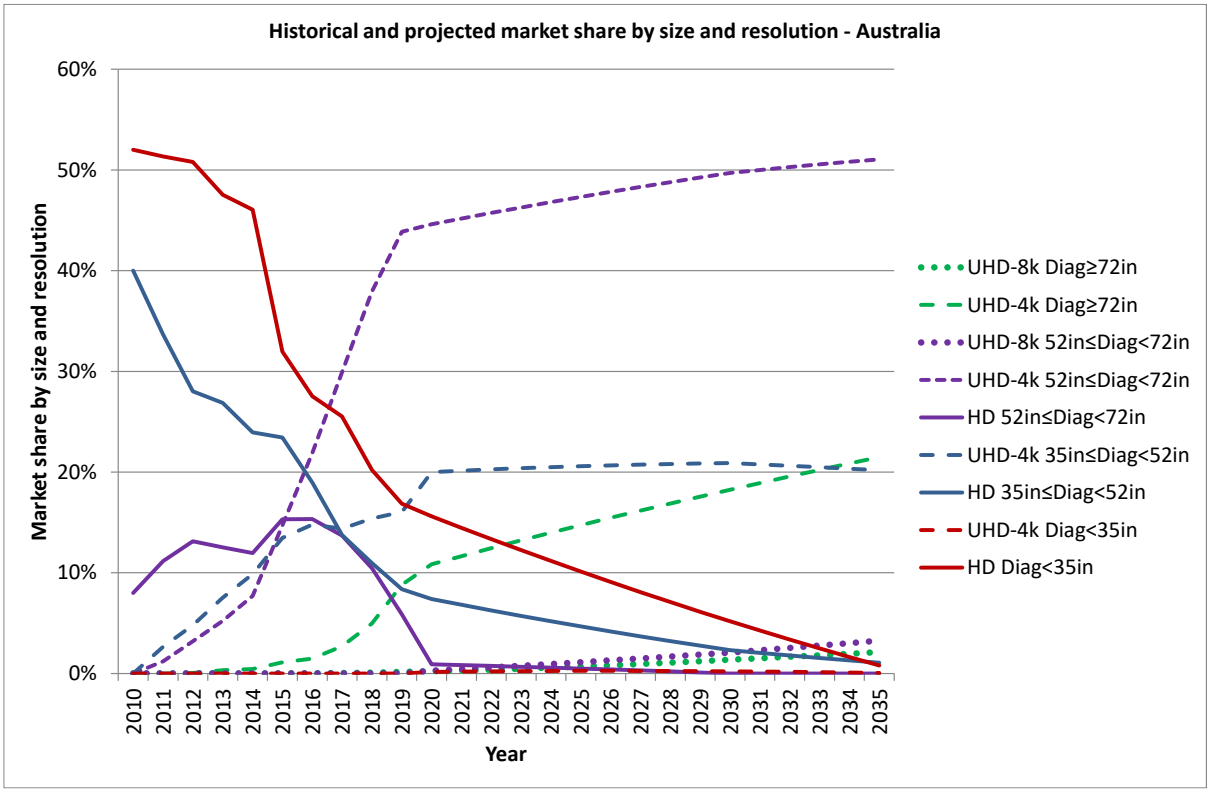


Photos showing energy rating labels on televisions partially obscured by promotional materials.

2.2.6 Scope of regulation coverage – size and screen resolution

The current scope of the Australian and New Zealand efficiency regulations is out-of-date and differs from European regulations. Screen resolution is a scope issue for televisions and computer monitors. The screen resolution of televisions has increased over time, with 8k televisions being the most recent development. While there is limited content available in 8k resolution and 8k televisions are not common in Australia and New Zealand, this may change in the future. Figures 9 and 10 show the historic and projected market share of televisions by size and resolution used in the analysis. The projected uptake of 8k televisions (dots in Figures 9 and 10) in this analysis is low. UHD 4k televisions size 52-72 inches (132 – 183cm) are projected to make up approximately half of the market share for televisions from around 2030.

Figure 9



Historical and projected market share of televisions by size range and resolution, Australia. Sales-weighted data to 2020[30].

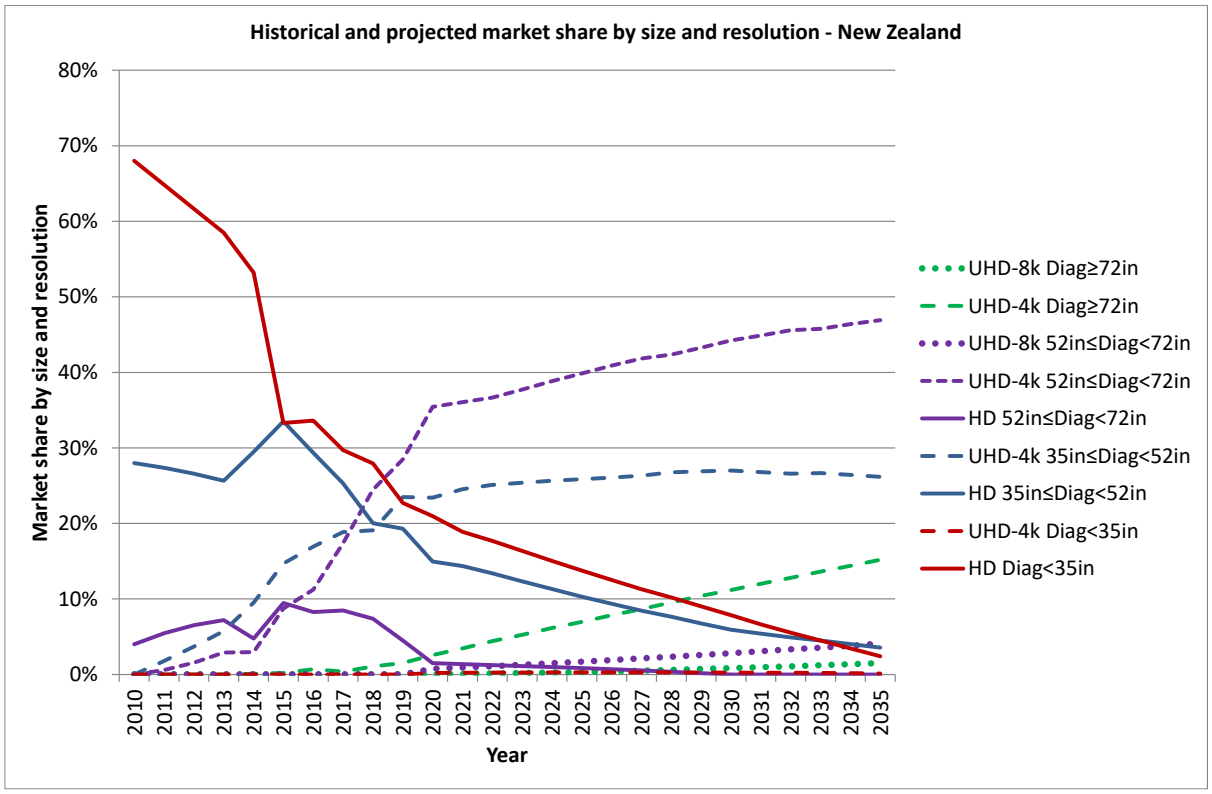
There are other scope issues for computer monitors. Only in-scope monitors up to 30 inches (76 cm) must comply with MEPS in on-mode and standby and display an ERL. Monitors between 30 to 60 inches (76 to 152 cm) need to comply with labelling requirements, but only need to comply with power limits in standby mode and off-mode[31]. MEPS for on-mode only apply to computer monitors with a screen diagonal of less than 30 inches (less than 76 cm or a screen area of about 2,468 cm²). There was only 1 product registered in 2013-14 that was larger than 30 inches, but now there are 348 models in this size range, which only have to comply with in low power modes[32], but not the on-mode MEPS.

[30] Actual sales by technology and screen size from 2010 to 2020 was used to develop an internal stock model for Australia based on screen size and technology. These trends were then projected out to 2030.

[31] See EECA information on computer monitor requirements or Greenhouse and Energy Minimum Standards (Computer Monitors) Determination 2014 and *AS/NZS 5815.2:2013 Information technology equipment - Energy performance of computer monitors Part 2: Minimum energy performance standards (MEPS) and energy rating labels*

[32] AS/NZS5815.2 (2013) Clause 2.2 defines on mode requirements, which are limited to monitors with a diagonal screen size of <76 cm. Standby and off mode limits (Clauses 2.3 and 2.4) apply to all monitors.

Figure 10



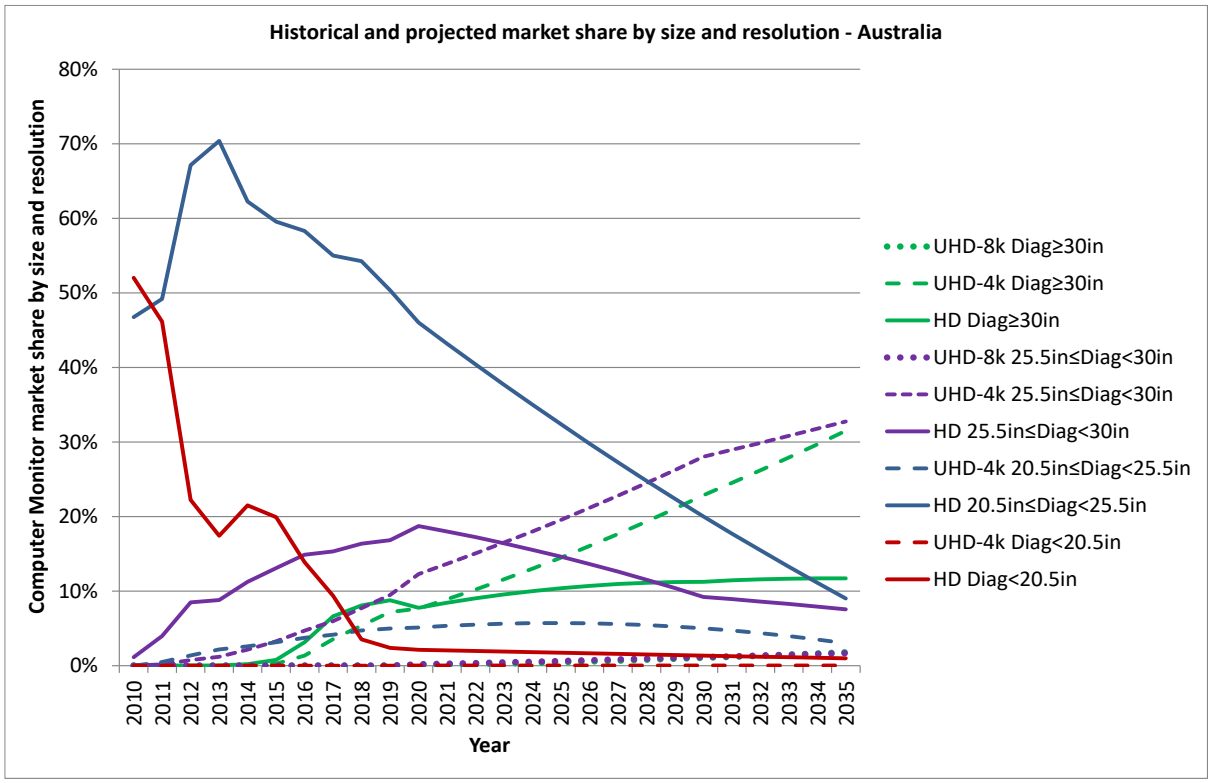
Historical and projected market share of televisions by size range and resolution, New Zealand. Sales-weighted data to 2021[33].

Figure 11 shows the historical and projected sales share for computer monitors by size range and resolution in Australia, and Figure 12 shows the same data for New Zealand. These figures show that the proportion of larger monitors is expected to continue to grow over time.

The current scope also doesn't take into account the significant technology shifts that have occurred in recent years. High-performance monitors typically use more energy than the types of monitors covered by the regulations. However, the efficiency regulations in Australia and New Zealand exclude these high-performance monitors, which anecdotally are becoming more common, compared to when the efficiency regulations were first set in 2013. GfK sales data show that a large number of models are now marketed as "gaming" monitors as illustrated in Figure 13. These are usually larger, higher resolution displays with a higher refresh rate. This style of monitor is now commonly used for all applications, not just gaming. This also suggests that the current scope and categories for labelling and MEPS for computer monitors are becoming increasingly outdated.

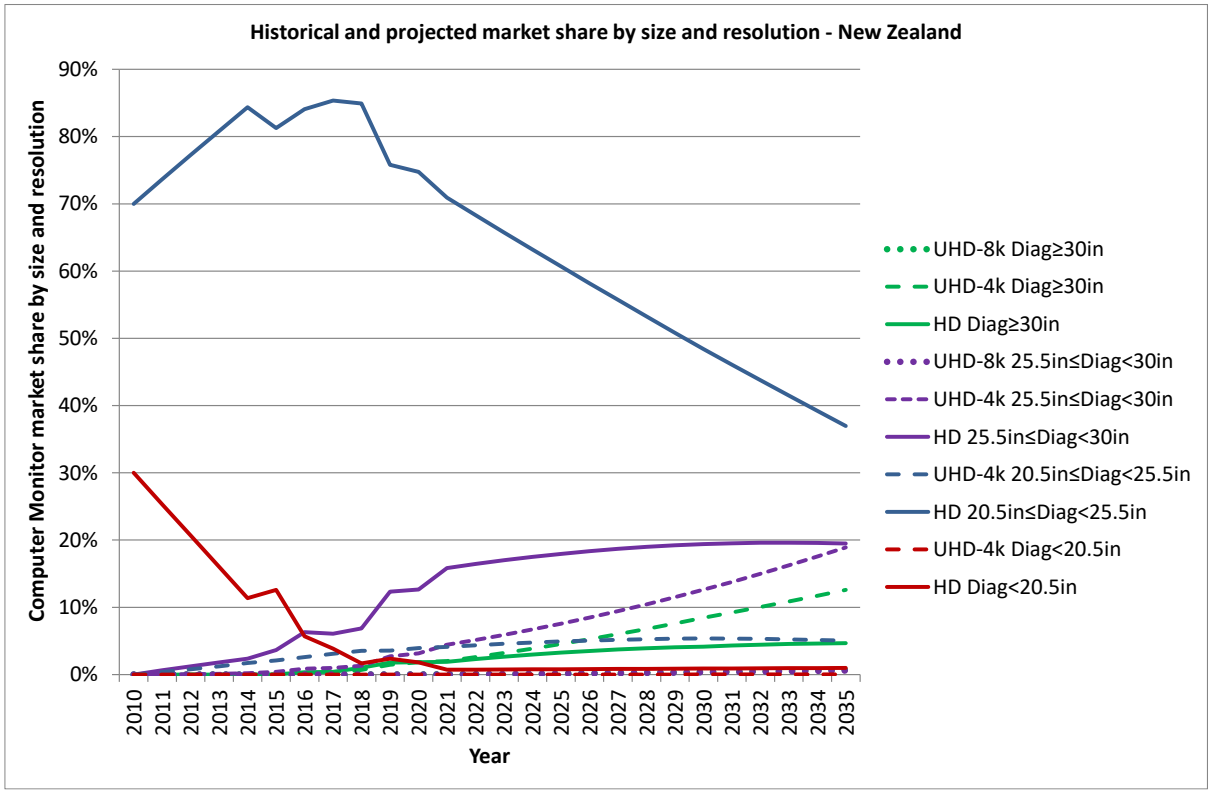
[33] Actual sales by technology and screen size from 2013 to 2021 was used to develop an internal stock model for New Zealand based on screen size and technology. These trends were then projected out to 2030.

Figure 11



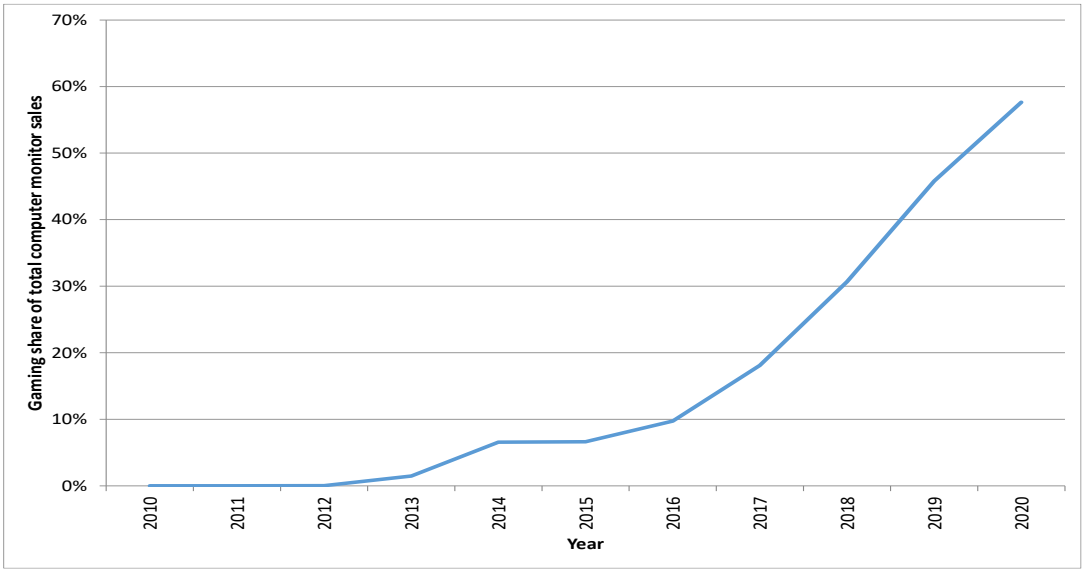
Historical and projected sales share for computer monitors by size range and resolution, Australia

Figure 12



Historical and projected sales share for computer monitors by size range and resolution, New Zealand

Figure 13



Share of gaming computer monitors in Australia[34]

2.2.7 Automatic brightness control for digital displays

Automatic brightness control (ABC), sometimes called dynamic backlight control, automatically adjusts a screen's overall backlight intensity to account for ambient light conditions. When ABC is active, it adjusts the screen brightness (luminance) to better match the ambient light level. As the ambient light drops, the screen should compensate by making the picture less bright. As energy consumption of digital displays is strongly linked to screen brightness, ABC saves energy. It also improves the viewing experience for consumers who are unlikely to regularly adjust the settings to match their ambient lighting conditions.

ABC is taken into consideration in the current Australian and New Zealand efficiency regulations for computer monitors[35], but not for televisions. The EU requirements provide for a 10% reduction in measured energy consumption, where a digital screen has a qualifying active ABC mechanism, which is a different approach to that in Australia and New Zealand. This is another example of where the Australian and New Zealand efficiency regulations differ from major international markets.

[34] From analysis of GfK computer monitor sales data.

[35] For computer monitors with ABC active by default, the value for P_{avg} for assessment of MEPS is determined as the weighted average of the measured power with a room illuminance of 300 lux (80% of the time) and a room illuminance of 0 lux (20% of the time).

2.3 Digital signage displays

2.3.1 Scope

The Australian and New Zealand energy efficiency regulations for televisions and computer monitors do not apply to digital signage displays. The scope of the current television and computer monitor efficiency regulations don't take into consideration the convergence of these technologies and international trends to regulate these products together. The EU 2021 and 2023 Ecodesign and labelling regulations for electronic displays cover televisions, computer monitors and digital signage displays together, because of the functional and technological convergence of these products[36]. The EU Explanatory Memorandum[37] for the electronic display regulations states that this convergence was creating possible regulatory loopholes in the previous EU regulations for these products.

Figure 14 shows digital signage displays in use in different applications. Digital signage displays are a globally traded product. They are used in the commercial sector in similar ways in Australia and New Zealand. Their uses include advertising, informational displays and menus in fast food restaurants.

Figure 14

A digital signage display in an international airport used to show information to passengers and another in the left-hand bottom corner being used for advertising.

The European regulations[38] for these products state:

[36] Revision of EU Ecolabel Criteria for Electronic Displays (previously Televisions) Final Technical Report, European Commission, September 2020

[37] EU Explanatory Memorandum for electronic displays regulations

[38] European Commission Delegated Regulation (EU) 2019/2013 of 11 March 2019 supplementing Regulation (EU) 2017/1369 of the European Parliament and of the Council with regard to energy labelling of electronic displays

Digital signage displays are used in public spaces such as airports, metro and train stations, retail stores, shop windows, restaurants, museums, hotels, conference centres or in prominent positions outside buildings and represent a relevant emerging market. Their energy needs are different and generally higher than those of other electronic displays because they are often used in luminous places and continuously on.

Digital signage displays are defined in the European regulations as:

*'digital signage display' means an electronic display that is designed primarily to be viewed by multiple people in non-desktop based and non-domestic environments. Its specifications shall include **all** of the following features:*
a) unique identifier to enable addressing a specific display screen;
b) a function disabling unauthorised access to the display settings and displayed image;
c) network connection (encompassing a hard-wired or wireless interface) for controlling, monitoring or receiving the information to display from remote unicast or multicast but not broadcast sources;
d) designed to be installed hanging, mounted or fixed to a physical structure for viewing by multiple people and not placed on the market with a ground stand;
e) does not integrate a tuner to display broadcast signals.

The European regulations exclude the following types of digital signage displays which meet any of the following characteristics:

1) designed and constructed as a display module to be integrated as a partial image area of a larger display screen area and not intended for use as a standalone display device;
2) distributed self-contained in an enclosure for permanent outdoor use;
3) distributed self-contained in an enclosure with a screen area less than 30 dm² or greater than 130 dm²;
4) the display has a pixel density less than 230 pixels/cm² or more than 3,025 pixels/cm²;
5) a peak white luminance in standard dynamic range (SDR) operating mode of greater than or equal to 1,000 cd/m²;
6) no video signal input interface and display drive allowing the correct display of a standardised dynamic video test sequence for power measurement purposes.

Digital signage displays of less than 3000 cm² (nominal 16:9 diagonal of 83.8 cm or 33 inches) or more than 13000 cm² (nominal 16:9 diagonal of 174.4 cm or 68.7 inches) are outside the scope of mandatory energy labelling.

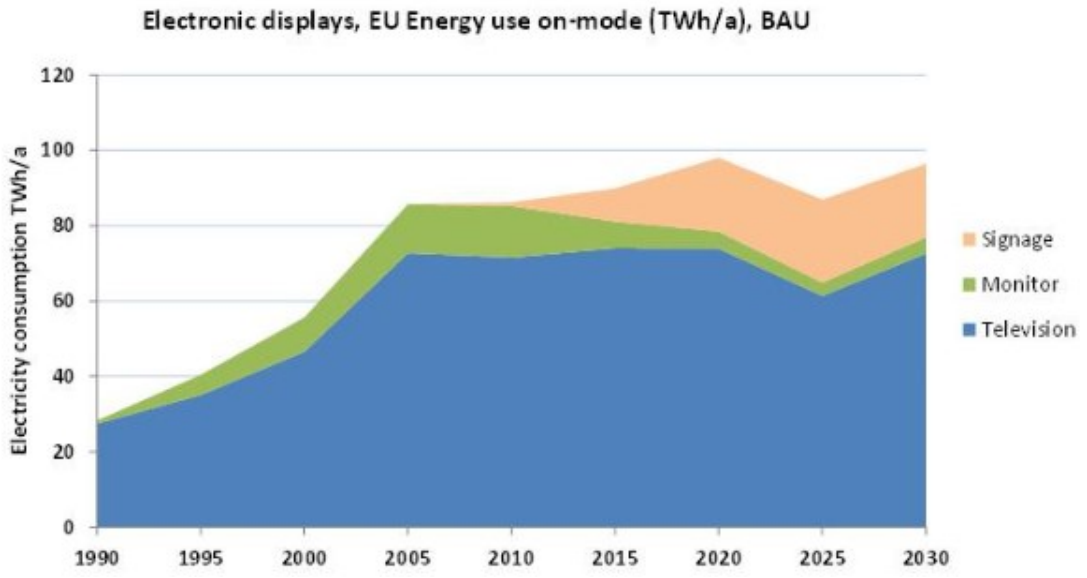
2.3.2 Energy use and greenhouse gas emissions

Europe only mandates energy labelling and standby/networked standby MEPS for digital signage displays that fall within the scope. Australia and New Zealand do not regulate digital signage displays for energy efficiency. Unpriced negative externalities, such as the cost of GHG emissions and greater demand on the electricity grid, apply to digital signage displays, just as they do to televisions and computer monitors. The rapidly progressing functional convergence between different electronic displays, such as televisions, computer monitors and signage displays creates possible regulatory inconsistencies for all three

products, if separately regulated, creating a strong case for a more integrated approach to this product group as a whole.

The EU found that digital signage displays will continue to account for a sizeable share of energy use for all electronic displays, unless corrective action is taken[39]. All electronic displays are becoming bigger and stock numbers are increasing quickly as prices fall. This is particularly the case for digital signage displays,[40] which generally have higher luminance. Figure 15 from the EU Explanatory Memorandum shows increasing yearly energy use in the EU for digital signage displays in the absence of any energy efficiency requirements. This graph was produced prior to the introduction of the EU 2021 requirements for electronic displays.

Figure 15



Actual and predicted electricity use of televisions, monitors and digital signage displays in Europe[41].

According to a 2019 European Commission report[42], most signage displays consume on average 2.5 times more energy than a television of the same size, because of the significantly higher luminance of digital signage displays and longer operating hours. These European trends of increased electricity consumption are likely to be mirrored in Australia and New Zealand without government intervention.

Digital signage displays are not a regulated product in Australia and New Zealand and so there is little data available on their performance. It is assumed that the energy

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[39] EU Explanatory Memorandum for electronic displays regulations

[40] The EU energy labelling metric for digital signage displays has a correction factor for displays that have a luminance of over 500 lm/m² in the brightest on-mode configuration in recognition that many are used in high illuminance environments. Size for size, digital signage displays are generally 10% to 20% cheaper than televisions.

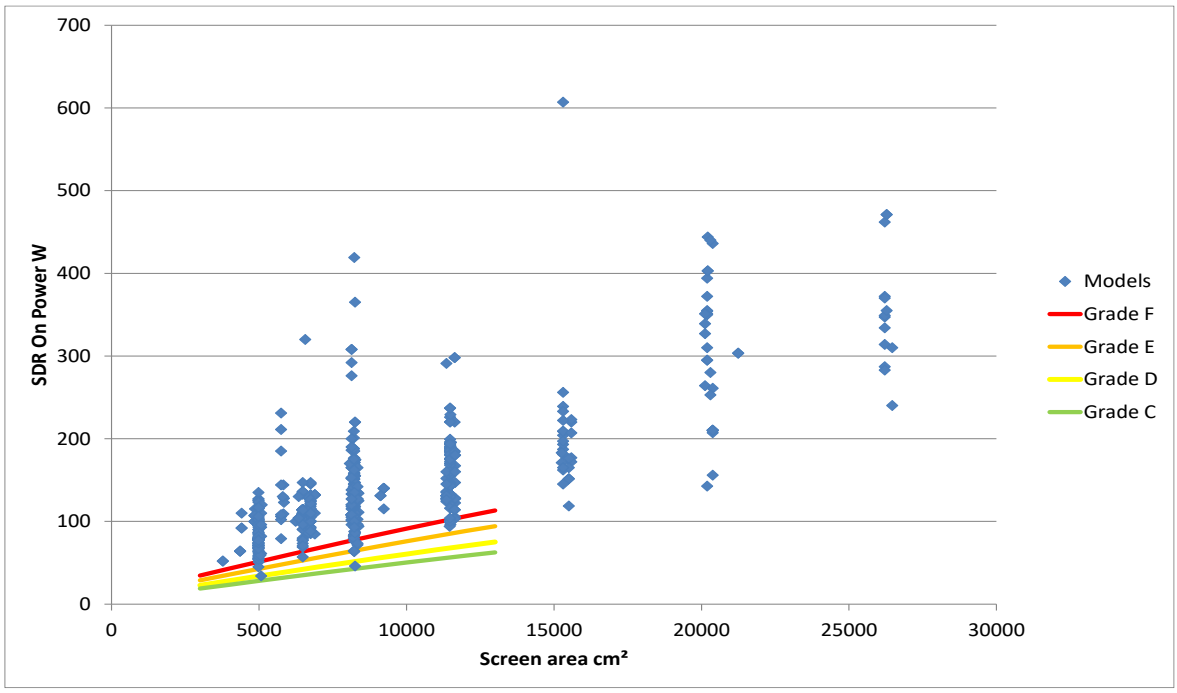
[41] EU Explanatory Memorandum for electronic displays regulations

[42] EU Impact Assessment for electronic displays regulations

consumption of digital signage displays sold in Europe is similar to that sold in Australia and New Zealand. Figure 16 shows the distribution of energy performance data from the European Product Registry for Energy Labelling[43] (EPREL) as of September 2022. Only Label Grade F to C lines from the European labelling scheme have been shown in this Figure (energy must be below the line to reach the grade). Most products are rated Grade G (above the F Grade line).

Products below the regulation size threshold (<30 dm²) have been excluded. Label grade lines are shown across the specified size range for the regulation for signage displays. The larger products shown in this graph have been voluntarily added to the EPREL database. The data shows a wide range in energy consumption, with the most efficient models using 25% of the energy of the highest energy models for a given screen area. This illustrates that substantial energy savings are possible.

Figure 16



Distribution of the Standard Dynamic Range (SDR) on-power of digital signage display models from the EPREL public database.

2.3.3 Barriers and behaviours – regulatory and market failures

Purchasers of digital signage displays do not have easy access to energy efficiency information. For example, Australian websites selling digital signage displays typically do not mention energy or power consumption upfront, and where this information is available on the website, it is often not easy to find. Desktop research undertaken by the Department on Australian websites found that some companies sell digital signage displays via an online quote form. While it is possible that the quotes may include energy consumption

43 EPREL - European Product Registry for Energy Labelling - Televisions, monitors and other displays

information, the webpages advertising these products typically don't mention energy use (or power). Other companies sell digital signage displays that are available for purchase immediately from the website with online delivery. Similarly, energy consumption information can be very difficult to find on these webpages. (For example, for one signage display, this information was provided on page 58 of a hard-to-find online manual).

Having no agreed system of energy measurement or energy declaration means that organisations wishing to buy more efficient signage displays are unable to include this in their purchase specifications.

There is also the potential for split incentives in situations where the purchasers and installers of signage displays (such as specialised contractors) may not be responsible for electricity costs, resulting in underinvestment in cost effective energy efficiency measures. The European Commission's 'Working Document – Impact Assessment 2019[44]' for the EU's electronic display regulation states:

> Without up-to-date energy efficiency requirements, the guarantee that the products will be cost-effective over their life-time is lost. This is especially important for certain groups of consumers, in particular those in a landlord-tenant situations, where the landlord buys the appliance and the tenant pays the energy bill, which for this product group is particularly relevant for signage displays.

[44] EU Impact Assessment for electronic displays regulations

3. Rationale for government action

3.1 Overview

Government action may be needed when the market fails to provide the most efficient and effective solution to a problem. A range of regulatory and market failures exist for the energy use of electronic displays in Australia and New Zealand. These were set out in Section 2.

In Australia, the GEMS Act objectives include promoting the development and adoption of products that use less energy and produce fewer GHG. The GEMS Act allows for mandatory minimum energy efficiency requirements to be set for appliances and equipment (called GEMS-level requirements), which helps drive greater energy efficiency by excluding the poorest performing products from the market. It also allows for consistent, national labelling requirements to increase consumers' awareness of options to improve energy efficiency.

In New Zealand, the purpose of the EEC Act 2000 includes the promotion of energy efficiency and energy conservation. Improved energy efficiency reduces energy consumption, energy costs and GHG emissions for consumers and businesses.

Without government action, the regulatory and market failures identified in Chapter 2 will persist and worsen over time and the objectives of the GEMS and EEC Acts will not be met. Regulatory and market failures such as those described in Section 2 can be resolved or reduced by mandatory labelling and more stringent MEPS to improve energy efficiency. Energy efficiency provides some of the most cost-effective GHG mitigation options, while reducing energy bills and strengthening energy security[45]. Energy efficiency improvements reduce the amount of energy use required to provide a service. These energy savings create economic, social and environmental benefits.

A recent International Energy Agency report[46] on *Achievements of Energy Efficiency Appliance and Equipment Standards and Labelling Programmes* reviewed nearly 400 published reports from around the world. This IEA publication confirms that policies that introduce MEPS and energy-consumption labelling on appliances and equipment reduce

[45] IEA webpage on energy efficiency

[46] Achievements of Energy Efficiency Appliance and Equipment Standards and Labelling Programmes – Analysis - IEA, 2021

power consumption, lower greenhouse gas emissions and provide cost savings for consumers. Standards and labelling programs (such as the E3 program) for appliances and equipment are some of the lowest-cost options available today for reducing energy consumption and associated emissions, with typical society benefit cost ratios of 4:1.

3.1.1 Non-regulatory measures

To achieve the same level of energy efficiency improvements achievable by government intervention, suppliers would need to agree to a common approach to testing and to disclosing the information on websites and in product documentation, preferably in a uniform format, and to have some form of external verification of product claims. The few examples of voluntary standardisation of energy performance information have involved leadership by a strong industry association, an energy utility or both.

In the 1980s, for example, the Australian Gas Association was able to introduce gas appliance energy labelling without regulation, but there were special circumstances that no longer exist. Gas utilities set conditions of connection specifying that appliances connected to the gas network had to comply with published gas product standards, including energy labelling requirements. These conditions do not apply in the case of digital displays. Electricity utilities cannot set conditions of connection for plug loads (as all digital displays are). Where conditions can be set, they are limited to either electrical safety or protecting the network, not product performance.

The E3 Program has had experience with a Voluntary Energy Rating Label Program (VERLP) for swimming pool pumps. Suppliers were invited to voluntarily test products to AS/NZS 5102, register them on energyrating.gov.au and disclose their performance on a standard energy label. When the program began in April 2010 it was announced as a transitional step to mandatory MEPS and labelling. The Decision RIS for swimming pool pumps in 2018[47] observed that:

> Most pool pumps are not registered under the VERLP. Typically, more energy efficient pumps are labelled, leaving around 70 per cent without a label. Limited registration of products is a common feature of voluntary labelling or rating schemes, both in Australia and overseas.[1] Due to the partial coverage of pumps on the market, the consumer benefits of the labelling scheme are limited.
>
> [1] For example, Australia's Water Efficiency Labelling and Standards (WELS) scheme originated in a voluntary industry-led labelling program. Following a review, the partial coverage and limited take up was one factor leading to the adoption of the current legislated WELS scheme.

There is no indication that a voluntary program to standardise testing and disclosure of performance information for digital screens would be any more successful than it has been for other products. On the basis of these precedents, efforts to implement a voluntary

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[47] Decision Regulation Impact Statement: Swimming pool pumps, E3, 2018

information program would be ineffective and would only delay the need to consider other options to address the problem.

3.2 Televisions and computer monitors

3.2.1 Energy use and greenhouse gas emissions

Mandatory energy labelling and MEPS for televisions were introduced in Australia in 2009 and in New Zealand in 2012. The stringency of both was increased in 2013 in Australia[48] and New Zealand. Mandatory energy labelling and MEPS for computer monitors were introduced in Australia[49] in 2014 and New Zealand in 2013.

In 2021, the EU increased the stringency of their MEPS levels for televisions and computer monitors and increased the stringency again in 2023. Australia's and New Zealand's MEPS levels are now lagging behind prevailing international standards and there is the potential for less efficient products to dominate in the market. While some efficient models are already sold in Australia and New Zealand, other less-efficient models continue to have significant market share. Moving the market towards more efficient models available overseas would deliver considerable electricity savings, emissions abatement and energy cost savings for consumers.

Figure 17 shows that the current MEPS level in Australia and New Zealand (solid blue line) for televisions is weak, when compared to the EU Ecodesign MEPS levels (solid and dashed purple lines). This is not surprising for a product that is evolving rapidly and subject to out-of-date regulations. Figure 17 shows that the requirements for 4 stars for televisions are less stringent than any of the EU MEPS levels.

The European energy label has 7 label grades[50] where A is the most efficient grade and G is the least efficient. Figure 17 also shows 4 of the European label grades. The red line is Grade F, the dark orange line is Grade E, light orange is Grade D and the green line is Grade C.

Figure 18 is a similar graph for computer monitors. The current Australian and New Zealand on-mode MEPS levels for computer monitors only applies to monitors that are less than 30 inches (76 cm) measured diagonally. This is equivalent to a screen area of 2,458 cm^2 (16:9 aspect ratio), which is why the blue MEPS lines stop at this point.

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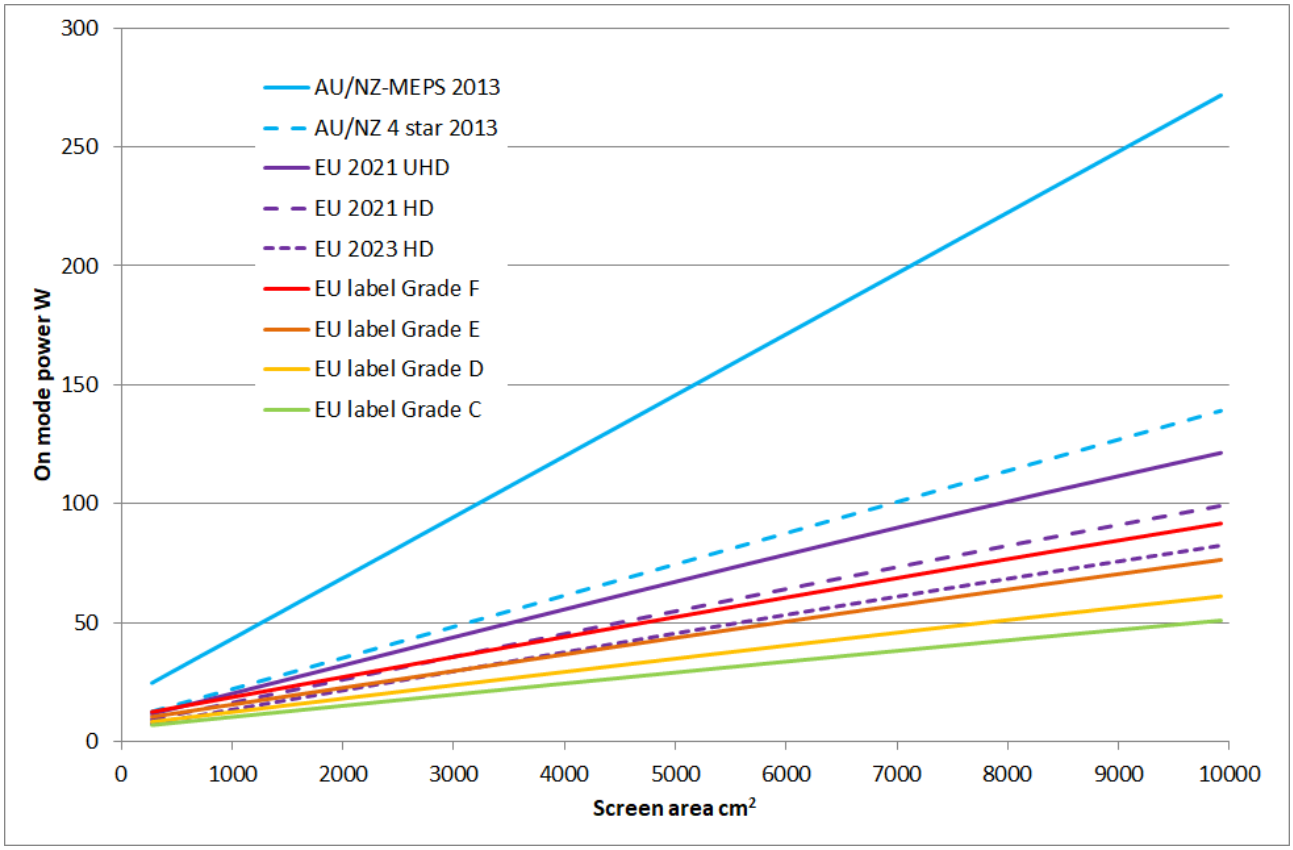
[48] Greenhouse and Energy Minimum Standards (Television) Determination 2013 (No. 2)

[49] Greenhouse and Energy Minimum Standards (Computer Monitors) Determination 2014

[50] European Commission information webpage on energy labelling and ecodesign regulations for electronic displays

Figure 17



Televisions - Comparison of Australian/New Zealand MEPS and labelling levels with EU Ecodesign MEPS and EU labelling.[51]

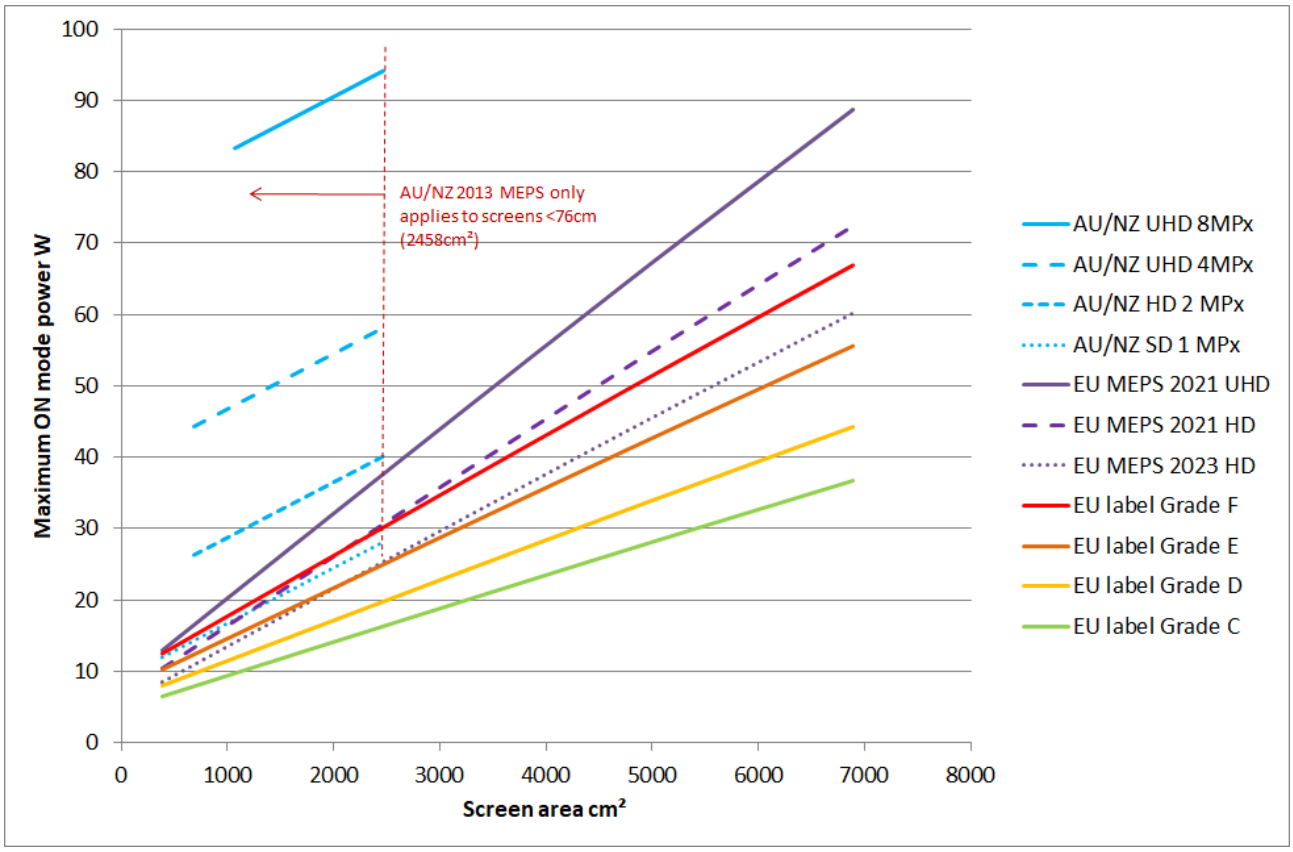
Figure notes: The EU 2021 HD MEPS level is the same as the EU UHD 2023 MEPS level and therefore has not been shown as a separate line.

The Australian and New Zealand MEPS for computer monitors are different for different screen resolutions. Figure 16 shows the MEPS for 4 different screen resolutions: UHD 8 Megapixels (MPx), UHD 4 MPx, HD 2 MPx and SD 1 MPx.

Similarly to Figure 17 for televisions, Figure 18 also shows 4 of the European label grades. The red line is Grade F, the dark orange line is Grade E, light orange is Grade D and the green line is Grade C. One option for Australia and New Zealand is to use these EU label Grades as a basis for the star ratings on the energy rating label. For example, 2 stars on the ERL could be equivalent to Grade F, in which case 3 stars would be Grade E, 4 stars would be Grade D and 5 stars would be Grade C.

[51] The EcoDesign and European energy labelling regulations provide for a flat 10% reduction in measured energy where the television has a qualifying Automatic Brightness Control mechanism that is active. EU EcoDesign for UHD in 2023 is the same as the HD level in 2021, so only the latter has been shown. EU EcoDesign 2023 levels are approximately one third of the power level set under the current Australia/New Zealand MEPS level.

Figure 18



Computer monitors - Comparison of Australian/New Zealand MEPS and labelling levels with EU Ecodesign MEPS and EU labelling

Figure notes: The EU 2021 HD MEPS level is the same as the EU UHD 2023 MEPS level and therefore has not been shown as a separate line.

Effectiveness of the efficiency regulations

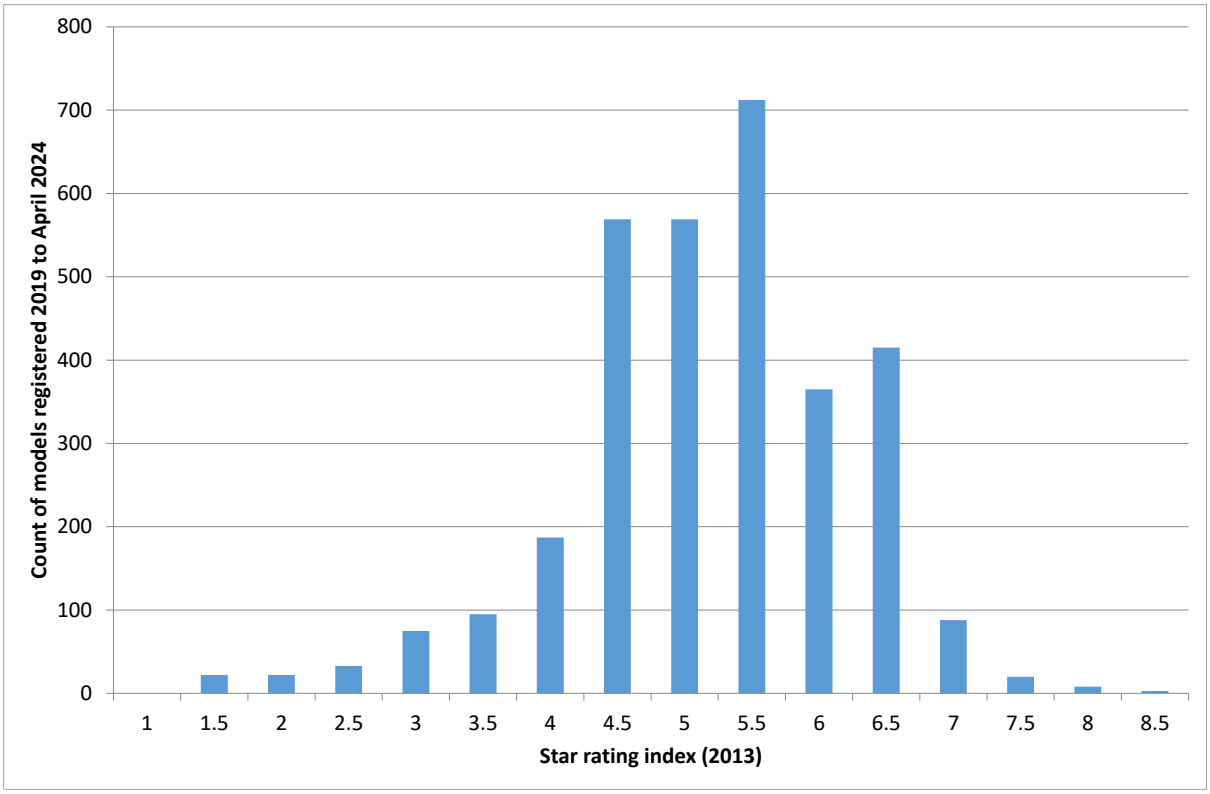
While Australia's and New Zealand's MEPS levels were appropriate for the market conditions in 2013, they have since become out of date because:

- Large markets such as the EU have tightened their MEPS and energy labelling requirements.
- The products supplied on the Australian and New Zealand market have changed significantly in terms of technology, features, screen size and energy efficiency.
- Australia and New Zealand's test method standard has been superseded and is no longer used overseas.

The range of efficiencies of registered products is an indicator of the effectiveness of the determination. A broad range of efficiencies indicates that the determination is likely to be preventing some inefficient products from entering the market. It also indicates that there may be scope to make the MEPS requirement more stringent to increase the average efficiency of new products sold.

Figure 19 shows the distribution of television star ratings from E3 model registration data from 2019 to 2021. The ratings range from 1.5 stars up to 8.5 stars with 5.5 stars being the most common rating.

Figure 19



Distribution of television star ratings for new registrations[52] 2019 to April 2024

Figure 20 shows the number of GEMS registrations at each star rating for computer monitors. The most common star rating for registered computer monitors is 5.5 stars with a small number registered above 8 stars and a few below 2.5 stars[53]. There has been little variation in the energy efficiency of registered monitors over the life of the determination, except for a moderate increase in 5, 7 and 8 star monitors in the last few years. New Zealand data[54] shows a similar trend.

This data shows that while the current MEPS for televisions and computer monitors are likely to be too weak to be effective, the label does provide consumers with useful information on energy efficiency. This means that there is likely to be value in increasing the MEPS levels.

Of the 1,421 television models that were registered in Australia and New Zealand after 31 December 2021 to mid-April 2024, 62% of registrations pass the EU 2021 MEPS

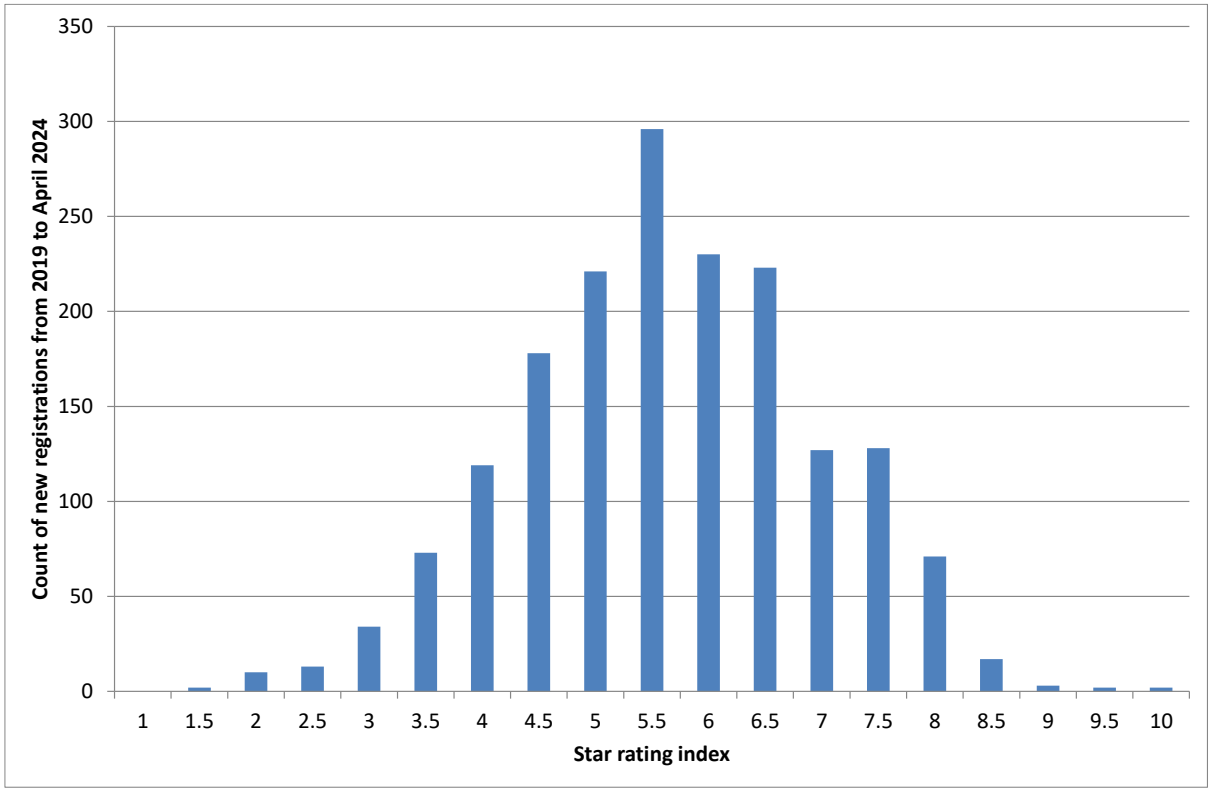
[52] This figure includes all new registrations in Australia and New Zealand with the status of approved registered between 1 January 2019 and 24 April 2024.

[53] Sunsetting review of computer monitors determination

[54] New Zealand E3 Programme sales and efficiency data

requirements and 28% of registrations pass the EU 2023 requirements. Of the 793 computer monitor models registered after 31 December 2021 to mid-April 2024, 73% of registrations pass the EU 2021 MEPS requirements and 58% of registrations pass the EU 2023 requirements.

Figure 20



Distribution of computer monitor star ratings from GEMS registrations 2019 to April 2024

3.2.2 MEPS and labelling

Energy rating labels (see Appendix A) are an information tool intended to help consumers compare the energy consumption of different products in a particular class. They may also be used as information and marketing tools for suppliers to differentiate their product. However, they do not remove high-energy use products from the market.

Conversely, MEPS are performance-based regulations that set minimum energy performance requirements. MEPS are an effective way to increase the energy efficiency of appliances and equipment. By specifying a minimum energy performance level, inefficient products are prevented from entering the marketplace, and manufacturers are given a signal to increase energy efficiency of the products they supply. For consumers, MEPS mean that products available in the market use less energy and have lower running costs over their lifetime. MEPS act as a consumer protection measure by ensuring that all models of a given product type available for sale meet minimum acceptable levels for energy performance and do not result in unnecessarily high running costs. MEPS can provide energy savings and avoid GHG emissions above those achieved from energy rating labelling alone.

Government intervention to update the MEPS and labelling requirements for televisions and computer monitors would reduce the regulatory and market failures identified in Chapter 2, which would reduce unnecessarily high electricity consumption for these products. Government intervention provides a level playing field for businesses and consumers and helps to ensure the integrity of the system.

3.2.3 Superseded test methods

Harmonisation with international test methods reduces costs and trade barriers for manufacturers and suppliers. The test method standard for televisions used in Australia and New Zealand was last updated in 2010 and is based on a now-superseded international standard: IEC62087:2008 (Edition 2). The IEC test method standard was updated and published most recently on 17 February 2023 with further revisions expected in 2025 and 2026, This most recent update means that there have been 3 revisions to the IEC standard since Edition 2 was adopted for Australia and New Zealand. The test method standard for computer monitors is AS/NZS 5815.1:2012 Part 1 and is also out of date. It is based on ENERGY STAR v5, which was published in 2009[55]. Government action is required to update these regulatory test method standards.

3.2.4 Flexible labelling in stores

It is mandatory for energy labels to be displayed on televisions and computer monitors in showrooms and retail premises. The new EU labelling regulations[56] for electronic displays allow suppliers and retailers to choose to display either a physical label or an electronic label, as long as the display is kept in on-mode[57] when visible to customers. However, this is not an option in Australian and New Zealand energy efficiency regulations.

The Australian and New Zealand regulators are open to adopting this as an option. If this is possible under current regulatory frameworks, then the option of digital labelling may solve many of the in-store labelling issues identified by the GEMS compliance officers. Similarly, providing a wider range of options for physical labels may also help solve these issues.

3.2.5 Scope of regulatory coverage

Technologies and features for televisions and computer monitors have changed and advanced significantly since 2013. The current regulatory framework is out of date and unable to deal adequately with some of the new products on the market. The scope of coverage is also not harmonised with major international markets. The scope of the

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[55] Computers and Computer Monitors Consultation Regulation Impact Statement – Ministerial Council on Energy December 2010

[56] European Commission information webpage on energy labelling and ecodesign regulations for electronic displays

[57] 'on-mode' or 'active mode' means a condition in which the electronic display is connected to a power source, has been activated and is providing one or more of its display functions

efficiency regulations needs to be updated by the Australian and New Zealand Governments to harmonise our requirements with those applying overseas.

3.2.6 Automatic brightness control for digital displays

ABC can significantly reduce electricity consumption.[58] The current treatment of ABC in the efficiency regulations in Australia and New Zealand is not aligned with international requirements, such as those in the EU.

Around 5% of registered computer monitors in Australia and New Zealand are noted as having some form of automatic brightness control. In Europe, about 3% of computer monitors are listed as having a compliant ABC feature[59]. The EU regulations have a provision whereby televisions and computer monitors with ABC controls can earn a 10% reduction on the measured energy. This effectively provides a 10% reduction in MEPS stringency and label thresholds. This allowance is provided on the basis that when ABC is active during normal use, energy consumption from the screen will be at least 10% less than it otherwise would be.

3.3 Digital signage displays

Australia and New Zealand do not regulate digital signage displays for energy efficiency. The EU, however, introduced an update to its MEPS and labelling regulations for electronic displays with effect from 1 March 2021[60]. These new regulations include mandatory energy labelling requirements for digital signage displays[61] within the scope (and voluntary labelling for other sizes) and set limits for electricity consumption for non-operating modes such as off-mode, standby mode and networked standby mode (but no limits for on-mode). The EC concluded that there was a need for new energy efficiency requirements for televisions and that the same requirements should also apply to other displays, such as computer monitors and digital signage displays, because of the increasing overlap in function between these products.

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[58] See section 2.2.8 on page 19.

[59] To qualify for the 10% ABC energy allowance in Europe, products need to meet several criteria. Firstly, ABC needs to remain active by default in other Preset Picture Settings in SDR mode. Secondly, the screen luminance and power consumed both need to reduce within a specified envelope as the room illuminance decreases from 100 lux to 60, 35 and 12 lux. These prescriptive requirements would rule out a number of models from qualifying for the EU ABC allowance for MEPS and energy labelling, even though the product nominally has some form of ABC functionality. The ABC allowance provides an estimate of the likely energy reduction during normal use for products that have a qualifying ABC control, given the likely distribution of room illuminance levels and viewing patterns. Therefore the ABC adjusted energy consumption estimate has been used directly in the stock model.

[60] European Commission Regulation 2019/2021

[61] An energy efficiency grade from A to G is awarded based on the power consumption in on-mode.

Digital signage displays are included in the EU labelling requirements for electronic displays. Because digital signage displays are included in EU requirements, E3 has included them in this RIS process to explore whether Australia and New Zealand should also regulate this type of display. CESA stated[62] in their response to the Issues Paper that they welcomed the discussion on inclusion of digital signage displays in the CRIS.

While digital signage displays are sold commercially and are not for domestic use, E3 believes that energy rating labelling information may be used by some purchasers as part of their product specifications in bulk procurement processes to purchase more efficient displays[63]. Comparative information on the public registration database would be important to achieving this aim as many digital signage displays are not offered for supply in physical stores. Aligning with the EU regulations would help to reduce the regulatory and market failures identified in Chapter 2, while placing minimal additional requirements onto suppliers.

While there is limited data on digital signage displays in Australia and New Zealand, the European database EPREL includes information about the power used by each model of digital signage display in on-mode[64]. All products must show Standard Dynamic Range data (power in watts and the label efficiency grade) and certain products must also show the same High Dynamic Range data. This is also discussed in Section 2.3.2 above.

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[62] E3 Program: televisions, computer monitors and digital signage issues paper consultation - CESA response

[63] Signage displays were included in the now elapsed EU-US Energy Star Agreement. After it lapsed, signage displays were no longer covered by any labelling programme in any region, even on voluntary basis, and no labelling instrument existed to cover these products under public procurement criteria prior to the introduction of energy labelling for these products by the EU in 2021. This was a strong driver for including digital signage displays into the EU energy labelling program.

[64] While the EPREL database for signage displays does improve access to energy information for some products, this only covers European models and configurations. There are many local models in Australia and New Zealand which are not included in the EU database (most of the models that are listed in Europe are not available locally).

4. Policy options

In early 2022, the then Australian Government Department of Industry, Science, Energy and Resources, on behalf of the E3 Program, released an Issues Paper[65] on televisions, computer monitors and digital signage displays for public consultation. This Issues Paper included an overview of international energy policies for electronic displays, including the United States of America, the EU, China and Japan. Stakeholder feedback on the Issues Paper showed a strong preference to align with the EU regulations, rather than other international policies. This RIS process therefore focuses on policy options that align with the EU approach.

The principles listed in Section 1.1 were used to finalise this list of options. For example, the option of creating a new methodology for MEPS was rejected because this would not meet the requirements for international harmonisation and reduced regulatory burden for industry. The Business as Usual (BAU) scenarios assume that the current regulatory arrangements continue without change. Some of the policy options in this DRIS have been modified from those described in the Consultation RIS to take into account stakeholder feedback.

4.1 Televisions and computer monitors

The cost and difficulty for suppliers and sellers of electronic displays of adjusting to any new MEPS and labelling requirements is dependent, in part, on the timing of any new regulation. One possible approach may be to introduce more stringent requirements in a series of steps. This could involve starting with the lower EU 2021 requirements and moving to the higher EU 2023 levels at a later stage. Another option is a more streamlined approach where Australia and New Zealand move straight to the EU 2023 levels 1-2 years after their introduction in Europe.

Below are a list of the policy options for televisions and computer monitors analysed in this DRIS. These options are explained in more detail in the sections below this list. A detailed quantitative cost-benefit analysis was undertaken on the MEPS and labelling options, and a qualitative analysis was used for the other options. This quantitative analysis is set out in Chapter 5 of this DRIS.

MEPS

Option 1) BAU – no change to the current MEPS levels.

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[65] E3 Program: televisions, computer monitors and digital signage issues paper consultation

Option 2) Adopt EU MEPS 2023. Harmonise the scope of Australian and New Zealand regulation of televisions and computer monitors with the EU.

Option 3) Staged introduction of EU MEPS levels. Initially, adopt EU 2021 levels followed by EU 2023 levels two years later. Harmonise the scope of Australian and New Zealand regulation of televisions and computer monitors with the EU.

Energy testing and label rating algorithm

Option 1) BAU – no change to the current energy rating labelling specifications in the current Australian and New Zealand efficiency regulations.

Option 2) Update labelling requirements using EU calculations and the equivalent EU test method. Harmonise the scope of Australian and New Zealand regulation of televisions and computer monitors with the EU.

Test method for MEPS[66]

Option 1) BAU – no change to the current test method as specified in the current Australian and New Zealand efficiency regulations.

Option 2) Test method – Align with the test method requirements in the EU regulations.

Energy rating labelling - implementation

Option 1) BAU – no change to the current energy rating labelling requirements in the Australian and New Zealand efficiency regulations, including the requirement to display a printed label in stores.

Option 2) Allow flexibility in labelling, including the choice between digital labels and types of physical labels in stores[67]. The choice between digital labels and physical labels would be similar to the approach in the EU regulations (2019/2013, article 4). The flexibility in types of physical labels in stores could be similar to the approach taken with several GEMS products other than digital displays[68].

4.1.1 MEPS

The no change option for the scope of energy efficiency regulations for televisions and computer monitors (**Option 1**) is keeping the same energy use requirements as specified

[66] The IEC 2015 test method was previously proposed for televisions and discussed in the CRIS. However, this test method has now been superseded by the IEC 2023 version and the EU test method approach. Adoption of IEC 2015 by itself would not resolve the problem of different testing requirements in Australia and New Zealand from the current EU requirements. This option was not considered further in this DRIS.
[67] Note that in New Zealand, the energy rating label is required to be supplied with each product sold.
[68] For example, see section 20 of the Greenhouse and Energy Minimum Standards (Swimming Pool Pump-units) Determination 2021

in Section 6 in the current GEMS determinations for televisions[69] and computer monitors[70], and in the New Zealand Regulations.[71]

The original EU MEPS requirements came into effect in Europe on 1 March 2021 and these became more stringent on 1 March 2023. There are 2 options for MEPS that are modelled in this DRIS:

- Adopt the EU 2023 MEPS level (with the EU 2023 scope) and bypass EU 2021 MEPS levels
- Adopt a staged approach where Australia and New Zealand move to the EU 2021 MEPS level (with the EU 2021 scope) initially, followed 2 years later by adoption of the EU 2023 MEPS level (with the EU 2023 scope)[72].

The 2023 MEPS level for HD electronic displays has an increased stringency of 17%, compared with the 2021 level, while the MEPS level for UHD displays (for products where a pre-existing limit was in place) has been made more stringent by 18%.

The EU regulations set on-mode requirements (called an energy efficiency index or EEI) as well as separate standby requirements. Both on-mode and standby requirements are considered in this DRIS.

The EU MEPS levels are defined below and are explained in more detail in Appendix B:

Levels	Electronic displays with 2,138,400 pixels or less (HD)	Electronic displays with pixel count above 2,138,401 (HD) to 8,294,400 (UHD-4k).	Electronic displays with pixel count above 8,294,400 (UHD-4k), and MicroLED displays
2021	Max EEI of 0.90	Max EEI of 1.10	No level
2023	Max EEI of 0.75	Max EEI of 0.90	Max EEI of 0.90

The EU regulations for electronic displays have 3 distinct resolution sub-categories: high definition (HD), 4k, and 8k. From 2023, the EU requirements for 4k and 8k merged, leaving only 2 sub-categories. The EU 2023 EEI levels effectively reduce the EEI limit categories of digital displays to 2:

- Electronic displays with 2,138,400 pixels or less (HD), and
- Electronic displays with a pixel count of 2,138,401 or more (UHD).

Option 2 Australia and New Zealand could adopt EU 2023 levels while allowing sufficient time for Australian and New Zealand suppliers to adapt. Chapter 5 shows the results of the cost -analysis for this option with a possible implementation date in 2025.

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[69] Greenhouse and Energy Minimum Standards (Television) Determination 2013 (No. 2)

[70] Greenhouse and Energy Minimum Standards (Computer Monitors) Determination 2014

[71] Energy Efficiency (Energy Using Products) Regulations 2022 - New Zealand

[72] Based on feedback from stakeholders, a new recommendation has been added for high resolution products such as 8k televisions and some high-resolution computer monitors. This recommendation is to introduce a less stringent MEPS level with an EEI of 1.1. This hasn't been included in the cost-benefit analysis because of the low numbers of these products included in the stock model.

Option 3 is a staged approach that would also allow long-term harmonisation with Europe. This option was included in this RIS process, because the EU regulations have taken a staged approach.

For both Options 2 and 3, Australia and New Zealand could adopt the same scope for energy efficiency regulation of televisions and computer monitors as the EU. This would enable harmonisation with a major international market.

There are some differences between the MEPS scope for the EU 2021 and 2023 levels. If Australia and New Zealand adopt the EU 2023 levels, then it would make sense to adopt the scope of the EU 2023 requirements at the same time, with the exception of high resolution 8k products.

Summary of EU Scope and Exclusions for televisions and computer monitors

The scope of the European regulations covers televisions and computer monitors with a display with screen area of greater than 100 cm^2 (nominal 16:9 screen diagonal of more than 15.3 cm or 6 inches). The European regulations define a television as 'an electronic display designed primarily for the display and reception of audiovisual signals and which consists of an electronic display and one or more tuners/receivers'. A computer monitor (or monitor or computer display) means an 'electronic display intended for one person for close viewing such as in a desk-based environment.' For further details on the scope, see the EU Regulations. General exclusions from the scope include:

- projectors
- all-in-one video conference systems
- medical displays and medical devices
- virtual reality headsets
- certain types of military and security equipment, research equipment, products intended for use in space, certain specialised industrial and transport equipment types
- electronic displays that are components or sub-assemblies (not available separately)
- broadcast displays
- security displays
- digital interactive whiteboards
- digital photo frames
- status displays and control panels

4.1.2 Energy rating labelling – testing and algorithm

The no change option for the scope of energy efficiency regulations for televisions and computer monitors (**Option 1**) would mean keeping the labelling requirements as specified in Section 7 in the current GEMS determinations for televisions[73] and computer monitors[74], and in the New Zealand Regulations.[75]

[73] Greenhouse and Energy Minimum Standards (Television) Determination 2013 (No. 2)

[74] Greenhouse and Energy Minimum Standards (Computer Monitors) Determination 2014

[75] Energy Efficiency (Energy Using Products) Regulations 2022 - New Zealand

Option 2 is to regrade the star ratings on the energy rating labels using the EU test method (or equivalent) and calculations to underpin the star ratings. This would set the 1 star line at an equivalent of the European Grade G and additional stars would be added for a specified reduction in electricity consumption.

One option for Australia and New Zealand is to use these Grades as a basis for the star ratings on the energy rating label. There are 7 Grades on the European labels and both Australia and New Zealand have 10 stars on our ERL. Several additional levels would need to be added to the pre-existing 7 European Grades. For the scenario of adopting the EU 2023 MEPS levels, one option that would highlight the efficiency of the best performing products is set out in the table below.

Number of stars	1	2	3	4	5	6	7	8	9	10
EU Label Grade	G	F	E	D	Halfway between D and C	C	Halfway between B and C	B	Halfway between A and B	A

The half stars between 1 and 6 stars could be set at halfway between the full star ratings either side. For example, 3½ stars could be set halfway between E and D Grade.

One issue with adopting the EU Grades is that the European approach sets limits on non-operating modes such as off-mode, standby mode and networked standby mode, and bases the label efficiency grades on on-mode power only. This is a significant move away from the current approach in Australia and New Zealand, where the label energy rating typically reflects the expected total energy consumption of the product in normal use. Another issue is that some higher power modes (such as smart-wake functions) may not be covered by the EU requirements at this stage and are not likely to be included in the overall label energy, if an unmodified EU approach is adopted. Recording the presence of any smart-wake modes and their non-operating power consumption is an option that may be considered as part of the labelling package to better understand the prevalence and effect of these features.[76]

4.1.3 Test methods for MEPS

This DRIS uses the principles below to inform analysis of possible test methods for televisions and computer monitors:

- Harmonise internationally - aligning with EU where appropriate.
- Keep the test method effective, but as simple and low cost as possible.

[76] In some cases where smart speakers are connected to the television (for example, equipment that allows remote voice activation of devices such as a television), this has resulted in the television staying in a higher energy mode (up to 20W) in order to maintain a suitable network reactivation mode. This allows a voice command at the smart speaker to turn the television on and even select a specific program. This would result in more energy used in smart-wake mode than on-mode over a normal viewing year.

- Future-proof the test method standard where possible, for example, by exploring whether known future IEC developments can be incorporated.

The no change option for test methods for televisions and computer monitors MEPS (**Option 1**) is keeping the test method requirements as specified in the current Australian GEMS determinations for televisions[77] and computer monitors[78] and in the New Zealand Regulations.[79] The test method used in Australia and New Zealand for televisions was published in 2010 and is based on a superseded international standard. This international test method has since been revised multiple times and the most recent new standard was published in 2023, meaning that the Australian and New Zealand televisions test method standard is out of date and unique to our markets. The Australian and New Zealand computer monitors 2013 test method standard has also been superseded by the current EU test method for electronic displays.

An alternative would be to adopt the equivalent of the current EU test method[80]. (**Option 2**).

4.1.4 Displaying the energy rating label

This DRIS provides evidence of the problems faced by retailers in complying with energy labelling requirements for televisions and computer monitors. Stakeholders for labels include television and computer monitor suppliers, small and large retailers, consumers, and the Australian and New Zealand regulators, including compliance officers.

The BAU option is a printed label displayed on a product at the point of sale, such as a retail store (**Option 1**). This DRIS considers giving suppliers the option of choosing between digital labels (**Option 2**) and printed labels to display. The digital label option, which is an option under the current EU regulations, would allow for the label to be part of the shop-mode[81] video display on the screen. The EU regulations require that electronic displays be kept in on-mode when visible to customers for sale, if the digital label option is chosen, instead of the printed option. Digital labels may save suppliers and retailers money[82] and be more convenient to use, than printed labels. Allowing more flexibility in printed label options, such as those in the *GEMS Air Conditioners up to 65kW*

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[77] Greenhouse and Energy Minimum Standards (Television) Determination 2013 (No. 2)

[78] Greenhouse and Energy Minimum Standards (Computer Monitors) Determination 2014

[79] Energy Efficiency (Energy Using Products) Regulations 2022 - New Zealand

[80] This current EU test method is CENELEC EN 62087 Parts 1 to 3 (2016). It is an adoption of IEC 62087 Parts 1 to 3 (2015) but 2 elements are modified by the EU Regulations.

[81] The EU regulations call this 'shop configuration' and define it as "the configuration of the electronic display for use specifically in the context of demonstrating the electronic display, for example in high illumination (retail) conditions and not involving an auto power-off if no user action or presence is detected".

[82] Digital labels can avoid marks on the screen surface, which enables retailers to more easily sell display stock and it avoids the administration with obtaining replacement energy labels that may be removed from the product on display (intentionally or accidentally).

Determination 2019[83], would also help suppliers and retailers to comply with their labelling obligations.

Other label issues, such as a requirement for labelling of products sold online, are outside the scope of this DRIS; this issue is being separately considered by E3 across all regulated products, not just televisions and computer monitors. Incorporation of a QR code on the ERLs was initially considered as an option in the CRIS as this has already been implemented successfully in the EU and China[84]. Consumers in these regions can scan the QR code with their mobile device and obtain more information about a particular model. However, further analysis by the Department and feedback from stakeholders has shown that this would take significant time and resources to implement for both industry and regulators. E3 may reconsider QR codes in the future.

4.2 Digital signage displays

This section lists the policy options for digital signage displays analysed in this DRIS.

MEPS
Option 1) BAU – no energy performance requirements for digital signage displays.

Option 2) Introduce standby and network MEPS requirements to match EU Regulation requirements. Adopt the equivalent of the test method in the EU regulations for electronic displays. Harmonise the scope of Australian and New Zealand regulation of digital signage displays with the EU. This option does not include on-mode power limits for digital signage displays.

Labelling
Option 1) BAU – no energy rating labelling requirements for digital signage displays.

Option 2) Introduce mandatory registration for digital signage displays as per the scope of the EU regulations, which will include comparative data to be listed on the public registration database. Introduce optional physical or electronic energy rating labels for digital signage displays, if legislative frameworks allow.

4.2.1 MEPS

Australia and New Zealand have not previously regulated digital signage displays, but the EU included this product in its electronic display regulation, which came into effect in 2021, because of the increasing technology convergence of digital display with televisions and computer monitors[85]. This DRIS explores whether the EU regulations for this product should be adopted in Australia and New Zealand.

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[83] GEMS (Air Conditioners up to 65kW) Determination 2019
[84] Information about the EU QR code
[85] Revision of EU Ecolabel Criteria for Electronic Displays (previously Televisions) Final Technical Report, European Commission, September 2020

The EU regulations include mandatory power demand limits for off-mode, standby mode and networked standby mode for digital signage displays. These requirements reduce electricity consumption without affecting on-mode performance. If this option was adopted, then E3 proposes adopting the same scope as in the EU regulations. The EU regulations[86] define digital signage displays as electronic displays that are designed primarily to be viewed by multiple people in non-desktop based and non-domestic environments. Digital signage monitors are often used in high ambient light situations, including broad daylight, which means their energy needs are different and generally higher that of other digital displays during on-mode. However, the EU regulations only impose MEPS on standby and networked modes, not on-mode.

4.2.2 Energy rating labels

Digital signage displays are included in the EU labelling requirements for electronic displays. E3 does not typically require ERLs for non-domestic products. However, it may be beneficial to the registration of star ratings for digital signage displays so that purchasers can use the ratings as specifications in procurement processes.

Stakeholder feedback from the CRIS supported mandatory registration with energy consumption and labelling being available on the public registration databases, but not mandatory physical or digital labelling. This is because digital signage displays are rarely sold in physical stores. E3 has taken on board this feedback and has identified that another option is to allow optional labelling if digital signage displays are being supplied or offered to supply in a physical store, similar to the labelling requirements in the *Greenhouse and Energy Minimum Standards (Air Conditioners above 65kW) Determination 2022*[87]. Registration for signage displays would be mandatory and comparative data would be listed on the energy rating website. Flexible options for labels, such as electronic labels or swing tags, could also be considered for this product.

Similar to the proposal in section 4.1.2 for televisions and computer monitors, star ratings for digital signage displays could be based on the EU test method (or equivalent) and calculations to underpin the star ratings. This would set the 1 star line at an equivalent of the European Grade G, and additional stars would be included for a specified reduction in energy consumption.

One option for Australia and New Zealand is to use these Grades as a basis for the star ratings on the energy rating label. There are 7 Grades on the European labels, while Australia and New Zealand have 10 stars on our ERL. So several additional levels would need to be added to the pre-existing 7 European Grades. One option which would maximise the spread of star ratings into the future is shown in the table below.

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[86] See definition 5 in Article 2 Definitions - EU regulations

[87] Greenhouse and Energy Minimum Standards (Air Conditioners above 65kW) Determination) 2022

Number of stars	1	2	3	4	5	6	7	8	9	10
EU Label Grade	G	F	E	D	Halfway between D and C	C	Halfway between B and C	B	Halfway between A and B	A

The half stars between 1 and 6 stars could be set at halfway between the full star ratings either side. For instance, 3 1/2 stars could be set halfway between E and D Grades.

4.2.3 Test methods

The Department proposes that Australia and New Zealand use the same principles to inform test method selection for digital signage displays, as for televisions and computer monitors:

- Harmonise internationally, aligning with Europe where appropriate
- Keep the test method effective, but as simple and low cost as possible
- Future-proof the test method standard where possible, for example, by exploring whether known future IEC developments could be incorporated.

One option is adopting the equivalent of the current European test method, which is used for televisions, computer monitors, and digital signage displays. This is CENELEC EN 62087 Parts 1 to 3 (2016). This is an adoption of IEC 62087 Parts 1 to 3 (2015), but two elements are modified by the EU regulations. These modifications are included in the newly published IEC 62087 test method Parts 2 and 3 (2023)[88]. The policy intent is to align with the test method requirements in the EU regulations. E3 will need to carefully review the test methods to ensure this policy intent is captured in any new energy efficiency regulations.

[88] The test method for electronic displays in Europe is based on the EN62087 series of standards published in 2015, but with significant technical modifications in the EU document titled Transitional Test Method for Ecodesign and Energy Labelling requirements for electronic displays dated 1 July 2020 (TTM). A revision of IEC62087.2 and IEC62087.3 was published in February 2023. This revision included many of the significant technical changes specified in the TTM, but not all. Some of the existing differences between IEC 2023 and TTM include:

- IEC and TTM specify an overhead LED lamp to provide room illuminance, but TTM allows the use of an overhead projector as an alternative (IEC does not permit this)
- TTM specifies slightly difference video test clips to IEC
- TMM requires more testing of intermediate test patterns to determine peak luminance levels
- TMM requires a more continuous assessment of room illuminance levels to assess ABC performance with specific recording equipment and an assessment of ABC latency effects
- TMM specifies some small differences in the room setup and the measurement equipment to be used
- TMM sets out an approach for a device to qualify for the persistence rules for ABC in different preset picture settings as well as the power and screen luminance changes under different room illuminance levels to assess compliance with the EU regulations.

4.2.4 Implementation issues

Digital signage displays are not household products and may have similar issues for administration and compliance with a GEMS determination as other commercial products, such as bespoke or customised products. Digital signage displays have not previously been regulated for energy efficiency in either Australia or New Zealand. They are sold as single displays.[89] Historically, regulating commercial and industrial products under the Australian legislative framework is more complex and has proved to be more difficult to do, than regulating household appliances for energy efficiency.

Digital signage displays are effectively large televisions, generally without a tuner and they may or may not have a speaker, but usually include more options for network connections. They are a mass-produced international consumer good supplied by major television manufacturers and others. While they are not usually on display for sale in a retail store, they can be readily acquired through specialist wholesalers. Most systems will be installed by professionals to ensure that they link into the existing hardware and software networks and systems.

[89] The scope of the EU regulations for digital signage displays applies to stand alone products and specifically excludes units designed and constructed as a display module to be integrated as a partial image area of a larger display screen area and not intended for use as a standalone display device. The scope of the EU regulations is set out in Section 2.3.1.

5. Cost-benefit analysis of MEPS and labelling options

This chapter discusses the central estimates from the cost-benefit analysis for the MEPS and labelling measures proposed in this DRIS, as described in Chapter 4 above. The qualitative analysis and conclusions for the other proposals are in Chapter 7. Qualitative assessments have been undertaken for policy options where there is insufficient data and the effect on the cost benefit analysis is not expected to be significant. This includes the choice of test methods, flexibility in labelling options and how to display the label.

The modelling in this DRIS includes the following costs and benefits:

- **Cost of electricity**
- **Regulatory costs for government and suppliers**
- **Price on GHG emissions**
- **Peak demand benefits**
- **Changes to the cost of products.**

The modelling excludes the following benefits:

- **Indirect health benefits from the reduction of fossil fuel generation produced from program energy savings**
- **Macroeconomic effects where expenditure and investment options are available using the monetary value of energy savings**
- **Effects of reduced household energy consumption leading to reduced financial stress**
- **Changes in wholesale electricity prices or investment in generation caused by changes in future electricity demand.**

These additional benefits haven't been included because the effects are either relatively small within the context of this modelling or are highly specific to particular households (cohorts) and therefore difficult to quantify at the macroeconomic level.

5.1 Cost-benefit analysis inputs and assumptions

This section provides a high-level overview of the main inputs and assumptions for the cost-benefit analysis of the central estimates. A detailed, lengthy explanation of inputs,

assumptions and methodology is provided in the separate CRIS Technical Appendices[90]. Note that the emissions pricing used in this analysis has been updated since the publication of the Technical Appendices. The cost-benefit analysis in this DRIS now uses the emissions values in the Australian Energy Market Commission (AEMC) 2024 guide[91] in *Table A-1 Interim values of emissions reduction*.

Savings are compared to the base case of no change to the current efficiency regulations and are cumulative for all new products installed up to 2035. The assumptions and inputs underlying the cost benefit analyses are conservative and therefore are likely to underestimate the benefits. The impact scenarios modelled in these central estimates for televisions and computer monitors are:

- Scenario A) Adopt EU 2023 MEPS and labelling in 2025
- Scenario B) Staged introduction: adopt EU 2021 MEPS and labelling in 2024 and then EU 2023 MEPS and labelling in 2026.

The modelling assumes that the scope of any new efficiency regulations would align with the scope in the EU regulations. The impact modelling quantifies the differences between the scenarios listed above and the base case of no change to the current Australian and New Zealand efficiency regulations. A third option was modelled in the CRIS to adopt the EU 2023 requirements in 2024 but this has been removed from the DRIS as the timing is not feasible.

The analysis assumes that televisions and computer monitors will continue to have requirements for MEPS and labelling but aligned with EU regulations and scope. At these higher levels, MEPS will remove the lowest efficiency televisions and monitors from the market, and consumers and businesses will benefit from being able to compare the performance of the remaining higher efficiency products on the market by at different price points using the energy rating label. The effect of MEPS and labelling have been modelled together in this analysis. A conservative approach has been taken for the effect of labelling, given that online sales do not have mandatory labelling requirements.

For digital signage displays, the analysis assumes that the EU requirements for MEPS (mandatory power demand limits for off-mode, standby mode and networked standby mode, but not on-mode) and labelling are introduced for the first time in parallel with the first EU labelling and MEPS for televisions and computer monitors. At these low levels, MEPS for non-operating modes such as off-mode, standby mode and networked standby mode are unlikely to have much effect, unless supported by mandatory registration and comparative label data published on the public registration database. Again, the effect of MEPS for non-operating power modes and labelling have been modelled together.

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[90] Consultation RIS – Televisions, Computer Monitors and Digital Signage Displays (dcceew.gov.au)

[91] AEMC Guide 'How the national energy objectives shape our decisions' 2024

In Australia, the Office of Impact Analysis[92] (OIA) recommends the calculation of net present values at an annual central real discount rate of 7%, with sensitivity analysis conducted using a lower bound discount rate of 3% and an upper bound discount rate of 10%[93]. This is the same central value and range as used in the National Construction Code (NCC) 2022 DRIS[94]. The sensitivity analysis is shown in the CRIS Technical Appendices[95]. Similar sensitivity analyses for New Zealand are also included, but using the central and sensitivity rates specified by the New Zealand Treasury.

The following parameters have been included in the modelling, because they affect total energy consumption:

- Total stock installed and operating in each year over the modelling period
- Daily hours of usage and power characteristics in on-mode
- Daily hours in non-operating modes such as off-mode, standby mode and networked standby mode (24 minus daily usage) and power characteristics in these other modes.

In order to assess the effect of the EU 2021 and EU 2023 requirements on televisions and computer monitors currently on the market in Australia and New Zealand, the main performance parameters as defined in the EU regulation were determined for each model with a current registration. These include:

- Screen resolution and EU electronic display resolution category: HD, UHD-4k, UHD-8k
- Determination of the applicable MEPS level for EU 2021 and EU 2023 (based on resolution and technology)
- The current on-mode power in watts
- The maximum permitted power consumption for EU 2021 and EU 2023 in watts
- An assessment of whether the model passes EU 2021 and EU 2023 MEPS
- If the product does not meet the EU 2021 or EU 2023 MEPS requirements, the power target that the product would need to achieve in order to have a small margin below MEPS (nominally 5% better than the MEPS limit)[96]
- The EU labelling EEI_{label} index for the product and the relevant EU label grade prior to the implementation of an EU MEPS level
- The EU labelling EEI_{label} index after the EU 2021 MEPS is applied where the power level has been adjusted to meet the EU 2021 MEPS with a 5% margin
- The EU labelling EEI_{label} index after the EU 2023 MEPS is applied where the power level has been adjusted to meet the EU 2023 MEPS with a 5% margin.

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[92] Formerly known as the Office of Best Practice Regulation (OBPR)

[93] OIA guide to Environmental Valuation and Uncertainty, June 2021

[94] ABCB NCC 2022 Residential Energy Efficiency - Final Decision RIS

[95] Consultation Regulation Impact Statement – Televisions, Computer Monitors and Digital Signage Displays - Climate (dcceew.gov.au)

[96] The assumption is that suppliers will either re-engineer their models to meet MEPS or will source alternative models that meet MEPS to replace those models that are currently unable to meet MEPS.

Australian key economic inputs:

- Discount rate (central): 7% (medium/central case)
- Value of peak demand reductions – Base case, adapted from NCC 2022 DRIS ($500/kW)
- Energy-price coefficient of –0.1 (medium case, based on detailed analysis by EES)
- Residential electricity tariff – NCC 2022 DRIS tariffs – see CRIS Technical Appendices[97] for details
- Commercial electricity tariff – adapted from NCC 2022 DRIS residential tariffs using national and state-based sources to set commercial/residential tariff ratios – see CRIS Technical Appendices for details
- Emissions intensity of electricity from the grid – emission factors from NCC 2022 DRIS for each state and territory – see Technical Appendices for details
- Cost of GHG emissions – *Table A-1 Interim values of emissions reduction* Australian Energy Market Commission (AEMC) 2024 guide[98].
- Number of households and businesses.

New Zealand key economic inputs:

- Discount rate (central): 5% (medium/central case)
- Carbon price – see Technical Appendices for details
- Value of peak demand reductions – Base case $230/kW reduction
- Energy-price coefficient of –0.1 (medium case, based on detailed analysis by EES)
- Residential electricity tariff – long run marginal cost[99] of electricity
- Commercial electricity tariff – long run marginal cost of electricity
- Emissions intensity of electricity from the grid – Scenarios dataset for the NZ Climate Change Commission's 2021 Final Advice – see Technical Appendices for details
- Number of households and businesses
- Assumed exchange rate of NZ1.00 = AU$0.93[100] where applicable.

Australian values are in Australian dollars and New Zealand values are in New Zealand dollars throughout this DRIS.

5.1.1 Stock models

Five separate stock models were developed to operate in parallel in order to estimate the energy consumption of the target appliances in this DRIS:

- Residential sector televisions
- Commercial sector televisions

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97 Consultation Regulation Impact Statement – Televisions, Computer Monitors and Digital Signage Displays - Climate (dcceew.gov.au)

98 AEMC Guide 'How the national energy objectives shape our decisions' 2024

99 Provided by the New Zealand Ministry of Business, Innovation and Employment.

100 This assumed exchange rate is the only difference between the New Zealand cost-benefit analysis in the CRIS and the DRIS. The CRIS used NZ1.00 = AUD$0.85.

- Residential sector computer monitors
- Commercial sector computer monitors
- Digital signage displays (assumed to be only used by the commercial sector).

Each stock model used in this cost-benefit analysis tracks the number of installed units in each state and territory in Australia and New Zealand each year from 1990 to 2035. A normal distribution retirement function was used to determine the number of units that remain in the stock each year after its initial installation, for a given average lifetime. This retirement function then weights the characteristics of each new cohort (year of installation) with all existing stock to calculate stock average characteristics each year over the modelling period. The stock model has inputs from as early as 1970, but as the policy impacts only occur from 2024 onwards, the differences between all scenarios is zero up to 2023. However, getting the magnitude of the stock correct is important as this has a direct bearing on the total energy consumption.

There is limited data on the expected lifetime for these products, but indirect evidence was used to determinate estimated lifetimes. A lifetime of 12 years for residential televisions and computer monitors and 10 years for commercial televisions and computer monitors generated a sales stream that was consistent with the available historical data, so this has been used as the basis for modelling. A lifetime of 10 years for digital signage displays has been assumed based on some typical maintenance contracts[101] and is the value used by the European Commission in their analysis. A normal distribution retirement function was used in the stock model.

The approximate allocation of stock and sales by sector in the stock model is:

- Around 85% of televisions are in the residential sector, with about 15% in the commercial sector in both Australia and New Zealand
- In Australia, about half of the computer monitor sales are for the residential sector with half in the commercial sector. In New Zealand, the split is 40% residential and 60% commercial for sales. However, residential sector appears to make up about two thirds of the computer monitor stock in both Australia and New Zealand.
- 100% of digital signage displays are in the commercial sector.

It was assumed that New Zealand ownership for the residential sector and business sector is similar to Australia. The number of households per business is slightly higher in Australia.

The current energy label for televisions and computer monitors assumes on-mode of 10 hours per day (3,650 hours per year), with the remaining time in standby. Research undertaken for this DRIS indicates this assumption is likely to be too high to accurately

[101] For example, see signage displays maintenance company Big Screen Video

estimate the energy consumption during normal use[102]. The modelling in this DRIS used the following average usage assumptions for on-mode:

- Residential sector televisions – 3.7 hours per day
- Commercial sector televisions – 3.7 hours per day
- Residential sector computer monitors – 5 hours per work day (which equates to 2.7 hours across all days of the year)
- Commercial sector computer monitors – 6 hours per work day (which equates to 3.3 hours across all days of the year)
- Digital signage displays – 12 hours per day.

It is assumed that there was some shift in computer monitor usage hours in the commercial sector to the residential sector over the period 2020 to 2021 due to the pandemic and increased working from home, which is assumed to persist into the future. These hours are broadly consistent with EU assumptions for their modelling of these products. A wide range of data sources were used to establish the characteristics of new products sold into the Australian and New Zealand markets. These are briefly described below.

Televisions – key data sources include:

- Registration data submitted since 2009 up to June 2022 (Australia and NZ)
- GfK sales data 2007 to 2020 – this covers the whole Australian retail market
- NZ sales data matched to registrations from 2013 to June 2022
- EU data for 10,331 models is also available as a reference (as at September 2022)
- Long term monitoring of television viewer habits from OzTam in Australia and a range of other end use data sources.

Computer monitors – key data sources include:

- Registrations data submitted since 2013 up to June 2022 (Australia and NZ)
- GfK monitor sales data 2010 to 2020 – this covers the whole Australian retail market
- NZ sales data matched to registrations from 2014 to June 2022
- EU data for 3,625 models is also available as a reference (as at September 2022).

Digital signage displays – key data source includes:

- European EPREL database of signage displays which includes EU registration data and energy performance data for 664 models (as at September 2022)
- Data from local service providers and contractors.

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[102] Long term monitoring of televisions in homes shows that average viewing hours of all media types is less than 40% of the current label assumption. Detailed calculations for office computers also shows that viewing hours for monitors (on average) to be at a similar level after taking into account activation of sleep mode during periods of inactivity. There will of course be a distribution of usage in all sectors – the modelling estimates the average only for the calculation of stock energy consumption. Full assumptions are documented in the CRIS Technical Appendices.

Further information on all of these assumptions and other inputs is provided in the CRIS Technical Appendices[103].

5.2 Benefit cost ratios – all electronic displays

The results for the central analysis of televisions, computer monitors and digital signage displays are combined in this section and include both residential and commercial sector usage[104]. Scenario A means adopting the EU 2023 requirements in 2025 and Scenario B means adopting EU 2021 regulations in 2024, followed by the introduction of EU 2023 regulations in 2026. Energy saved, emissions reductions, total benefits and costs are cumulative for the lifetime of all new products purchased between 2025-2035. They are modelled compared to the base case of retaining the current efficiency regulations for televisions and computer monitors, and no regulations for digital signage displays.

The effects of adopting the EU MEPS and labelling approaches have been modelled together. The main reason for this approach is because it would make little sense to adopt just one of either the EU MEPS or labelling requirements and not both.

Australia

Policy option	A) Adopt EU 2023 Regs in 2025	B) Staged introduction
Energy saved (cumulative GWh)	12,000	11,200
Emissions reduction (cumulative kt CO2-e)	3,130	2,830
Total costs (NPV $m - AUD)	-$355	-$332
Total benefits (NPV $m - AUD)	$1,759	$1,598
Benefit Cost Ratio	**4.95**	**4.81**

New Zealand

Policy option	A) Adopt EU 2023 Regs in 2025	B) Staged introduction
Energy saved (cumulative GWh)	1,920	1,780
Emissions reduction (cumulative kt CO2-e)	101	94
Total costs (NPV $m - NZD)	-$38	-$36
Total benefits (NPV $m - NZD)	$141	$129
Benefit Cost Ratio	**3.67**	**3.57**

[103] Consultation RIS – Televisions, Computer Monitors and Digital Signage Displays (dcceew.gov.au)

[104] In Australia, energy savings and increased equipment costs accrue to equipment end users. All other benefits accrue to the whole of society, for example reduced GHG emissions and peak demand requirements. In New Zealand, all costs and benefits are assumed to accrue to the whole of society.

These results show that there is an overall net benefit for introducing more stringent MEPS and labelling for electronic displays compared with keeping the current efficiency regulations in both Australia and New Zealand.

Both scenarios have a similar benefit cost ratio for both countries. Scenario A) (adoption of EU 2023 requirements in 2025) produces slightly higher energy savings and reduced GHG emissions for both countries. Most of the costs in the total costs are from the increased cost of products. This means that the total cost for Scenario A) is slightly higher than for Scenario B) because some of those product costs will happen earlier.

5.3 Benefit cost ratios – televisions

This section looks at the benefit cost ratios for the central analysis of televisions. The scenarios, inputs and assumptions are described in sections 5.1 and 5.2.

Australia

Televisions – residential sector

Policy option	A) Adopt EU 2023 Regs in 2025	B) Staged introduction
Energy saved (cumulative GWh)	9,470	8,700
Emissions reduction (cumulative kt CO2-e)	2,440	2,180
Total costs (NPV $m - AUD)	-$254	-$236
Total benefits (NPV $m - AUD)	$1,428	$1,283
Benefit Cost Ratio	**5.62**	**5.44**

Televisions – commercial sector

Policy option	A) Adopt EU 2023 Regs in 2025	B) Staged introduction
Energy saved (cumulative GWh)	1248	1150
Emissions reduction (cumulative kt CO2-e)	343	308
Total costs (NPV $m - AUD)	-$38	-$35
Total benefits (NPV $m - AUD)	$164	$149
Benefit Cost Ratio	**4.35**	**4.22**

New Zealand

Televisions – residential sector

Policy option	A) Adopt EU 2023 Regs in 2025	B) Staged introduction
Energy saved (cumulative GWh)	1,500	1370
Emissions reduction (cumulative kt CO2-e)	79	72
Total costs (NPV $m - NZD)	-$26	-$24
Total benefits (NPV $m - NZD)	$115	$104
Benefit Cost Ratio	**4.46**	**4.31**

Televisions – commercial sector

Policy option	A) Adopt EU 2023 Regs in 2025	B) Staged introduction
Energy saved (cumulative GWh)	239	220
Emissions reduction (cumulative kt CO2-e)	12.7	11.6
Total costs (NPV $m - NZD)	-5.2	-4.9
Total benefits (NPV $m - NZD)	15.2	13.7
Benefit Cost Ratio	**2.91**	**2.81**

For both Australia and New Zealand, all of the benefit-cost ratios are above one. Scenario A) has a slightly higher benefit-cost ratio, compared with the staged approach, but there are no significant differences for televisions. Scenario A) would require only a single change to the regulations. This would be more straightforward and simpler for consumers, suppliers, retailers and regulators, because there will only be one transition period to manage. Transitional issues for suppliers and retailers include supply chain management to ensure compliant products can be obtained by the date at which the new regulations come into effect, including ensuring new products are displaying the correct label and all new products have been tested and registered, where appropriate.

Of the 1,582 television models that were registered in Australia and New Zealand after 31 December 2019, 61% of registrations pass the EU 2021 MEPS requirements and 26% of registrations pass the EU 2023 requirements. All size and resolution cohorts with some registrations had some models that could meet the EU 2023 requirements, except for UHD-8k, where no current models appear to be able to comply. This would affect 30 models in the 52-72 inch size category and 45 models in the greater than 72 inch size category. These models represented 0.5% of sales in Australia in 2020 and 0.8% of sales in New Zealand in 2021.

UHD-8k televisions currently have low sales volumes in Australia and New Zealand and this is predicted to remain low for some years[105]. The European Product Registry for Energy Labelling (EPREL) database lists at least 151 models that are classified as 8k and 10 of these passed the EU 2023 requirements as at September 2022.

Adopting the EU 2023 MEPS levels and labelling requirements is expected to reduce energy consumption attributed to TVs by 18% in Australia and 22% in New Zealand.

5.4 Benefit cost ratios – computer monitors

This section looks at the benefit cost ratios for the central analysis of computer monitors. The scenarios, inputs and assumptions are described in sections 5.1 and 5.2.

Australia

Computer monitors – residential sector

Policy option	A) Adopt EU 2023 Regs in 2025	B) Staged introduction
Energy saved (cumulative GWh)	657	634
Emissions reduction (cumulative kt CO2-e)	168	160
Total costs (NPV $m AUD)	-$37	-$35
Total benefits (NPV $m AUD)	$82	$78
Benefit Cost Ratio	**2.23**	**2.24**

Computer monitors – commercial sector

Policy option	A) Adopt EU 2023 Regs in 2025	B) Staged introduction
Energy saved (cumulative GWh)	421	405
Emissions reduction (cumulative kt CO2-e)	118	113
Total costs (NPV $m AUD)	-$23	-$22
Total benefits (NPV $m AUD)	$56	$54
Benefit Cost Ratio	**2.49**	**2.49**

[105] GfK sales share for 8k televisions was 0.4% in 2020 in Australia. While this share is growing (sales were close to zero in 2018), it is likely to remain low for some years as prices are still much higher than 4k televisions and there are currently no broadcast or on-line sources available in 8k native resolution. The value of the additional resolution is therefore still limited at this stage.

New Zealand

Computer monitors – residential sector

Policy option	A) Adopt EU 2023 Regs in 2025	B) Staged introduction
Energy saved (cumulative GWh)	76	72
Emissions reduction (cumulative kt CO2-e)	4.0	3.8
Total costs (NPV $m NZD)	-$4.0	-$3.8
Total benefits (NPV $m NZD)	$4.6	$4.3
Benefit Cost Ratio	**1.15**	**1.14**

Computer monitors – commercial sector

Policy option	A) Adopt EU 2023 Regs in 2025	B) Staged introduction
Energy saved (cumulative GWh)	58	55
Emissions reduction (cumulative kt CO2-e)	3.1	2.9
Total costs (NPV $m NZD)	-$3.1	-$2.9
Total benefits (NPV $m NZD)	$3.7	$3.5
Benefit Cost Ratio	**1.20**	**1.18**

For both Australia and New Zealand, all of the benefit-cost ratios are above one[106]. While there are no significant differences between the 2 scenarios, the staged introduction scenario benefit-cost ratios are all slightly lower. Scenario A) would require only a single change to the regulations. This would be more straightforward and simpler for consumers and retailers, because there will only be one transition period to manage. Transitional issues for suppliers and retailers include:

supply chain management to ensure compliant product can be obtained by the date at which the new regulations come into effect

ensuring new products are displaying the correct label and all products have been tested and registered, where required.

Overall energy savings for computer monitors are expected to be 23% for Australia and 13% for New Zealand, if the EU 2023 MEPS levels were adopted. The percentage effect is larger for Australia than for New Zealand. This is because the EU requirements are more stringent for larger displays, which are more prevalent in Australia, and the overall

[106] The economic analysis for New Zealand assumes that the value of saved energy is at the long run marginal cost (public costs only), which is considerably lower than the retail price that consumers pay for their energy (about one third of the cost). This means that the value of energy savings is also relatively low. While New Zealand assumes a wholesale cost price factor of 0.4 for this analysis, the assumed energy-cost coefficient used is very conservative and will likely overestimate increased purchase costs. Computer monitors are generally lower power, so the value of energy used is lower relative to the purchase cost of the equipment, which makes the benefit cost ratio appear to be lower in all scenarios.

efficiency of the sales mix in New Zealand is better than the mix in Australia, so the impact of increased MEPS in New Zealand is lower.

Of the 925 computer monitor models registered after 31 December 2019[107], 74% of registrations pass the EU 2021 MEPS requirements and 54% of registrations pass the EU 2023 requirements, resulting in lower overall benefits for computer monitors, than for televisions.

5.5 Benefit cost ratios – digital signage displays

As digital signage displays are not a regulated product in Australia and New Zealand, there is little data available on their performance. It is assumed that the market for signage displays in Australia and New Zealand is similar to the market in Europe for these products. On this basis, data from European Commission reports and the EPREL database[108] were used to build the stock model and inform the modelling for this DRIS.

Only one scenario has been modelled for digital signage displays, because the EU 2021 and EU 2023 regulations are identical for this product category. The scenario is introducing labelling and MEPS for standby and networked standby modes to match the EU requirements for digital signage displays. The results are shown for adopting the requirements in 2025.

Australia

Digital signage displays – commercial sector

Policy option	Adopt EU requirements in 2025
Energy saved (cumulative GWh)	245
Emissions reduction (cumulative kt CO2-e)	58
Total costs (NPV $m AUD)	-$4.5
Total benefits (NPV $m AUD)	$29
Benefit Cost Ratio	**6.38**

[107] This includes larger monitors registered for energy labelling but currently exempt from MEPS, but does not include some high performance monitors that are exempted from the scope of the current labelling and MEPS program but that may be included within the EU scope.

[108] EPREL database for electronic displays

New Zealand

Digital signage displays – commercial sector

Policy option	Adopt EU requirements in 2025
Energy saved (cumulative GWh)	51
Emissions reduction (cumulative kt CO2-e)	2.7
Total costs (NPV $m NZD)	-0.41
Total benefits (NPV $m NZD)	3.0
Benefit Cost Ratio	**7.24**

The benefit cost ratios are positive for both Australia and New Zealand. However, this product category has not been regulated in this way before and the practicality of implementation will need to be carefully considered, including timeframes.

6. Consultation and feedback

This chapter summarises the consultation process and feedback received from industry stakeholders, including from the consultation RIS.

6.1 Review of GEMS Computer Monitors Determination 2021

The then Australian Government Department of Industry, Science Energy and Resources[109], on behalf of E3, consulted on 4 GEMS determinations that at the time were assumed to expire after 10 years.[110] The GEMS Computer Monitors determination[111] was reviewed and included in this public consultation. Since then, recent investigations have revealed that GEMS determinations do not expire.[112] However, the review findings are still valid and have informed this RIS process.

The *Public Consultation Paper: Review of the GEMS Computer Monitors Determination*[113] (the review) found that the determination is still effective and efficient. The benefits of the determination are greater than the cost of the regulation. It also found that the computer monitor MEPS are too weak to be effective, but there is still value in retaining the energy rating label, because it helps consumers to differentiate between products on the basis of energy use.

The review stated that MEPS and the energy efficiency defined by each star rating could be increased following consideration in a full RIS process. The most common star rating for registered computer monitors was 6 stars with a small number registered above 8 stars and a few below 2.5 stars. The review also found that the scope of the determination could be expanded to include digital signage display screens, such as those used in stores to display menus. These can also be imported as computer monitors or televisions, if they have a television tuner.

Four stakeholder responses were received[114] covering all 4 determinations that were included in the public consultation. These responses were from George Wilkenfeld and

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[109] A Machinery of Government change moved the Greenhouse and Energy Minimum Standards (GEMS) program to the new Department of Climate Change, Energy, the Environment and Water on 1 July 2022.
[110] E3 Program: GEMS determinations due to expire by 2025 consultation
[111] Greenhouse and Energy Minimum Standards (Computer Monitors) Determination 2014
[112] News article on energyrating: Sunsetting does not apply to GEMS Determinations September 2022
[113] E3 Program: GEMS determinations due to expire by 2025 consultation
[114] Public submissions on the consultation 'GEMS determinations due to expire by 2025'

Associates, CHOICE, the EEC and the Consumer Electronic Suppliers Association (CESA). Three submissions supported the recommendations in the reviews, but CESA expressed concerns at the time about expanding energy efficiency regulation to include digital signage displays. As the European Commission successfully introduced energy efficiency requirements for digital signage displays in 2021 as part of its regulations for electronic displays with televisions and computer monitors, the Department decided to include this type of display in an Issues Paper released in 2022.

6.2 Issues Paper 2022

The then Australian Government Department of Industry, Science Energy and Resources, on behalf of E3, released an Issues Paper[115] on televisions, computer monitors and digital signage displays for public consultation. The consultation opened on 22 February 2022 and closed on 6 April 2022. The Department presented the Issues Paper to CESA on 16 March 2022.

Three submissions[116] were received from CESA, the Australian Retailers Association (ARA), and the Australian Small Business and Family Enterprise Ombudsman (ASBFEO). A high level summary is provided below:

- ARA's response includes 6 principles-based recommendations, a few of which appear to be outside the scope of this RIS process for televisions, monitors and signage displays. However, many of the principles (such as minimise complexity and barriers to adoption, international harmonisation) are in broad alignment with the Department's preferred approach.
- The ASBFEO response focuses on how implementation may affect small businesses, particularly changes to labelling.
- CESA's response was quite detailed and provided technical input on many of the questions from the Issues Paper. CESA supported the review of MEPS, labelling and test methods for televisions, monitors and digital signage displays. The submission expressed a strong preference to align with the policy and test method set out in the EU regulations, rather than the US or other jurisdictions. CESA also stated that they now welcomed the discussion on inclusion of digital signage displays.[117] As a result, the Department included this type of display in this RIS process to explore the feasibility of adopting the EU requirements for this product.

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[115] E3 Program: televisions, computer monitors and digital signage issues paper consultation 2022

[116] E3 Program: televisions, computer monitors and digital signage issues paper consultation 2022 - List of responses

[117] "CESA supports the Departments review of the MEPS and Labelling requirements for televisions and computer monitors and welcomes the discussion on the inclusion of digital signage displays." CESA comments on the Televisions, Computer Monitors and Digital Signage Displays Issues Paper - February 2022

6.3 Consultation RIS on the energy efficiency of electronic displays 2023

A Consultation RIS[118] detailing the cost-benefit analysis and draft policy proposals for improving the energy efficiency of electronic displays was published for consultation on 23 May 2023, with written submissions invited up to 7 July 2023. Notices and links to the CRIS were emailed directly to digital display and retailer contacts in Australia and New Zealand and publicised on www.energyrating.gov.au and other government sites and social media. This included importers and suppliers, manufacturers, retailers and end-users of digital displays.

The purpose of the CRIS was to consider whether to update Australia's and New Zealand's television and computer monitor energy efficiency requirements and harmonise these with European requirements. It also considered whether to introduce mandatory energy efficiency labelling and non-operating mode (such as off-mode, standby mode and networked standby mode) power requirements for digital signage displays to align with the new European requirements for electronic displays. The CRIS sought comments and submissions from stakeholders on these options, as well as on the research, methodology and analysis underlying the options.

A public consultation session was held via video call on 15 June 2023. Twenty-nine stakeholders, including industry associations, suppliers and manufacturers, participated in the consultation session. Several of the manufacturers who participated were based in Taiwan. While issues raised during the session were noted, participants were encouraged to make submissions in writing.

Industry associations and 4 digital display companies provided written submissions. The industry associations who provided public submissions[119] were CESA and the Australian Information Industry Association (AIIA). The digital display companies made confidential submissions, several of whom gave permission for extracts to be used in this document. A member of the general public also made a submission, but covered topics outside the scope of this RIS process.

In general, all industry submissions supported harmonising with the EU requirements, increasing the stringency of MEPS, regrading of the energy rating label, and updating the

[118] Consultation RIS – Televisions, Computer Monitors and Digital Signage Displays (dcceew.gov.au)
[119] Stakeholder feedback - Consultation RIS – Televisions, Computer Monitors and Digital Signage Displays (dcceew.gov.au)

test method standard for televisions and computer monitors. For digital signage displays, there was general support for adoption of the EU requirements, as long as there is flexibility for labelling requirements and sufficient time is given for industry to implement any changes. No comments were received on the cost benefit analysis for any of the product categories.

6.3.1 Televisions and computer monitors

MEPS levels

Submissions from CESA, AIIA and other stakeholders broadly supported the move to align with the European MEPS levels. CESA's preference was to adopt the EU 2023 MEPS levels directly and not do a staged approach. They stated that it "would be simpler and less confusing if Australia and New Zealand undertook a single step to catch up to the current EU 2023 levels." CESA consider that a 2 step staged approach would be too administratively burdensome for suppliers and retailers.

The only significant issue raised in the submissions was that the MEPS levels for EU 2023 were considered too stringent for high performance monitors (not defined in the submissions) and true 8k televisions. Some submissions opposed these levels, some proposed a longer implementation timetable, while others, including CESA and AIIA, suggested an EEI of 1.1 for 8k televisions and high resolution monitors. CESA stated 'The EU 2023 Max EEI of 0.90 is too difficult for manufacturers to meet with current screen technology. To achieve Max EEI of 0.90 the image brightness is insufficient.'

CESA also said in their submission that larger models of computer monitors are similar to televisions, but smaller computer monitors should be regulated separately. E3 notes that this doesn't appear to be the approach taken by the European regulations and is likely to be inconsistent with the goal of international harmonisation. The scope of the EU regulations is such that some high performance computer monitors that were previously excluded from the scope of MEPS and labelling in Australia and New Zealand would be included for the first time. Larger monitors previously excluded from MEPS would also now be covered.

Energy rating labelling

The labelling topics covered in the submissions included:

- Hours on the label: the submissions were evenly split on their views regarding the current ERL assumption of 10 hours of on-mode usage per day for televisions and monitors versus actual usage estimates. Most supported EU assumptions for labelling of digital signage displays (12 hours), although one submission proposed 8, 12 and 24 hours.
- Label grading: Most submissions supported the proposed alignment of star ratings with the EU label grades as per Section 5.7 of the CRIS.[120]

[120] Consultation RIS – Televisions, Computer Monitors and Digital Signage Displays (dcceew.gov.au)

- Label look and feel: Most submissions recognised that the current label design used in Australia and New Zealand is different to Europe and would continue to be used locally. Some submissions wanted the EU label to be used locally. Several submissions wanted to ensure that the new label was easily distinguishable from the existing label, with CESA supporting the continuous 10 star arch, as per the swimming pool pump label.[121]
- QR codes: The submissions were evenly split on the inclusion of a QR code on the updated energy label. The main opposition to QR codes comes from concerns that a suitable database for the QR code to link with does not yet exist and that generating QR codes may be more administratively burdensome, unless these were generated at the time of registration or similar.
- Elements displayed on the label: Some submissions noted that HDR is becoming more common and one proposed that the energy should be an average of SDR and HDR. If the proposal is to align with Europe, the label efficiency grade will be based on SDR, and data on HDR data, if available, could be shown separately. One submission recommended a check box to indicate that the product qualifies for ABC allowances.
- Affixing and displaying labels: While the submissions were quite diverse in their general views, most agreed that flexible labelling options for products on retail display should be included in any new requirements. These flexible labelling options could include labels attached to the screen or bezel, a flip tag that hangs over the front, an electronic label when in display mode, a label attached to packaging if not on display, or a banner next to the product on display.

6.3.2 Digital signage displays

Labelling

Most submissions noted that digital signage displays were rarely on retail display, so there was little support for any sort of mandatory label affixed to these products. A range of other options were canvassed such as optional labelling, a label affixed to packaging, standardised information sheets or no label at all with just mandatory registrations with comparative data published on the public registration database. Physical or electronic labelling would have the most benefit for digital signage displays that were on retail display.

Spare parts and replacement units

Several submissions were concerned that spare parts and replacement units could be captured by the regulations and that this would make warranty and other repairs difficult. It was proposed that replacement units under warranty should be exempted from the regulation. One submission proposed that products in existing contracts should be exempted from the new requirements for a period of time.

[121] Pool pumps | Energy Rating

6.3.3 Alignment with EU requirements for all products

All submissions called for full alignment with EU requirements regarding scope, exemptions, definitions and test method. There was some nuance in this position across submissions. Most accepted that Australia and New Zealand have their own existing labelling scheme which would necessitate some differences. Several submissions opposed the inclusion of non-energy requirements (information, recycling, servicing) in the local proposal, but these were specifically excluded in the CRIS. Several submissions requested that local requirements do not go beyond EU requirements. The proposals in the CRIS are generally in line with the points made in the submissions.

CESA raised concerns about the test method and whether the new IEC test methods should be adopted for the new requirements. They don't support the adoption of IEC62087 Part 2 & 3 (2023) until the test methods are aligned with current European requirements. However, all submissions agreed with the policy intent to harmonise with the EU test method requirements.

6.3.4 Transition and implementation times for all products

All submissions called for adequate transition times before the new regulations come into force. Several submissions asked for 1 year while others asked for 2 years. One supplier called for one year for televisions and 2 years for monitors and digital signage displays due to their slower turnover. CESA asked that the transition date be in July to match the minimum of the sales cycle. Another supplier proposed that signage displays in existing contracts should be exempted (for a limited period). Some of the concerns raised by suppliers appear to show a misunderstanding of the rules regarding existing registrations and grandfathering. The implementation process will need education and communication materials for suppliers and retailers to alleviate any concerns and confusion about the new requirements.

7. Recommendations

Harmonising Australia's and New Zealand's regulations on the energy efficiency of electronic displays supplied in both countries would provide substantial benefits for consumers and the economy as a whole. Suppliers and retailers of electronic displays would be the stakeholders most affected by any changes to the regulations applying to the supply of these products. This chapter summarises the findings of this DRIS and makes recommendations.

7.1 Televisions and computer monitors

7.1.1 New MEPS levels and transition times

The introduction of more stringent MEPS for televisions and monitors would reduce identified market failures and increase the uptake of energy efficient products, reducing electricity costs for consumers. Harmonising with the EU MEPS would reduce compliance and administrative burdens for industry.

Two scenarios were modelled in this DRIS, one of which was a staged approach. These scenarios were originally identified and modelled in the CRIS. Harmonising with the EU 2023 requirements instead of a staged approach removes the increased cost and effort for retailers and suppliers to adapt and upgrade to comply with 2 different requirements within 2 years. This simpler and more straightforward approach is supported by stakeholder feedback from CESA. E3 therefore recommends adopting the EU 2023 MEPS requirements in one step and not a staged approach.

All CRIS submissions called for adequate transition times before new regulations come into force, with a range of transition times requested by different stakeholders. E3's preference is to allow 12 months from when the GEMS determination is made until when it comes into effect, but E3 could consider other time periods on the basis of evidence of a need or benefit of a longer or shorter delay.

Recommendation 1
Introduce EU 2023 MEPS requirements for televisions and computer monitors to come into force approximately 12 months after the GEMS determination is made. New Zealand will consider whether to align with these new requirements following New Zealand Cabinet consideration of the issue.

7.1.2 High resolution displays – MEPS levels

Submissions from stakeholders raised the issue that the EU 2023 MEPS levels were too stringent for 8k televisions and high-resolution monitors and suggested either a delayed implementation date for these products or a lower MEPS level. Industry stakeholders highlighted that adopting the EU 2023 levels for these products would affect product availability in Australian and New Zealand markets. E3 has considered this issue, including an analysis of GEMS registration data and agrees that there is a risk to product availability. E3 therefore proposes implementing a less stringent MEPS level in the short to medium term, with this to be reviewed at a later date to see if this requirement should be adjusted. The recommended MEPS level for these products is an energy efficiency index of 1.1, which was suggested by several stakeholders.

Recommendation 2
Introduce a less stringent MEPS level with an energy efficiency index (EEI) of 1.1 for high resolution products[1] such as 8k televisions and some high-resolution computer monitors to ensure that some products in all product categories can meet MEPS. This should be reviewed after several years to determine whether this requirement should be adjusted.

7.1.3 Regrading of energy rating labels

Stakeholders agreed with the CRIS proposal to regrade the star ratings on the energy rating labels using the EU test method (or equivalent) and calculations to underpin the star ratings (refer to section 4.1.2 for details). The European labels have 7 grades and the E3 labels have 10 stars, so 3 more levels will need to be added to the pre-existing EU grades. One star could align with the lowest EU grade.

Recommendation 3
Introduce new star ratings levels for the energy rating label to align with the 7 European label grades and include 3 additional levels to give the full 10 star range for televisions and computer monitors.

7.1.4 Scope of requirements

The current scope of the Australian and New Zealand efficiency regulations is out of date and differs from European regulations. The current scope also doesn't account for the significant technology shifts that have occurred in recent years. For example, high performance monitors typically use more energy than other types of monitors, but are generally not covered by the Australian and New Zealand efficiency regulations. Aligning with the scope in the EU 2023 requirements would harmonise the Australian and New Zealand markets with a major international market and simplify compliance requirements.

[1] Displays with resolution above 8 294 400 pixels (UHD-4k) and for MicroLED displays

Recommendation 4
Match the scope of products covered by the EU electronic displays regulations for the new MEPS and labelling requirements for televisions and computer monitors in Australia and New Zealand.

7.1.5 Test method

International harmonisation with test method standards reduces costs and trade barriers for manufacturers and suppliers. The current Australian and New Zealand test methods for televisions and computer monitors are superseded and out of date. Use of these out-of-date test methods, rather than an updated, internationally recognised and employed test method, imposes an unnecessary regulatory burden and cost on manufacturers and suppliers.

E3's preferred option is to use an equivalent test method to that used in the EU, because it would resolve the problems identified in Chapters 2 and 3 and align the Australian and New Zealand markets with a major international market. It would also enable adoption of the EU MEPS and replication of EU grades in the ERL for televisions and computer monitors in Australia and New Zealand.

Recommendation 5
Introduce the equivalent of the EU test method for televisions, computer monitors and digital signage displays.

7.1.6 New label design

E3 labels will continue to be used across the E3 program. Several submissions wanted to ensure that the new label was easily distinguishable from the existing label, with CESA supporting the continuous 10 star arch, as per the swimming pool pump label.[122] This would reduce confusion for retailers and consumers, given the significant label regrade that has been recommended. E3 agrees that a different label design would assist with the transition to the new requirements.

Further consideration should be given to the addition of other elements to the label, following consultation on the development of the determination.

Recommendation 6
Introduce a different label design for the new regraded energy rating labels for televisions and computer monitors.

7.1.7 Physical and electronic labelling options

As described in Chapter 2, GEMS compliance officers have noted an increasing incidence of problems with the mandatory labelling requirements for televisions and computer

[122] Pool pumps | Energy Rating

monitors in Australian retail stores. These problems have become more common as frame sizes have shrunk or vanished and screen sizes have increased. CRIS stakeholder submissions support a more flexible approach to labelling. This would assist suppliers and retailers in complying with their obligations.

This could include giving suppliers and retailers the option to choose between a physical or electronic label[123], similar to what is allowed in the EU 2023 regulations. This could also include giving suppliers and retailers a choice of options for the display of physical labels. The GEMS determinations for swimming pool pumps[124] and air conditioners up to 65kW[125] both have examples of flexible labelling options such as swing tags.

Recommendation 7
Introduce an option for suppliers and retailers to display the energy rating label electronically instead of using a physical label, if legislative frameworks allow for this. Consider introducing flexible options for the display of physical labels (for example, swing tags). This would apply to televisions and computer monitors.

7.2 Digital signage displays

7.2.1 Standby, networked standby and off-mode energy requirements

The introduction of mandatory power demand limits for off-mode, standby mode and networked standby mode for digital signage displays would reduce identified market failures and increase the uptake of energy efficient products. Additionally, there would be a reduction in electricity costs for consumers, and a reduction in electricity network costs due to reduced peak demand.

Australia and New Zealand do not regulate digital signage displays for energy efficiency. The rapid progress in functional convergence between different electronic displays, such as televisions, computer monitors and signage displays creates a strong case for a more integrated approach to this product group as a whole. Aligning with the EU regulations would help to reduce the regulatory and market failures identified in Chapters 2 and 3, while placing minimal additional requirements on suppliers.

All CRIS submissions that mentioned digital signage displays called for adequate transition times before any new regulations come into force. E3's preference is to allow 12 months from when the GEMS determination is made until when it comes into effect, but E3 would be prepared to consider other time periods on the basis of evidence of a need or benefit of a longer or shorter delay.

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[123] Note that the NZ efficiency regulations require a label to be supplied with each product.
[124] Greenhouse and Energy Minimum Standards (Swimming Pool Pump-units) Determination 2021
[125] Greenhouse and Energy Minimum Standards (Air Conditioners up to 65kW) Determination 2019

Recommendation 8
Introduce mandatory power demand limits for off-mode, standby mode and networked standby mode to match the EU regulation requirements for digital signage displays and match the scope of products covered by the EU regulations. This should take effect approximately 12 months after the GEMS determination is made.

7.2.2 Energy rating label

Purchasers of digital signage displays do not have easy access to energy efficiency information. Having no agreed system of energy measurement or energy declaration means that organisations wishing to buy more efficient signage displays are unable to include this in their purchase specifications. Digital signage displays are included in the EU labelling requirements for electronic displays and were included in the CRIS as a policy option. The European labels have 7 grades and the E3 labels have 10 stars, so 3 more levels will need to be added to the pre-existing EU grades (refer to section 4.2.2 for details). One star could align with the lowest EU grade.

Stakeholder submissions had mixed reactions to introducing similar labelling requirements here, noting that digital signage displays are rarely on retail display. E3 has considered this feedback and notes that the *Air Conditioners up to 65kW GEMS Determination*[126] allows for optional labelling for certain types of air conditioners covered by the determination. This approach could be adopted for digital signage displays, along with flexibility in electronic and physical labelling as per Recommendation 7 for televisions and computer monitors.

Recommendation 9
Introduce mandatory registration for digital signage displays as per the scope of the EU regulations, which will include comparative data to be listed on the public registration database. Use star ratings levels for the energy rating label to align with the 7 European label grades and include 3 additional levels to give the full 10 star range. Introduce optional physical or electronic energy rating labels for digital signage displays, if legislative frameworks allow. Flexible options for physical labels could also be considered for this product.

[126] Greenhouse and Energy Minimum Standards (Air Conditioners up to 65kW) Determination 2019

8. Implementation and review

8.1 Implementation

If the Energy and Climate Change Ministers[127] agree to changing the MEPS and labelling requirements for television and computer monitors, and introducing labelling and standby/networked standby power requirements for digital signage displays, then the decision will be implemented as below.

New regulations

E3 will prepare one or more draft determinations and stakeholders would have the opportunity to review and provide comments on at least one exposure draft of each determination. The draft determinations would be submitted to the EEWG, under the Energy and Climate Change Ministers, for final review and approval. Once the EEWG has approved a draft determination, it would be submitted to the relevant Commonwealth Minister for Climate Change and Energy for final approval and signature[128].

The proposed requirements for televisions, computer monitors and digital signage displays would be implemented in Australia by one more GEMS determinations under the *Greenhouse and Energy Minimum Standards (GEMS) Act 2012*. In New Zealand, the Energy Efficiency (Energy Using Products) Regulations 2002 would be used.

In New Zealand the intent is that the introduction of the proposed requirements would align with the timing of the determination under the GEMS Act. Policy decisions and Amendments to the Regulations are subject to New Zealand Cabinet approval, which is a separate process to determinations under the GEMS Act. The process involves policy approval, drafting of regulations, and approval of regulations. The transition to new requirements may be different, including registration requirements.

If Ministers agree to proceed with new energy efficiency requirements for televisions, computer monitors and digital signage displays, the Department would commission the drafting of one or more new GEMS determinations covering these products. The Department would aim to publish the draft determinations as exposure drafts for public comments and submissions by late 2024 and final determinations by mid 2025. It is expected that manufacturers and suppliers of these products would be given a lead time of approximately 12 months before any new determination comes into effect.

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[127] Cabinet in New Zealand

[128] The amendment of New Zealand legislation is a separate process to the creation of a GEMS determination and subject to different requirements

Products imported into or manufactured in Australia from the commencement date would be required to comply with the new regulations, before they could be offered for supply or sale. Products that are manufactured or imported into Australia prior to the commencement date would be allowed to be offered for supply until the existing stock is exhausted. In addition, suppliers would be able to voluntarily register products before the commencement date.

Competition effects of MEPS

E3 does not expect the introduction of the proposed requirements to significantly reduce competition in the electronic displays markets. There are many companies supplying the market and a range of products sold. There may be some reduction in contestability, if small or medium sized firms, who stock a small number of products that won't meet the new MEPS levels, withdraw products from market. A reduction in companies supplying the market is unlikely to occur, because many of the main suppliers already supply compliant products in the EU. If suppliers do leave the market, it is not expected that this would have a material effect on competition, because of the number of suppliers in the market.

The introduction of mandatory labelling and the associated costs of testing and registering products not previously covered by a GEMS determination may discourage some suppliers from offering products. This may occur where the market potential is small or unknown, such as special offerings by chain retailers.

Product registration - Australia

In accordance with the Australian Government Charging Framework,[129] the GEMS Regulator charges fees for the registration of products. These fees recover the costs incurred in processing registration applications and monitoring compliance with the GEMS Act.

When developing new GEMS determinations, the GEMS Regulator will determine the appropriate registration fees[130]. This will be based on analysis of expected registration volumes and likely compliance activities and may include consultation with industry to ensure the analysis and proposed fees are a reasonable estimate of the cost of administering the program.

Products required to be registered under the GEMS Act are grouped into one of 4 fee bands,[131] ranging from $440 to $780, depending on the product type. Registrations in Australia are for a period of 5 years and the applicable fee is payable on lodgement of the application to register a product. GST does not apply to these fees.

The current fee for televisions and computer monitors is $440 per registration. This figure has been used as an indicative value for modelling purposes to support this DRIS. It does

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[129] Australian Government Charging Framework, Department of Finance

[130] GEMS Registration Fees instrument

[131] https://www.energyrating.gov.au/registration-fees-and-payment

not indicate that the applicable fees would continue to be $440 per registration. In setting the fee for registration of products under any new determinations, the GEMS Regulator will consider the expected costs of registration and testing products and the number of models that would need to be registered.

Registration of models in New Zealand is free, but models registered only in New Zealand cannot be supplied in Australia, unless they are manufactured in or exported from New Zealand as per Trans-Tasman Mutual Recognition Agreement (TTMRA) requirements.

New Zealand requirements

Products imported into or manufactured in New Zealand before the enforcement date can legally be supplied[132] after the enforcement date without meeting the requirements of the amended regulations, but must meet the requirements of the regulations on the day they were imported.

Products imported into New Zealand from the enforcement date must meet the requirements of the amended regulations, which includes meeting the appropriate MEPS levels and any labelling requirements.

Under the current New Zealand Regulations, if a product is registered with the Australian (GEMS) regulator, it does not have to be registered with the New Zealand regulator. This does not affect the requirement of meeting the new MEPS levels and the new labelling requirements as outline in the amended New Zealand regulations.

The TTMRA allows products that comply with the GEMS determination to be sold in New Zealand, without meeting the New Zealand Regulation requirements (and vice versa). For the TTMRA to apply, the product (each individual item to be supplied in New Zealand) must be manufactured in or imported through an Australian jurisdiction.

Family of models

The GEMS Act specifies that a registered product may cover more than one model in a family of models. This means that if there are 2 or more electronic displays with the same characteristics, they may be grouped together in a family and registered as a single product. A definition of a family of models will be included in the GEMS determination.

Labelling

Chapters 2 and 3 describe some of the labelling issues for televisions and computer monitors. It is mandatory for a printed ERL to be displayed on the product at the point of sale, such as in a retail store. However, Australian compliance officers have noted that compliance with this requirement is becoming more difficult, due to narrow frames and other promotional materials affixed to the product.

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[132] Supplied covers, sale, lease, hire, and hire-purchase as per the New Zealand Energy Efficiency (Energy Using Products) Regulations 2002.

The EU labelling regulations[133] for electronic displays allow suppliers and retailers to choose to display either a physical label or an electronic label, as long as the display is kept in on-mode[134] when visible to customers. The Australian and New Zealand regulators will adopt this as an option, if legislative frameworks allow this approach, because it would make it simpler for suppliers to comply with labelling requirements in retail stores. Suppliers would still have the option of using printed labels, if they prefer. E3 will also consider allowing flexible options for the display of physical labels, such as swing tags.

Public information

As part of the registration process, some information about registered electronic displays would become public and some information would be kept confidential, such as applicant details and test information. However, energy performance and product information would be available to the public. Information about proposed changes resulting from new regulations would be provided to suppliers, retailers, industry groups and consumers to explain the new regulations.

Implementation risks

There are some risks with introducing MEPS and mandatory labelling for televisions, computer monitors and digital signage displays. The first risk, which is considered low, is with not allowing enough time for industry to adjust before the new regulations would take effect. This decision RIS proposes that the new requirements would come into force approximately 12 months after the GEMS determination is made. This takes into consideration that suppliers and retailers would need time to prepare for MEPS and labelling, but most suppliers would also have access to a full range of products that would meet the proposed requirements. While some manufacturers indicated in their consultation RIS submissions that a 12-month lead time would be sufficient, others indicated that they may need up to 24 months.

The problems with a 12-month period before the regulations would take effect are reduced by allowing product that is imported into, or manufactured in, Australia and New Zealand prior to the regulation start date to be sold until the stock is exhausted. In addition, industry would have notice of the forthcoming regulation from the time that the Ministers announce their decision to introduce new requirements for electronic displays, and from the publication of exposure drafts of any GEMS determination.

Another risk is the potential for confusion between the existing label for televisions and computer monitors and a new label. Existing registrants of these products will be advised of the new requirements. Providing a lead time of 12 months, prior to the start of the new requirements, would allow manufacturers to factor the new labelling requirements into their production and ordering cycles. Training and education material would also be made

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[133] European Commission information on energy labelling and ecodesign requirements for electronic displays

[134] 'on-mode' or 'active mode' means a condition in which the electronic display is connected to a power source, has been activated and is providing one or more of its display functions

available to the suppliers, retailers and industry associations explaining the change. The new labels would be recognisably part of the family of existing energy rating labels and it is intended that the new label would be clear and easier to understand than the current label of televisions and computer monitors.

Compliance monitoring

Once a new determination is published, products can be registered. All products that fall within the scope of the determination would need to be registered by the date of commencement. The GEMS Regulator is responsible for monitoring and enforcing compliance of GEMS products in Australia. The Regulator works with industry groups and informs manufacturers, distributors, suppliers and retailers of their obligations under the GEMS Act. The GEMS Regulator undertakes compliance and monitoring activities such as:

- assisting industry with understanding the requirements of the GEMS Act
- monitoring compliance
- check testing products to verify MEPS energy efficiency claims and other performance measures are met
- conducting market surveillance of products to verify models are correctly registered and display the appropriate energy rating label
- responding to any allegations of non-compliance
- pursuing those who contravene the Act.

8.2 Evaluation and review

GEMS determinations and MEPS settings are evaluated and reviewed from time to time. Section 176 of the GEMS Act states that the Act itself must be independently reviewed at least every 10 years.

New requirements for televisions, computer monitors and digital signage displays would be included in these evaluation and review processes as needed. Any reviews would consider the effect of MEPS and mandatory labelling on the market, consumer behaviour in response to the energy efficiency regulations, difficulties encountered by suppliers during the transition, any technological changes, and any concerns or other issues raised by stakeholders. E3 reviews typically include a cost benefit analysis, analysis of energy and greenhouse gas emissions savings, along with qualitative analyses of other impacts and benefits.

E3 uses various sources of information to evaluate the effectiveness of the program and product requirements. These sources include:

- retrospective reviews, to compare the actual impacts of measures with projections
- analysis of sales data to understand consumer awareness and the use of energy efficiency information and labelling
- monitoring of activity on the Energy Rating website.

Appendix A – MEPS and Energy rating labels

MEPS

Minimum energy performance standards (MEPS) specify a minimum level of energy performance that an appliance must meet or exceed before it can be supplied of offered for sale in Australia and New Zealand. When applied appropriately, MEPS are an effective policy measure to increase appliance energy efficiency, limit inefficient appliances from entering the market and, in consultation with industry, provide a signal to manufacturers to increase appliance efficiency.

For consumers, MEPS guarantee all appliances available in the market meet minimum energy performance targets and have lower running costs over their lifetime. Notably, regardless of consumer purchasing decisions, MEPS deliver national benefits with significant energy savings and emissions reductions.

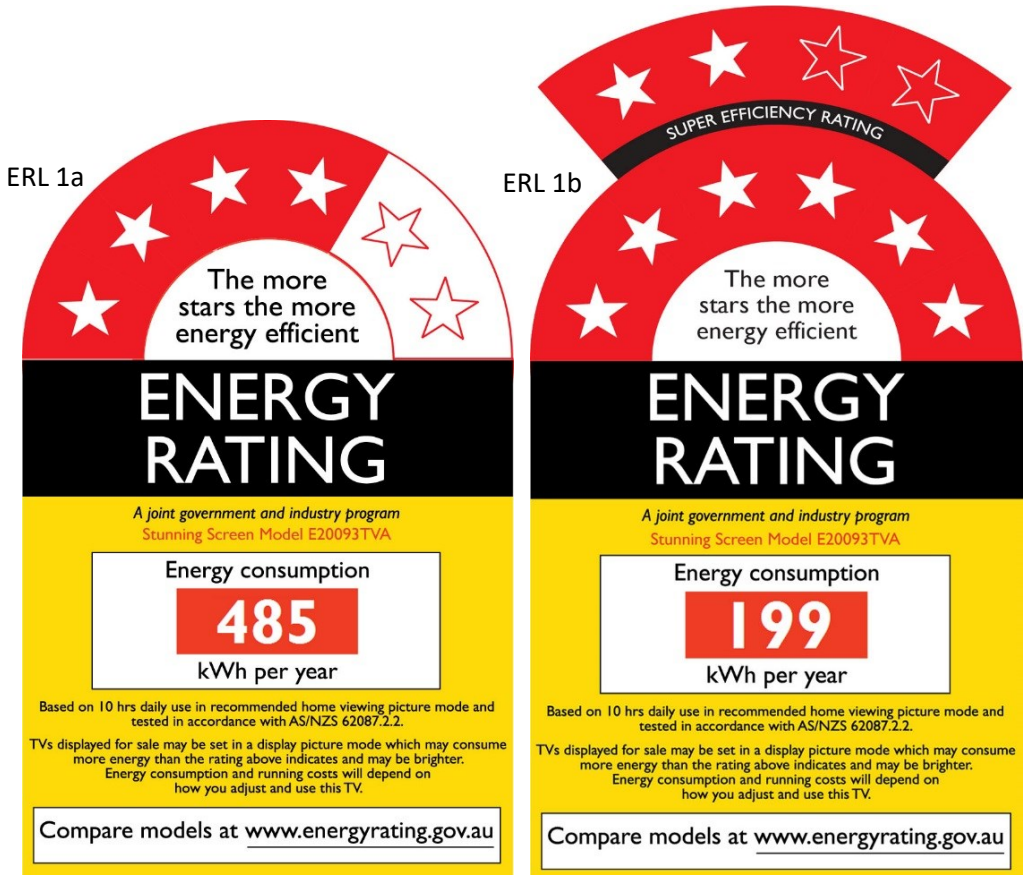
Energy Rating Labelling

The ERL provides consumers with a visual display of the relative energy efficiency of one product compared with another. It reduces consumers' 'search costs' by summarising highly technical information in a format that can be readily understood and is available to people at the point of purchase. The ERL helps consumers to understand how much a particular model may cost to run and how energy efficient it might be in comparison to similar models. It also helps consumers to consider the total lifetime cost of owning and operating an appliance at the time of purchase.

The ERL, shown in Figure 21 was first introduced for televisions in 2009 and for computer monitors in Australia in 2014 and New Zealand in 2013. It is mandatory for the ERL to be displayed on a product at the point of sale, for example in a retail store. Label 1a is displayed on televisions (or computer monitors) rated from 1 to 6 stars and label 1b on those rated between 7 and 10 stars.

The labels on televisions, computer monitors, refrigerators, air conditioners, dishwashers, washing machines and dryers, can show a maximum of 10 stars. That is, the least efficient models have 1 star, while the most efficient models can have up to 10 stars. Where a model has 6 stars or less, it will be displayed on the label out of 6 stars, shown in half-star increments. Super-efficient models of 7 to 10 stars have the additional stars shown in a band above the regular 6 star label. There are no half star increments above 6 stars, so products with 6-10 stars are shown in single star increments.

Figure 21



Example 4 star and 8 star television Energy Rating Labels (ERL).

Appendix B – EU Ecodesign regulations – MEPS

One of the core policy options under consideration is the adoption of the EC Ecodesign Regulation[135] for electronic displays. Essentially this is a MEPS level for the on-mode power for an electronic display. The regulation also defines maximum permitted power levels for various non-operating modes such as off-mode, standby mode and networked standby mode, with adders for specific functions and an overall cap on the permitted power in each mode. This regulation effectively applies on-mode limits to televisions and computer monitors only, and non-operating mode limits (off-mode, standby mode and networked standby mode) to all electronic displays within the scope (e.g. including digital signage displays). The regulation defines an energy efficiency index (*EEI*) for the appliance based on its screen area and on-mode power consumption. The regulation then defines the maximum permitted *EEI* for specific products based on the screen resolution. The Ecodesign *EEI* is defined for a product using the following equation:

$$EEI = \frac{(P_{measured} + 1)}{\left(3 \times \left[90 \times \tanh\left(0.02 + 0.004 \times (A - 11)\right) + 4\right] + 3\right) + corr}$$

- $P_{measured}$ is the on-mode power in Standard Dynamic Range (SDR) as measured in a high ambient light setting in W
- A is the screen area in dm² (screen area in cm² divided by 100)
- *corr* is a correction factor of 10 for OLED electronic displays that do not apply the ABC allowance and this only applies until 28 February 2023. *corr* shall be zero in all other cases.

For products with complying ABC functions, then on-mode power may be reduced by 10% when assessing the product against Ecodesign and energy labelling requirements. To qualify for the ABC allowance, the ABC must meet all of the following requirements:

- ABC is enabled in the normal configuration of the electronic display and persists in any other standard dynamic range configuration available to the end-user;
- the value of $P_{measured}$, in the normal configuration, is measured with ABC disabled or, if ABC cannot be disabled, in an ambient light condition of 100 lux measured at the ABC sensor;

[135] See COMMISSION REGULATION (EU) 2019/2021 of 1 October 2019 laying down Ecodesign requirements for electronic displays pursuant to Directive 2009/125/EC of the European Parliament and of the Council, amending Commission Regulation (EC) No 1275/2008 and repealing Commission Regulation (EC) No 642/2009.

- the value of $P_{measured}$ with ABC disabled, if applicable, shall be equal to or greater than the on-mode power measured with ABC enabled in an ambient light condition of 100 lux measured at the ABC sensor;
- with ABC enabled, the measured value of the on-mode power must decrease by 20% or more when the ambient light condition, measured at the ABC sensor, is reduced from 100 lux to 12 lux; and
- the ABC control of the display screen luminance meets all of the following characteristics when the ambient light condition measured at the ABC sensor changes:
    - the measured screen luminance at 60 lux is between 65% and 95% of the screen luminance measured at 100 lux;
    - the measured screen luminance at 35 lux is between 50% and 80% of the screen luminance measured at 100 lux; and
    - the measured screen luminance at 12 lux is between 35% and 70% of the screen luminance measured at 100 lux.

The regulation sets limits on the value of EEI for an electronic display as set out in Table 1.

Table 1: Maximum permitted EEI for electronic displays in Europe by tier

Applicable date	EEI_{max} for electronic displays with resolution up to 2138400 pixels (HD)	EEI_{max} for electronic displays with resolution above 2138400 pixels (HD) and up to 8294400 pixels (UHD-4k)	EEI_{max} for electronic displays with resolution above 8294400 pixels (UHD-4k) and for MicroLED displays (UHD-8k)
1 March 2021	0.90	1.1	N/A
1 March 2023	0.75	0.9	0.9

Table notes: Abbreviations in **BOLD** above are used to denote these product categories throughout this report. A resolution of 1080×1920 is 2.073 MPx which is defined as **HD**. A resolution of up to 2160×3840 is 8.2944 MPx is defined as **UHD-4k**. MicroLED displays are currently rare (only 1 model of a total of 14,841 registered in Europe claim to use microLEDs as of mid-September 2022 and the display category was "Other"). Any vertical resolution of greater than 2160 will generally be classified as **UHD-8k** above under EU Ecodesign (even though formal 8k is 4320×7680 = 33.177 MPx). These EEI_{max} limits do not apply to signage displays (only televisions and computer monitors).

Although not directly referenced in the regulations, the test method used for measurement is an EN version of IEC62087 in parts (Edition 1 in 2015) as follows:

- EN 62087-1:2016 Audio, video, and related equipment - Determination of power consumption - Part 1: General
- EN 62087-2:2016 Audio, video, and related equipment - Determination of power consumption - Part 2: Signals and media
- EN 62087-3:2016 Audio, video, and related equipment - Determination of power consumption - Part 3: Television sets

The EU regulation, by means of the Transitional Test Method (2020)[136], makes a number of changes to the EN test method including (but not limited to):

- inclusion of DC powered products
- use of an overhead solid state overhead projector for setting room illuminance for ABC testing
- the inclusion of HDR10 and HLG media for energy
- use of the slightly different test clip for SDR
- a larger range of test patterns for peak luminance measurement
- requirement for continuous data logging
- small differences in the position of the unit under test and associated screens and measurement equipment as well as the sequence of testing
- some additional measurements and checks regarding peak white luminance, room illuminance settings for ABC and screen luminance measurements.

Some of these technical changes have been included in Edition 2 of IEC62807.2 and IEC62087.3 published on 17 February 2023 but there are still some technical differences with the latest IEC standards. The EU Transitional Test Method also specifies some additional measurements and checks not covered by IEC.

[136] CLASP host a PDF of the EU Transitional Test Method document (1 July 2020) and links to the EU test clips that are mandated. See https://www.clasp.ngo/research/all/transitional-test-method-for-ecodesign-and-energy-labelling-requirements-for-electronic-displays/

Glossary

Term	Definition
$m	Million dollars
4k televisions	A television with a horizontal resolution of approximately 4000 lines, normally 3840
8k televisions	A television with a horizontal resolution of approximately 8000 lines, normally 7680
ABC	automatic brightness control
ARA	Australian Retailers Association
ASFBEO	Australian Small Business and Family Enterprise Ombudsman
BAU	Business as usual
cd	Candela (cd) is a unit of measurement of luminous intensity. It is the amount of light radiated in a given direction.
CENELEC	European Committee for Electrotechnical Standardization
CESA	Consumer Electronics Suppliers Association (Australia)
CHOICE	magazine of the Australian Consumers' Association (consumer advocacy group)
cm	centimetre
CO2-e	Carbon dioxide equivalent
Computer monitor	screen that displays visual information from a computer, workstation or server as its primary function
CRIS	Consultation Regulation Impact Statement
CRT	cathode ray tube televisions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
Digital signage display	Screen for public and/or non-focussed viewing, often long range. The European regulations define a digital signage display as an electronic display that is designed primarily to be viewed by multiple people in non-desktop based and non-domestic environments.
DRIS	Decision Regulation Impact Statement
dm^2	Square decimetre
E3 Program	Equipment Energy Efficiency Program (Australia and New Zealand)
EC	European Commission
EEC	Energy Efficiency Council (Australia)
EEC Act	Energy Efficiency and Conservation Act (New Zealand)
EECA	Energy Efficiency and Conservation Authority (New Zealand)
EEI	Energy efficiency index
EPREL	European Product Registry for Energy Labelling (EU)
ERL	Energy rating label
EU	European Union
EU 2021	MEPS levels defined in Regulation (EU) 2019/2021 in force from 1 March 2021 to 28 February 2023.
EU 2023	MEPS levels defined in Regulation (EU) 2019/2021 that come into force on 1 March 2023. More stringent than EU 2021.
GHG	greenhouse gas emissions
GWh	gigawatt hour – unit of electrical energy
HD	high definition (1080 lines or more)
HDR	high dynamic range
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
kt	kilo tonnes (thousand tonnes)
kWh	kilowatt hour – unit of electrical energy

Term	Definition
LCD	liquid crystal display
LED	light emitting diode
m^2	square metre
MEPS	minimum energy performance standards
Micro-LED	MicroLED is an emissive display technology where the light level of each red, green, or blue sub-pixel is a small LED light source that can be controlled individually.
Mini-LED	An LED display technology that uses a full-array of small backlights arranged in a grid to provide backlight for an LCD TV. Mini-LED displays differ from traditional LED displays in that they may have a couple of orders of magnitude (e.g. thousands) more backlights in the full-array backlight. This enables higher contrast ratios through more localised dimming.
Mt	Mega tonnes (million tonnes)
NPV	Net present value
On-mode	'on-mode' or 'active mode' means a condition in which the electronic display is connected to a power source, has been activated and is providing one or more of its display functions
Preset Picture Setting (PPS)	A pre-programmed factory setting with pre-determined picture parameters such as brightness, contrast, colour, sharpness, etc.
SD	standard definition (up to 728 lines)
SDR	standard dynamic range
Shop configuration	'shop configuration' means the configuration of the electronic display for use specifically in the context of demonstrating the electronic display, for example in high illumination (retail) conditions and not involving an auto power-off if no user action or presence is detected
Specialist display	screen with specific industry/professional applications (for example, in medical applications)
Televisions	an appliance[137] for the display and possible reception of television broadcast and similar services for terrestrial, cable, satellite and broadband network transmission of analogue or digital signals, and includes: (a) a display or monitor with an inbuilt television tuner; (b) a display or monitor without an inbuilt television tuner sold in modular form; and (c) a television that has additional functions which are not required for its basic operation as a television
TTMRA	Trans-Tasman Mutual Recognition Agreement
TV	television
UHD	Ultra high definition (usually more than 2 Megapixels and includes 4k and 8k displays)

[137] Definition from television determination

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