Queensland

Electricity Amendment Regulation (No. 4) 2009

Regulatory Impact Statement for* SL 2009 No. 197

made under the

Electricity Act 1994

Televisions

* Under the *Statutory Instruments Act 1992*, section 46(1)(h), a regulatory impact statement (RIS) need not be prepared for proposed subordinate legislation if it only provides for, or to the extent it only provides for, a matter involving the adoption of an Australian or international protocol, standard, code, or intergovernmental agreement or instrument, if an assessment of the benefits and costs has already been made and the assessment was made for, or is relevant to, Queensland.

A RIS was not prepared for the above item of subordinate legislation on the basis that it provides for the adoption of an Australian Standard however a RIS was prepared for the Equipment Energy Efficiency Committee, which reports to the Ministerial Council on Energy, in relation to the subject matter.

The RIS in relation to the subject matter prepared may be viewed at the following site—

http://www.energyrating.gov.au/library/pubs/200903-ris-tv.pdf

Copies of the RIS provided to the Queensland Government are attached.

Regulatory Impact Statement: Proposed Minimum Energy Performance Standards and Labelling for Televisions

May 2009
Report 2009/0X

Issued by the Equipment Energy Efficiency Committee under the auspices of the Ministerial Council on Energy

This Regulatory Impact Statement was prepared by the Equipment Energy Efficiency Committee, utilising the services of Digital CEnergy Australia. This document will be presented to the Ministerial Council on Energy (MCE) for decision. The MCE determines end-use equipment energy efficiency regulatory proposals involving all Australian Governments (Commonwealth, State and Territory) and the New Zealand Government.

Requests for information regarding this document should be directed in the first instance to:

Australia
Mark Johnston Appliance Energy Efficiency Team Department of the Environment, Water, Heritage and the Arts GPO Box 787 CANBERRA ACT 2601 mark.johnston@environment.gov.au Or via email to energy.rating@environment.gov.au

This document was prepared by:

Digital CEnergy Australia
40 Highland St
Leura
NSW 2780
Australia

keithj@digitalcenergy.com.au
www.digitalcenergy.com.au

Daniel Mascarenhas	Mark Johnston
Regulation and Economics Advisor	Television Product Manager
Department of Environment, Water, Heritage and the Arts (DEWHA)	

Australian Government

Department of the Environment, Water, Heritage and the Arts

GLOSSARY AND ABBREVIATIONS

ABS	Australian Bureau of Statistics
ACMA	Australian Communications and Media Authority
ADL	Arthur D. Little
AGO	Australian Greenhouse Office
ANZ	Australia and New Zealand
AS/NZS	Australian Standards and New Zealand Standards
BAU	Business as usual
CBA	Cost Benefit Analysis
CDV	Committee Draft for Vote
CEC	California Energy Commission
CECP	China Certification Centre for Energy Conservation Projects
CESA	Consumer Electronics Suppliers Association (Australia)
CNIS	China National Institute for Standardisation
CO_2-e	Carbon dioxide equivalent units
COAG	Council of Australian Governments
COP	Coefficient Of Performance
CPRS	Carbon Pollution Reduction Scheme
CRT	Cathode Ray Tubes
DCC	Department of Climate Change
DEWHA	Department of the Environment, Water, Heritage and the Arts
DLP	Digital Light Processing
DoE	Department of Energy (USA)
DTV	Digital Television
EC	European Commission
EECA	Energy Efficiency and Conservation Authority – New Zealand
EPA	Environment Protection Agency (USA)
ETS	Emissions Trading Scheme
EU	European Union
EuC	European Union Commission
E2WG	Energy Efficiency Working Group
E3	Equipment Energy Efficiency Committee (formerly NAEEEC) Committee
E3 Program	Equipment Energy Efficiency Program (formerly NAEEEP)
FPD	Flat Panel Display (also known as Flat Display Panels (FDP)
GATT	General Agreement on Tariffs and Trade Agreement
GfK	GfK Retail and Technology (consultants)
GHG	Greenhouse Gases
GWA	George Wilkenfeld & Associates
GWh	Giga Watt hour – 1 billion Watt hours
HD	High Definition
IEC	International Energy Commission
kt	Kilo tonnes – 1 thousand tonnes
kWh	Kilo Watt hour – 1 thousand watt hours
kWh/y	Kilo Watt hour per year – 1 thousand watt hours per year
LCD	Liquid crystal display
LED	Light-emitting diode
MCE	Ministerial Council on Energy
MEA	Mark Ellis & Associates
MEPS	Minimum Energy Performance Standards
MFD	Multi-function Device – imaging equipment
MoU	Memorandum of understanding
MRET	Mandatory Renewable Energy Target
Mt	Mega tonnes – 1 million tonnes
NAEEEC	National Appliance Equipment and Energy Efficiency Committee (now E3)
NAEEEP	National Appliance and Equipment Energy Efficiency Program
NEMMCO	National Electricity Market Management Company Ltd
NFEE	National Framework for Energy Efficiency
NGAC	New South Wales Greenhouse Abatement Certificate

NPV	Net Present Value
NRDC	Natural Resources Defence Council
NZ	New Zealand
OLED	Organic Light-emitting diode
PC	Productivity Commission
PC	Personal Computer
PI	Power Integrations
PJ	Petajoule – 10^{15} joules
PSMA	Power Supply Manufacturers Association (USA)
PSW	Power Supply Workshop
PV	Present Value
RIS	Regulatory Impact Statement
SME	Small to Medium Enterprise – a business with 1 – 19 people
SMPS	Switch Mode Power Supply
SNZ	Standards New Zealand
SRI	Star Rating Index
TBT	Technical Barriers to Trade Agreement
TTMRA	Trans-Tasman Mutual Recognition Arrangement
TV	Television
TWh	Tera Watt hour – 10^{12} Watthours
UNCC	United Nations Framework Convention on Climate Change
UNFCCC	United Nations Framework Convention on Climate Change
Vac	Voltage – alternating current

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Executive Summary

Purpose of Regulatory Impact Statement (RIS)
This regulatory impact statement (RIS) analyses the likely impact of the proposed introduction of Minimum Energy Performance Standards (MEPS) and Energy Rating labels in Australia for televisions (TVs).

Discussion and supplementary discussion papers were released in the last quarter of 2007 (available at http://www.energyrating.gov.au/library/details200710-tv-meps-labelling.html and http://www.energyrating.gov.au/library/details200719-tv-supplementary.html). These papers cover background information on television energy consumption, and technical information relevant to this RIS.

A consultation RIS was released in March 2009. Stakeholder comments were generally supportive of the proposed measures and did not challenge the validity of the approach and the conclusions presented in the consultation RIS. The Consumer Electronics Suppliers' Association (CESA), representing suppliers of a wide range of televisions in the Australian market, supported the proposal in general. However, CESA noted that the timeframe for industry to prepare for mandatory labels by 1 October 2009 would be tight given that should the Ministerial Council for Energy (MCE) approve the proposal it would also require the introduction of state/territory regulations and the processing of potential backlog of registrations by jurisdictions by 1 October 2009. Other suggestions included with the CESA submission have been incorporated as appropriate. The two community submissions were supportive of the proposal and consistent with the existing understanding of consumer sentiment (see http://www.energyrating.gov.au/library/pubs/2009-marketsurvey-tv.pdf).

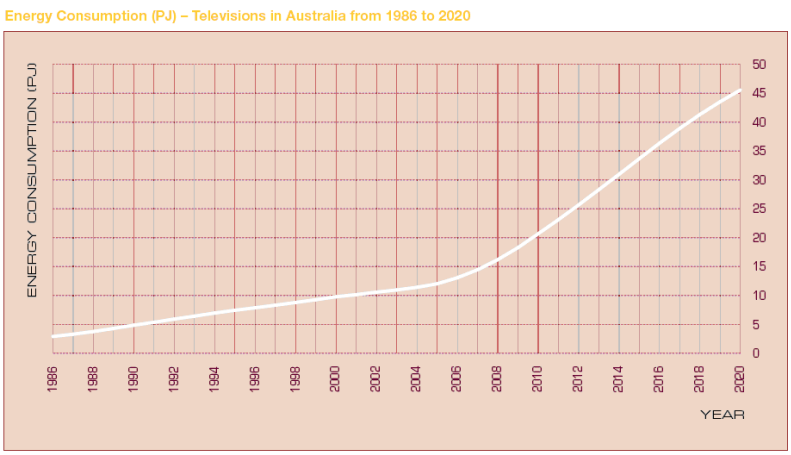
The problem
Climate change is a serious global challenge, requiring an effective global response. An important part of the response to climate change is the need to curb growth in energy demand. It is therefore a problem that the quantity of energy consumed by televisions has risen rapidly over the last 20 years and the BAU case sees this trend continuing. Television energy consumption in Australia is projected to rise from around 15PJ in 2008 to 45 PJ in 2020. Television energy use is already approaching the 22 PJ consumed by refrigerators in 2008. However, energy efficiency measures for refrigerators have been in place for many years and as a result refrigerator energy consumption is projected to slightly decrease to 20PJ in 2020 – a stark contrast with the business as usual (BAU) scenario for televisions.[1] Currently, Australia does not have any energy efficiency requirements in place with respect to televisions.

The figure below[2] provides a graphical depiction of television energy growth in Australia

[1] Department of Environment, Water, Heritage and the Arts, 2008, *Energy Use in the Residential Sector: 1986-2020.* p.56,64

[2] Department of Environment, Water, Heritage and the Arts, 2008, *Energy Use in the Residential Sector: 1986-2020.* p.64

Energy Consumption – Televisions in Australia (1986-2020)



Source: Department of Environment, Water, Heritage and the Arts, 2008, Energy Use in the Residential Sector: 1986-2020[3]

This regulatory proposal seeks to address The quantity of energy consumed by televisions and market failures that prevent energy efficiency opportunities in the television industry sector from being fully realised. Television energy use already represents a similar proportion of residential energy consumption seen in larger appliances such as refrigerators. Importantly, television energy consumption is rapidly growing - under the BAU scenario television energy consumption will be more than double that of refrigerators by 2020.

New televisions are consuming significantly more energy now than many other household appliances already subject to the mandatory Energy Rating Label or MEPS, because televisions are changing in both technology and size. Both factors have caused the average energy consumption of televisions to increase considerably over the last few years. In addition to the increased screen size, it is now evident that the number of televisions per household has also been increasing steadily over the last few decades. Conservatively, the number of TVs per household is at least two with evidence that it is actually between 2.4 and 2.7 per household.

The release of flat screen TVs has seen a massive turn in technology, accounting for 65 percent market share, while cathode ray tube (CRT) televisions has decreased to below 35 percent. In 2007, plasma sales accounted for around 17 percent of the market with Liquid Crystal Display (LCD) technology making up the difference with 48 percent of sales. The average screen size now being sold in Australia is fast approaching 106cm.

It is estimated that the stock of televisions in Australia was 17.8 million in 2007. The annual direct electricity consumption of these televisions was estimated at 6604 GWh/yr. In terms of greenhouse gas (GHG) emissions in 2007 this equates to 6883 kilotonnes (kt) of CO_2. In Australia, there were around 2 million televisions sold during 2007[4]. However, in the first six months of 2008 LCD TV sales increased by an astonishing 52 per cent and Plasma sales by 38 per cent. Total sales for 2008 will be well in excess of 2 million.

[3] This figure's proctctions were compiled with data from various sources available up to and including 2008. Actual consumption may vary depending on unforeseen technology development and the impact of energy saving scheme in various parts of the world

[4] GfK article "Falling Prices Encourage Flat TV Sales", Appendix No.14

Further, research conducted indicates that energy use of televisions is generally absent or not featured in the advertising material for televisions (see section 2.4.3). This means that consumers are not able to make fully informed decisions when they purchase televisions.

The objective
The primary objective of the proposal is to improve, in an efficient manner, the energy efficiency performance of the television product sector in Australia. Improvements in television energy efficiency will decrease household energy costs and greenhouse gas emissions below what they are otherwise projected to be (i.e. the 'business as usual' case). Improved television energy efficiency will also reduce total residential energy demand, decreasing pressure on energy supplies.

A secondary objective is to provide consumers with the information necessary to encourage informed purchase decisions concerning the energy efficiency of televisions.

A third objective is to provide a degree of consumer protection from unnecessarily high running costs and to provide a level of insulation from the electricity price rises that will come with the introduction of the CPRS.

Within the objective, any measure must also provide a net benefit to the community, while the preferred option must provide the greatest net benefit.

The Case for Government Intervention
Government intervention can assist in correcting market failures and market impediments that currently restrict the take up of potential energy efficiency improvements in the TV market.

Australia's in-coming Carbon Pollution Reduction Scheme (CPRS) from 2010 is anticipated to address the negative externalities of greenhouse emissions. However, the CPRS will not address all market failures, including those preventing the uptake of energy efficiency opportunities. In this case complementary policies are required.

New television technology is consuming an increasing amount of energy. The graph on the following page depicts projected television energy consumption in purple and illustrates the severity of increased energy television use to 2020, as a proportion of total residential energy use. It is evident that Australians are spending far more on running televisions than ever before.

Market failure specific to television energy consumption is apparent in a number of ways.

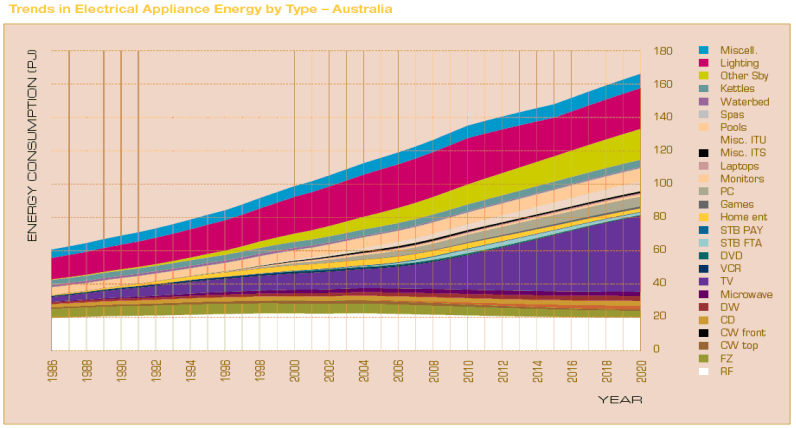
Firstly, there is an information gap in the market, commonly known as an information asymmetry. As a result many consumers are unaware of the energy consumption of televisions and manufacturers are not obliged to share this data. This information deficiency is evidenced by surveys of consumers and retailers and a survey of TV marketing material conducted for this RIS (see sections 2.5.1,2.5.2 and 2.5.3). The survey of TV marketing material showed that in all cases, electricity consumption was not a feature that was promoted in the advertising. The consumer study found more than half of consumers considering buying a new television found it difficult or very difficult to find any information relating to the energy consumption of televisions. A majority of consumers also significantly underestimated the power consumption of televisions relative to other common household appliances. The results also suggest that due to the increasing energy intensity of new television technology, energy efficiency would be strongly considered in purchasing decisions if it was made available. Mandatory labelling will effectively address this information gap.

Secondly and arising from the first point, there appears little incentive (or market signals) currently for TV manufacturers to produce more energy efficient units or to promote this feature. While some specialist information is available to consumers, for example, via websites (e.g. www.comparison.com.au), this information is limited, can be misleading (e.g. provides information on maximum power use rather than average power use) and there is little explanation on how the energy rating scale has been established. As a result, this situation makes it hard for consumers to make informed, rational decisions. It should be noted: consumer

advocates such as the Australian Consumers Association (ACA) provide higher quality information on selected televisions for testing. However, information is not provided for every model in the market place and consumers are required to subscribe to access such services. Consumers access this high quality information to compare a range of criteria, including energy efficiency. The proposed mandatory efficiency labelling scheme has worked effectively for over 20 years for a number of different products and would appear to be the best measure to address TV information failures. It is unlikely that this scheme will have a significant impact on the viability of ACA services as consumers seeking independent information on technology type, picture quality, sound quality, ease of use or other features not described by the energy rating label, will warrant access to ACA reports.

Thirdly, energy bills are aggregated and periodic and therefore do not provide immediate feedback on the effectiveness of individual energy saving investments. Consumers must therefore gather information and perform a reasonably sophisticated calculation to compare the life-cycle costs of individual television models and sizes, but many lack the skills. For others, the amounts saved are too small to justify the time and effort required. This could be attributed to bounded rationality – some consumers will not be able to make a decision encompassing all aspects of a TV purchase and others will choose to save time by either ignoring or discounting certain factors, including energy costs (given the low cost of energy in Australia). A combination of MEPS and labelling measures will reduce unnecessary energy use in TVs. Labelling assists those consumers who choose to factor energy efficiency into their purchase decision. MEPS will address the various forms of bounded rationality discussed above by removing the most energy intensive television models from the market. This protects these consumers from unnecessarily high running costs and provides the overall benefits associated with reduced total energy use to the whole economy.

Trends in Electrical Appliance by Type – Australia



Source: Department of Environment, Water, Heritage and the Arts, 2008, Energy Use in the Residential Sector: 1986-2020[5]

Fourthly, in addition to the inability or unwillingness of some consumers to grapple with issues of annual and lifetime running costs, there are other factors leading to bounded rationality in the TV market. TVs have a high capital cost to energy running cost ratio. TVs also have a high

[5] This figure's proctctions were compiled with data from various sources available up to and including 2008. Actual consumption may vary depending on unforeseen technology development and the impact of energy saving scheme in various parts of the world.

"service quality" requirement - the picture quality and other product features such as sound quality, appearance, reliability, brand perception have a greater bearing on consumer satisfaction than does energy performance. With this in mind, consumers could choose to ignore or forego the assessment of important information such as energy use, which may not necessarily be significant in their purchase decision. Again, MEPS addresses this form of bounded rationality.

Fifthly, price inelasticity of energy demand will effectively dilute the price signal stemming from the CPRS. Electricity prices will rise, but consumer demand for the current level of performance provided by that energy will not drop by the same amount.
The National Electricity Market Management Company Ltd (NEMMCO) recommend that a long run elasticity of demand of 0.25 for the Australian residential sector be used (NEMMCO, p. 3). This means that for a one percent increase in electricity price, demand will reduce by just one quarter of one percent. In the particular instance of television use, it is the opinion of the proposal authors that many consumers will not look at their electricity bill and then make an effort to use their television less because for most consumers this would involve a drop in their utility of that appliance – they use a television for enjoyment, information gathering, not as a energy using device. Again, MEPS addresses this barrier to energy efficiency take up and allows for the benefits of energy savings to flow to the economy.

Government intervention in the television market, in the form of mandatory labelling and MEPS can reduce the effect of all the above impediments to energy efficiency improvements. Reducing market impediments will provide increased opportunity to realise energy efficiency gains and enable consumer utility to remain at the same level while still providing savings through reduced running costs and avoiding carbon emissions.

Garnaut[6] has recently considered possible market barriers to take up of energy efficiency improvements as part of his review of climate change. The report states that information asymmetry can be corrected through the use of mandatory disclosure of which energy rating labels are an example. The report also states that bounded rationality can be addressed by MEPS. The report states that any government intervention in the form of mandatory labelling and MEPS must be cost effective and deliver net benefits.

The proposal
The E3 Committee propose Ministers agree to a regulatory package for televisions based around two decisions:

Tier 1- Commencing not earlier than 1 October 2009:

- mandating energy efficiency star labelling for all televisions with the detail contained in Australian Standard AS/NZS 62087;
- mandating initial energy performance requirements for all televisions, equivalent to 1 star in the rating scale published in Australian Standard AS/NZS 62087;

Tier 2 - Commencing not earlier than 1 October 2012

- maintaining the mandatory algorithm underpinning the labelling scheme
- mandating a more stringent energy performance requirements for all televisions, equivalent to 4 star in the rating scale published in Australian Standard AS/NZS 62087;
- providing authority for Energy Efficiency regulatory agencies to extend the timeframe should the findings of a marketplace review (conducted after 12 months and published within 18 months) not confirm the anticipated improvements in energy efficiency of televisions. This decision would authorise regulators and industry to negotiate a longer timetable to implement regulation if expert projections are not accurate.

[6] Garnaut, R, 2008, *Garnaut Climate Change Review Final Report, September 2008*, Chapter 17

The proposed mandatory labelling scheme will transition from a voluntary labelling scheme in Australia, which was officially announced by the Australian Minister for the Environment in June 2008.

It is anticipated that the mandatory labelling scheme will provide a highly effective and proven means of addressing information asymmetry market failures. Mandatory labelling acts in two ways to encourage better energy use of televisions. Firstly, by informing consumers on the energy performance of available televisions in the market, consumers are empowered to make informed decisions related to future energy consumption and associated costs. Secondly, the label provides manufacturers with a competitive marketing tool to promote improvements in television energy use. Therefore, by addressing information market failures, labelling allows energy efficiency to become a point of difference between competitors in the market place.

The mandatory labelling scheme was initially proposed and agreed with industry to commence on 1 April 2009. However, due to several delays associated with development of the standard and recent discussions with the Consumer Electronic Suppliers Association (CESA), it has been acknowledged that 1 April 2009 is no longer achievable. Given recent delays the E3 Committee now propose to implement mandatory labelling from 1 October 2009.

MEPS have been proven to complement labelling. A retrospective study completed in 2006 on the impacts of Labelling and MEPS on refrigerators and freezers, found that both measures were effective. MEPS was more effective than originally forecast and there was no impact on price as a result of MEPS.[7] For more information on the dual effectiveness of MEPS and Labelling please see section 4.7.3

In the television market MEPS will operate to ensure that the worst performing television products (in terms of energy consumption) are either modified to improve their energy efficiency, or withdrawn from sale and sets a minimum energy standard for industry. It is important to note that the proposed MEPS levels will not remove or restrict competition. It is anticipated that the current division of market share among technology types (see section 1.5) will not be greatly altered by MEPS. E3 acknowledge that some 2007/8 Plasma models will not comply with Tier 1 MEPS, however major Plasma suppliers have confirmed that they will have replacement models ready before October 2009. (More information is available below and in sections 1.5, 2.3.2 and 4.7.1).

Tier 1 MEPS under this proposal is designed to serve two purposes. Firstly MEPS will encourage and promote innovation, and maintain a minimum level of energy efficiency improvement across the television market. Secondly, MEPS will serve as a consumer protection measure. It is estimated that the proposed Tier 1 MEPS level, if implemented now, would affect 9.1 percent of models on the market, using data from the last quarter of 2008. This indicates that the level of market transformation as a result of Tier 1 MEPS to October 2012 is limited, but, consumers who cannot compute the energy savings or choose to ignore energy efficiency information in their purchase decision will be protected from excessive and unnecessary running costs.

This proposal considers it particularly important that Tier 1 MEPS be provided as a consumer protection measure for several reasons:

- Large televisions use very large amounts of electricity – more than clothes washers, clothes dryers and dishwashers combined.
- Testing has shown that the difference between an efficient and inefficient television of the same size and technology varies by up to 41 percent (see section 2.2.4)
- As an example, a one star, 106cm television (the average size for new televisions) consumes around 220kWh less than a zero star television. At 15 cents a kWh this is an annual saving of $33 (for more information, please see section 4.7.4).
- Many consumers are unaware that televisions do use energy on this scale (Gfk Australia survey). The Artcraft consumer study of 2005 indicated that most consumers

[7] EnergyConsult, 2006, Retrospective Analysis of the Impacts of Energy Labelling and MEPS: Refrigerators and Freezers, October 2006, pp. E7 – E9

only use the star rating of the energy label – not the kWh consumption figure (Artcraft, 2005, p. 141).

- Labelling provides information, but bounded rationality means that some consumers do not use all the information provided to them. Some consumers will not use the information provided by the label to calculate and then compare the running costs of different sets. These consumers will therefore not realise that their running costs could be substantially lower if they select the most efficient model available in their chosen size. MEPS will reduce the number of under performing models on the market, therefore providing a degree of protection to those consumers.
- The Council of Australian Governments (COAG) has agreed that energy efficiency measures be accelerated in order to minimise the negative impact on households of higher electricity prices that will result from the CPRS.
- The Department of Broadband, Communications and the Digital Economy[8] has proposed a digital switchover for free to air TV broadcasts by the end of 2013. This may result in accelerated sales of flat screen TVs as consumers buy new digital ready televisions – these consumers switching from an older CRT TV should be protected from purchasing inefficient models which could use more than double the amount of energy.

Tier 2 MEPS is anticipated to strengthen the consumer protection measure by ensuring running costs for televisions decrease over time. Section 4.7.3 provides examples of the individual energy and cost savings of a 4 star 106cm television over a 1 star 106cm television. However, it is also assumed Tier 2 MEPS will encourage market transformation – that is the entire product sector will take a significant step up in improving energy performance. Tier 2 MEPS will provide the largest portion of the energy savings and carbon emissions avoidance projected to result from the measures outlined in this RIS.

Two options for MEPS Tier 2 have been proposed:

- Increase the stringency of MEPS to 3 stars (as agreed with industry); or
- Increase the stringency of MEPS to 4 stars.

The increase to Tier 2 MEPS from 3 to 4 stars will gain additional benefits in energy savings and costs. It is estimated that additional costs to consumers will not result from the change in the MEPS level. In addition, current evidence collected through the voluntary labelling scheme indicates that a four star MEPS from 2012 is feasible. E3 have received notifications from several large manufacturers including Samsung, Panasonic and Sharp that some 2009 models (plasma and LCD) will be capable of achieving energy ratings between 2 and 5 stars. It therefore seems reasonable to expect that by October 2012, both plasma and LCD technology will have improved sufficiently enough across the market to meet the Tier 2 MEPS requirement. Given the E3 recommendation to delay mandatory labelling, significant energy consumption and greenhouse emission savings will be lost over the six month period (from April to October 2009). The E3 Committee propose to increase the timeframe of MEPS Tier 2 if the findings of a marketplace review do not confirm predictions of the rate of television efficiency improvement.

It should also be noted that at the July 2008 stakeholder meeting, industry associations including CESA agreed to the Tier 1 and 2 (at the less stringent 3 star option) MEPS levels for implementation in October 2009 and October 2012 respectively. Further; agreement was reached to retain the existing energy rating algorithm under Tier 2 MEPS.

While there is not exhaustive data on the effects of MEPS and labelling on televisions; there is detailed knowledge of the television market. It is known that:

- The television market is highly competitive, with the top 100 selling models in the first half of 2008 accounting for only 61% of the market and those models split between 23 brands (GfK Australia web article);

[8] More information on the Digital Switchover can be found at www.dbcde.gov.au

- Currently there is no correlation between price and energy efficiency in the television market (see section 1.5.1);
- Prices for televisions are falling (section 1.1.1 & Gfk web article);
- Both Plasma and LCD technologies have many models, among different brands, that qualify for MEPS;
- Both Plasma and LCD technologies have the capacity to make further energy efficiency improvements;
- There is a fairly rapid model turnaround in the television market of between 6 and 18 months; and
- Industry associations and major suppliers have been aware of the proposed labelling and MEPS program since October 2007.

These factors in combination mean that the risk of Tier 1 MEPS, proposed for commencement in October 2009, acting to increase prices of models is very low. The risk that some poor performing models will remain on the market in the absence of a MEPS measure is comparatively high. These factors – model turnaround, available technology and a competitive market place also mean that the risk that Tier 2 MEPS will increase price is also very low.

Assessment

In the following analysis, a sales growth of 2.6 percent has been used:

- a base scenario of MEPS at an average 3 star performance of remaining models due to the influence of labelling; and
- a second scenario of MEPS tier 2 at four stars, and labelling.

Australia

The following table summarises the analysis for Australia for the period 2007 to 2020. The data presented is based upon Present Value (PV) calculations at a discount rate of 7.5 percent.

Summary Data for Alternative BAU Sales Australia – 7.5% Discount Rate

Scenario	MEPS and Labelling (Tier 2 at 3 stars)	MEPS and Labelling (Tier 2 at 4 stars)
Energy Saved (cumulative)	34.1 TWh (122.8 PJ)	40.1 TWh (144.4 PJ)
GHG Emission Reduction (cumulative)	31.3 Mt CO_2-e	36.7 Mt CO_2-e
Total Benefit	$5052M	$6052M
Total Cost	$188M	$185.3M
Cost Benefit Ratio	26.9	32.67

Note: The benefits, costs and cost benefit ratio are calculated to include any TV sold in 2020 to the end of that TVs predicted life.

A cost benefit ratio of 26.9 clearly demonstrates that action should be taken to improve the energy efficiency aspects of televisions. Even at a higher discount rate of 10 percent, for the base scenario, benefit-cost ratios are positive at 23.2. If the incremental costs of improved product to meet the MEPS are increased by 200 percent from the values assumed in the RIS analysis, the benefits are still approximately 9.2 times the costs under the base model scenario. Although the future carbon price under the forthcoming Carbon Pollution Reduction Scheme (CPRS) is uncertain, at present, emissions trading will mean the estimated benefits will always be higher than without emissions trading (i.e., the benefits will always be higher when the carbon price is above zero). The CPRS will not provide an alternative to the proposed MEPS and labelling as it will not provide the consumer with the information necessary to determine the energy consumption implications of their TV purchase and it will not act to remove poor performing products from the market.

Other Options

The other options considered for achieving the objective are:

- voluntary codes of practice;
- voluntary labelling;
- levies and emissions trading;

- a certification program; and
- dis-endorsement labelling.

Voluntary codes of practice rely on equipment suppliers organising themselves and other stakeholders into an effective organisation that could develop the appropriate codes and standards that would ultimately be necessary to achieve the desired reduction in energy use. Stakeholder feedback indicated that a significant number of suppliers would not participate in such a code for televisions and therefore this alternative has not been considered further.

A voluntary labelling scheme has been introduced in Australia from November 2008 and is intended to transition into mandatory labelling. Although the scheme will partially address information asymmetry in the market, it is unlikely all suppliers will participate. Participating suppliers are also unlikely to label their full model range. Additionally, industry including the Consumer Electronics Suppliers Association (CESA) has only agreed to participate in the voluntary scheme on the understanding that a mandatory labelling scheme would be implemented. The Garnaut report references the Productivity Commission on the issue of the relative merits of voluntary and mandatory labelling and states "*Disclosure schemes will be far more effective if they are mandatory, as sellers are only likely to apply voluntary labels to high-performing products, leaving consumers unable to select among average and poorly performing products*[9]*.*

As of 1 February 2009 two suppliers have one model each available in Australian retail stores that bear the voluntary label. Given that the scheme was announced on June 2008 and the limited amount of participation in the scheme, it appears quite clear that a stand alone voluntary scheme will not work.

Product levy options are considered an inferior policy choice as a general levy would not target energy consumption related to the use of TVs. Therefore E3 considers it would be an indirect measure to address the identified problem.

The Australian Government has announced that a Carbon Pollution Reduction scheme (CPRS) will be implemented no later than 2012.

Professor Garnaut has released a draft report on the Australian CPRS and stated:

> *"The introduction of an emissions trading scheme will increase returns from adopting opportunities to lower emissions. However, market failures will impede adoption of opportunities that may be privately cost-effective. Policies that tackle these market failures would lower the cost of mitigation across the economy."*[10]

Certification is unlikely to succeed as the program is likely to cover only a proportion of the televisions available. It would also involve the establishment of an independent testing facility and the management of a register of certified product. Even if suppliers did participate in such a scheme there would be a tendency for only the better performing product to be certified leaving poorer performing models in the market place.

A dis-endorsement labelling scheme is very unlikely to be effective for televisions, as these products are sold on the basis of their price, screen size and technical specifications. It would therefore appear to be unjustified and inappropriate in Australia.

Recommendation

After consideration of all alternative options to address this solution it is concluded that:

- The mandatory MEPS and labelling option is likely to be the most effective means to meet the stated objectives;
- None of the alternatives examined appear as effective in meeting all objectives. Some would be completely ineffective with regard to certain objectives and others appear to

[9] Garnaut, R, 2008, *Garnaut Climate Change Review Draft Report, June 2008*, p. 454.

[10] Garnaut, R, 2008, *Garnaut Climate Change Review Draft Report, June 2008*, p. 442

be considerably more difficult or costly to implement and may possibly misinform consumers.

A table of specific comments was requested by the E3 Committee as part of the consultation RIS. Responses to that request are listed in Section 6.

1 SCOPE

1.1 Regulatory Impact Statement

This Regulatory Impact Statement (RIS) has been prepared to demonstrate the net benefits of regulating Minimum Energy Performance Standards (MEPS) and energy rating labels for televisions.

This document presents the evidence of market failure with respect to the energy use of televisions. It also presents the evidence that there is a significant benefit-cost ratio (26.9 at a discount rate of 7.5 percent by 2020 in Australia) for the introduction of MEPS and energy rating labels.

1.2 Australian Policy Context

This regulatory proposal cannot be assessed in isolation; it forms part of a coordinated response by Governments to undertake regulatory measures for any energy-using products that are cost-effective and meet agreed environmental and energy goals.

1.2.1 Australia's Response to Climate Change

Australia's greenhouse abatement and climate change policies have evolved steadily since the release of the National Greenhouse Response Strategy in 1997. The paper received overall bi-partisan support, including support for national energy efficiency measures. Appendix 2 records some of the more important stages in that development.

On 11 March 2008, Australia's ratification of the Kyoto Protocol was officially recognised by the United Nations Framework Convention on Climate Change (UNCCC). Under Kyoto, Australia is obliged to limit its greenhouse gas emissions in 2008-2012 to 108 per cent of 1990 emission levels. The Australian Government has also released a report demonstrating how Australia intends to measure the reductions in emissions required under Kyoto titled Australia's Initial Report under the Kyoto Protocol.

In October 2008, the Council of Australian Governments (COAG) agreed to develop the National Strategy for Energy Efficiency, to accelerate energy efficiency efforts across all governments and to help households and businesses prepare for the introduction of the incoming Carbon Pollution Reduction Scheme (CPRS). Streamlined roles and responsibilities for energy efficiency policies and programs will be agreed in early 2009. The strategy will be implemented by June 2009, ensuring that programs assisting households and businesses to reduce their energy costs are in place before the CPRS is introduced.

Most recently, the CPRS White Paper, released in December 2008 stated on page 110 (Vol 2) that:

"Energy efficiency is the final piece of the emissions reduction strategy. Energy use is the key driver of emissions growth in Australia. The Renewable Energy Target and CCS will reduce the emissions produced and released in generating energy, but there is also considerable scope to increase the efficiency of energy use. Using energy more efficiently can significantly reduce the cost of greenhouse gas abatement and ease the transition to a low-carbon economy"

and

"There are several impediments to the uptake of energy efficiency measures, including gaps in the information available to households and businesses to make informed decisions. By becoming more energy efficient, households can reduce the cost impacts of the Scheme. Prior to the commencement of the Scheme, the Government will deliver household energy efficiency

initiatives building on existing programs to help households do their bit to tackle climate change and reduce energy bills".

Energy Efficiency Policy
Since October 2006, Australia has had a policy of adopting "new energy efficiency measures which deliver net public benefits, including low cost greenhouse abatement measures that do not exceed the cost of alternate measures being undertaken across the economy".

This policy means the MCE will consider new regulatory measures that may have net up-front costs but have greater private economic and greenhouse benefits over the long term.

Equipment Energy Efficiency Program
The proposed regulation is an element of the Equipment Energy Efficiency Program (E3), formerly known as National Appliance and Equipment Energy Efficiency Program (NAEEEP). E3 embraces a wide range of measures aimed at increasing the energy efficiency of products used in the residential, commercial and manufacturing sectors.

E3 is an initiative of the MCE, and is an element of the NFEE. It is organised as follows:

- Implementation of the program is the direct responsibility of the Equipment Energy Efficiency Committee (referred to as the "E3 Committee"), which comprises officials from Australian federal, state and territory government agencies. These officials are responsible for implementing product energy efficiency initiatives in the various jurisdictions.
- The E3 Committee reports through the Energy Efficiency Working Group (E2WG) to the MCE and is ultimately responsible to the MCE.
- The MCE has charged E2WG to manage the overall policy and budget of the national program.
- The members of the E3 Committee work to develop mutually acceptable labelling requirements and MEPS. New requirements are incorporated in Australian and developed within the consultative machinery of Standards Australia.
- The program relies on State and Territory legislation for legal effect in Australia, enforcing relevant Australian Standards for the specific product type.
-

The broad policy mandate of E3 has been regularly reviewed over the last decade. Not only is any energy-using equipment type potentially included in resulting work plans for possible regulation but televisions were specifically nominated for regulatory impact assessment.

1.3 Television Technologies

Televisions are a well known consumer product. Until recently, CRTs were the only display technology available on the market. However, this technology had a number of fundamental limitations that affected the size and resolution of televisions. New display technologies have now appeared including Plasma and LCD units. Projection televisions and Digital Light Processing (DLP) units have also been introduced although, similar to CRT, limitations have only seen minor market penetration.

The impact of the introduction of these display technologies has meant that the average size of televisions has considerably increased, rising from below 68cm to around 106cm in less than 5 years. In addition many models are now offered with a resolution of 1080 viewable lines (known as Full High Definition (HD)). This coupled with HD content from broadcasters and the development and production of Blue Ray disks (a DVD format capable of HD playback) has seen consumers increasingly attracted to these new technology types. However, these devices use more energy to operate – a drawback which is usually unknown to the consumer due to the lack of information available.

1.4 Policies and Measures related to Televisions

The E3 Committee has been involved in developing policies applying to end-use appliances, including TVs.

Interest in televisions has increased due to projections presented in the E3 discussion paper on television MEPS and labelling.[11] The paper states that due to an increase in screen size and number of units per household, televisions have become the fourth highest domestic user of energy behind Space heaters/coolers, Water heaters and refrigerators.

These policies are outlined below.

1.4.1 ENERGY STAR

Australia is an international ENERGY STAR partner for some office and home entertainment equipment, specifically:

- Computers and monitors;
- Printers and fax machines;
- Photocopiers;
- Multi-function devices;
- VCRs; and
- Audio and DVD products.

ENERGY STAR is a voluntary program whereby conforming products are required to meet specific criteria, which are usually similar to those in the USA. The latest criteria, released in November 2008, for monitors and imaging technologies include criteria for active mode.

New Zealand also uses the ENERGY STAR mark to promote energy efficiency in standby for the products above as well as televisions, and also a range of other products, some of which are required to meet criteria tailored specifically to the Australasian market. In November 2008, New Zealand introduced new criteria for televisions, which cover active modes of use as well as standby, (http://www.energystar.govt.nz/energy-star-products/home-electronics/televisions).

1.4.2 Standby Power Plan

In 2003 and 2004, NAEEEC published a series of standby profiles, indicating the Government's plans for a range of appliances, some of which are packaged with televisions.
These include:

- Photocopiers
- Computer Printers
- Scanners & Multifunction Devices
- Portable Stereos
- Video Cassette Recorders
- Modems
- PC Speakers
- Garage Doors
- Burglar alarms
- Integrated Stereos
- Set Top Boxes
-

In accordance with the standby strategy, proposed efficiency targets were identified for each appliance and the Government signalled its commitment to publish the required criteria in Australian Standards.

Further, in order to provide a uniform test method for the measurement of standby power consumption, Standards Australia published AS/NZS 62301 Household Electrical Appliances—Measurement of Standby Power (a clone of IEC CDV draft) in 2003. It is also planned to add separate parts to the standard with test procedures specific to individual products.

[11] Digital CEnergy Australia Supplementary Discussion Paper on MEPS and Labelling for TVs, December 2007

1.4.3 Television Regulation

Australian and international studies have identified that televisions are candidate products for intervention to address market failure.[12]

This RIS studies the impact of proposed mandatory MEPS and energy rating labels for televisions, with a nominal 230 Vac. mains supply. The scope includes monitors designed primarily for television viewing but excludes both rear and front projection televisions. Monitors designed primarily for computer display or televisions that are battery operated are also excluded from the scope of this RIS.

The energy consumed by a television is defined as the energy used in average on mode as defined in the draft AS/NZS 62087 Part 1, standby modes as defined in IEC 62301 and AS/NZS 62087 Part 2.2. This will include televisions that are powered from an external power supply (EPS).

1.5 The Television Market

All televisions sold in the Australian marketplace are manufactured overseas. However, from time to time limited assembly of products takes place locally; usually for special purposes. However, this is insignificant compared to the vast number of televisions sold annually and even these televisions use components that are manufactured overseas, in particular the display panels that account for most of the power consumption of a television.

As Australia introduced Digital Television (DTV) requirements that are unique, and televisions are generally produced in large factories for the world market, there is a need to adapt televisions for the Australian market. These modifications are in general small and mostly relate to software and firmware. While the majority of televisions are made in China, some are manufactured in other south-east Asian countries such as Japan, Taiwan, Korea, Malaysia and Indonesia.

In the Australian market the dominant technology is now LCD. Sales of all technology types totalled 2,370,812 for the 12 months from November 2007 to November 2008 in the Australian market. LCDs accounted for 57% of sales. Plasma is popular in the larger available screen sizes and accounted for 22 percent of the total market. Generally, CRT televisions are rapidly disappearing with market share down to 21%. Rear projection televisions are also rapidly losing market share and account for less than 1 percent of the market. (Data obtained from GfK Retail and Technology, Australia). The dominant small to medium (size up to 106cm) FPD market is dominated by LCD technology, however plasma sales remains strong in 127cm plus category. It should be noted though that LCDs are starting to compete strongly in the larger screen sizes.

Average screen size is rapidly increasing and is now approaching 106cm. This increasing trend is expected to continue into the future. Average screen size has increased from 68cm to 106cm over the last 5 years. This increase in screen size has also increased the energy consumption of many models currently sold.

Analysis of the TV market shows that the market is dominated by around 15 suppliers that jointly control around 65 percent of the market (of these the 5 major suppliers have a joint share of over 50 percent).[13] The remaining 35 percent of the market is made up of around 17 smaller suppliers.

The recent November 2007 to November 2008 sales figure of over 2.35 million units sold confirms earlier information obtained from industry suggest that there are at least 2 million televisions imported into Australia each year. Industry sources have estimated that the market grows on average each year by around 2.5 – 3.5 percent. Sales grew faster than this in 2008. The first half of 2008 saw very strong growth with LCD and Plasma sales up 52% and 38%.

[12] Digital CEnergy Australia Supplementary Discussion Paper on MEPS and Labelling for TVs, December 2007

[13] Figures supplied by Industry.

1.6 Comparison of LCD and Plasma Pricing

Stakeholder comment suggests that larger LCD televisions are not price competitive with similar screen size plasma technology; however, a recent survey of 50 televisions conducted in April 2008 shows that there is no significant difference in the price between LCD and Plasma in most cases. The proposed MEPS levels will limit sale of TVs which do not meet or exceed the efficiency requirement, irrespective of technology type. In practise, Tier 1 MEPS will affect only the least energy efficient Plasma televisions available, but there is no evidence to suggest that the small number of models that will not meet the proposed level are the least expensive.

Figure 5 further below also demonstrates that all prices across technology are falling.

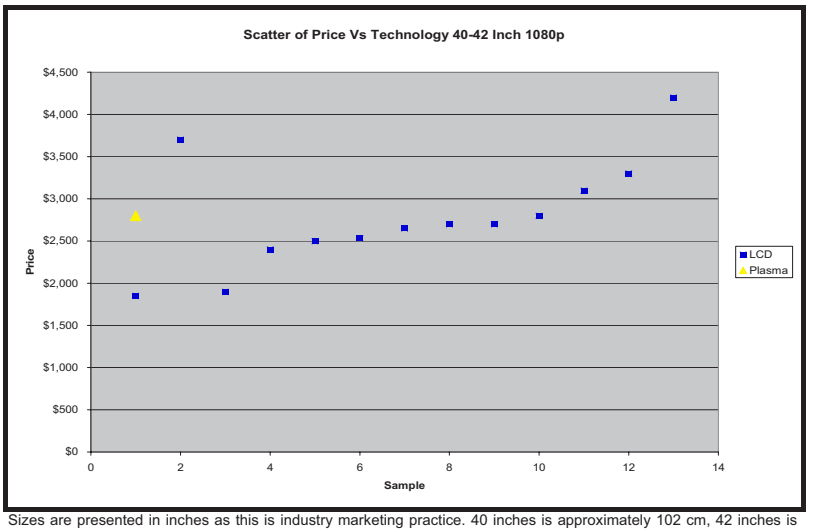
As evident below, LCDs are widely available in the smaller screen size market, while Plasma's are largely produced for the larger screen size market. However, where a price difference does exist between the technology types, there is evidence to suggest LCD prices are falling rapidly to become competitive in both markets over the short term. Figure 1 to

Figure 4 show a series of scatter charts prepared from data of 50 televisions collected in April 2008 from prominent TV retailers.

Two types of resolution quality are described in the figures below:

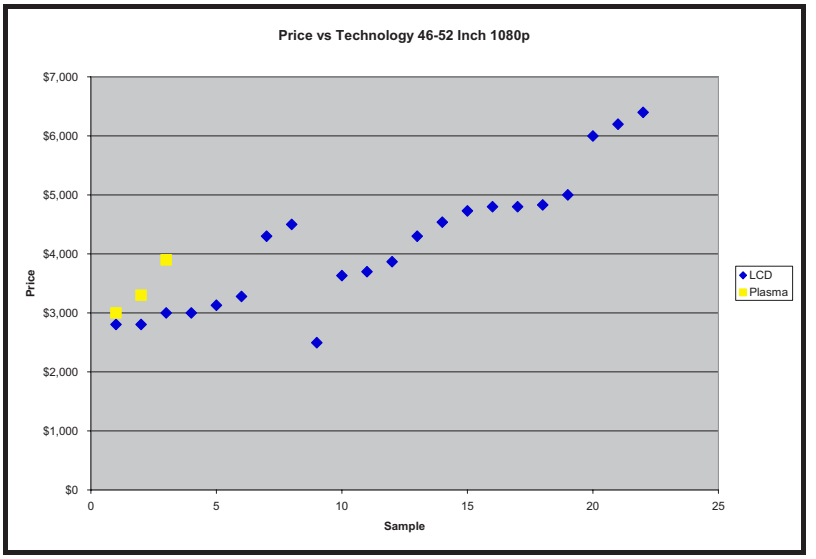
- HD (or HD ready) TVs specify only the vertical resolution and are capable of 720 pixels or above. The display output can also accept full HD signals, by scaling such higher resolutions to fit the panel resolution. However, the picture quality will be compromised.
- Full HD TVs are capable of producing displays with a horizontal resolution of 1920 and vertical resolution of 1080 pixels. The display panel has the ability to reproduce the maximum HD digital broadcast output available, without downscaling.

Figure 1: Scatter chart of pricing for LCD and Plasma 40-42 Inch 1080p (Full HD) TVs



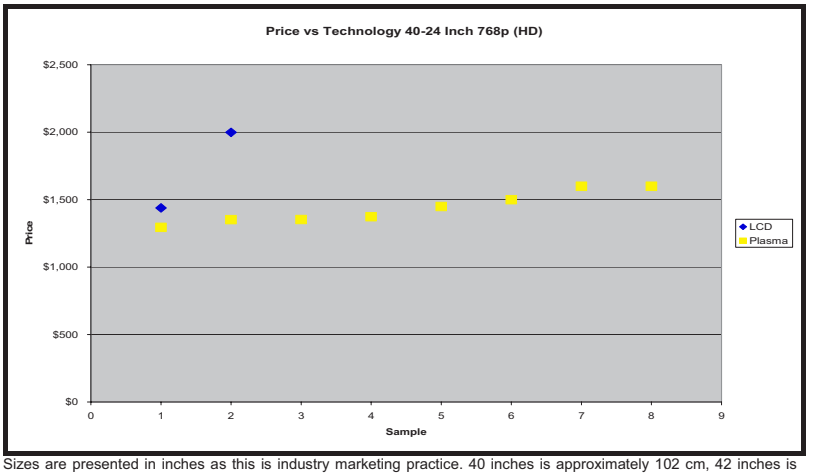
Sizes are presented in inches as this is industry marketing practice. 40 inches is approximately 102 cm, 42 inches is approximately 107cm.

Figure 2: Scatter chart of Pricing for LCD and Plasma 46-52 Inch 1080p (Full HD) TVs



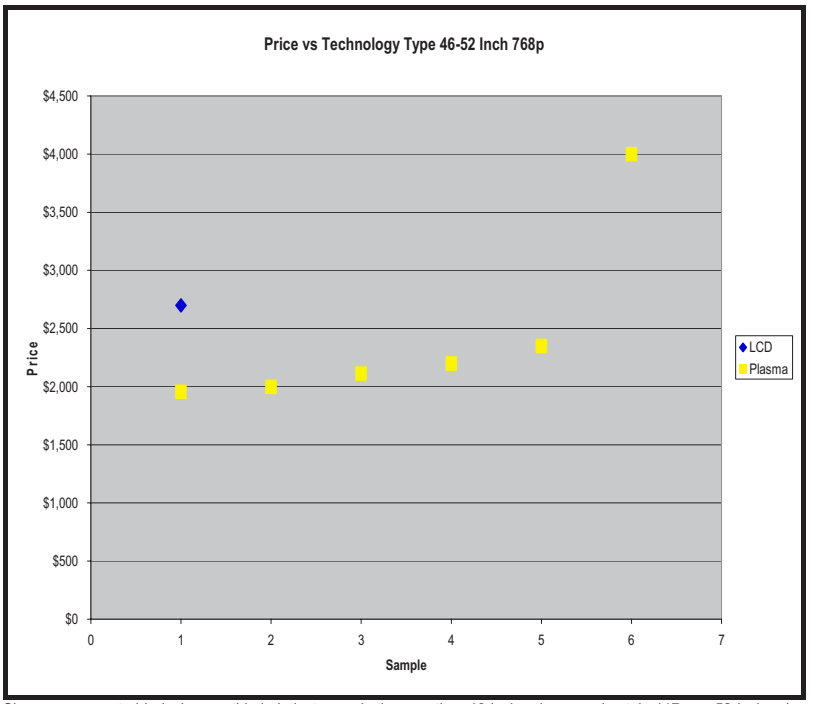
Sizes are presented in inches as this is industry marketing practice. 46 inches is approximately 117 cm, 52 inches is approximately 132cm.

Figure 3: Scatter chart of pricing for LCD and Plasma 40-42 Inch 768p (HD) TVs



Sizes are presented in inches as this is industry marketing practice. 40 inches is approximately 102 cm, 42 inches is approximately 107cm.

Figure 4: Scatter chart of pricing for LCD and Plasma 46-52 Inch 768p (HD) TVs



Sizes are presented in inches as this is industry marketing practice. 46 inches is approximately 117 cm, 52 inches is approximately 132cm.

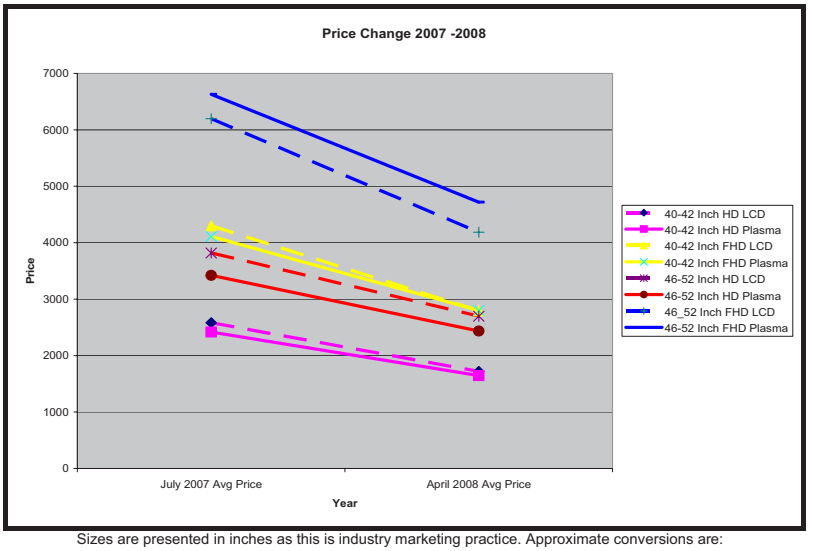
Figure 1 and Figure 2 illustrate a spread of data that places Plasma toward the middle of the pricing range. Both figures show clearly that LCD televisions exist at a lower pricing point than that of Plasma models.

Figure 3 and

Figure 4 show that on average, HD plasmas are lower priced when compared to HD LCD products. There may be, however, another explanation for the apparent higher price placed on LCDs.

Figure 5 shows a number of interesting trends over the time period 2007 to April 2008. These include the general rapid price reduction of LCDs and Plasmas and the lower position, in terms of price, that Full HD LCD televisions have compared to Plasma. The same survey showed many more Full HD LCD models are being introduced into the market (see Table 1) and the price competition in these segments is showing clear advantage to LCD.

Figure 5: Time series of price changes between samples in July 2007 and April 2008.



Sizes are presented in inches as this is industry marketing practice. Approximate conversions are:
40 inch / 102 cm, 42 inch / 107cm, 46 inch / 117 cm, 52 inch / 132cm, 60 inch / 152 cm

Both the Full HD categories show lower prices for LCDs than for the equivalent Plasmas. The higher LCD HD prices could be a due to older models being offered and the likelihood that LCD suppliers are not pursuing better pricing as Full HD becomes the dominant technology.
Table 1Table 1 and Table 2 shows the data in another way.

Table 1: TV Pricing for Full HD TVs collected in April 2008 showing highest, lowest, average and the number of models.

Full HD	LCD	Plasma
Screen Size Range	40-42 Inch	40-42 Inch
TVs on Offer	11	1
Average Price	$2,797	$2,799
Lowest Price	$1,850	$2,799
Highest Price	$4,199	$2,799
Screen Size Range	46-52 Inch	46-52 Inch
TVs on Offer	23	3
Average Price	$4,817	$3,399
Lowest Price	$2,804	$2,999
Highest Price	$6,399	$3,899
Screen Size Range	60 Inch	60 Inch
TVs on Offer	1	1
Average Price	$6,599	$6,799
Lowest Price	$6,599	$6,799
Highest Price	$6,599	$6,799

Sizes are presented in inches as this is industry marketing practice. Approximate conversions are:

40 inch / 102 cm, 42 inch / 107cm, 46 inch / 117 cm, 52 inch / 132cm, 60 inch / 152 cm

Table 2: TV Pricing for HD TVs collected in April 2008 showing highest, lowest, average and the number of models.

HD	LCD	Plasma
Screen Size Range	40-42 Inch	40-42 Inch
TVs on Offer	2	9
Average Price	$1,719	$1,646
Lowest Price	$1,439	$1,295
Highest Price	$1,999	$3,299
Screen Size Range	46-52 Inch	46-52 Inch
TVs on Offer	1	6
Average Price	$2,699	$2,436
Lowest Price	$2,699	$1,956
Highest Price	$2,699	$3,999

Sizes are presented in inches as this is industry marketing practice. Approximate conversions are:
40 inch / 102 cm, 42 inch / 107cm, 46 inch / 117 cm, 52 inch / 132cm

In these tables there is no evidence to support the proposition that plasma TVs are cheaper than LCD in the emerging Full HD segment.

2 THE PROBLEM

Climate change is a serious global challenge, requiring an effective global response (IPCC 2007). The United Nations Framework Convention on Climate Change (UNFCCC) was agreed in 1992 and came into force in 1994. It places much of the responsibility for taking action to limit greenhouse gas emissions on the developed countries, which are collectively referred to as Annex 1 countries, including Australia. Annex 1 countries are required to report each year on the total quantity of their greenhouse gas emissions and on the actions they are taking to limit those emissions.

The Kyoto Protocol to the UNFCCC was agreed in December 1997, and came into force in 2005. The Australian Government ratified the Kyoto Protocol on 3 December 2007, and has committed to meet its Kyoto target of 108 percent of 1990 emissions, on average, over the period 2008 to 2012.

An important part of the response to climate change is the need to curb growth in energy demand, particularly in Australia because of its reliance on fossil fuel energy production.

The quantity of energy consumed by televisions has risen rapidly over the last 20 years and the BAU case will see this trend continue. Television energy use now rivals that of refrigerators. Television use therefore represents an increasing contributor to greenhouse emissions and energy security problems.

The quantity of energy consumed by televisions has risen rapidly over the last 20 years and the BAU case will see this trend continue. Television energy consumption in Australia is projected to rise from around 15PJ in 2008 to 45 PJ in 2020. Television energy use is already approaching the 22 PJ consumed by refrigerators in 2008. However, energy efficiency measures for refrigerators have been in place for many years and as a result refrigerator energy consumption is projected to slightly decrease to 20PJ in 2020 – a stark contrast with the BAU scenario for televisions.[14] Currently, Australia does not have any energy efficiency requirements in place with respect to televisions.

The energy efficiency performance of televisions varies markedly. There appears to be little correlation between energy efficiency and other performance features of television and its price. In addition, there is limited information readily available to consumers in the market to allow them to determine and compare the energy efficiency performance of individual television models sold. This may impede consumers' ability to purchase relatively energy efficient televisions and achieve the associated lifecycle cost savings available from using energy efficient appliances.

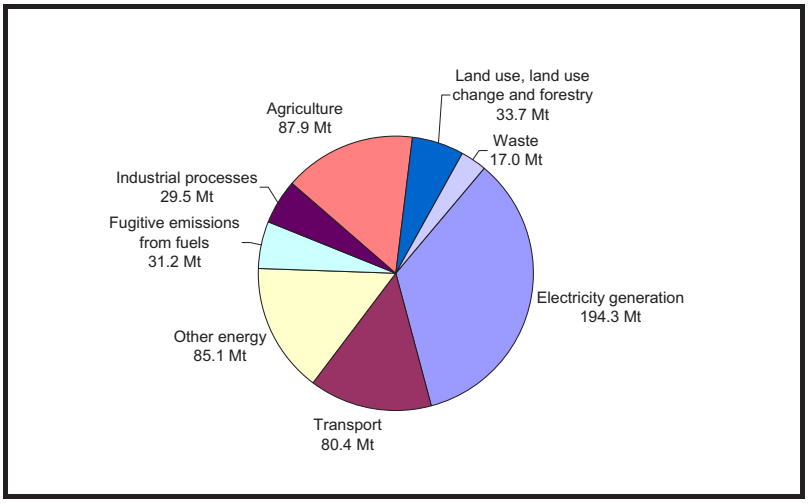
The problem of increasing television energy consumption should be seen in the context of Australia's objective to reduce energy-related greenhouse gas emissions by reducing product energy consumption.

2.1 Energy and Greenhouse Gas Emissions

Figure 6 shows estimated Australian greenhouse gas emissions by sector for 2005. The estimated total greenhouse gas emissions for 2005 are 559.1 million tonnes of CO_2-e (NGGI 2005). The electricity generation sector represents the greatest contribution to Australia's greenhouse gas emissions.

[14] Department of Environment, Water, Heritage and the Arts, 2008, *Energy Use in the Residential Sector: 1986-2020.* p.56,64

Figure 6 Australian Greenhouse Gas Emissions by Sector 2005 Mt $C0_2$-e [NGGI 2005]



The largest contribution to stationary energy emissions comes from the generation of electricity (69.5 percent). Electricity generation accounted for 194.3 Mt C02-e or 34.7 percent of national emissions in 2005. Electricity generation emissions increased by 0.7 Mt (0.4 percent) from 2004 to 2005, but by 64.8 Mt (50.1 percent) from 1990 to 2005.

ABARE 2003 projects total electricity use to increase by an average of 2.2 percent p.a. between 2001 and 2020. Energy use in the commercial and services sector is projected to increase by 2.5 percent p.a. and by 2.2 percent in the manufacturing sector. Slowing, and ultimately reversing, the growth in electricity-related emissions is thus a high priority in Australia's greenhouse gas reduction strategy.

In the case of appliances, such as televisions, there are significant opportunities to reduce energy consumption at little or no cost increase to the consumer. Increased energy efficiency provides energy savings and avoided carbon emissions at negative cost.

2.2 Contribution of Televisions to Energy Use and Emissions

The energy consumption of televisions can be broadly categorised into three modes:

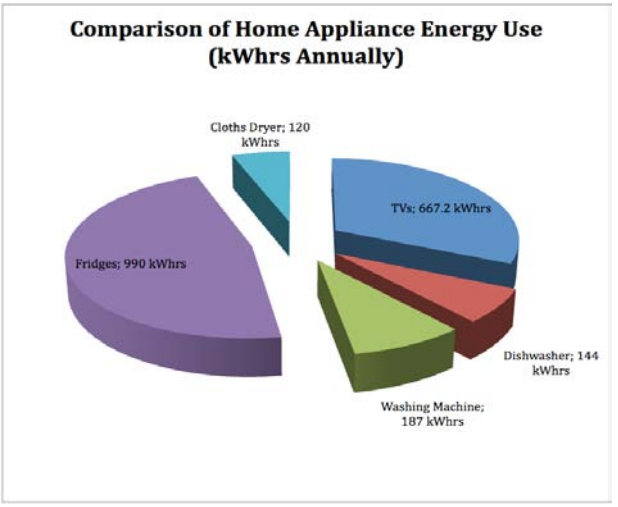
- Average "On Mode" – energy used by the television when in use and showing typical television video signals;
- Active Standby Mode – Energy used by the television when no picture is being shown but the television is performing some other task such as downloading EPG or new firmware; and
- Passive Standby Mode, where the television is plugged in to mains electricity supply and waiting for a command to switch to one of the two On Modes stated above.

In 2007, energy consumption from televisions was estimated to be over 6604 GWh/yr in Australia. The contribution of standby mode to these estimates is relatively low, at 90GWh/yrs. It is expected that television energy consumption and related emissions will increase significantly under a BAU scenario to 2020 and beyond.

On average, new televisions are consuming more energy now than many other household appliances already subject to the mandatory Energy Rating Label and MEPS. This has not been the case for traditional CRT televisions, but the trend toward larger screen sizes and technologies has changed their overall consumption profile. Similarly, the increase in hours of operation and units per household have also attributed to this growth in energy. Not so long ago, in 2006 televisions used only around 30 percent of the energy consumed by all common household appliances such as refrigerators, washing machines, dishwashers and dryers (see Figure 7 below). This figure is now rapidly increasing when compared to these common whitegoods (see chapter 4.1).

Given the trend toward larger televisions and more televisions per household it is reasonable to postulate that televisions will exceed refrigerators as the highest energy consumption appliance by 2012.

Figure 7 Annual power consumption of consumer appliances in Australia (2006)[15]



[15] Digital CEnergy Australia, 2007, *Discussion Paper on MEPS and Labelling for TVs*, p.25

There are also *indirect* energy losses and gains associated with the heat from televisions. During periods of cooling, waste energy adds to the energy required by air conditioning systems and during periods of heating, waste energy is beneficial and reduces the heating energy load.

Like any electrical appliance, the contribution of televisions to energy use and emissions is a function of the number of units in use, technical attributes of the television units, and usage trends. For the purposes of this study, televisions are estimated to be operating at 10 hours a day; 365 days a year (see section 5.1.3). It should be noted that this is the estimated time on, not the time being watched by any particular individual. Televisions are left on for numerous reasons ranging from background noise to the enjoyment of the radio services that now exist with a number of DTV services. Evidence collected from the USA suggests a figure of 8.3 hours daily but TV usage is reported to be on the rise[16] particularly for high definition TV sets which are rapidly becoming the predominant TV sold. Please refer to chapter 5.1.3 for sensitivity analysis on the operating hours of a TVs.

As previously discussed, there were an estimated 18 million televisions in use in Australia, with an annual growth in sales of around 3.5 percent per annum.

2.3 Television Technology and Energy Efficiency

2.3.1 Television Technology

Televisions exist using a number of technologies including:

- Cathode Ray Tube (CRT);
- Plasma;
- Liquid Crystal Display (LCD);
- Rear Projection (LCD and DLP); and
- Front Projection (LCD and DLP).

2.3.1.1 Cathode Ray Tube (CRT) Televisions

Cathode Ray Tube (CRT) technology is the oldest display technology used for televisions. A CRT is a vacuum tube that is able to fire electrons onto a phosphorus screen causing the phosphor to emit light. By sweeping the electron beam across a screen of phosphor dots an image is created. CRTs use a significant amount of glass making them very heavy as they increase in size. As CRT technology has almost disappeared from the market, it will not be discussed further.

2.3.1.2 Plasma Televisions

Plasma display technology is a flat panel technology, which like CRTs uses phosphors energised by electrons to produce light. The difference is that in a Plasma Display each pixel is a single tube. The display is produced by arranging these tubes into a panel, and energising each tube that is needed to produce the image. Therefore, unlike CRTs, plasmas do not use scanning technology. Further, due to their size and inherent technology, plasma televisions have relatively higher energy needs. On average a 106cm television is rated at a maximum power consumption of around 300W, however displays of 256cm can consume as much as 1500W.

2.3.1.3 Liquid Crystal Televisions (LCD)

Liquid Crystal Displays (LCD) are not an emissive technology. An LCD panel is made up of an array of crystals that when energized due to their molecular structure are able to wind and unwind causing polarized light to be filtered from a low leakage point (Black Level) to allowing the full light to pass (Peak White). The light source, usually an array of CCFLs (Cold Cathode Fluorescent lamps), is placed behind the LCD panel and the image is produced by the light that is allowed to pass through the many crystals that form the display. An alternative source of light is an array of LEDs. A couple of these TVs were released at the end of 2008. This technology

[16] TV predictions.com. (February 25, 2008)

has potential for further energy savings as each LED can be dimmed according to the picture being shown.

For this reason the energy consumption of an LCD television is determined by the energy needed to produce the backlight. Also, unlike CRTs and Plasmas, LCDs are inherently much lighter and are suitable for the smallest of screen sizes to screens well over 100cm. LCD televisions are rapidly replacing CRTs at the smaller screen size of the market and creating strong competition with Plasmas at the larger screen size of the market. The power consumption for LCD televisions varies from 50W for 66cm screens to around 200W for a 106cm screen size.

2.3.1.4 Projection Technology Televisions.

LCD, CRT and DLP technology has been used to produce projection televisions. LCD projection involves using a high light emitting source such as a halogen lamp being shone through an LCD array with the image then being focused onto either mirrors projecting onto a screen in the case of rear projection or directly onto an external screen in the case of front projection. In the case of DLP technology the LCD array is replaced by a DLP array.

2.3.1.5 Digital Tuners in Australia

Australia has started a transition to digital television. The broadcasts are based on MPEG 2 with both Standard Definition and High Definition formats. In either case the contribution of the tuner and decoder, in terms of energy use, is of a similar nature as most televisions now sold in Australia incorporate an MPEG 2 or MPEG 4 chip set that decodes MPEG 2 High Definition signals. Many Chip set manufacturers have announced that they will no longer continue to support MPEG 2 only platforms and development will continue only with MPEG 4 platforms. As MPEG 4 chip sets also support MPEG 2 it is expected that MPEG 2 only devices will disappear from the market.

2.3.2 Energy Efficiency Levels

Figure 8 demonstrates the measured performance of a range of televisions as at December 2008. In terms of television energy consumption, the most important issues for consideration in this proposal include the differences in energy use for the varying technologies and screen sizes. The chart in Figure 8 shows that the predominant factor for power consumption is not in fact technology but screen size. It is evident that in the case of larger screen sizes, LCD technology performs slightly better than Plasma technology. It is evident when comparing the performance of models at each size, that both technologies (LCD and Plasma) have significant scope for energy use improvements.

In the case of LCD modulated back light technology, there is also scope to save power. At least one major manufacturer has announced plans to release TV with a 50 percent power reduction by 2010[17]. Further, a change to LED backlight technology in LCDs has also reported significant energy consumption improvements.

Figure 8, which shows individual models tested over 2007/2008, demonstrates that;

- some plasma models will not meet Tier 1 MEPS;
- almost all 2007/8 plasma models and some 2007/8 LCDs will not meets Tier 2 MEPS at 3 star level; and
- a larger number of models again would not meet Tier 2 MEPS at 4 star level.

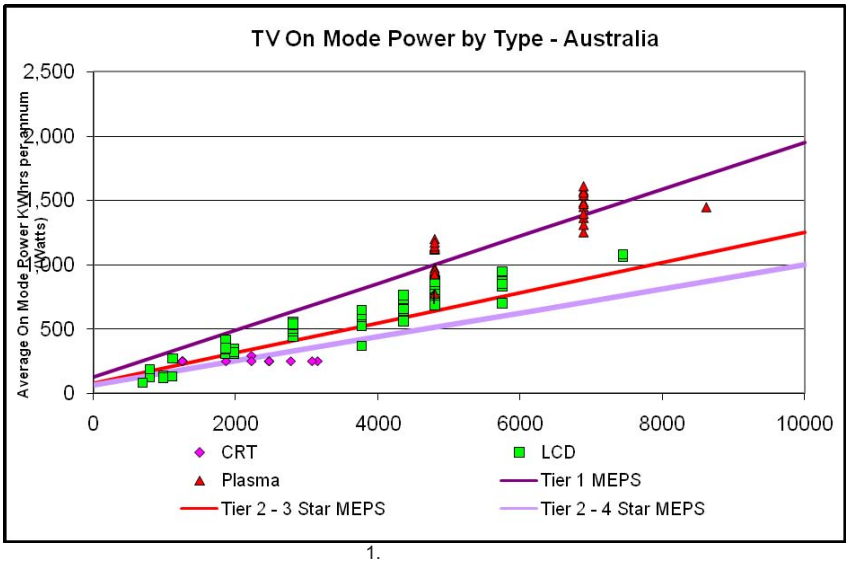
However it is expected that, due to the implementation of MEPS Tier 1 and the marketing incentives provided by mandatory labelling, manufacturers will have developed a range of more efficient TVs which will meet Tier 2 MEPS at 4 star. Industry sources advise that new models are developed every six to eighteen months.

Further, E3 have been advised plasma technology improvements in the emissivity of the plasma cells also has good potential to reduce energy use (see Appendix 11). See chapter 4.7.1 for a

[17] Gizmodo 2007 www.gizmodo.com.au/2007/06/samsung_70inch_lcd_tv_has_loca.html (see Appendix 11)

more detailed discussion of the affects of Tier 2 MEPS on television technologies, including the impact on plasma types.

Figure 8 Television Power Consumption – Australian Data Set



1.

2.3.3 Television Testing

Television's operating power, in general, depends on the pictures they are showing. Older test methods have not adequately accounted for this variation and this has been recognised by the IEC who have now revised their standard to account for the effect that pictures have on television power consumption.

Manufacturers, suppliers and importers require uniform (harmonised) test methods and performance rating for these globally traded products. Until recently no internationally agreed test method existed that provided a fair and accurate measurement of TV power for all types of display. An international test method has now been developed and is supported by Australia's standards setting process. This IEC TV measuring standard has now been approved for publication. This method has been adopted as an interim standard in Australia and New Zealand. The method has also been adopted by the US EPA for their new energy star specification for televisions and the EU has indicated that it will also adopt the new method for the programs it is developing.

2.3.3.1 Australia

In Australia the testing interim standard AS/NZS 62087 Part 1, *Methods of measurement for the power consumption of audio, video and related equipment*, is based on the equivalent IEC standard IEC 62087, which is currently being prepared for publication. This new version of the standard has had extensive work done on improving the TV power measurement test.

To cover the MEPS and Labelling requirements an additional part of AS/NZS 62087 has been written called *MEPS and Labelling requirements*. This part covers what products should be labelled and how, and includes details of the 2009 MEPS requirements. These requirements have been used in the modelling presented in this report.

2.3.3.2 USA
The improved method has been adopted by the EPA for their Energy Star program.

2.3.3.3 Europe
The testing standard has also been recommended in the EuC Ecostudy on TV as the preferred method for any EU programs for TV Energy use.

2.3.3.4 Other international programs
In 2007 the former Australian Greenhouse Office (now the Department of the Environment, Water, Heritage and the Arts) entered into a Memorandum of Understanding with the US EPA ENERGY STAR Program, California Electricity Commission and China Certification Centre for Energy Conservation Products (CECP) to agree upon harmonised test methods for the energy performance of televisions. Australia has supported the development of the IEC Draft 62087 and is working closely with China National Institute of Standardisation (CNIS) to have this standard adopted by both countries.

2.3.3.5 Testing Capability
It is important in adopting any particular test methodology that an assessment is made on testing facilities that can test to those standards. Currently there are at least two facilities that exist in Australia that test to these standards.

2.4 The Carbon Pollution Reduction Scheme (CPRS)
In 2007, the Australian Government formally announced its intention to introduce a Carbon Pollution Reduction Scheme (CPRS) (previously known as the Emissions Trading Scheme) by 2010. Economic literature suggests such a scheme can be used as an effective policy tool for internalising the costs associated with greenhouse gas emissions. However, even under a CPRS, there may still be a role for complementary policies.

Energy efficiency measures have been proven in some circumstances as a cost-effective method for households and businesses to reduce energy consumption while delivering greenhouse gas abatement. All other things being equal, the increase in costs of energy resulting from a CPRS should encourage households and businesses to improve the efficiency of their energy use. However, in some instances, market failures and/or other factors may act to mitigate some of the impacts of a CPRS, and therefore complementary energy efficiency measures may be appropriate. For example, information asymmetries may lessen the effectiveness of a CPRS in delivering an 'optimal' investment in energy efficiency in tenanted dwellings.

In other instances, the transactions costs of investing in energy efficiency may outweigh the marginal benefits of such investments, even in a CPRS environment. For example, the potential energy savings to consumers may be small, relative to the time and effort required to calculate the associated life cycle costs when purchasing a product. In this circumstance, it is possible that a CPRS will not deliver an optimal investment in energy efficiency. A similar situation can arise if there is imperfect information, such as a lack of comparative energy consumption data on energy bills.

Taking into account the above factors, in some situations it is possible that the increase in electricity prices induced by a CPRS may result in a relatively small rise in demand for energy efficient products. Therefore it is possible that the carbon abatement costs induced by complementary energy efficiency measures may be lower than those induced solely under a CPRS. In such cases, it may be beneficial to consider energy efficiency policies, including MEPS and energy labelling, in conjunction with a CPRS.

2.4.1 CPRS and the market for Televisions
CPRS will not adequately address failures in the market for televisions.
Specifically, CPRS does not:

- reform energy metering and billing practices in a way that provides users with prompt feedback on amount and cost of the electricity that is used by their television;

- improve the literacy and numeracy skills of users to the point where they can calculate the costs and benefits of more energy efficient televisions;
- address other market failures such as information asymmetry, information failures and bounded rationality; and
- overcome the inelastic demand for electricity. The CPRS is also expected to have a fairly gradual effect on electricity prices, further dampening the impact of the price signal.

Therefore complementary measures such as energy labelling and MEPS could assist consumers in their efforts to manage energy cost pressures, including the additional pressures that a CPRS will impose, such as an increase in electricity prices.

2.5 Assessment of Market Deficiencies and Failures

There are many potential barriers to consumers taking advantage of increased energy efficiency opportunities as outlined in the Productivity Commission (PC) Inquiry into the *The Private Cost Effectiveness of Improving Energy Efficiency (2005)*[18]. The trend of rising energy efficiency in the residential sector since at least the early 1970s suggests that householders have a history of adopting energy efficiency improvements when it is sufficiently cost effective for them. However there are various types of market failure that cause householders to overlook some energy efficiency improvements that are cost effective for them. There are several market failures or impediments that are distinctly evident in the television market.

The market failures and impediments that exist in the TV market include information barriers such as information asymmetry and bounded rationality.

Another issue impeding energy efficiency improvement is that energy consumption is price inelastic (NEMCO, 2007). Price inelasticity is not considered a market failure, but it is an example of an impediment to the take-up of energy efficiency opportunities. The CPRS will send price signals to encourage energy efficiency. However the price inelasticity of energy demand means that the price signals stemming from the CPRS will not be sufficient to overcome other barriers to energy efficiency take-up that exist in the television market. MEPS and labelling can help to mobilise market forces other than price to drive improved energy efficiency across the TV market.

The Case for Government Intervention

The market failures of information barriers and bounded rationality specific to television energy consumption are evident in a number of ways.

Firstly, there is an information gap in the market, commonly known as an information asymmetry. As a result many consumers are unaware of the energy consumption of televisions and manufacturers are not obliged to share this data. This information deficiency is evidenced by surveys of consumers and retailers conducted for this RIS (see section 2.5.1 and 2.5.2). The results suggest that due to the increasing energy intensity of new television technology, energy efficiency would be strongly considered in purchasing decisions if it was made available. Mandatory labelling will effectively address this information gap.

Secondly and arising from the first point, there appears little incentive (or market signals) currently for TV manufacturers to produce more energy efficient units or to promote this feature. While some specialist information is available to consumers, for example, via websites (e.g. www.comparison.com.au), this information is limited, can be misleading (e.g. provides information on maximum power use rather than average power use) and there is little explanation on how the energy rating scale has been established. As a result, this situation makes it hard for consumers to make informed, rational decisions. It should be noted: consumer advocates such as the Australian Consumers Association (ACA) provide higher quality information on selected televisions for testing. However, information is not provided for every

[18] Productivity Commission 2005, The Private Cost Effectiveness of Improving Energy Efficiency, Report no. 36, Canberra

model in the market place and consumers are required to subscribe to access such services. Consumers access this high quality information to compare a range of criteria, including energy efficiency. The proposed mandatory efficiency labelling scheme has worked effectively for over 20 years for a number of different products and would appear to be the best measure to address TV information failures. It is unlikely that this scheme will have a significant impact on the viability of ACA services as consumers seeking independent information on technology type, picture quality, sound quality, ease of use or other features not described by the energy rating label, will warrant access to ACA reports.

Thirdly, energy bills are aggregated and periodic and therefore do not provide immediate feedback on the effectiveness of individual energy saving investments. Consumers must therefore gather information and perform a reasonably sophisticated calculation to compare the life-cycle costs of individual television models and sizes, but many lack the skills. For others, the amounts saved are too small to justify the time and effort required. This could be attributed to bounded rationality – some consumers will not be able to make a decision encompassing all aspects of a TV purchase and others will choose to save time by either ignoring or discounting certain factors, including energy costs (given the low cost of energy in Australia). A combination of MEPS and labelling measures will reduce unnecessary energy use in TVs. Labelling assists those consumers who choose to factor energy efficiency into their purchase decision. MEPS will address the various forms of bounded rationality discussed above by removing the most energy intensive television models from the market. This protects these consumers from unnecessarily high running costs and provides the overall benefits associated with reduced total energy use to the whole economy.

Fourthly, in addition to the inability or unwillingness of some consumers to grapple with issues of annual and lifetime running costs, there are other factors leading to bounded rationality in the TV market. TVs have a high capital cost to energy running cost ratio. TVs also have a high "service quality" requirement - the picture quality and other product features such as sound quality, appearance, reliability, brand perception have a greater bearing on consumer satisfaction than does energy performance. With this in mind, consumers could choose to ignore or forego the assessment of important information such as energy use, which may not necessarily be significant in their purchase decision. Again, MEPS addresses this form of bounded rationality.

Fifthly, price inelasticity of energy demand will effectively dilute the price signal stemming from the CPRS. Electricity prices will rise, but consumer demand for the current level of performance provided by that energy will not drop by the same amount. The National Electricity Market Management Company Ltd (NEMMCO) recommend that a long run elasticity of demand of 0.25 for the Australian residential sector be used (NEMMCO, p. 3). This means that for a one percent increase in electricity price, demand will reduce by just one quarter of one percent. In the particular instance of television use, it is the opinion of the proposal authors that many consumers will not look at their electricity bill and then make an effort to use their television less because for most consumers this would involve a drop in their utility of that appliance – they use a television for enjoyment, information gathering, not as a energy using device. Again, MEPS addresses this barrier to energy efficiency take up and allows for the benefits of energy savings to flow to the economy.

Government intervention in the television market, in the form of mandatory labelling and MEPS can reduce the effect of all the above impediments to energy efficiency improvements. Reducing market impediments will provide increased opportunity to realise energy efficiency gains and enable consumer utility to remain at the same level while still providing savings through reduced running costs and avoiding carbon emissions.

Garnaut[19] has recently considered possible market barriers to take up of energy efficiency improvements as part of his review of climate change. The report states that information asymmetry can be corrected through the use of mandatory disclosure of which energy rating

[19] Garnaut, R, 2008, *Garnaut Climate Change Review Final Report, September 2008*, Chapter 17

labels are an example. The report also states that bounded rationality can be addressed by MEPS. The report states that any government intervention in the form of mandatory labelling and MEPS must be cost effective and deliver net benefits.

2.5.1 Perceptions of Potential TV Buyers

The Department of the Environment, Water, Heritage and the Arts (DEWHA) engaged GfK Marketing Services to undertake a small survey regarding purchasing decisions in August 2008 (see http://www.energyrating.gov.au/library/pubs/2009-marketsurvey-tv.pdf). The survey provides evidence of market failure in relation to *imperfect information* and was conducted to supplement the findings from a 2006 study[20].

The key findings of the survey (40 on-line interviews) were as follows:

- Of those current TV owners planning to buy a new flat screen TV in the next 24 months, more than half (53%) indicated that it was difficult or very difficult to obtain power consumption information on flat screen televisions.
- The vast majority of respondents (95%) were unwilling to give an estimate of how much electricity their current TV consumes in watts per hour. Many respondents also don't know how much electricity their TV consumes relative to other household appliances in a year. Among those who were willing to hazard a guess, they believed, on balance, that their TV uses less electricity in a year than their dishwasher, air conditioner, fridge, tumble dryer and washing machine.
- When asked if energy efficiency rating labels should be mandatory on new TVs sold in retail stores, 100% of respondents agreed they should. When told that some large screen TVs use as much electricity as refrigerators, the response was the same: 100% of respondents agreed that energy efficiency rating labels should be mandatory on new TVs sold in retail stores.
- Virtually all respondents (97.5%) indicated energy efficiency labels would be *considered* in the buying process if they were on TVs for sale in retail stores. However, the survey indicates energy efficiency labels would not be the most important factor. The most important factor when deciding to purchase a TV is likely to be picture quality. 'Energy efficiency/star rating labels' is considered the most important factor by just 15% of respondents but was included in the top three most important factors by 60% of the sample.

Although the final findings are based on a small sample size, it is consistent with the Productivity Commission observation that buyers tend to select products on the basis of qualities such as price, performance, capacity and style, and energy efficiency may not be an equally visible attribute. The Commission referenced the Syneca Consulting RIS for Air Conditioners which stated that "marketing sources report that energy efficiency is often not a primary or even a significant consideration in consumer purchases. The apparent lack of concern is at odds with the fact that energy costs contribute significantly to the 'whole of life' costs of using an appliance (Syneca Consulting 2003)

GfK conducts a large tracking study of 5000 recent flat panel television buyers – *GfK's ConsumerScope TV Study.* Consumer attitudes to energy efficiency issues were not tracked as part of the last study. GfK provided an article to DEWHA reporting on some of the findings of this study. The article provides interesting evidence of the different weightings consumers place on various criteria when making their purchase decision. This study found that price and "value for money" factors are the most important purchase criteria. "Price" was found to be the most important factor overall, with "picture quality" the next most important factor. However for buyers of larger (over 42 inch) and more expensive televisions (over AU$2000), picture quality was considered more important than price – but buyers of these televisions tend to have higher household incomes.

[20] Artcraft Research, 2005, Report Overview: Appliance Performance Labeling in Australia and New Zealand. Over 4000 interviews were conducted on behalf of the E3 Committee to measure consumer awareness and understanding of the energy rating label scheme.

2.5.2 Perceptions of Television Retailers

To supplement the consumer survey, a telephone survey was conducted with major Australian television retailers in August 2008. A total of 67 retailers in all states and territories (including metropolitan and non metropolitan areas) were included. Opinions were sought regarding consumer awareness of energy consumption of new televisions. The findings of this survey were generally consistent with the consumer survey:

- Majority of retailers claimed consumers were either generally not aware (45%) or not sure (34%) of energy consumption/power use of televisions (79%), while a smaller proportion (21%) claimed consumers were generally aware of power consumption.
- When retailers were asked how important consumers considered power consumption to be in the television purchase decision, more than half reported that consumers did not consider it important (55%).
- Retailers were provided with a list of key tv features and asked to rank the top three consumer criteria in terms of importance in purchase decisions. The retailers reported that the most important were "brand, price and picture quality" (72%), and "brand, price and size" (15%). Only a small proportion of retailers (3%) listed "energy" use as a priority.

2.5.3 Retailer Advertising Material

Further, a desk top analysis was undertaken of three major electrical retailers. On 18 August 2008, Harvey Norman, Retravision and Clive Peeters website catalogues were accessed. A total of 62 television models were examined noting specifications. In all cases, electricity consumption was not a feature that was promoted in the advertising. Only one brand, AQUOS, listed power consumption in minor print. Therefore consumers have no way of comparing relative energy efficiency, aside from questioning the salesperson. Even in the case of AQUOS, the listing of power consumption is not easily understood by the prospective purchaser.

This suggests that consumers are not aware of power consumption performance of televisions and represents an information gap. This in turn is further evidence of market failure (by way of 'information gap') as the cost of energy (and the subsequent impact of CO_2 emissions) are not being factored into the purchase decisions (or the costs of production). As noted above in the survey of consumer perceptions, this is considered an important issue for consumers.

2.5.4 The Spread in the Energy use of televisions

There is considerable technical scope to increase the energy efficiency of televisions. The analysis of the spread of power used by the same type of television and the same screen size shows wide variation in the power use. Table 3 below shows the typical spread for small medium and large televisions. Figure 8 is a graphical representation of the source data.

Table 3: Spread of Power usage for Small, Medium and Large TVs

Screen Size	Min(W)	Max(W)	Spread(W)	Spread %
Small (2090cm^2)	80	114	34	30%
Medium (5393cm^2)	194	328	134	41%
Large (7741cm^2)	342	450	108	31.6%

Data used in this table include televisions with various aspect sizes (eg, 4:3, 16:9). In order to provide meaningful comparisons between these televisions, the television size is described by screen area (in cm^2) rather than by the standard industry practice of using the linear diagonal size. Small, medium and large in

this table correspond approximately to 26 inches (66 cm), 30 inches (76cm) and 42 inches (107cm) for a television with the currently more common 16:9 aspect ratio.

This table suggests that, unless there is a relationship between price and power consumption, the spread of power consumption values is much larger that would otherwise be expected. It also suggests that the minimisation of power consumption is not a priority in the design of many televisions. Given this, it would appear that consumers are unable to make purchase decisions taking energy consumption and GHG emission costs into account.

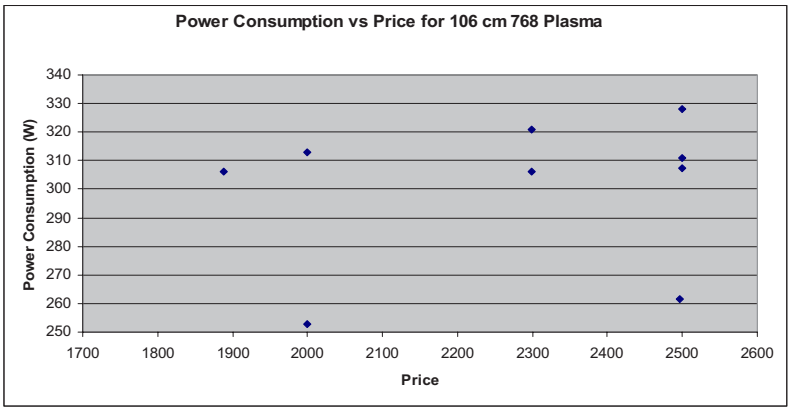
These costs appear to lack transparency and are not being factored in at all. As a result there is a market failure in the form of an information gap in relation to these costs. The following section explores any relationship between price and energy consumption where there are deficiencies in the television market.

2.5.5 Energy Performance vs Market Price

If there were market price reasons for the spread of energy use then it would be reasonable to expect to see this reflected in the price vs energy consumption data. This however is not the case.

A study was conducted on the 96 televisions sampled in 2007[21] and the results are shown in Figure 9 to Figure 12. To ensure that the comparisons of price vs energy consumption did not unfairly compare different technologies of screen resolutions the study separated these attributes and compared like with like. The conclusion is that the charts do not show a relationship between cost and energy consumption.

Figure 9: Scatter chart of Price vs Power consumption of 106cm 768 Line Plasma

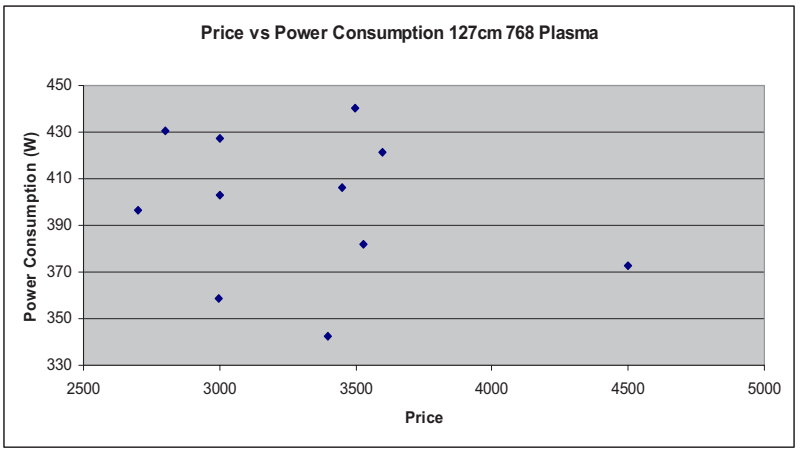


Metric sizes are presented for consistency with the original data. Industry marketing practice is to use measurements in inches. 106cm is approximately 41.7 inches.

In the above Figure it is evident that the power varies from 260W – 329W (27 percent) for this category of Plasma televisions. In addition the best performing TV is the equal second cheapest.

[21] Survey conducted by EnergyConsult Pty Ltd results reported in DigitalCEnergy TV Discussion Paper October 3rd 2007.

Figure 10: Scatter Chart of Price vs Power Consumption for 127cm 768 Line Plasma



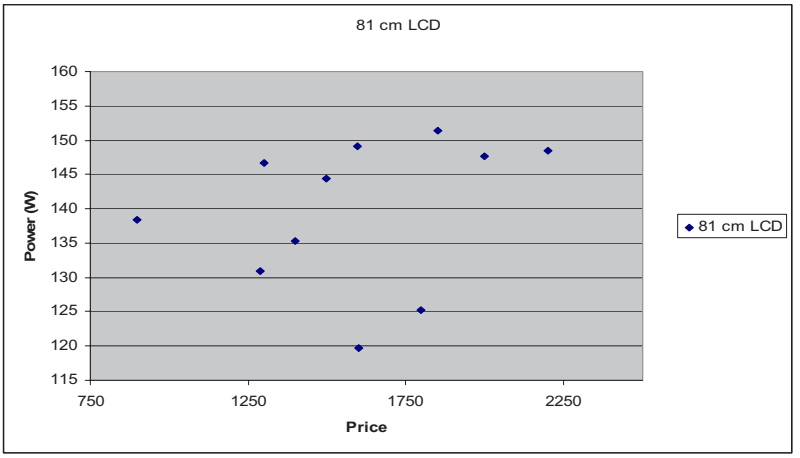
Metric sizes are presented for consistency with the original data. Industry marketing practice is to use measurements in inches. 127cm is approximately 50 inches.

The lack of evidence for a relationship between price and energy use is even more evident in

Figure 10. The best energy performing TV is in the medium price range whereas the most expensive is also in the same range. The second best energy performing TV is actually toward the lower price range.

Figure 11 below shows the same analysis for LCD televisions and again it is clear that there is no evidence for a relationship between price and energy consumption.

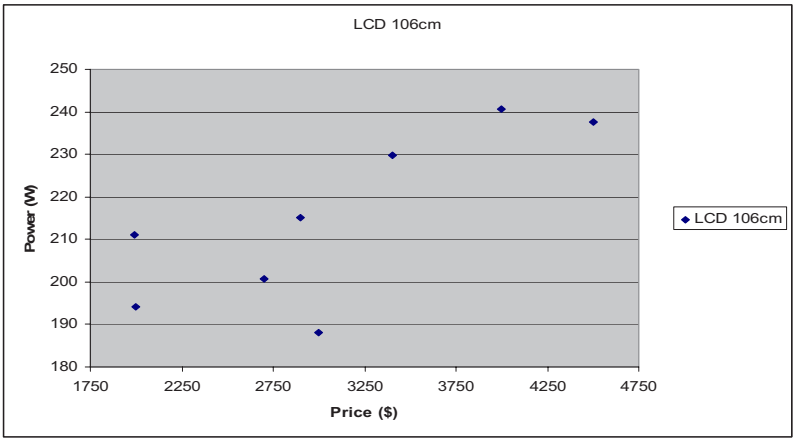
Figure 11: Scatter Chart of Price vs Power Consumption for 81cm LCD 768p TVs



Metric sizes are presented for consistency with the original data. Industry marketing practice is to use measurements in inches. 81 cm is approximately 32 inches.

Finally the trend continues for Figure 12. In fact if any trend does exist in this chart it would actually support the argument that better energy performing LCD TV are actually cheaper.

Figure 12: Scatter Chart of Price vs Power consumption for 106 cm 768p LCD TVs



Metric sizes are presented for consistency with the original data. Industry marketing practice is to use measurements in inches. 106cm is approximately 41.7 inches.

2.5.6 The use of the voluntary TV energy rating labelling scheme as a marketing tool

On 5 June 2008 the Australian Commonwealth Government announced a voluntary labelling scheme that provides those suppliers who choose to participate, a tool to assist in conveying to the consumer the energy consumption benefits of their product offering. The response to this

announcement was very positive from several major suppliers who not only announced their support for the initiative but also confirmed their intention to use the new scheme. This support was qualified to the extent that the suppliers also asserted that it should be followed by a mandatory scheme suggested in this RIS and both schemes should have consistent requirements so that consumer confusion can be avoided.

Suppliers were able to register officially from November, and voluntary labels appeared in stores from late December 2008.

3 Objectives

The primary objective of the proposal is to improve, in an efficient manner, the energy efficiency performance of the television product sector in Australia. Improvements in television energy efficiency will decrease household energy costs and greenhouse gas emissions below what they are otherwise projected to be (i.e. the 'business as usual' case). Improved television energy efficiency will also reduce total residential energy demand, decreasing pressure on energy supplies.

A secondary objective is to provide consumers with the information necessary to encourage informed purchase decisions concerning the energy efficiency of televisions.

A third objective is to provide a degree of consumer protection from unnecessarily high running costs and to provide a level of insulation from the electricity price rises that will come with the introduction of the CPRS.

Within the objective, any measure must also provide a net benefit to the community, while the preferred option must provide the greatest net benefit.

4 PROPOSED REGULATION AND ALTERNATIVES

4.1 Status Quo (Business as Usual)

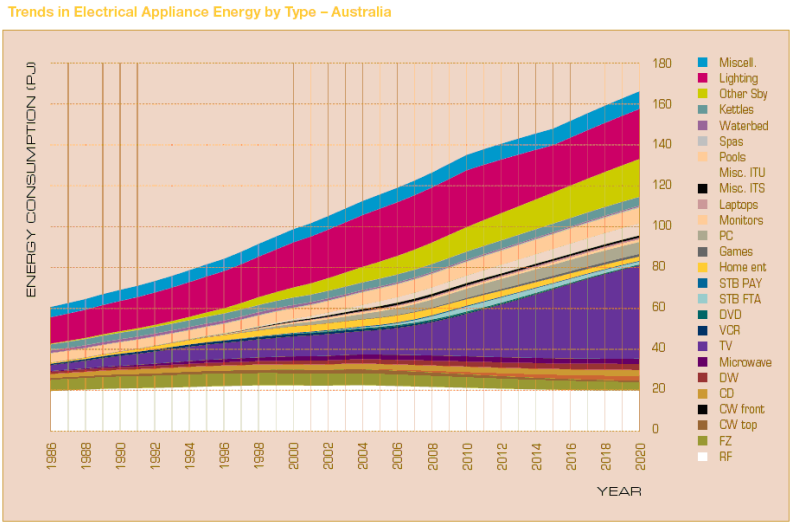
Net energy consumption in 2007, from all types of television products in Australia was estimated at approximately 6604 GWh per annum. This was equivalent to annual greenhouse emissions of 6883 kt CO_2-e.

If current market and technology trends continue, the net energy resulting from the use of televisions is projected to grow to over 22,784 GWh by the year 2020. These estimated 'business as usual' (BAU) projections of energy usage depend on assumptions and data regarding the sales, power consumption and usage characteristics of televisions and are discussed in more depth in chapter 5. Appendix 6 and Appendix 11 detail the power consumption and usage characteristics.

It is important to note that in establishing the BAU case, the voluntary energy efficient labelling scheme announced in Australia by the Minister for the Environment on 5 June 2008 has not been factored into the analysis. This is because given the likelihood of mandatory labelling (which is strongly supported by major global suppliers and industry associations), the longevity of such a scheme is likely to be short (December 2008 to October 2009). It is acknowledged, however, that such a scheme will make a positive start in achieving the objectives of this RIS (although it is anticipated it will not be as effective as the proposed compulsory scheme).

The graph below illustrates the three hundred percent increase in TV energy consumption in the BAU if the problems identified in this RIS are not addressed.

Figure 13: Trends in Electrical Appliance by Type - Australia



Source: Department of Environment, Water, Heritage and the Arts, 2008, Energy Use in the Residential Sector: 1986-2020

In summary, the usage of televisions is based on a number of sources of data and TV viewing trends. While there has been difficulty in obtaining reliable Australian data, the figure of 10 hours on per day is a reasonable estimate that has been determined taking into consideration all the available data (see section 5.1.3 for more information). Other data sources also show that the usage of televisions is increasing, particularly with the introduction of HD content material.

The other predominant factor in the BAU case is the trend to larger screen sizes. Over the five years from 2003 to 2008, the average screen size of televisions has almost doubled in size - from 68cm to 106cm.

4.2 Overseas Policies, Programs and Measures

While several countries and/or regions are looking at minimising energy consumption of televisions only two schemes are actually in place. The Environment Protection Agency in the USA has internationally released a specification for its voluntary Energy Star scheme and Japan addresses television energy efficiency through the top runner program. The details of these scheme are shown in Table 4.

4.2.1 US ENERGY STAR

The latest US ENERGY STAR voluntary program for televisions was introduced on 1 October 2008.

Many television manufacturers have embraced the program; however, it remains unclear as to what extent televisions will comply. The specification itself is complicated and applies significantly different levels to the various TV technology types.

Table 4: On Mode Power Level Requirements for TV Products

Tier 1: Effective November 1, 2008			**Tier 2: Effective September 1, 2010**	
Screen Area	**Maximum On Mode Power Consumption (A expressed in inches^2) Maximum On Mode Power Consumption (A expressed in cm^2)**		**Maximum On Mode Power Consumption (expressed in inches^2)**	**Maximum On Mode Power Consumption (expressed in cm^2)**
Non-High Definition TVs (i.e. ≤ 480 Native Vertical Resolution)				
All Screen Areas	P_{Max} = 0.120*A + 25	P_{Max} = 0.01860*A + 25	TBD	TBD
High Definition and Full High Definition TVs (i.e. > 480 Native Vertical Resolution)				
A < 680 inch^2 (< 4,387 cm2)	P_{Max} = 0.200*A + 32	P_{Max} = 0.03100*A + 32	TBD	TBD
680 inch^2 ≤ A < 1045 inch^2 (4,387 cm^2 ≤ A < 6,742 cm^2)	P_{Max} = 0.240*A + 27	P_{Max} = 0.03720*A + 27	TBD	TBD
A ≥1045 inch^2 (≥ 6,742 cm^2)	P_{Max} = 0.156*A + 151	P_{Max} = 0.02418*A + 151	TBD	TBD

4.2.2 California Energy Commission

A paper has been released by Pacific Gas and Power discussing the merits and proposal to produce a 'Title 20' for televisions in November 2009. The levels for the 'Title 20' are proposed to be the same as those for the EPA < 680 Inch^2 (see Table 4).[22] This is currently in the form of a proposal but further demonstrates the international activity and concern for the energy consumption of televisions.

4.2.3 Top Runner

Japan operates the Top Runner standards program which aims to dramatically improve the energy efficiency of appliances by setting target values based on the current highest efficiency level of each type of product instead of the current average efficiency level. Manufacturers and importers have to ensure the average (sales weighted) efficiency of all their appliances meets this standard by a specified date (the target year). The program allows a continuum for improvement over time; ensuring manufacturers constantly increase the efficiency of appliances. The Top Runner standards are voluntary as there is no minimum level, however penalties can be applied if the average efficiency target is not met.

There is almost universal participation in the scheme – so the participation rate is close to that achieved under mandatory schemes. However the reasons for such a high participation rate are somewhat Japanese specific. While the Top Runner program applies to suppliers / manufacturers, there is also a legal requirement that obliges retailers to provide energy consumption information. This was introduced in April 2006 in the Law Concerning the Rational Use of Energy. It mandates that retailers provide information such as energy consumption and expected electricity cost. Effectively the retailers pass this obligation onto the suppliers – if the suppliers want to sell their product it must carry a Top Runner label.

The Japanese Ministry of Economy, Trade and Industry monitors the program and it is legislated through the Energy Conservation Law. Japan has reported that the program has been quite successful so far. When the target year is reached, new target levels can be established. For LCD and Plasma televisions, the target was around 15.3% of average efficiency improvement to be achieved between the 2004\2005 financial year and the 2008\09.

The Top Runner program does have beneficial effects for Australia. It seeks continual improvement, so international manufacturers are required to make energy efficiency advances. However it is not thought that an Australian version would be as effective because it is unlikely that the responsibility to provide energy information would be passed to retailers. Please see further discussion on issues surrounding voluntary programs under section 4.3.

For more information on the Top Runner program, please see:
http://www.eccj.or.jp/top_runner/img/32.pdf

4.2.4 The EU and the preparatory study on TVs

The EU is currently investigating and developing a program for televisions but it has not yet been finalised. The most recent information from the EU suggests that the MEPS line currently being considered is 25 + .051*(Screen Area), which is very similar to the one proposed in Australia. Special consideration of 1080p plasma has not been decided and it should be stressed that this study is still being developed with public meetings scheduled for 22 July 2008.

Table 5 shows a summary of the programs that exist or are being developed around the world.

[22] Codes and Standards Enhancement (CASE) Initiative for 2008: Title 20 Standards Development, Title: Analysis of Standards Options for Televisions, Prepared for: Pacific Gas and Electric Company

Table 5: Comparison of Programs around the world

Country	Gov. Body	Name	Status	Start Date	Vol / Mand	Test Method	MEPS Line	Screen Area (cm^2)	Res
Australia	DEWHA	Labelling	Proposed	01-Apr-09	Mandatory				
		MEPS	Proposed	01-Apr-09	Mandatory (Tier 1)	AS/NZS 62087	<= 127.5kEhrs+0.1825*A	All	All
			Proposed	01-Oct-12	Mandatory (Tier 2)	AS/NZS 62087	<=90.1kWhrs+0.1288*A	All	All
USA	EPA	Energy Star	Proposed	01-Oct-08	Voluntary	AS/NZS 62087	25 + 0.01860*A	All	≤480
							32 + 0.03100*A	A <4,387	>480
							27 + 0.03720*A	4,387 ≤ A < 6,742	>480
							151 + 0.02418*A	≥ 6,742	>480
Europe	EuC		Proposed	TBD	Voluntary	AS/NZS 62087	25 + .051 * A		All
China	CECP		Proposed	TBD	Mandatory	TBD	TBD		
Japan	Ministry of Economy Trade and Industry	Top Runner	Operating	Current	Mandatory	JEITA	Under Review for Full HD		

4.3 Voluntary Efficiency Standards

Voluntary efficiency standards are a policy option that encourages equipment suppliers and/or manufacturers to voluntarily meet certain minimum energy efficiency levels, i.e. in the absence of regulation.

This option can be effective when there are a relatively small number of suppliers with highly similar products and they are willing to agree to the introduction of the voluntary efficiency standards for a product. This may occur when the few suppliers perceive there will be advantages in meeting such standards in terms of public relations and brand positioning. However, when there are large numbers of suppliers it is more difficult to obtain agreement to the voluntary efficiency standards from a sufficient number of suppliers for the voluntary efficiency standards to have a significant impact on the energy efficiency of the products entering the market.

It is estimated that there are more than 50 importers of televisions serving the Australian market. In theory it might be possible to get all the suppliers to agree on voluntary efficiency standards. However, consultation with CESA indicated that suppliers did not support the use of voluntary efficiency standards and without such support the standards would not be effective. Instead, the position of stakeholders is that:

- Mandatory MEPS/labelling should be implemented for Australia;
- Mandatory MEPS/Labelling should apply to all types of televisions and television monitors, and
- A voluntary program might be effective in raising awareness for energy efficiency issues. Noting this, support was given to a voluntary labelling program as a precursor to a mandatory scheme, so long as the voluntary scheme reflected the requirements of the mandatory scheme.

Participation in a voluntary efficiency standard has raised a serious issue with many suppliers. Without strong enforcement of the agreed standards, many manufacturers, especially major global suppliers, are worried that new or existing players in the market may choose to ignore the requirements of the voluntary standard. While in the current market there is no evidence of correlation between price and energy efficiency, there is a possible risk that non participants in a voluntary system might retain older models rather than introducing newer, more energy efficient models at the normal rate. These models, superseded in terms of their energy performance, could potentially be sold at lower prices and possibly undercut sales and product profits margins of participating brands.

The current structure of the market would suggest that it is unlikely that a majority of televisions being sold in Australia would be covered by a voluntary efficiency standard and is therefore not recommended by the E3 Committee. Major global suppliers to the Australian market including Samsung and Panasonic, have announced their intended support for a voluntary energy rating labelling scheme for televisions, to increase energy efficiency awareness. More information on this scheme can be found in chapter 4.5

4.4 Voluntary Certification Program

A voluntary electrical performance certification program would require the establishment and approval of a third party test centre. Manufacturers would voluntarily supply televisions for certification in order to gain a listing on, for example, a website.

As with other voluntary information-type programs, there is a tendency for only the better performing products to participate in an attempt to gain a marketing advantage over cheaper, and poorer performing, products. This type of program can work in a market where consumers are looking for efficient products, but given that the purchase of a television has already been shown to lack due consideration of energy consumption there is great doubt that such a scheme would be effective.

This option would require a significant complementary consumer and salesperson education program, of quite a technical nature, in stores and in the media to detail the aims of the program. In summary, this option is not supported by the major global suppliers and does not have any evident advantages over the proposed MEPS and mandatory energy labelling measures, except for the ability of participants to claim some energy efficiency credentials over non-participants.

4.5 Dis-endorsement Label and Voluntary Labelling

The principle of a dis-endorsement label is to highlight that a product is an energy waster. This type of labelling is most suited to where a clear delineation exists between two competing technologies being used to make the same product. An example of this would be where a newer, more energy efficient, technology is developed that produces the same product traditionally built with a mature technology which is energy wasting. Televisions do not fit into this scenario. Both plasma and LCD are relatively new technologies and each claim advantages over the other independent of energy consumption. Each also claims that significant energy saving can be achieved within a relatively short period. It is hard to see how a dis-endorsement label could be adapted to cover the specific attributes of television without discriminating between technologies and causing significant consumer confusion.

In the case of televisions, the dis-endorsement label is a negative marketing message and is unlikely to be supported by the major suppliers. Industry, through an association has provided support to the introduction of the Australian voluntary labelling scheme. This scheme has been designed to seamlessly transition into the mandatory labelling scheme proposed to begin on 1 October 2009. The support suppliers have given to the voluntary labelling scheme is predicated on the consistency between the voluntary scheme and any mandatory scheme. Given that the voluntary labelling scheme has been modelled on the successful white goods label it contains both endorsement and dis-endorsement attributes in that a low star rating will provide a disincentive to the purchaser and a high star rating will provide an incentive

Dis-endorsement labelling is also outside the scope of the international MOU on harmonising testing, which would make Australia a special case for these globally traded products.

As discussed above, on 5 June 2008 the Commonwealth Government announced that it would be facilitating a voluntary energy efficiency labelling scheme. This RIS acknowledges that such a scheme is an improvement on the current arrangements and will provide consumers with information that should to some extent correct the identified 'information gap'. However, such a scheme is likely to only be adopted by retailers/manufacturers with particularly efficient TV models (known as the 'self-selection' problem) and is therefore not likely to be as effective as a mandatory scheme. It should also be made clear that retailers\manufacturers who adopt the voluntary labelling scheme are not obliged to label all stock produced, but instead have the option to choose to label their most efficient products. It is assessed that the integrity and hence effectiveness of a labelling scheme is diminished if proportion of the industry does not participate in it. As of 1 February 2009, only two suppliers have participated in the scheme. More information is available in the executive summary.

Some may question why a scheme similar to the existing white goods program is the most suitable for Australia and not one that is established elsewhere like the ENERGY STAR® program. The main reason is that the existing Energy Rating program has been shown to work very well in Australia because of its proven high level of consumer acceptance and recognition. This rating system, for example used on whitegoods, is a comparative label where every model is labelled under a mandatory scheme.

In contrast the ENERGY STAR program uses an endorsement mark to indicate those models produced by participating manufacturers and suppliers that are performing at a high-efficiency level, as defined under the relevant specification. This provides an independent verification of energy efficiency to consumers, and provides a selling point that manufacturers, suppliers and retailers can use in their promotion of televisions.

4.6 Levies and Emissions Trading

One way of increasing the uptake by the market of more energy efficient products is to increase the purchase cost or operating costs of the inefficient products to the consumer. This can be done by raising the price of the television via a levy or by raising the price of the electricity the product consumes via a levy or an emissions trading scheme. These options are discussed below.

Equipment Levy

The equipment levy involves imposing a levy upon high energy use televisions which would raise their price and fund programs which would redress the greenhouse impact of equipment energy use. Two variations of this option are worthy of consideration:

- The proceeds from the levy are diverted to greenhouse-reduction strategies unrelated to television energy use (i.e. the levy is 'revenue-positive').
- The proceeds are used to subsidise the costs of more lower energy use televisions so that any cost differentials between these and higher energy use televisions are narrowed or eliminated (i.e. the levy is 'revenue-neutral').

There are significant issues surrounding the measurement of equipment, the costs of collecting such a levy and the allocation of the resulting funds which would need to be addressed in order to implement this option. It is also unclear how such a levy scheme could be efficiently managed and whether the costs of implementing such a scheme could be justified in terms of its impact.

Electricity Levy

At present, the electricity prices faced by consumers reflect – however imperfectly - the cost of the capital invested in the electricity generation and transmission systems, operating and maintenance costs, plus taxes. They may also reflect the costs of controlling pollutants such as oxides of nitrogen and sulphur (NOx and SOx), for which emissions standards are currently in force in some areas. They do not reflect the value of greenhouse gas emissions; or rather they

implicitly assign a value of zero to such emissions. In other words, greenhouse costs are not internalised in the electricity price. However, through the Federal Government Mandatory Renewable Energy Target (MRET) program and the New South Wales Greenhouse Abatement Certificate (NGAC) programs, some costs of greenhouse gas emissions are imposed.

At present, electricity prices are sufficiently low that few consumers consider the cost of the electricity required by appliances when the consumer is making decisions regarding the purchase of the appliance. One policy option would be to introduce a levy on the price of electricity to reflect the cost of greenhouse gas emissions from the production and combustion of the fuels used to generate it. This would raise the consumers' consideration of the energy efficiency of appliances and might encourage the uptake of lower energy use televisions.

The Australian Government has decided to implement an emissions trading scheme in the form of the CPRS and therefore it is very unlikely that an electricity levy would also be considered. A levy in its own right will not better inform the consumer of the energy use implications of their TV purchase, but may increase the impact of that purchase. In this way the significance of the information that the label conveys becomes greater. Other reasons why an electricity levy is not preferred are provided in the conclusion to this section.

Australia's ETS – the Carbon Pollution Reduction Scheme

Australia has decided to introduce the Carbon Pollution Reduction Scheme (CPRS). The introduction of an emissions trading scheme in the form of the CPRS is Australian Government policy, however by itself is unlikely to impact considerably on the energy use of televisions. The energy price rises that might flow from the introduction of an ETS are unlikely to quickly lead to consumers being concerned about the energy use of televisions, and consumers would still lack information on the energy usage of the televisions even if they were more concerned. Further, a range of financial concessions or exemptions may dampen any such price impacts associated with an ETS. Hence it is concluded that an ETS on its own is unlikely to affect TV energy performance or market take-up.

Given the information above, the E3 Committee considers that there is no reasonable basis for recommending the introduction of a levy as an appropriate solution to the problems presented. In addition:

- A general levy would not target energy related greenhouse emissions. Rather, it would affect all forms of electricity, including 'green energy' products. Thus to be effective at dealing with the problem, the levy would need to be targeted at supplies from particular general plants (e.g. coal fired). Even then the levy will need to be reviewed periodically and may need to be varied according to the level of emissions from the plant, which would be quite difficult to design and implement. .
- A general levy would not target energy consumption related to the use of TVs. Therefore it would be an indirect measure aimed at addressing the problem.
- All taxes\levies will distort behaviour and reduce economic efficiency to some extent. The goal for policy makers is to implement tax\levy policies which minimise the distortions. In general, broad based taxes are less disruptive to the market allocation of resources than are targeted\specific tax. A tax or levy that targets only electricity when greenhouse emissions occur more widely is likely to be more distortionary than a broader tax on emissions.
- Given Australia's intention to introduce a CPRS from 1 July 2011, any levy may need to be regularly reviewed and adjusted in light of permit allocations and the changing price of carbon emissions. This has the potential to increase business compliance costs and government administration costs.

4.7 Proposed MEPS and Energy Rating Labels

4.7.1 Minimum Energy Performance Standards - MEPS

MEPS aims to improve the average energy efficiency of a product class, i.e. televisions, sold on the market place by setting an energy performance criterion which is built into the relevant AS/NZS Standard and mandated through Australian State and Territory legislation. These requirements apply to products covered by the standard which are sold in Australia. This energy performance criteria is developed by a committee comprised of industry and government representatives.

The proposed mandatory MEPS program would apply to all televisions within the scope of AS/NZS 62087.2.2. Australia has introduced MEPS for a range of products and has a very successful implementation record in this area. Further information is available from: http://www.energyrating.gov.au/meps1.html.

As noted in the Television supplementary paper completed in December 2007, the E3 committee proposed a commencement date of no earlier than 1 October 2009. A tier 2 MEPS has been proposed for implementation from no earlier than 1 October 2012.

The proposed Tier 1 MEPS line can be expressed as:

$$TVAnnual\ kWhrs \leq Base\_Load + 0.1825 \times Screen\_area$$

Where:
Screen_area is the viewable surface area of the TV screen in cm^2
Base_Load is Base Load Energy Consumption of the television and is 127.75 kWhrs.[23]

The proposed Tier 2 MEPS (3 star) line can be expressed as:

MEPS Tier 2 (3 Star) = 81.8 + 0.1186*screen_area kWhrs annually

Where:
Screen_area is the viewable surface area of the TV screen in cm^2
Base_Load is Base Load Energy Consumption of the television and is 90.1 kWhrs.

The proposed Tier 2 MEPS (4 Star) line can be expressed as:
MEPS Tier 2 (4 Star) = 65.4 + 0.0934*screen area kWhrs Annually

Affected Product [24]
The estimated proportions of 2007/8 units that currently do not meet the MEPS level under the various levels are:

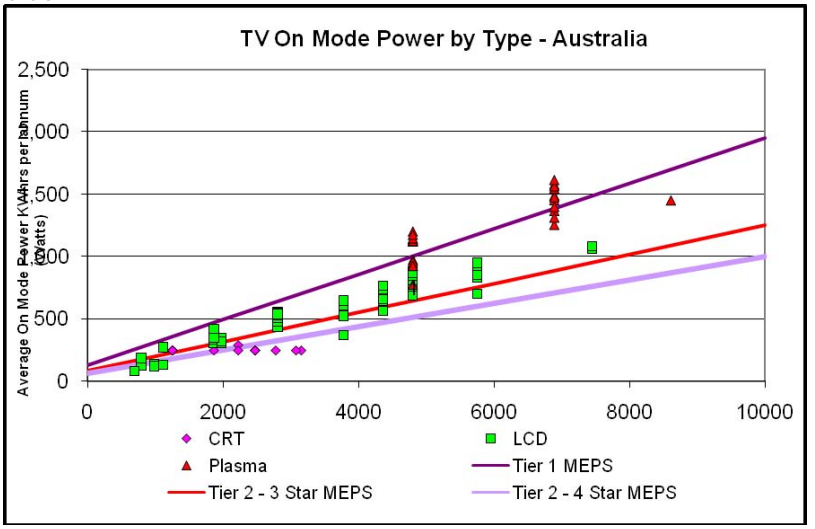
- Tier 1, 9 percent of current television models,
- Tier 2 at 3 star, 74 percent of current television models
- Tier 2 at 4 star, 90 percent of current television models

Early indications are that much lower percentages of new 2009 models will be affected by MEPS. Voluntary labelling notifications show that 2009 Plasma models are achieving energy ratings of 3 stars and that LCD models are achieving energy ratings of up to 5 stars.

[23] The base load annual energy consumption is the energy consumption due to operation of the television excluding the contribution of the display device.

[24] based on 07/08 sales data

Figure 14 Comparison of Products 2007\08 in Australia against the Proposed MEPS levels



For Tier 1 it is clear from Figure 15 that there exists product in every technology type that achieves the proposed Tier 1 MEPS level.

The red line depicts Tier 2 MEPS at 3 star level and the mauve line shows Tier 2 MEPS at 4 star level. In 2007, at the start of the consultation process for this proposal, CESA, the peak industry association suggested that the recommended level for Tier 2 MEPS should be two stars However, Government did not agree with this position and discussions continued. In July 2008, major suppliers and CESA indicated their agreement with the 3 Star level (July 2008 meeting minutes). However, due to current evidence that existing televisions already achieve 4 stars, and given that almost 4 years notice will have been given before the introduction of MEPS Tier 2, the E3 Committee proposed to increase the stringency from 3 to 4 stars.

As the potential savings with the introduction of newer technology is somewhat uncertain a review of this recommendation (Tier 2 MEPS at 4 stars) will be conducted in 2010 to consider whether this level is achievable across all technology types. Further the review will indicate what future technology improvements are achievable.

It is apparent from Figure 15 that the 2nd Tier MEPS (both 3 and 4 star options) essentially achieves the desired market transformation. In energy consumption terms the relative energy consumption improvement that a supplier would need to achieve from Tier 1 to Tier 2 requirements is 40 percent. This improvement would be needed over the four year period 2008 -2012 and means that television energy efficiency will need to improve by about 8 percent annually over that period. Given the announcements that many suppliers are capable of making around 30 percent improvements within the next few years these improvements are not considered overly ambitious.

More information on the rationale for the proposed MEPS levels can be found in the executive summary on pages xii and xiii.

Costs and Benefits of MEPS

Table 6 below shows the estimated costs and benefits of a MEPS *without* labelling scenario to clearly illustrate the substantial benefits and cost effectiveness of the proposed MEPS program. MEPS is projected to provide more than half of the emissions and cost reductions of the combined MEPS and Labelling measures.

Table 6: Summary Data for MEPS only alternative to BAU

7.5% Discount Rate 2007-2020

Scenario	MEPS Only (Tier 2 at 4 Stars)
Energy Saved (cumulative)	25TWh
GHG Emission Reduction (cumulative)	22.8 Mt CO_2-e
Total Benefit	$3941M
Total Cost	$180M
Cost Benefit Ratio	21.2

4.7.2 Energy Labelling

Energy labelling requires the application and display of a comparative energy performance label on products and packaging. It is designed to provide consumers with a visual display of the relative energy performance of one product to another. Energy labelling seeks to reduce consumers' 'search costs' by summarising highly technical information in a format that can be readily understood by consumers and is available to them at the point of purchase to assist in influencing their purchasing decisions.

It would also appear that consumers generally favour energy performance labelling. In a recent study it was found that 76 percent of Australians regarded appliance performance labelling as 'quite important' when making a purchasing decision.[25]

Industry submissions (associations and major suppliers) received in early 2008 to the Supplementary Discussion Paper were broadly supportive of a voluntary labelling scheme to start as soon as possible, which would be transitioned into a mandatory labelling scheme shortly afterwards. Mandatory labelling was seen as necessary by industry in order to provide regulatory certainty and a level playing field.

The comparative energy label has been used in Australia for over last twenty years, and has been highly effective in providing consumers with the additional information needed to distinguish between competing models. It is intended that the mandatory labelling program will be formed using two labels – the existing 6 star label and a recently introduced 10 star label to be used on 'super efficient' products.

The 10 star label adds a "crown" of 4 additional stars above the classic red 6 star band on models that qualify for 7-10 stars. It is not expected that any television currently on the market will qualify for in excess of seven stars for at least three years, however the current standard being developed will allow for the extension to 10 stars.

[25] Artcraft Research, 2005, *Report Overview: Appliance Performance Labeling in Australia and New Zealand*, Conducted for E3, p. 15

The calculation to determine the star rating index (SRI):
SRI = 1 + [Log (TV_Annual_kWhrs/BSR)/Log (1-0.2)]

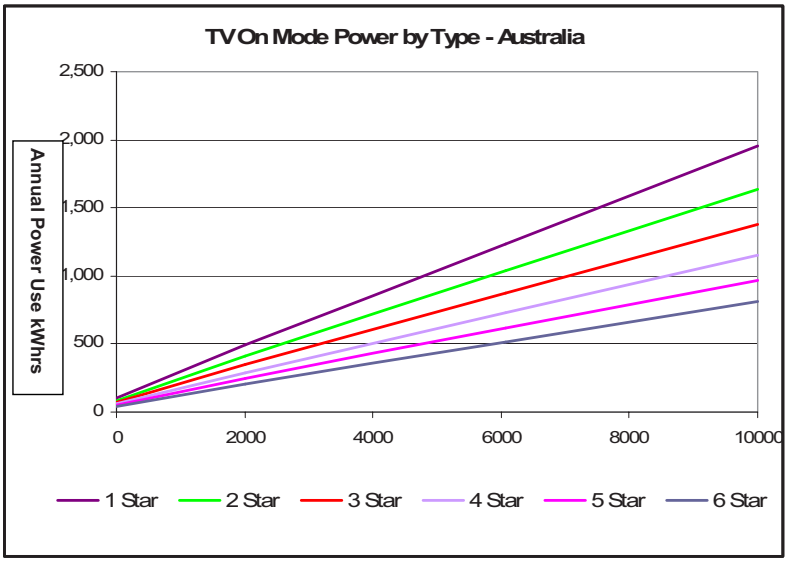
Where;

Log is to Base 10.

0.2 Represents 20% increments between Stars

Figure 15 shows the graphical representation for the first six stars for the Tier 1 requirements.

Figure 15: Proposed Energy Rating Levels for Tier 1.



A labelling scheme can either be voluntary or mandatory. It is proposed to introduce a mandatory labelling scheme for televisions on 1 October 2009, the same start date as for MEPS. The labelling scheme was initially proposed for April 2009, however due to a range of delays this is no longer feasible. The reasons for a mandatory scheme are discussed in section 4.5. The levels for the energy rating scheme are shown in Figure 15. Past experience with whitegoods indicate that soon after introduction product achieves an average of 3 stars as this is perceived by consumers as a reasonable energy performance.

In Australia, a communications and educational campaign has been developed to promote and explain the voluntary labelling program to consumers and retailers and will commence in early 2009. The campaign will utilise point of sale and web-based material. This material will be available to support the mandatory labelling program.

Figure 16 and Figure 17 show examples of the voluntary 6 star and 10 star labels.

Figure 16: Example of a label for a product with an energy rating of 6 or less 6 stars

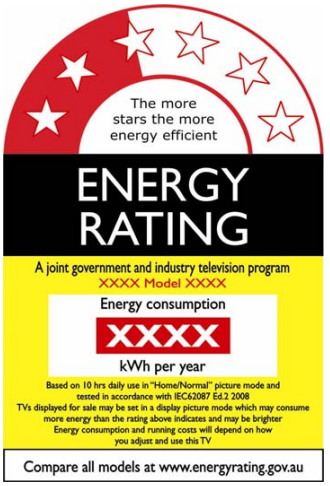
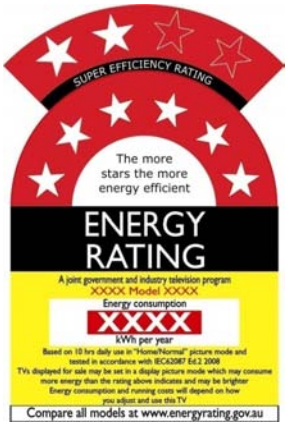


Figure 17: Example of a label for a product with an energy rating of 7 or more stars



Costs and Benefits of Labelling

Table 7 below shows the costs and benefits of a Labelling *without* MEPS scenario. This clearly illustrates the substantial benefits and cost effectiveness of the proposed labelling program.

Table 7: Summary Data for Labelling only alternative to BAU

7.5% Discount Rate 2007-2020

Scenario	Labelling Only
Energy Saved (cumulative)	15.1 TWh
GHG Emission Reduction (cumulative)	13.9 Mt CO_2-e
Total Benefit	$2,111M
Total Cost	$149.4M
Cost Benefit Ratio	14.1

4.7.3 The need for a combination of MEPS and Energy Rating Labels

Energy rating labels first appeared on refrigerators in 1992. The initial scheme was not accompanied with a MEPS level. For this reason poorly performing products continued to be sold along side products from suppliers that have been designed to achieve better energy performance. This resulted in limited energy improvements overall. To combat this result, MEPS was introduced for refrigerators in 1999, and an immediate improvement in the energy savings of that product sector was seen. This was further evidenced in 2005 when the MEPS level was tightened.[26] [27]

In the case of refrigerators it is estimated that around two thirds of energy savings for the period 2009 to 2020 will come from MEPS. [28]

Labelling is an information tool designed to allow consumers to compare the relative energy consumption of different products in a particular class. It may be also used as an information and marketing tool for suppliers to differentiate their product. However, it does not ensure the removal of high energy use products.

Conversely, MEPS are performance based regulations that set minimum energy performance targets whilst still providing the flexibility to encourage technological development. MEPS are required to provide energy savings and avoid carbon emissions at negative cost, additional to those achieved through labelling, and to act as a consumer protection measure, by ensuring that all models of a given product available for sale meet acceptable levels for energy performance and do not result in unnecessarily high running costs. This is particularly relevant for the proposed Tier 1 MEPS level, which is estimated to affect 9.1% of the market place

Energy labelling and MEPS are not mutually exclusive or sequential (i.e. it is not the case that MEPS can only be justified once labelling has been (or will be) shown to fail'). Some markets may be close enough to 'ideal' to not warrant any intervention, but others may have market barriers and imperfections which are most effectively addressed by government intervention.

[26] Regulatory Impact Statement: Energy Labelling and Minimum Energy Performance Standards for Household Electrical Appliances in Australia, George Wilkenfeld and Associates Pty Ltd, 1999

[27] Retrospective Analysis of the impacts of Energy Labelling and MEPS: Refrigerators and Freezers, EnergyConsult Pty Ltd, October 2006.

[28] Prevention is Cheaper than Cure: Avoiding Carbon Emissions through Energy Efficiency, George Wilkenfeld and Associates Pty Ltd, January 2009

This can include MEPS or labelling alone, however in some circumstances a combination of both is necessary. Again this is evident in the example for refrigerators. Together MEPS and Labelling are complementary measures that ensure the best possible improvement within the policy framework.

The above discussion compliments section 2.4. In that section, aspects of the Garnaut report were considered that addressed issues of information asymmetry and bounded rationality. The above proves that there is evidence from previous schemes that both types of market failure have existed and it is reasonable to suggest that they will exists for televisions as well.

COAG[29], recognise that the CPRS will increase electricity prices, and have therefore prioritised the need to help households prepare for the CPRS by agreeing to accelerate energy efficiency measures. MEPS and labelling address different market failures and together will assist the greatest possible number of households minimise their television electricity use and running costs.

Costs and Benefits

Table 8 below shows the costs and benefits of the proposed programs in combination. The costs of running both programs in parallel are only fractionally higher than running a single labelling or MEPS program – thus substantial additional benefit is gained for very little additional costs, delivering a very high benefit to cost ratio.

Table 8: Summary Data for MEPS and Labelling alternative to BAU

7.5% Discount Rate 2007-2020

Scenario	MEPS and Labelling (Tier 2 at 4 stars)
Energy Saved (cumulative)	40.1 TWh (144.4 PJ)
GHG Emission Reduction (cumulative)	36.7 Mt CO_2-e
Total Benefit	$6,052M
Total Cost	$185.3M
Cost Benefit Ratio	32.67

4.7.4. Individual Energy Consumption and Savings

The energy consumption of televisions varies greatly within comparable size ranges. As an example of electricity consumption and yearly running costs, a 106cm TV at different star ratings has been chosen (this size is the average size for new TVs sales in 2008).

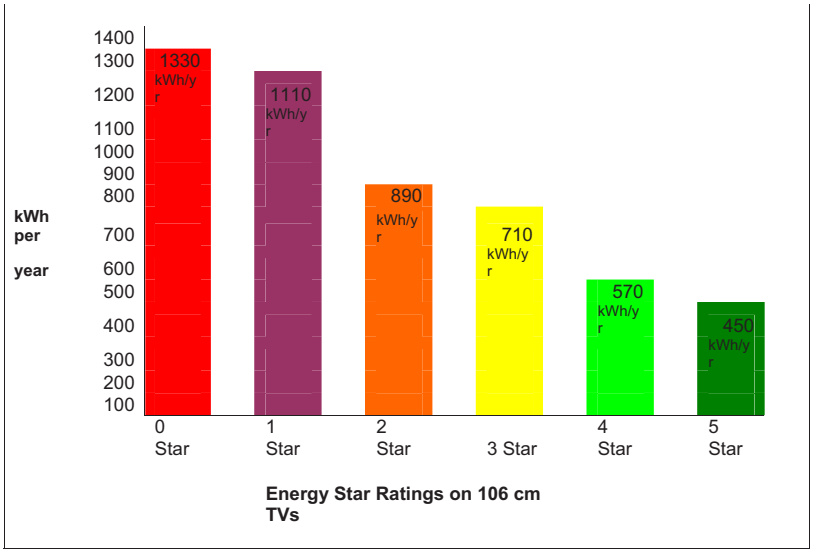
Please see

Figure 18 below illustrating energy consumption for televisions of varying star ratings.

The example 106cm television rated at 1 star would consume 1100kWh over a year. By comparison, a 4 star television would consume 570kWh and a zero star television would consume 1330kWh. Under the proposed MEPS program, models rating zero stars (or less) would not be available, thus protecting consumers who choose not to use the information provided by the proposed mandatory labelling from excessive energy consumption and resultant running costs. Mandatory labelling obviously provides information enabling consumers to make significant further savings on energy use and running costs.

[29] Council of Australian Governments' Meeting 2 October 2008

Figure 18: An Example of Energy Consumption and Savings on 106cm TVs



For Australia, annual and life-time running costs under this example are:

Zero stars	$199.50 per year	$1995 over 10 years	$2993 over 15 years
One star	$166.50 per year	$1665 over 10 years	$2498 over 15 years
Four star	$85.5 per year	$855 over 10 years	$1283 over 15 years

The annual savings for a consumer operating a one rather than zero star television are therefore $33 over 1 year and $495 over 15 years. A four star television would provide an additional $81 annual saving and a $1215 saving over 15 years compared to a one star television.

(The above energy costs are calculated at 15cents a kWh as an average for Australia at a daily use of 10 hours per day. In excess of 90 percent of televisions are used for a minimum 10 years and many are used for 15 years and beyond)

5 COSTS, BENEFITS AND OTHER IMPACTS

5.1 Assumptions and Parameters for the Costs and Benefits

A number of assumptions and parameters have been used for the costs and benefits presented within this section of the RIS.

5.1.1 Sales and Stock growth

The number of televisions per household has been discussed in the reports released in last quarter of 2007. This discussion pointed out that the actual number of televisions per household is not an easy matter to determine. There is good evidence, however, that from these reports that it not unreasonable to estimate that there will be around 3 televisions per household by 2020. Given that the number of Australian households is projected to be 10 million[30] by 2020 the stock of televisions in Australia will be around 30 million. Extrapolated from current sales and stock this indicates a growth rate in sales as 2.6 percent on average between now and 2020. This is consistent with both Australian past data and the international TV growth trends.

The sales models have also accounted for one significant characteristic of TV sales in Australia. It is evident that historically the trend has been for an increase in sales in Olympic years followed by a decline in the next year. Certainly 2008 did see higher sales (see section 1.5) and the relative decline in the Australian dollar against Japanese and US currencies would seem to suggest a decline in 2009 from 2008 levels is likely.

5.1.2 Power Consumption Levels for BAU, MEPS and Energy rating levels

The power usage figures used for the different models presented were based on measured data which was supplemented with surveyed data for some of the emerging larger screen size models. Fundamental to the determination of BAU and the impact of MEPS and labelling were the following principles:

- BAU is the average power consumption currently existing based on the available data;
- MEPS level was the calculated value for the screen size in question unless the BAU was lower in which case the BAU value was used;
- Incremental movements due to the effect of labelling were calculated as a weighted average of a normal distribution around the 3 star level; and
- An assumed improvement of 1 percent per annum has been applied to the BAU values as an anticipated natural improvement to energy performance.

The base model evidence from labelling of whitegoods indicates that soon after labels are introduced an average of 3 stars is achieved. This is also consistent with the level consumers also perceive as a reasonable performing product.

5.1.3 Television usage

For the purposes of this RIS, figures from a US study have been used as a basis[31]. This survey identified televisions as being on an average 8.3 hours per day. Considering a number of other factors such as radio services offered through digital broadcasts and reports indicating that HD is leading to an increase in the time that televisions are in use, a figure of 10 hours per day for televisions in “On” mode has been used.

[30] ABS Cat 3236.0 - Household and Family Projections, Australia, 2001 to 2026

[31] Neilson survey from 2007. Reported in Sydney Morning Herald August 2007.

A sensitivity analysis was conducted for 6 and 8 hours daily use as well as the 10 hours used for the main analysis. This resulted in cost benefit ratios, calculated at a discount rate of 7.5% of:

Table 9: Sensitivity Analysis for 6,8 and 10 hours on daily.

Proposal A (including MEPS II at 3 stars)		Proposal B (including MEPS II at 4 stars)	
Daily Hours of Use	**Cost Benefit Ratio**	**Daily Hours of Use**	**Cost Benefit Ratio**
6 hrs	16.4	6 hrs	19.6
8 hrs	21.7	8 hrs	26.1
10 hrs	26.9	10 hrs	32.7

This sensitivity analysis showed that there were significant net benefits for Australia under all three scenarios.

5.2 Cost to the taxpayer

The proposed mandatory MEPS program will impose costs on governments. Some of these are fixed and some vary from year to year.

The government costs comprise:

- Administration of the program by government officials (salaries and overheads, attendance at E3 Committee and Standards meetings, etc.);
- Cost of maintaining a registration and approval capability;
- Random check testing to protect the integrity of the program;
- Costs of producing leaflets and other consumer information; and
- Consultant costs for standards development, market research, RIS, etc.

The government costs have been estimated as follows, which are similar to the allocations made for other products regulated by the E3 Committee:

- Salary and overheads for officials administering the program: $50,000 per year;
- Check testing, research and other costs underpinning the program: $75,000 per year, half of it borne by the Commonwealth and the other half by other jurisdictions in proportion to their population, in accordance with long-standing cost-sharing arrangements for E3 activities; and
- Printing and promotional activities at $25,000 per year.

Hence total government program costs are estimated to be $150,000 per annum. These costs have been included in the cost-benefit analyses throughout this document.

5.3 Business compliance costs

Compliance with the standard is the responsibility of the importer or local manufacturer of the television.

This RIS assumes that any increases in television design, construction, testing and registration costs will be passed on to customers and are included in incremental costs in the cost benefit analysis. The initial cost of testing is assumed to be borne by the manufacturers, either locally or overseas. Cost of compliance with the standard is incremental to testing and registration costs already borne by the manufacturer in compliance with other standards. These compliance costs will ultimately be amortised over the sales of the product, thus making the unit cost of compliance dependent upon the volume of sales expected.

As in the case of other programs there is no requirement for independent testing and suppliers will self certify conformance to MEPS and the energy rating level claimed. These requirements are no more onerous than existing safety and EMC requirements and as such should not impact such issues as time to market.

The Office of Best Practice Regulation's Business Cost draft user guide specifies a checklist of compliance tasks/costs for analysis in a RIS. This RIS adopts the same methodology and the following addresses the checklist.

Notification
Will businesses incur costs when they are required to report certain events?
Businesses will be required to register each television or family of models on a website. The current Australian registration cost per television or family of models is AUD$150 (NOTE: The implementation of the Victorian Government's *Electricity Safety (Equipment Efficiency) Regulations 2009* will increase this registration cost to an $284.90 (indexed) in that state for applications received from 1 May 2009).

Education
Will costs be incurred by business in keeping abreast of regulatory requirements?
Business costs will be limited to the initial purchase of AS/NZS62087.1 and AS/NZS62087.2.2
Estimated cost of part one of the standard is A$150.00
Estimated cost of part two of the standard is A$100.00
Amendments to standards are available free of charge from the SAI-Global web site.

Product Exclusions [32]
The estimated proportions of 2007/8 units that currently do not meet the MEPS level under the preferred option are:

Tier 1, 9 percent of current television models,
Tier 2 at 3 star, 74 percent of current television models
Tier 2 at 4 star, 90 percent of current television models

Permission
Are costs incurred in seeking to conduct an activity?
No.

Purchase cost
Are businesses required to purchase materials or equipment?
Suppliers will be required to purchase compliant televisions. In this RIS, these costs are assumed to be passed onto the consumer and are included in the Consumer Costs and Benefits Analysis.

Record keeping
Are businesses required to keep records up-to-date?
In Australia businesses will be required to retain records, as per AS/NZS 62087.2.2, for a period of five years after the last date of manufacture or import. Businesses are also required to keep model registrations up to date.

Enforcement
Will businesses incur costs when cooperating with audits or inspections?
Suppliers are obliged to pay costs incurred due to non-compliance with the standard and are therefore not part of "normal" business costs.

However, the E3 program does conduct regular check testing as part of its compliance activities. Suppliers are notified of the results and asked to pay for the cost of the testing and half of the cost of the product. The testing cost is estimated at $800 and the product cost will vary depending on the model tested. It should be noted that suppliers are not obliged to pay these costs, however all funds generated through this activity are re-invested into the check-testing program.

[32] based on 07/08 sales data

Publication and documentation
Will businesses incur costs when producing documents for third parties?
It is possible that suppliers may prepare promotional information for retailers but this is not a requirement of the proposed scheme.

Procedural
Will businesses incur costs that are of a non-administrative nature?
No

Other
Are there any other compliance costs associated with the regulatory proposal?
To be registered and sold in Australia televisions must be tested in accordance with AS/NZS62087.1

The two options for a television:
1. Use a compliant model that has been tested elsewhere and request a copy of the test records for the registration process.
2. Test a model that has not been tested.

In this second case, testing costs per television are inversely proportional to the quantity of televisions sold. Based on advice from a number of test laboratories the testing costs vary between $600 and $1000 per model tested. A cost per TV has been taken as $800 for this RIS. As there is no requirement for independent testing it could be done 'in-house', which would be considerably cheaper than independent testing.

5.3.1 Impact on Small Business

The compliance costs per unit, as per the previous section, are totally dependent on volume and labour rates for testing and registration. As with other electrical products, businesses are required to utilise products that comply with Australian Standards. It is then a business decision to either purchase compliant products or test an untested model. Given the international harmonisation of testing and marking and the increasing number of compliant models from original equipment manufacturers, businesses can purchase these to suit their needs.

5.4 Industry, Competition and Trade Issues

5.4.1 Industry issues

This section reviews the impacts of the proposal/s on suppliers. In many industries manufacturers, importers, distributors and retailers vary greatly in size, from trans-national corporations to small family businesses. Clearly these groups have different capacities to respond to the costs that the proposed regulations will place on them. Product energy testing costs are more or less fixed for each model, so suppliers with many models will have higher costs, and will be at a further disadvantage if average sales per model are low.

Not all industry impacts are negative. Most energy efficiency regulations envisage an increase in average production costs due to increased quantities and/or higher quality of materials – although the envisaged price increases are rarely realised in practice. Price increases would raise product supplier revenues, but would have varying impacts on other sectors. As a result of the greater energy efficiency of the products, consumers will spend less on energy and this will decrease the sales revenue of energy suppliers below BAU.

However, consumers could choose to divert this spending elsewhere, which will increase the sales revenue of suppliers of other goods and services in the economy. (Impacts on energy suppliers are not usually analysed in detail since the energy consumption of the product in question usually represents a very small part of their market. For customer segments where energy costs are under-recovered, a reduction in energy sales could actually increase the profitability of the energy supplier.)

The previous sections examined the costs and benefits of the MEPS options from the perspective of television users. The television industry is an extremely competitive. Normally

the only opportunity to pass on cost increases to consumers occurs where additional features are provided that can be seen by the consumers as 'value adding'. Such features in the recent past have included
:

- Digital Tuners;
- Resolution improvement (480p - 768p and 786p – 1080p); and
- Recording capability.

It is also often assumed that the price of a product is equal to the cost of manufacturing the product including all material costs and compliance cost, plus a profit margin as determined by the differing elements of the supply chain. This model is not necessarily true for consumer electronics including televisions. Other models for pricing exist that look at the potential price for sale and then work back to the actual costs. The decision on whether to produce the product relies on what profit the manufacturer is prepared to accept. In this model it is also unclear as to whether cost increases, due to energy compliance, would be passed onto consumers.

E3 are also aware of some products currently on the market capable of meeting MEPS Tier 2 requirements. Further, it has been demonstrated in section 1.5.1 that there is no price to power consumption relationship when comparing like products. Therefore it is assumed that there will be no increase in costs for the consumer for complying product under Tier 1 MEPS.

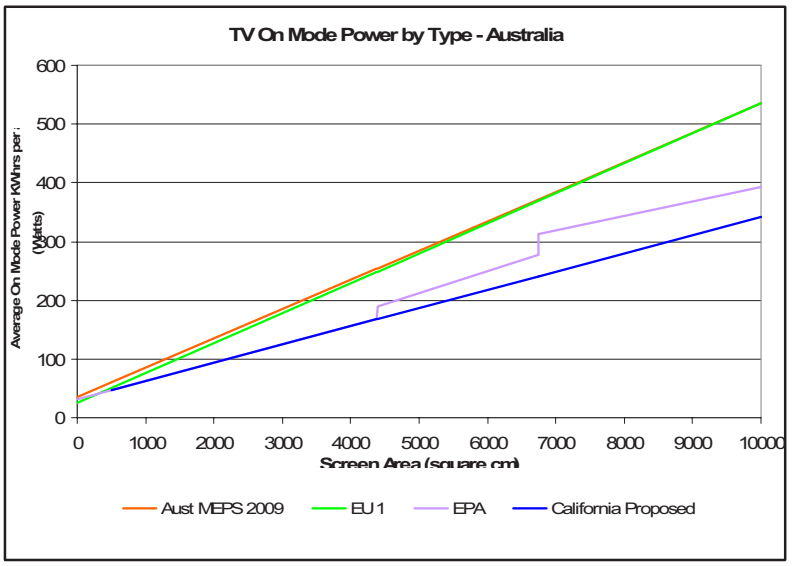
5.4.2 Trade

Mandatory energy efficiency regulations apply to all products sold, whether locally manufactured and imported, and irrespective of country of origin. There are no television manufacturers in Australia and most televisions are imported from Asia, although some are imported from Europe. For this reason the impost to Australian importers of meeting MEPS and Energy Rating labels is equally applied.

One remaining question is whether the requirements being imposed are so different from any potential international program that unnecessarily severe conditions were being placed in Australia. The discussion papers released late in 2007 suggest that the level of regulation proposed is in line with Europe, and less stringent than the USA.

Figure 19 shows a comparison of the various schemes and the MEPS line being proposed in this RIS.

Figure 19: Comparison between Aust and other international Programs



GATT issues

One of the requirements of the RIS is to demonstrate that the proposed test standards are compatible with the relevant international standards and are consistent with Australia's international obligations under the General Agreement on Tariffs and Trade (GATT), and the

Technical Barriers to Trade (TBT) Agreement. The relevant part of the *TBT is the Technical Regulations and Standards* is Article 2: *Preparation, Adoption and Application of Technical Regulations by Central Government Bodies*. These are addressed below.

As all televisions addressed in the RIS are currently imported, MEPS would not favour local supplies against imports. However, it is a particular concern of the TBT that where technical regulations are required and relevant international standards exist, members should use them, or the relevant parts of them, as a basis for their technical regulations. The standard that is being proposed for the measurement of TV energy consumption is the same as the draft IEC 62087. This is the same standard being used by the United States EPA ENERGY STAR tests. China, the world's major source of televisions is currently engaged in a bilateral project with Australia, aimed at harmonising the energy testing of televisions. Australia is strongly recommending the adoption of the IEC standard.

There would be scope for accepting the results of television tests conducted in other countries under comparable standards. However, there is no scope for accepting a television that may comply with MEPS in its country of origin (e.g. in the EU) unless it also complies with Australian MEPS levels. The GATT does not prevent countries from setting MEPS levels according to their own requirements, costs and benefits.

In summary, the proposed regulations are fully consistent with the World Trade Organisation's Technical Barriers to Trade Agreement, and follow international standards where possible.

5.4.3 TTMRA

The Trans-Tasman Mutual Recognition Agreement (TTMRA) states that any product that can be lawfully manufactured in or imported into either Australia or New Zealand (ANZ) may be lawfully sold in the other jurisdiction. If the two countries have different regulatory requirement for a given product, the less stringent requirement becomes the de facto level for both countries unless the one with the more stringent requirement obtains an exemption under TTMRA.

As the ANZ appliance and equipment markets are closely integrated, TTMRA issues arise if one country proposes to implement a mandatory energy efficiency measure but the other does not, if the planned implementation dates are different, or even if the administrative approaches are different (for example, Australian governments may require products sold locally to be registered with regulators, whereas New Zealand may not, thereby changing administrative and compliance verification costs).

5.4.4 Competition

The proposed regulation will prevent manufacturers from making and selling televisions that do not meet the proposed minimum energy performance standard, and constitutes a prima facie technical barrier to entry and a potential restriction on competition.

To ascertain whether the proposed minimum energy performance standard would restrict competition first requires an analysis of the impact of the standard on the television manufacturing sector as this would have a consequential flow-on effect to appliance manufacturers and ultimately consumers.

It is difficult to quantify the exact number of television models available on today's market that will be non compliant against the proposed MEPS, however with over 96 samples, it is reasonable to anticipate that the stated figures in chapter 5.3 will be indicative.

However it is thought that competition will not be unduly effected under either Tier 1 or 2 MEPS. There are several reasons to support this. As explained in the executive summary and section 1.5, the TV market is highly competitive with the top 100 selling models in the first half of 2008 accounting for only 61% of the market and those models split between 23 brands. It is not expected that MEPS at any Tier would cause any reputable supplier to exit the market or make any major change to the number of models available over the medium term. Therefore it is

expected the level of competition currently experienced will remain unchanged, given the introduction of MEPS.

Television manufacturers and suppliers have been aware of the proposed MEPS levels since October 2007 and have been involved in extensive consultation. Further; industry has participated in the development of the relevant AS/NZ Standard. This has allowed them time to ensure that models currently being developed or sourced for future release on the market will comply with the proposed MEPS levels.

As of early January 2009, several major manufacturers have provided notification of their intent to label products at 4 or more stars under the Australian voluntary scheme. These products have been rechecked and have been confirmed as correct. This information suggests that energy efficiency innovation has been encouraged by the proposal to introduce MEPS and labelling for televisions which was first announced in 2007.

5.5 Consumer costs and benefits

5.5.1 Costs and Benefits

The assumptions and parameters of the labelling and MEPS scenarios for televisions have been explained in section 5.1. These include all costs applied to the model. In addition based on the discussion in 5.4.1, it was assumed that there will be no additional cost to consumers for compliant televisions under Tier 1. This is based on pricing analysis already presented that shows:

1. No relationship between price and energy consumption, and
2. Evidence that televisions in all categories currently exist that meet the tier 1 MEPS.

For Tier 2 arrangements it is reasonable to assert that there will also be no price increase, however, for the purposes of this RIS a $100 price increase for 2013 and falling to a $50 dollar increase in 2014 has been factored in and comment is sought from industry stakeholders as to the necessity and quantum of this assumption.

5.5.2 Other impacts

Outside the costs and benefits to consumers, there are many other costs, benefits and impacts in other sectors of the community. Table 10 provides examples of impacts that result from reduced energy consumption.

Table 10: Examples of impacts in other community sectors

Sector	Impacts
Electricity retailers	Reduced sales of electricity and reduced profit. Lower operating costs. E.g. hedging contracts and exposure to high pool prices in periods of peak demand. Contribution to electricity reliability and security. Reduced need for greenhouse gas certificates.
Electricity transmission entities	Contribution to potential for deferral of transmission line upgrades.
Electricity generators	Reduced revenue and contribution to deferred capital expenditure.
Federal Government	Lower energy sales results in lower GST collected. Reduced Government energy consumption provides reduced operating costs. Contribution to meeting the Kyoto target.
Waste	Smaller televisions means less packaging and hence less waste.
Freight	Lower weight means reduced revenue for shipping companies. Lower weight means reduced fuel consumption and greenhouse gas emissions.
Business	Marginally increased sales (from consumers spending the money saved on their electricity bills on other goods and services). Higher profits increase Federal Government tax revenue.
Transport/travel	Lower weight means reduced fuel consumption resulting in reduced greenhouse gas emissions and lower operating costs.

Regarding electricity retailers, any energy efficiency improvements lead to less energy supply and hence lower revenue/profits. However, this decrease in energy sales is offset by the increase in sales of other goods and services purchased using the money saved from lower consumption of energy (hence the decrease in energy sales is not considered as a cost in section 5.6). Some of the goods purchased by these saving could be energy consuming products which by their use will offset the reduction in energy use of televisions. The additional spending on other goods from the reduction in energy use has not been factored as a benefit.

The reduction in electricity retailers' revenue/profits also needs to be weighed up against possible benefits of reduced energy and peak demand and their effect on capital expenditure of building additional generation capacity particularly for the peak load period.
Benefits include:

- reduced network costs — through avoiding the costs of augmenting transmission and distribution networks;
- reduced electricity generation costs — through avoiding the costs of new generation capacity; and
- increased supply reliability — through reducing the number of interruptions.

Some additional costs may be imposed upon television retailers selling products. These could include familiarisation with the new requirements, staff training, sourcing costs and costs associated with properly representing the labelling scheme and to ensure compliance with the display of labels.

While it is estimated that these impacts should be small (given that retailers are already familiar with the white goods labelling requirements), comments are sought concerning the scope and scale of any administrative costs and/or compliance burdens.

5.6 Impact on energy use and greenhouse gas emissions

Since the MEPS criteria apply only to new products entering the market, it will be a number of years before these measures impact on the stock of existing products to any major extent. The survival estimations for two scenarios have been calculated 1) Labelling and MEPS with Tier 2 at 3 star level and 2) Labelling and MEPS with Tier 2 at 4 Star level. Each has used an annual sales growth of 2.6 percent and are included in Appendix 4. These curves have been used to calculate the annual energy consumption and GHG emissions.

5.6.1 TV features and the impact of MEPS

By far the most dominant contributor to TV energy consumption is the display screen. Other features have only a small effect on energy consumption and these other features can be power managed to reduce their energy impact. The measuring standard for television power allows for the measurement with additional features turned off. For this reason it is asserted that the proposed MEPS regulation does not impact on the potential for additional features.

1080 resolution plasma is currently being considered on an international basis. The E3 committee, propose to wait until the energy issues associated with this technology are resolved before deciding how it should be treated in Australia. 1080 LCD and lower resolution televisions are all represented in 1st Tier MEPS compliant product.

The IEC working group on TV power consumption determined that interfaces such as HDMI etc did not have an impact on power consumption of televisions. Finally the measuring standard also reflects the view of the IEC working group that audio also does not impact significantly on TV power consumption.

5.6.2 TV contribution to Energy consumption and potential Savings

The Australian market is almost saturated and has experienced around 2.5-3.5 percent annual growth for some years. This growth rate is inline with international growth[33]. Evidence suggests that the number of televisions per household is still increasing with estimates currently around 2.4 – 2.7. Conservatively this RIS is based on a modest increase to 3 televisions per household by 2020.

Two scenarios have been analysed. One with labelling and MEPS with Tier 2 at 3 star level and achievement of an average star rating of 3 stars and a second scenario with labelling and MEPS with Tier 2 at 4 star level.

Figure 20: Annual 2.6% average projected sales growth.

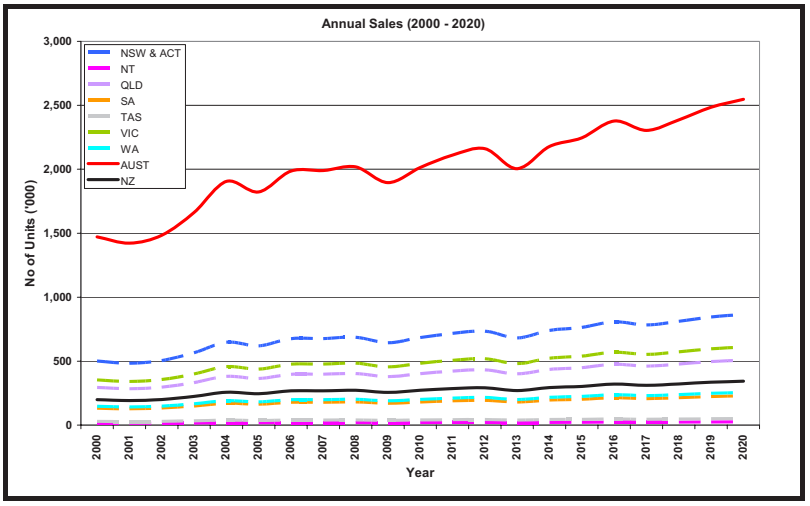
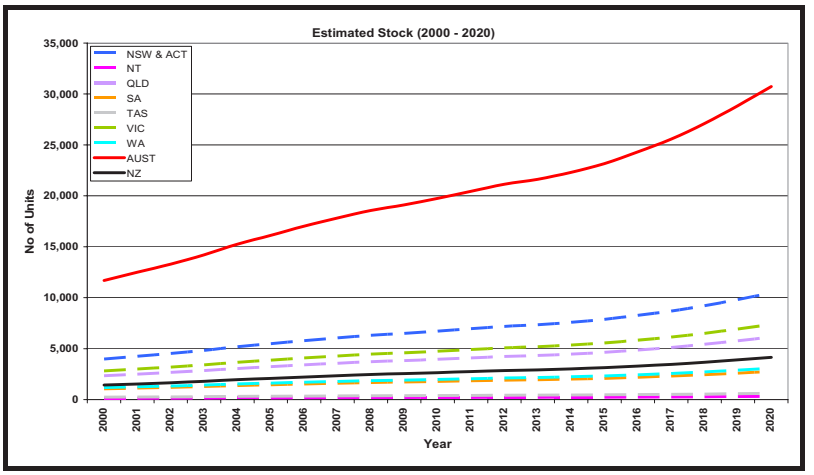


Figure 21: Forecast stock levels to 2020

[33] Display Search 2006



5.6.2.1 BAU vs MEPS and Labelling Options

This section compares the BAU case with:

MEPS and Labelling (Tier 2 MEPS at 3 star level). Error! Reference source not found.

Figure 22: Australian Energy Savings against the BAU,

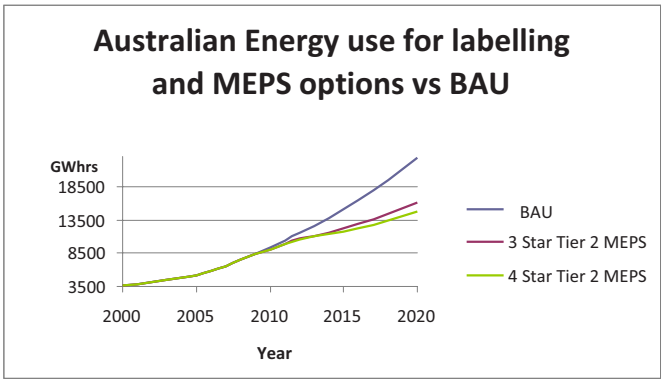
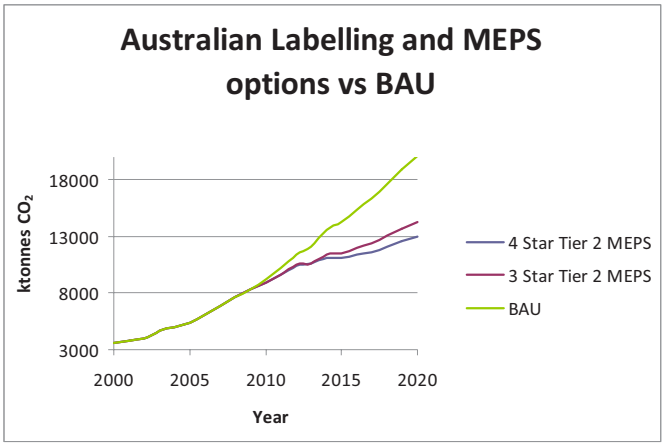


Figure 23, Australian Avoided Greenhouse Gas Emissions compared to BAU



To provide an example of annual energy savings, in 2020, the total GWh projected to be consumed by televisions under the BAU and the two MEPS and Labelling scenarios are:

BAU	22,784GWh
MEPS and Labelling (Tier 2 MEPS at 3 star level)	16,164GWh
MEPS and Labelling (Tier 2 MEPS at 4 star level)	14,684GWh

5.7 Australia - National and State costs and benefits

5.7.1 Community at large analysis valued at retail prices

This section provides estimates of the national, state and territory benefits and costs valued at the domestic and commercial retail electricity tariffs for each state against the two different sales growth scenarios.

Retail prices have been used because the economic value of the electricity saved is the reduction in consumers' expenditure on electricity. **Error! Reference source not found.**Tables 11 and 12 illustrates the Present Value and Benefit Cost Ratios for Australia against a range of discount rates for the Tier 2 MEPS at 3 stars scenario, and Tier 2 MEPS at 4 stars.

Table 11: Financial Analysis – Australia: Labelling + Tier 2 MEPS at 3 Stars

Discount Rate	PV Benefits $M	PV Costs $M	Net Benefit $M	Benefit Cost Ratio
5%	$ 7,178	$ 223.8	$ 6,954	32.1
7.5%	$ 5,052	$ 185.3	$ 4,864	26.9
10%	$ 3,629	$ 156	$ 3,471	23

Table 12 Financial Analysis – Australia: Labelling + Tier 2 MEPS at 4 Stars

Discount Rate	PV Benefits $M	PV Costs $M	Net Benefit $M	Benefit Cost Ratio
5%	$ 8,639	$ 220.5	$ 8,419	39.18
7.5%	$ 6,052	$ 185.3	$ 5,867	32.67
10%	$ 4,327	$ 156.4	$ 4,170.6	27.67

Table 13: Financial Analysis – Australia: Labelling only

Discount Rate	PV Benefits $M	PV Costs $M	Net Benefit $M	Benefit Cost Ratio
7.5%	$ 2,111	$ 149.4	$ 1961.6	14.1

Table 14: Financial Analysis – Australia: MEPS only Tier 2 at 4 stars

Discount Rate	PV Benefits $M	PV Costs $M	Net Benefit $M	Benefit Cost Ratio
7.5%	$ 2,919	$ 180.0	$ 2739	16.2

Net benefits are calculated, assuming a television is purchased before 2020, and kept until end of life disposal.

Table 15: Summary for Benefit Cost Ratio, Energy Tariffs state by state for a 7.5% discount rate comparing MEPS Tier 2 at 3 Star level with MEPS Tier 2 at 4 Star level

State	Benefit Cost Ratio: MEPS II at 3 Star	Benefit Cost Ratio: MEPS II at 4 Star	Domestic Tariff c/kWh
SA	27.6	33.5	20.0
Qld	27.0	32.7	14.0
NT	29.8	36.2	15.4
Tas	17.2	20.9	12.5
Vic	23.2	28.1	16.0
WA	24.4	29.6	14.7
NSW/ACT	30.8	37.4	18.00

Figure 24: Annual Net Benefit state by state for Tier 2 MEPS at 3 stars

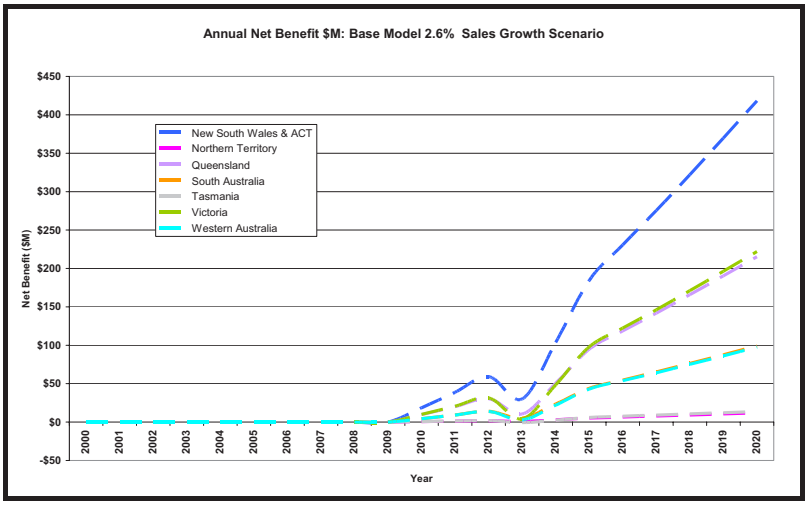
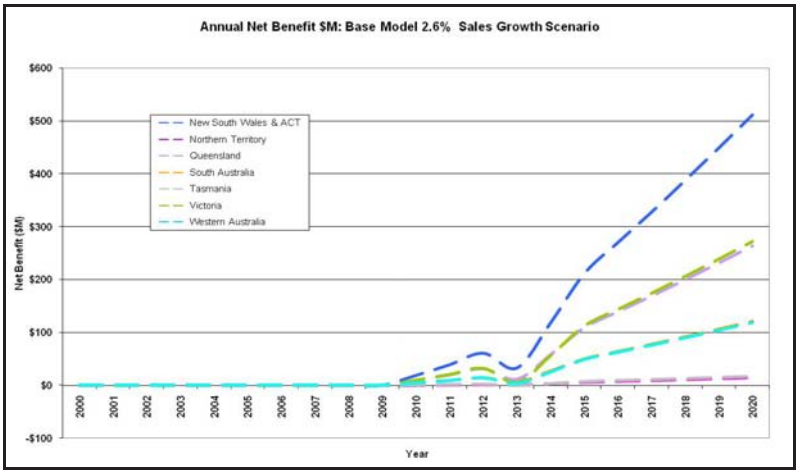


Figure 224 shows the forecast savings by State over the period 2008 to 2020 at a discount rate of 7.5 percent for the MEPS and energy rating labels. The negative benefits reflect the initial incremental cost increase on television prices before the reduced energy costs occur. The full impacts of the CPRS are assumed to be felt by 2013. The data used to generate Figure 224 is detailed in Appendix 8.

Figure 25: Annual Net Benefit state by state for Tier 2 MEPS at 4 Stars



6 CONSULTATIONS AND COMMENTS

***Consultation**: a RIS must outline who has been or will be consulted, and who will be affected by the proposed action. On a case by case basis, this may involve consultation between departments, with interest groups, with other levels of government and with the community generally.* (COAG 2004)

6.1 Consultations

Two stakeholder meetings were held in Sydney in 2007 to discuss aspects of the proposal to regulate the energy consumption of televisions through the use of MEPS and Energy Rating labelling.. An additional meeting was held in July 2008 in Sydney to provide stakeholders with a further opportunity to comment on the proposal. A further meeting was held in August 2008.

The first of these meetings was held on 3 October 2007, during which a discussion paper prepared by Digital CEnergy Australia was discussed and comments invited. In addition some policy options were presented and again comment was invited. As a result of this meeting a supplementary discussion paper was prepared which presented a number of proposals for consideration. Once again comments and views were requested and a commitment was made to establish a MEPS and labelling steering committee to discuss various issues such as final levels and introduction timing. Comments were requested on the issues raised by 1 February 2008.

Submissions on the supplementary discussion paper made by Australian stakeholders are summarised in a table in Appendix 13 of this document.

The MEPS and Labelling steering committee met four times during March and April 2008. A number of changes were made to the levels for labelling and MEPS. This RIS now contains elements of the discussion at those meetings, but at the same time proposes levels that are considered achievable and will result in meaningful savings of energy usage and GHG emissions.

The July 2008 television industry meeting was held to provide a summary of the proposals contained in this RIS to stakeholders, to provide an opportunity to industry for comment and brief Minister Garrett on progress and industry views. Industry present at this meeting, including the industry association bodies CESA and ADSIF and individual suppliers, expressed their agreement with the proposals contained in this RIS (with a less stringent Tier 2 MEPS level of 3 stars).

The most recent stakeholder meeting was held in Sydney on 22 August 2008. This meeting was held to discuss firstly measurement of power consumption for comparative energy labelling and secondly the explanatory wording to appear on the voluntary and then the proposed mandatory label. Agreement on both these issues was subsequently reached and is reflected in the draft AS/NZ Standard 62087 and Voluntary Labelling program. Further information, including an attendee list, on the meetings of both 22 July and 22 August can be found at the energy rating website at:
http://www.energyrating.com.au/forums-2008-televisions.html

6.2 Request for Comments and Responses.

As well as general comments and submissions on this RIS feedback was requested specifically in a number of areas. Detailed individual submissions and responses to the supplementary discussion paper released in December 2007 are provided for information at Appendix 13.

Comments on the Proposal

Issue	Recommendations/comments	Response from Consulation RIS
Voluntary labelling scheme Vs mandatory labelling scheme	Feedback is sought regarding the effectiveness of a voluntary labelling scheme and what costs would be associated with a mandatory labelling scheme	No Comments received
MEPS Tier 1 and 2 and likely consumer Price Increases	Feedback is sought on the likelihood and quantum on consumer price increases as a result of Tier 1 and 2 MEPS. Are the MEPS levels set in Tier 1 and tier 2 appropriate and practical? Why or why not?	No comment was received questioning the validity of the cost assumptions in the RIS or suggesting alternative values. CESA did not support the proposal to introduce Tier 2 MEPS level of four stars (rather than 3 stars) in 2012 and supported the review of this proposed by the E3 Committee (conducted after 12 months and published within 18 months). Therefore, the E3 Committee proposes that Ministers authorise Tier 2 MEPS timeframe be extended if the review does not confirm predictions of the rate of television efficiency improvement contained in this regulatory impact statement.
MEPS and Labelling measures	E3 are proposing to introduce a combination of MEPS and labelling measures to address current market failures? Do you agree with combined proposal? Why or why not?	CESA agrees to the approach. Two other comments agreed. No comments disagreed
Other measures	Are there any other measures that should be considered in this proposal to address current market failures?	One comment suggested a MEPS for Standby power in addition to On Power. A MEPS for standby power for a range of products is on the E3 Committee work plan.

		See Section 1.4.2 of this Regulatory Impact Statement.
Impact of a Carbon Pollution Reduction Scheme (ETS)	While the rate, coverage and concessions of the CPRS are currently being considered, feedback is sought on likely impacts or interaction of such a scheme with the proposed MEPS and mandatory labelling scheme. Would a CPRS alone address the issues presented in the problem section associated with TVs? Why or why not?	No comments received
The likely continuing existence of 768 (HD) as opposed to 1080 (FHD) in the market place.	It is suggested in the report that 768 (HD) product may already be being superseded by 1080 (FHD) product. Comments are invited as to whether both resolutions are likely to continue into the future	No Comments received
Impact on Retailers	Comment is sought from retailers as to impacts in their sector of both the labelling and MEPs components of the proposal.	No Comments Received
Perceived importance of TV energy use.	The extent to which consumers consider energy use of TVs in their purchase decision and the extent to which energy use are used by suppliers in their promotion mix.	Two comments received from consumers indicating that energy consumption was a crucial element in their purchase decision. No comments were received to the contrary
Brand share information and the likely impact on the penetration of less well known brands into the market.	To develop the final regulatory position it will be useful to understand better the market structure as seen by industry.	No Comments Received
Impact on Other Product Features	Are the proposed MEPS and labelling measures likely to have any impact on product features and consumer choice?	No Comments Received
Potential for Market Concentration / Effect on Competition	Feedback is requested on whether the proposed regulation will result in market concentration or impact on competition in any way.	No Comments Received
1080 Plasma	It was previously thought that high definition 1080P plasma televisions may require special attention (see Appendix 11). It would now appear that 1080P plasma televisions are able to achieve energy star ratings higher than the proposed MEPS level. Is there still a need for some special attention for this product category?	No comment received to treat 1080P plasma differently from other technology TVs
Timeframes	Are the timeframes suggested in this RIS practical?	CESA asserts that they are only practical if the if government departments and authorities can complete the processes required to implement

		the regulatory changes within the timeframes. The E3 Committee will request departments and authorities take appropriate actions to ensure the timeframes can be met.
Evaluation and Review	If Tier 1 MEPS and labelling is implemented in October 2009, the earliest review date would be October 2011. Is this sufficient or should the measure be evaluated and reviewed at an earlier date?	CESA suggests a review date of 2010 for the Tier 2 MEPS. The E3 Committee proposes a review would be appropriate if it commenced within 12 months of the commencement of the MEPS and was published within 18 months.

7 EVALUATION AND RECOMMENDATIONS

7.1 Assessment

7.1.1 Reduce Greenhouse Gas Emissions below Business as Usual

Based on a service life of televisions as estimated in the survival curves in Appendix 4, the majority of higher energy use televisions will be removed from the Australian stock within 10 - 15 years.

It is expected that, due to their voluntary nature, the other options will not reduce the energy consumption of televisions. This is because the other options do not have the ability to proscribe sales of higher energy use televisions immediately.

Mandatory Labelling should result in increased consumer awareness of television energy consumption and an increased likelihood that suppliers will seek to offer more energy efficient televisions to capitalise on the marketing opportunity presented by labelling. The proposed MEPS option effectively complements labelling by encouraging innovation and provides additional energy and GHG savings. Due to its absolute nature, the proposed mandatory MEPS option has the highest probability of reducing greenhouse gas emissions below business as usual.

7.1.2 Addressing Market Failures

Mandatory labelling will correct information market failures by providing energy use information to consumers and allow them to make an informed purchase transaction. Similarly, by requiring improvement in the energy performance of high energy use televisions in the market, mandatory MEPS will most effectively address market failures associated with bounded rationality.

The E3 committee believe that, given the problem, all other voluntary mechanisms and alternative options cannot effectively address the evident market failures and thereby achieve the objectives of the proposal.

The proposed mandatory MEPS would ensure products that do not meet energy criteria specified in AS\NZ 62087 are no longer sold. This is not thought to impact negatively on suppliers as the volume of sales would not be substantially affected.

7.1.3 Summary of costs and benefits

The following tables provide summary data on the costs and benefits for a range of discount rates, the benefits are valued at retail prices and not at avoidable costs of electricity.

Table 16: Financial Summary: MEPS and Labelling

(Tier 2 MEPS at 4 Star)

Discount Rate	PV Benefits $M	PV Costs $M	Net Benefit $M	Benefit Cost Ratio
7.5%	$ 5,052	$ 188	$ 4,864	26.9

Table 17 Australian Financial Summary: MEPS only

(Tier 2 MEPS at 4 Star)

Discount Rate	PV Benefits $M	PV Costs $M	Net Benefit $M	Benefit Cost Ratio
7.5%	$ 3941	$ 180	$ 3761	21.2

Table 18: Australian Financial Summary: Labelling only

Discount Rate	PV Benefits $M	PV Costs $M	Net Benefit $M	Benefit Cost Ratio
7.5%	$ 2,111	$ 149.4	$ 1961.6	14.1

7.1.4 Recommendations

It is recommended that the Ministerial Council on Energy (MCE) agree:

1. To implement mandatory energy performance standards and energy labelling for televisions.

2. That the scope of this regulation apply to all televisions, with a nominal 230 Vac mains supply, including monitors designed primarily for television viewing, but excludes both rear and front projection televisions. Monitors designed primarily for computer display or televisions that are battery operated are also excluded from the scope of this regulation.

3. That televisions must meet or surpass the minimum energy performance requirements specified by the test method described in AS/NZS 62087 Part I.

4. To have all jurisdictions take the necessary administrative actions to ensure that the regulatory package summarised below is implemented:
   - .

Tier 1- Commencing not earlier than 1 October 2009:

- mandating energy efficiency star labelling for all televisions with the detail contained in Australian Standard AS/NZS 62087;
- mandating initial energy performance requirements for all televisions, equivalent to 1 star in the rating scale published in Australian Standard AS/NZS 62087;

Tier 2 - Commencing not earlier than 1 October 2012

- maintaining the mandatory algorithm underpinning the labelling scheme,
- mandating a more stringent energy performance requirements for all televisions, equivalent to 4 star in the rating scale published in Australian Standard AS/NZS 62087;
- providing authority for Energy Efficiency regulatory agencies to extend the timeframe should the findings of a marketplace review (conducted after 12 months and published within 18 months) not confirm the anticipated improvements in energy efficiency of televisions. This decision would authorise regulators and industry to negotiate a longer timetable to implement regulation if expert projections are not accurate.

IMPLEMENTATION AND REVIEW

To ensure regulation remains relevant and effective over time it is important that all regulation be reviewed periodically. All governments have committed to reviewing annually existing regulations with a view to encouraging competition and efficiency, streamlining the regulatory environment, and reducing the regulatory burden on business arising from the stock of regulation.

Ensuring regulation remains relevant and effective may be achieved through planning for monitoring and review of regulation as part of the development of new regulatory proposals, or by incorporating sunset provisions or review requirements in legislative instruments.[34]

Television MEPS and labelling would be implemented under the same state and territory regulations as household appliance labelling and MEPS, and so subject to the same sunset provisions, if any. Victoria and South Australia have general sunset provisions applying to their labelling/MEPS regulations as a whole, while NSW has sunset provisions applying to the inclusion of some (but not all) items scheduled.

Once the states and territories agree to mandatory requirements, their removal in any one jurisdiction would undermine the effect in all other jurisdictions, because of the Mutual Recognition agreements between the states and territories. Under the co-operative arrangements for the management of the Trans-Tasman Equipment Energy Efficiency Program, states advise and consult when the sunset of any of the provisions is impending. This gives the opportunity for revised cost-benefit analyses to be undertaken.

Australian Standards called up in state and territory labelling MEPS regulations are also subject to regular review. The arrangements between the Commonwealth, State and Territory Governments and Standards Australia provide that the revision of any Standards called up in energy labelling and MEPS regulations are subject to the approval of the governments.

- E3 has adopted the principles that there should be a MEPS 'stability period', and that a cost-benefit analysis would be undertaken before any revisions are proposed. The earliest possible timing of any change to the MEPS regulations discussed in this RIS would therefore depend on date of their implementation. If they are implemented on 1 October 2009, the earliest possible revision would be October 2011. However, as stated in the recommendations above, a change to the MEPS regulation is recommended for 1 October 2012 at 4 star level. This can only be adjusted in time if the findings of a marketplace review (conducted after 12 months and published within 18 months) do not confirm predictions of the rate of television efficiency improvement contained in this regulatory impact statement.

[34] Council of Australian Governments (COAG), October 2007, *Best Practice Regulation: A Guide for Ministerial Councils And National Standard Setting Bodies*, Principle 6

APPENDIX 1 References

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DCE Supplementary Paper	Digital CEnergy Australia Supplementary Discussion Paper on MEPS and Labelling for TVs. December 2007
DEWHA	Department of Environment, Water, Heritage and the Arts, 2008, Energy Use in the Residential Sector: 1986-2020. p.40-41 and 61-64
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E3 Program	E3 TV Stakeholder meeting July 2008, notes, available at http://www.energyrating.com.au/pubs/attachment-b-tv-meeting-summary.pdf
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EPA Energy Star Specification	Power Supply Report produced by ECOS Consulting: http://www.efficientpowersupplies.org/pages/APEC%20Digest%20-%20High%20Efficiency%20PS.pdf
EuP	*Submission to the California Energy Commission by the Consumer Electronics Association. http://www.energy.ca.gov/appliances/2006rulemaking2/documents/comments/CONSUMER_ELECTRONICS.PDF*
COAG	Council of Australian Governments' Meeting 2 October 2008 *http://www.coag.gov.au/coag_meeting_outcomes/2008-10-02/index.cfm*
CSIRO	*Media Release "Emissions rising faster this decade than last", available online at http://www.csiro.au/news/EmissionsRising.html*
CEC 2008 - 1	*Submission to the California Energy Commission by NRDC* *http://www.energy.ca.gov/appliances/2006rulemaking2/documents/comments/NRDC.PDF*
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UK Energy Trust	*TV Hours of use*
SMH	*Sydney Morning Herald*

APPENDIX 2 Australian Energy Efficiency Policy Background

The Australian Government's initial response to concerns about the environmental, economic and social impacts of global warming was set out in the Prime Minister's statement of 20 November 1997, *Safeguarding the Future: Australia's Response to Climate Change.* The Prime Minister noted that the Government was seeking *"…realistic, cost-effective reductions in key sectors where emissions are high or growing strongly, while also fairly spreading the burden of action across the economy."* He also stated that the Government is "*…prepared to ask industry to do more than they would otherwise be prepared to do, that is, go beyond a 'no regrets'*[35]*, minimum cost approach where this is sensible in order to achieve effective and meaningful outcomes."* This "no regrets" test was a key part of the guidelines adopted by the Council of Australian Governments (COAG) in 1997 that any initiative proposed by the MCE, including standards and labelling measures under the Equipment Energy Efficiency Program, must meet.

In 1998 the Australian Government released *The National Greenhouse Strategy* (NGS) that was endorsed by the Australian Government and state and territory governments and committed them to an effective national greenhouse response. Progress under the NGS was reported to the Council of Australian Governments (COAG). Many key elements of the NGS were implemented successfully, but, over time, the Australian Government identified a range of emerging climate change priorities that required attention at the federal government level. Similarly, there was acknowledgment that state and territory jurisdictional boundaries necessitated state/territory level climate change action plans and these were developed.

In 2004, the Australian Government released a new climate change strategy as articulated through its Energy White Paper, *Securing Australia's Future*, and the 2004-05 Environment Portfolio Budget. Some elements of the earlier NGS were included in the new strategy. As a critical element of the Australian Government's climate change strategy, the new energy policy represented the refinement of strategic themes pursued in relation to energy under the NGS, including energy market reform, the development of low-emissions and renewable technologies, and improvements to end-use energy efficiency.

Since that time, COAG has remained the primary forum for progressing Australian, state and territory government collaboration on climate change issues requiring inter-jurisdictional attention. Significant progress has been made under the COAG climate change agenda since COAG's agreement in June 2005 to establish a new Senior Officials Group to consider ways to further improve investment certainty for business, encourage renewable energy and enhance cooperation in areas such as technology development, energy efficiency and adaptation. This work culminated in the January 2006 COAG climate change action plan. In addition, climate change issues requiring national coordination have been managed through a number of inter-governmental ministerial councils including the Ministerial Council on Energy.

The Australian Government's climate change strategy is the mechanism through which Australia will meet its international commitments as a party to the United Nations Framework Convention on Climate Change (UNFCCC). The Government has an overall target of limiting Australia's emissions in 2008-2012 to 108 percent of its 1990 emissions. This is a 30 percent reduction on the projected "business as usual" (BAU) outcomes in the absence of interventions. Over 2006, the national policy debate over introducing a carbon price in Australia continued with the state and territory governments proposing an emissions trading scheme, and the Australian Government holding a nuclear energy enquiry and announcing its own emissions trading inquiry by the *Task Group on Emissions Trading*.

[35] The Productivity Commission has defined "No regrets" policy options as measures that … *have net benefits (or at least no net cost) in addition to addressing the enhanced greenhouse effect. A more intuitive interpretation of 'no regrets' measures could be that they are actions which would still be considered worthwhile even in the absence of concerns about the potential adverse impact of global warming.* (PC 1997: page vii). This may involve imposing additional business costs on suppliers if the resulting more efficient products deliver a net benefit to the wider community.

On 11 March 2008, Australia's ratification of the Kyoto Protocol was officially recognised by the United Nations Framework Convention on Climate Change (UNCCC). Under Kyoto, Australia is obliged to limit its greenhouse gas emissions in 2008-2012 to 108 per cent of 1990 emission levels. The Australian Government has also released a report demonstrating how Australia intends to measure the reductions in emissions required under Kyoto titled Australia's Initial Report under the Kyoto Protocol.

In October 2008, the Council of Australian Governments (COAG) agreed to develop the National Strategy for Energy Efficiency, to accelerate energy efficiency efforts across all governments and to help households and businesses prepare for the introduction of the incoming Carbon Pollution Reduction Scheme (CPRS). Streamlined roles and responsibilities for energy efficiency policies and programs will be agreed in early 2009. The strategy will be implemented by June 2009, ensuring that programs assisting households and businesses to reduce their energy costs are in place before the CPRS is introduced.

The CPRS White Paper, *Carbon Pollution Reduction Scheme: Australia's Low Pollution Future* , was released in December 2008. It states that:

"The Government is implementing a comprehensive strategy for tackling climate change in Australia. The strategy is built on three pillars: reducing Australia's carbon pollution; adapting to unavoidable climate change; and helping to shape a global solution."[36]

"The Carbon Pollution Reduction Scheme will be the primary mechanism through which Australia will seek to meet its emissions reduction objectives. The other major elements of the Government's mitigation strategy are the expanded Renewable Energy Target investment in renewables and carbon capture and storage and action on energy efficiency. These comprise the four elements of the Government's carbon pollution reduction strategy. Together, they lay a solid foundation for the transition towards a low carbon pollution future." [37]

The CPRS White Paper, while predominately focused on the CPRS targets and design, does discuss in general terms the potential of energy efficiency improvements to provide emissions reductions and reduce costs to consumers. It also discusses government intervention in markets to facilitate and encourage energy efficiency improvements.

The White Paper states on page 110 (Vol 2) that:

"Energy efficiency is the final piece of the emissions reduction strategy. Energy use is the key driver of emissions growth in Australia. The Renewable Energy Target and CCS will reduce the emissions produced and released in generating energy, but there is also considerable scope to increase the efficiency of energy use. Using energy more efficiently can significantly reduce the cost of greenhouse gas abatement and ease the transition to a low-carbon economy"
and

"There are several impediments to the uptake of energy efficiency measures, including gaps in the information available to households and businesses to make informed decisions. By becoming more energy efficient, households can reduce the cost impacts of the Scheme. Prior to the commencement of the Scheme, the Government will deliver household energy efficiency

[36] DCC, 2008, CPRS White Paper, *Carbon Pollution Reduction Scheme: Australia's Low Pollution Future*, Executive Summary, p. xv

[37] DCC, 2008, CPRS White Paper, *Carbon Pollution Reduction Scheme: Australia's Low Pollution Future,* Executive Summary, p. xxiii

initiatives building on existing programs to help households do their bit to tackle climate change and reduce energy bills".

Further information on the policy stance of the government in regards to 'complementary measures'; those measures that complement the work of the CPRS in reducing emissions is quoted below from section 19 in the Policy Decisions Summary section of the White Paper

19 Complementary measures: Policy position 19.1
The Government will use the following principles to guide assessment of emission reduction measures:

1. The measures are targeted at a market failure that is not expected to be adequately addressed by the Scheme or that impinges on its effectiveness in driving emissions reductions. For example, research and development failures, common use infrastructure issues, information failures and excess market power.

2. Complementary measures should adhere to the principles of efficiency, effectiveness, equity and administrative simplicity and be kept under review. They may include: a) measures targeted at a market failure in a sector that is not covered by the Scheme b) measures for where the price signals provided by the Scheme are insufficient to overcome other market failures that prevent the take-up of otherwise cost-effective abatement measures c) measures targeted at sectors of the economy where price signals may not be as significant a driver of decision making (e.g. land use and planning)

d) Some measures in (a) or (b) may only need to be transitional depending on expected changes in coverage or movements in the carbon price.

3. Complementary measures should be tightly targeted to the market failures identified in the above criteria that are amenable to government intervention. Where the measures are regulatory they should meet best practice regulatory principles, including that the benefits of any government intervention should outweigh the costs.

4. Complementary measures may also be targeted to manage the impacts of the Scheme on particular sectors of the economy (for example to address equity or regional development concerns). Where this is the case, in line with regulatory best practice, the non-abatement objective should be clearly identified and it should be established that the measure is the best method of attaining the objective.

5. Where measures meet the above criteria, they should generally be implemented by the level of government that is best able to deliver the measure. In determining this, consideration should be given to which level of government has responsibility, as defined by the Constitution or convention/ practice; the regulatory and compliance costs that will be imposed on the community; and how the delivery of the measure is best coordinated or managed across jurisdictions.[38]

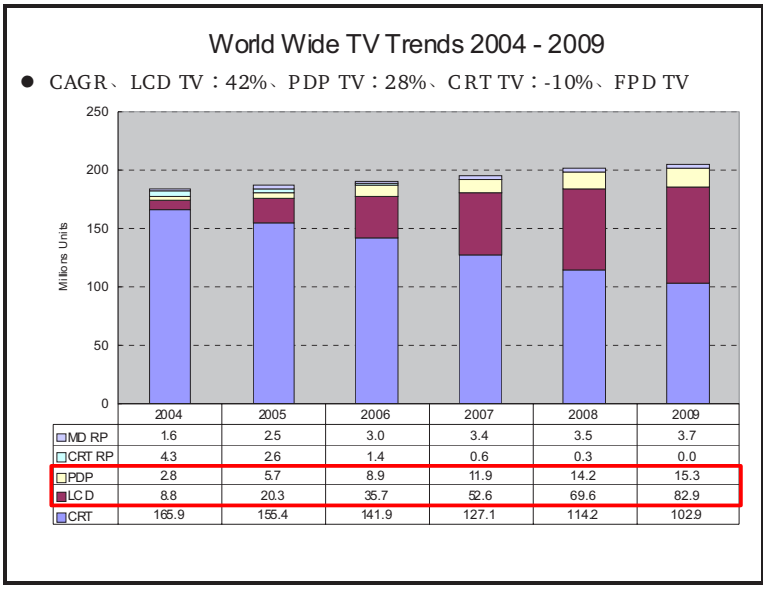
[38] DCC, 2008, CPRS White Paper, Policy Decisions Summary, available at http://www.climatechange.gov.au/whitepaper/report/pubs/pdf/V100fPolicyDecisionsSummary.pdf

APPENDIX 3 The Global TV Market and Growth Forecast

The World Television market Trend

Television broadcasting is changing rapidly throughout the world as the transition from analogue broadcasting to digital broadcasting accelerates. The digital broadcasting brings about significant improvements in picture quality particularly when High Definition broadcasting is adopted. The trend to bigger screen sizes was evident even before digital broadcasting but the problem of picture quality on the bigger screens inhibited the take up to a certain extent.

Figure 236: World wide TV sales trends 2004-2009



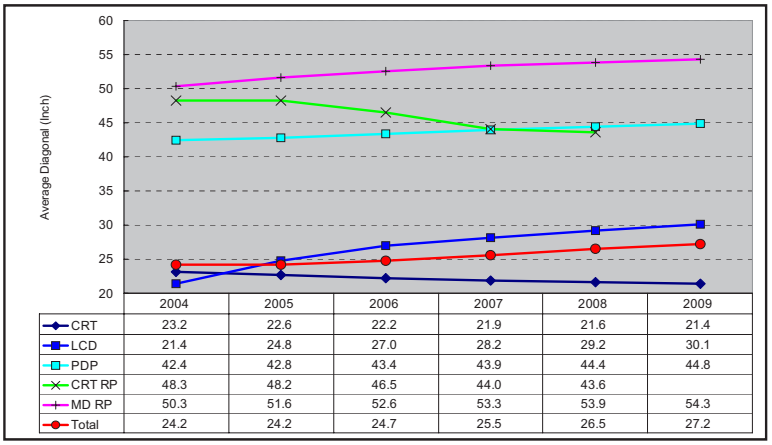
	2004	2005	2006	2007	2008	2009
MD RP	1.6	2.5	3.0	3.4	3.5	3.7
CRT RP	4.3	2.6	1.4	0.6	0.3	0.0
PDP	2.8	5.7	8.9	11.9	14.2	15.3
LCD	8.8	20.3	35.7	52.6	69.6	82.9
CRT	165.9	155.4	141.9	127.1	114.2	102.9

The improved picture quality of Digital Television, Digital HD Television, DVD and more recently Blue Ray and HD DVD has seen these impediments reduced. As a result Figure 23 shows how the adoption of LCD and Plasma, the two main technologies offering the improvement in screen size, has grown world wide from 2004 to the predicted levels of 2009. This figure demonstrates that in 2009 the 50/50 point between CRT and FPD (LDC and Plasma) will be reached world wide within just six years of FPDs appearing in the market. In other parts of the world such as Australia this point has already been reached in 2006 and as of February 2007 is as high as 60 percent.

As to the screen sizes Figure 24 shows the trend for the major technologies. CRTs will, on average, get smaller as they are displaced by FPDs in the larger screen categories. Price will ensure that CRTs continue to have a presence in developing economies where the televisions that can be afforded will be the smaller screen sizes. LCDs and Plasmas, however, on average will increase in size substantially. Plasmas will find good position in the 42 inch and larger while LCDs will displace CRTs in the smaller and medium screen sizes. This graph shows that CRTs will reduce on average by 2 inches LCDs will increase by 10 inches and Plasmas by about 2 inches. Rear Projection technologies are also present but as Figure 23 shows they have a relatively low penetration in the market and are not projected to improve upon this significantly in the future and as such do not impact greatly in terms of the World Wide Market. Other

technologies may also have an impact but as yet have not emerged as major factors. These include OLED, Laser and SED display types.

Figure 247: World Wide Screen Size Trend 2004 – 2009



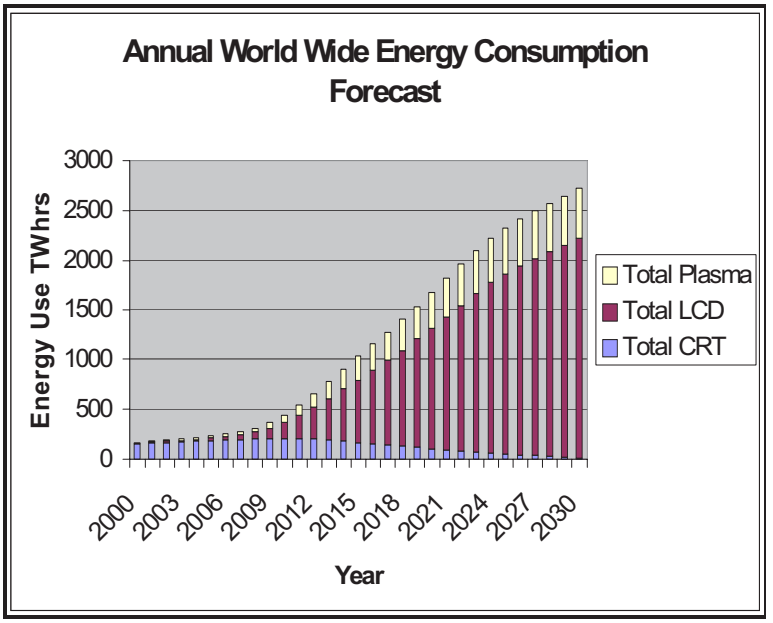
	2004	2005	2006	2007	2008	2009
CRT	23.2	22.6	22.2	21.9	21.6	21.4
LCD	21.4	24.8	27.0	28.2	29.2	30.1
PDP	42.4	42.8	43.4	43.9	44.4	44.8
CRT RP	48.3	48.2	46.5	44.0	43.6	
MD RP	50.3	51.6	52.6	53.3	53.9	54.3
Total	24.2	24.2	24.7	25.5	26.5	27.2

World Wide Television Energy Consumption

The impact that the above discussion on changes to the market has on world wide energy consumption can be seen in **Figure 25** This figure is based on current data on television sales and forecasts on the likely change to the market up to the year 2030. The model is based on business as usual (BAU) energy consumption figures from actual measured power consumption from the UK, USA and Australia. It should be noted that the forecast is not aggressive and is based on the overall market growing at around 3.5 percent compound annual growth rate (CAGR). An argument could be put that this is conservative as it is clear that during this time developing nations particularly China and India will continue to have strong economic growth making televisions affordable for many people in these countries who at the moment are unable to purchase such products.

The chart shows that world wide energy consumption is likely to increase 16 fold by 2030 from the consumption in 2000. The chart also shows that the main contribution will come from LCD televisions as they replace CRT televisions in the smaller screen sizes and smaller Plasma televisions in the larger screen sizes.

Figure 258: Forecast Annual World Energy Use (IEA July 2007)



APPENDIX 4 Stock and Energy Estimates

Estimating the total energy consumed by televisions requires knowledge of power supply stock numbers, broken down by TV type and size. For this report market statistics and Bureau of Statistics and industry stakeholder advice has been used to develop the current estimate of the stock and sales of televisions in Australia.

From this report it is estimated that there are 18 million televisions owned and in use in the 8 million Australian households.

In terms of energy estimates the base model power consumption limits are based on a normally distributed weighted average around a 3 star performing product. Where this is higher than the measured value for any particular screen size the lower figure has been chosen.

Table 19: Power Consumption figures used for the modelling in this report

Type	Screen Size	MEPS 1	MEPS 2	MEPS 1 3 Star Level	MEPS 2 3 Star Level	2007/2008 Average (BAU)
CRT	51cm	91	64	64	45	61
CRT	59cm	109	77	77	54	70
CRT	68 cm	134	94	94	67	85
LCD	66 cm or Less	128	90	90	64	68
LCD	67cm-< 106cm	175	124	124	87	140
LCD	Larger than 106cm	275	194	194	137	270
Plasma	106cm	275	194	194	137	249
Plasma	127cm	380	268	268	189	357
Plasma	128 cm or larger	516	364	364	257	525

The energy consumption of televisions can be broadly categorised into two modes:

- *On mode* - energy used by the appliance and energy lost as heat in the conversion process.
- *No load mode* - where the appliance is plugged in to mains electricity supply but switched off or unattached from the appliance being powered.

Stock is ultimately a function of sales and the annual retirement of existing older models. For this cost benefit analysis the following three figures show the functions that were used to calculate the annual retirement of CRT, LCD and Plasma televisions

Figure 26: CRT Survival Curve

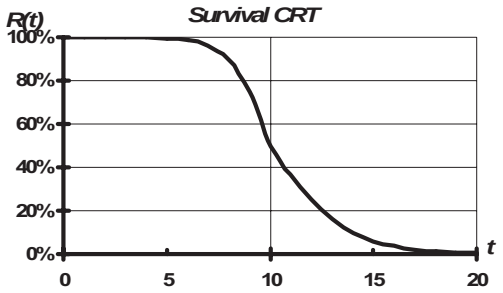


Figure 279: LCD Survival Curve.

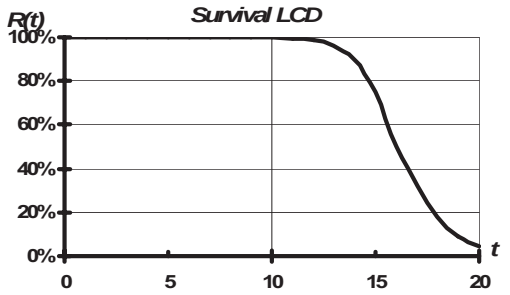
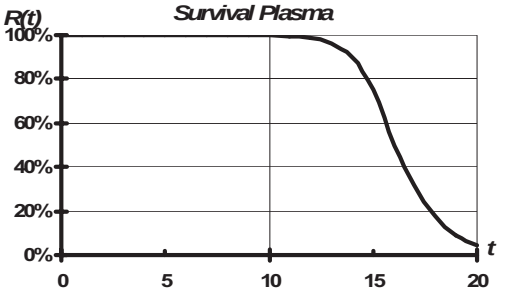


Figure 30: Plasma Survival Curves



The survival figures above were developed using manufacturers estimated screen life for Plasma and LCD along with estimations of estimated life other parts of the electronic design. In the case of CRTs the estimation was tempered with growing evidence of early disposal of CRT televisions in favour of Plasma and LCD before their actual useful life is over.

APPENDIX 5 Energy Prices and Factors

Consumer energy prices

Table 20 Marginal Energy Tariffs, 2005

	c/kWh Household (day rate)	c/kWh Household (off peak)	c/kWh Commercial	c/kWh Industrial	C/MJ Natural gas (household)
NSW	11.0	4.8	14.0	7.2	1.42
Victoria	15.6		16.0	7.8	1.00
Queensland	11.6		15.0	8.5	1.41
SA	14.8/18.0 (a)		16.0	8.5	1.17
WA	14.7		15.0	10.7	1.26
Tasmania	12.5		14.0	4.6	1.40
NT	15.4		17.0	14.5	1.17
ACT	9.8		14.9	7.2	1.37
Australia (weighted)	**12.7**		**14.9**	**8.0**	**1.14**

Source: Household estimates from *Electricity Australia* 2004, except (a) 14.8 for year-round energy use; 18.0 for energy use in summer (e.g. air conditioning). Other sector estimates by author.

Table 21 Typical household time-of-use tariff profile

	Period	Hrs	Workday c/kWh	Weekend c/kWh
Shoulder	7am-2pm	7	9.32	9.32
Peak	2pm-8pm	6	17.60	9.32
Shoulder	8pm-10pm	2	9.32	9.32
Off-peak	10pm-7am	9	4.83	4.83
24-hr average			9.71	7.64
Day rate			12.36	12.36

Source: EnergyAustralia, January 2005

APPENDIX 6 Greenhouse Gas Emission Factors

Table 22 Projected marginal emissions-intensity of electricity supply by State 2003-2020

Region	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
NSW+ACT	0.950	0.950	0.958	1.018	1.027	1.021	1.031	1.039	1.018	0.987	0.975	0.963	0.965	0.945	0.961	0.919	0.910	0.883	0.888	0.881	0.866
VIC	0.988	0.988	0.992	1.122	1.128	1.106	1.117	1.130	1.130	1.094	1.075	1.086	1.105	1.085	1.112	1.048	1.023	0.992	0.995	0.965	0.936
Qld	1.053	1.053	1.035	1.021	0.991	1.020	0.994	1.022	0.979	0.935	0.935	0.929	0.932	0.901	0.929	0.912	0.901	0.894	0.874	0.864	0.869
SA	1.020	1.020	1.003	1.163	1.167	1.112	1.123	1.153	1.161	1.113	1.093	1.099	1.120	1.078	1.093	1.014	0.993	0.986	0.979	1.000	0.955
WA	1.040	1.040	0.996	1.038	1.029	0.906	0.884	0.868	0.885	0.890	0.894	0.830	0.826	0.823	0.838	0.845	0.855	0.817	0.804	0.808	0.810
NT	0.008	0.008	0.008	0.754	0.757	0.760	0.760	0.764	0.770	0.769	0.775	0.779	0.727	0.732	0.735	0.739	0.743	0.747	0.750	0.752	0.754
Tas	0.651	0.651	0.663	0.840	0.769	0.769	0.902	1.007	1.024	1.033	0.998	0.993	1.000	1.016	1.005	1.038	0.984	0.965	0.954	0.966	0.976

Source: www.greenhouse.gov.au/ggap/round3/emission-factors.html: see separate emissions factor file for each State. Regional weightings by GWA
All values state-wide average kg CO_2-e per kWh delivered, taking into account transmission and distribution losses (combustion emissions only).

APPENDIX 7 Population and Household Numbers

Table 23 Population and Household Numbers

		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
NSW	HH ('000)	2489.1	2523.5	2557.8	2591.9	2625.7	2659.6	2692.2	2724.6	2756.8	2789.2	2821.4	2852.1	2882.6	2912.7	2942.9	2972.5	3001.7	3030.3	3058.4	3086.0
	Persons	6513.2	6566.2	6619.7	6673.5	6727.8	6782.6	6830.1	6878.0	6926.1	6974.6	7023.5	7067.8	7112.3	7157.1	7202.2	7247.6	7288.8	7330.3	7372.0	7413.9
VIC	HH ('000)	1836.1	1859.4	1882.6	1905.5	1928.1	1950.6	1971.6	1992.4	2012.9	2033.6	2053.8	2072.6	2091.1	2109.3	2127.5	2144.9	2162.1	2178.7	2194.9	2210.7
	Persons	4756.5	4786.0	4815.7	4845.6	4875.6	4905.9	4930.5	4955.1	4979.9	5004.9	5029.9	5051.2	5072.6	5094.1	5115.6	5137.3	5155.7	5174.2	5192.8	5211.4
QLD	HH ('000)	1410.9	1443.6	1476.9	1510.1	1543.5	1577.3	1609.9	1642.8	1675.8	1709.3	1742.9	1775.2	1807.4	1839.6	1872	1904.2	1936.0	1967.7	1999.0	2030.1
	Persons	3645.6	3705.5	3766.4	3828.3	3891.2	3955.1	4013.0	4071.8	4131.5	4192.0	4253.4	4310.6	4368.5	4427.3	4486.8	4547.1	4608.9	4671.6	4735.1	4799.5
SA	HH ('000)	617.8	623.7	629.5	635.3	640.9	646.5	651.3	655.9	660.6	665.1	669.5	673.2	676.7	680.2	683.6	686.7	689.8	692.7	695.4	697.9
	Persons	1502.4	1506.5	1510.7	1514.8	1519.0	1523.2	1525.5	1527.8	1530.1	1532.4	1534.7	1535.9	1537.1	1538.4	1539.6	1540.8	1541.0	1541.2	1541.5	1541.7
WA	HH ('000)	750.3	767.1	784.0	801.1	818.1	835.4	852.0	868.8	885.3	902.0	918.8	934.6	950.4	966.1	981.9	997.5	1012.8	1028.1	1043.2	1058.2
	Persons	1920.1	1948.7	1977.8	2007.2	2037.1	2067.5	2095.5	2123.8	2152.6	2181.7	2211.2	2238.8	2266.8	2295.2	2323.9	2352.9	2379.8	2407.0	2434.5	2462.4
TAS	HH ('000)	192.2	193.4	194.6	195.8	196.9	198.0	198.7	199.4	200.1	200.7	201.3	201.5	201.6	201.8	201.8	201.7	201.6	201.3	201.0	200.5
	Persons	470.3	469.2	468.2	467.1	466.1	465.0	463.3	461.6	459.9	458.2	456.5	454.3	452.2	450.0	447.9	445.8	443.1	440.5	437.8	435.2
NT	HH ('000)	69.1	70.9	72.6	74.3	76.1	77.9	79.6	81.4	83.2	85.0	86.9	88.8	90.6	92.5	94.3	96.2	98.1	100	101.8	103.7
	Persons	204.7	208.5	212.3	216.2	220.2	224.2	228.0	231.9	235.8	239.8	243.9	247.9	251.9	256.0	260.2	264.4	268.5	272.7	276.9	281.2
ACT	HH ('000)	123.6	125.6	127.6	129.6	131.5	133.5	135.2	137	138.7	140.5	142.2	143.8	145.3	146.8	148.3	149.8	151.3	152.7	154.0	155.3
	Persons	319.8	322.4	325.1	327.8	330.5	333.2	335.5	337.8	340.2	342.5	344.9	347.0	349.1	351.2	353.3	355.4	357.3	359.1	361.0	362.9
AUST	HH ('000)	7489.1	7607.2	7725.6	7843.6	7960.8	8078.8	8190.5	8302.3	8413.4	8525.4	8636.8	8741.8	8845.7	8949	9052.3	9153.5	9253.4	9351.5	9447.7	9542.4
	Persons	19333	19513	19696	19881	20068	20257	20421	20588	20756	20926	21098	21253	21411	21569	21729	21891	22043	22197	22352	22508
	Persons/HH	2.58	2.57	2.55	2.53	2.52	2.51	2.49	2.48	2.47	2.45	2.44	2.43	2.42	2.41	2.40	2.39	2.38	2.37	2.37	2.36

Source: ABS 3236.0 Household and Family Projections Australia 1996 to 2021

APPENDIX 8 Annual Benefit and Cost Data

NOTE – all PV calculations in these tables is at a 7.5 percent discount rate.

Table 24 Australia – MEPS and Labelling (M+L)- benefits and costs (2007 Dollars)

Australia		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAU Energy use	GWh/yr	7478	8367	9354	10451	11589	12621	13805	15083	16507	17934	19497	21133	22784
With-program energy use	GWh/yr	7478	8366	9058	9836	10628	11024	11351	11742	12230	12748	13359	14023	14684
Energy savings	GWh/yr	0	1	296	615	962	1596	2454	3341	4276	5187	6138	7109	8100
Value of energy saved	$M	0.0	0.2	48.2	100.2	156.7	260.0	399.6	544.1	696.5	844.7	999.7	1157.9	1319.2
Emissions saved (marginal)	kt CO_2-e	0	1	292	601	945	1534	2408	3155	3985	4718	5558	6374	7155
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	200.4	108.9	0.0	0.0	0.0	0.0	0.0	0.0

Table 25 Australia – MEPS Only - benefits and costs (2007 Dollars)

Australia		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAU Energy use	GWh/yr	7478	8367	9354	10451	11586	12617	13801	15080	16503	17931	19493	21129	22780
With-program energy use	GWh/yr	7478	8366	9058	9836	10628	11058	11589	12195	12911	13653	14501	15411	16327
Energy savings	GWh/yr	0	1	296	615	958	1559	2212	2885	3591	4278	4992	5717	6454
Value of energy saved	$M	0.0	0.2	48.2	100.2	156.0	253.9	360.2	469.8	584.9	696.7	813.1	931.2	1051.1
Emissions saved (marginal)	kt CO_2-e	0	1	292	601	942	1498	2171	2724	3347	3891	4520	5126	5701
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	200.4	108.9	0.0	0.0	0.0	0.0	0.0	0.0

Table 26 Australia – Label Only - benefits and costs (2007 Dollars)

Year	Units	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Australia														
BAU Energy use	GWh/yr	7478	8367	9354	10451	11589	12621	13805	15083	16507	17934	19497	21133	22784
With-program energy use	GWh/yr	7478	8366	9148	10022	10932	11749	12710	13752	14923	16093	17400	18782	20185
Energy savings	GWh/yr	0	1	206	429	657	872	1095	1331	1583	1841	2097	2351	2599
Value of energy saved	$M	0.0	0.2	33.6	69.9	107.1	142.0	178.4	216.8	257.8	299.9	341.6	382.8	423.3
Emissions saved (marginal)	kt CO_2-e	0	1	203	419	646	838	1075	1257	1475	1675	1899	2108	2296
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	161.3	87.7	0.0	0.0	0.0	0.0	0.0	0.0

Table 27 New South Wales – M+L - benefits and costs (2007 Dollars)

NSW&ACT		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAU Energy use	GWh/yr	2625	2937	3284	3669	4068	4430	4846	5295	5794	6296	6844	7418	7998
With-program energy use	GWh/yr	2625	2937	3180	3453	3731	3870	3985	4122	4293	4475	4689	4923	5154
Energy savings	GWh/yr	0	0	104	216	338	560	861	1173	1501	1821	2155	2496	2843
Value of energy saved	$M	0.0	0.1	18.7	38.9	60.8	100.9	155.0	211.1	270.2	327.7	387.8	449.2	511.8
Emissions saved (marginal)	kt CO_2-e	0	0	101	208	326	530	828	1078	1366	1608	1913	2199	2462
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	68.1	37.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 28 New South Wales - MEPS only - benefits and costs (2007 Dollars)

NSW&ACT	2008	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAU Energy use	GWh/yr	2625	2937	3284	3669	4067	4429	4845	5293	5793	6294	6843	7417	7997
With-program energy use	GWh/yr	2625	2937	3180	3453	3731	3882	4068	4281	4532	4793	5090	5410	5731
Energy savings	GWh/yr	0	0	104	216	336	547	776	1013	1261	1502	1753	2007	2266
Value of energy saved	$M	0.0	0.1	18.7	38.9	60.5	98.5	139.8	182.3	226.9	270.3	315.5	361.3	407.8
Emissions saved (marginal)	kt CO_2-e	0	0	101	208	325	517	746	931	1147	1326	1556	1768	1962
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	68.1	37.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 29 New South Wales - labels only - benefits and costs (2007 Dollars)

NSW&ACT		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAU Energy use	GWh/yr	2625	2937	3284	3669	4068	4430	4846	5295	5794	6296	6844	7418	7998
With-program energy use	GWh/yr	2625	2937	3211	3518	3837	4124	4462	4827	5239	5649	6108	6593	7085
Energy savings	GWh/yr	0	0	72	151	231	306	384	467	556	646	736	825	912
Value of energy saved	$M	0.0	0.1	13.0	27.1	41.5	55.1	69.2	84.1	100.0	116.3	132.5	148.5	164.2
Emissions saved (marginal)	kt CO_2-e	0	0	71	145	223	289	370	429	506	571	654	727	790
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	54.8	29.8	0.0	0.0	0.0	0.0	0.0	0.0

Table 30 Victoria – M+L - benefits and costs (2007 Dollars)

VIC		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Year	Units	1567	1753	1960	2190	2429	2645	2893	3161	3459	3759	4086	4429	4775
BAU Energy use	GWh/yr	1567	1753	1898	2061	2227	2310	2379	2461	2563	2672	2800	2939	3077
With-program energy use	GWh/yr	0	0	62	129	202	335	514	700	896	1087	1286	1490	1698
Energy savings	GWh/yr	0.0	0.0	9.9	20.6	32.3	53.5	82.3	112.0	143.4	173.9	205.8	238.4	271.6
Value of energy saved	$M	0	0	67	140	223	363	572	734	917	1078	1280	1438	1589
Emissions saved (marginal)	kt CO_2-e	0.0	0.0	0.0	0.0	0.0	48.1	26.1	0.0	0.0	0.0	0.0	0.0	0.0
Additional appliance cost	$M	1567	1753	1960	2190	2429	2645	2893	3161	3459	3759	4086	4429	4775

Table 31 Victoria - MEPS only - benefits and costs (2007 Dollars)

VIC		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAU Energy use	GWh/yr	1567	1753	1960	2190	2428	2644	2892	3160	3459	3758	4085	4428	4774
With-program energy use	GWh/yr	1567	1753	1898	2061	2227	2317	2429	2556	2706	2861	3039	3230	3422
Energy savings	GWh/yr	0	0	62	129	201	327	464	605	753	897	1046	1198	1353
Value of energy saved	$M	0.0	0.0	9.9	20.6	32.1	52.3	74.2	96.7	120.4	143.4	167.4	191.7	216.4
Emissions saved (marginal)	kt CO_2-e	0	0	67	140	222	355	515	634	770	889	1041	1156	1266
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	48.1	26.1	0.0	0.0	0.0	0.0	0.0	0.0

Table 32 Victoria - Label only - benefits and costs (2007 Dollars)

VIC		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAU Energy use	GWh/yr	1567	1753	1960	2190	2429	2645	2893	3161	3459	3759	4086	4429	4775
With-program energy use	GWh/yr	1567	1753	1917	2100	2291	2462	2664	2882	3128	3373	3647	3936	4230
Energy savings	GWh/yr	0	0	43	90	138	183	230	279	332	386	440	493	545
Value of energy saved	$M	0.0	0.0	6.9	14.4	22.0	29.2	36.7	44.6	53.1	61.7	70.3	78.8	87.2
Emissions saved (marginal)	kt CO_2-e	0	0	46	98	152	198	255	292	339	383	437	475	510
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	38.7	21.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 33 Queensland – M+L - benefits and costs (2007 Dollars)

QLD		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAU Energy use	GWh/yr	1737	1943	2172	2427	2691	2931	3206	3503	3833	4165	4528	4908	5291
With-program energy use	GWh/yr	1737	1943	2104	2284	2468	2560	2636	2727	2840	2960	3102	3257	3410
Energy savings	GWh/yr	0	0	69	143	223	371	570	776	993	1204	1425	1651	1881
Value of energy saved	$M	0.0	0.0	9.6	20.0	31.3	51.9	79.8	108.6	139.0	168.6	199.6	231.1	263.4
Emissions saved (marginal)	kt CO_2-e	0	0	64	133	208	334	529	708	895	1077	1246	1426	1635
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	40.1	21.8	0.0	0.0	0.0	0.0	0.0	0.0

Table 34 Queensland - MEPS only - benefits and costs (2007 Dollars)

QLD		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAU Energy use	GWh/yr	1737	1943	2172	2427	2691	2930	3205	3502	3832	4164	4527	4907	5290
With-program energy use	GWh/yr	1737	1943	2104	2284	2468	2568	2691	2832	2998	3171	3368	3579	3792
Energy savings	GWh/yr	0	0	69	143	222	362	514	670	834	993	1159	1328	1499
Value of energy saved	$M	0.0	0.0	9.6	20.0	31.1	50.7	71.9	93.8	116.8	139.1	162.3	185.9	209.8
Emissions saved (marginal)	kt CO_2-e	0	0	64	133	207	326	477	611	751	888	1013	1147	1302
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	40.1	21.8	0.0	0.0	0.0	0.0	0.0	0.0

Table 35 Queensland - Labels only - benefits and costs (2007 Dollars)

QLD		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAU Energy use	GWh/yr	1737	1943	2172	2427	2691	2931	3206	3503	3833	4165	4528	4908	5291
With-program energy use	GWh/yr	1737	1943	2124	2327	2539	2729	2952	3194	3466	3737	4041	4362	4687
Energy savings	GWh/yr	0	0	48	100	153	202	254	309	368	428	487	546	604
Value of energy saved	$M	0.0	0.0	6.7	14.0	21.4	28.3	35.6	43.3	51.5	59.9	68.2	76.4	84.5
Emissions saved (marginal)	kt CO_2-e	0	0	45	93	142	182	236	282	331	382	426	472	525
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	32.3	17.5	0.0	0.0	0.0	0.0	0.0	0.0

Table 36 South Australia – M+L - benefits and costs (2007 Dollars)

SA		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAU Energy use	GWh/yr	589	659	737	823	913	994	1087	1188	1300	1413	1536	1664	1795
With-program energy use	GWh/yr	589	659	713	775	837	868	894	925	963	1004	1052	1105	1157
Energy savings	GWh/yr	0	0	23	48	76	126	193	263	337	409	483	560	638
Value of energy saved	$M	0.0	0.0	4.5	9.3	14.5	24.0	36.9	50.3	64.3	78.0	92.3	107.0	121.9
Emissions saved (marginal)	kt CO_2-e	0	0	25	53	85	136	211	267	334	403	473	560	609
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	18.0	9.8	0.0	0.0	0.0	0.0	0.0	0.0

Table 37 South Australia - MEPS only - benefits and costs (2007 Dollars)

SA		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAU Energy use	GWh/yr	589	659	737	823	913	994	1087	1188	1300	1412	1535	1664	1794
With-program energy use	GWh/yr	589	659	713	775	837	871	913	961	1017	1075	1142	1214	1286
Energy savings	GWh/yr	0	0	23	48	75	123	174	227	283	337	393	450	508
Value of energy saved	$M	0.0	0.0	4.5	9.3	14.4	23.5	33.3	43.4	54.0	64.4	75.1	86.0	97.1
Emissions saved (marginal)	kt CO_2-e	0	0	25	53	85	132	190	230	281	332	385	450	485
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	18.0	9.8	0.0	0.0	0.0	0.0	0.0	0.0

Table 38 South Australia - Labels only - benefits and costs (2007 Dollars)

SA		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAU Energy use	GWh/yr	589	659	737	823	913	994	1087	1188	1300	1413	1536	1664	1795
With-program energy use	GWh/yr	589	659	721	789	861	925	1001	1083	1175	1268	1370	1479	1590
Energy savings	GWh/yr	0	0	16	34	52	69	86	105	125	145	165	185	205
Value of energy saved	$M	0.0	0.0	3.1	6.5	9.9	13.1	16.5	20.0	23.8	27.7	31.6	35.4	39.1
Emissions saved (marginal)	kt CO_2-e	0	0	18	37	58	74	94	106	124	143	162	185	196
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	14.5	7.9	0.0	0.0	0.0	0.0	0.0	0.0

Table 39 Western Australia – M+L - benefits and costs (2007 Dollars)

WA		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAU Energy use	GWh/yr	749	837	936	1046	1160	1263	1382	1510	1652	1795	1952	2115	2281
With-program energy use	GWh/yr	749	837	907	985	1064	1104	1136	1175	1224	1276	1337	1404	1470
Energy savings	GWh/yr	0	0	30	62	96	160	246	334	428	519	614	712	811
Value of energy saved	$M	0.0	0.0	4.4	9.0	14.2	23.5	36.1	49.2	62.9	76.3	90.3	104.6	119.2
Emissions saved (marginal)	kt CO_2-e	0	0	27	51	80	132	206	283	366	424	494	575	657
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	20.0	10.9	0.0	0.0	0.0	0.0	0.0	0.0

Table 40 Western Australia - MEPS only - benefits and costs (2007 Dollars)

WA		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAU Energy use	GWh/yr	749	837	936	1046	1160	1263	1381	1509	1652	1795	1951	2115	2280
With-program energy use	GWh/yr	749	837	907	985	1064	1107	1160	1221	1292	1367	1452	1543	1634
Energy savings	GWh/yr	0	0	30	62	96	156	221	289	359	428	500	572	646
Value of energy saved	$M	0.0	0.0	4.4	9.0	14.1	22.9	32.5	42.4	52.8	62.9	73.5	84.1	95.0
Emissions saved (marginal)	kt CO_2-e	0	0	27	51	79	128	186	244	307	350	402	462	523
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	20.0	10.9	0.0	0.0	0.0	0.0	0.0	0.0

Table 41 Western Australia - Labels only - benefits and costs (2007 Dollars)

WA		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAU Energy use	GWh/yr	749	837	936	1046	1160	1263	1382	1510	1652	1795	1952	2115	2281
With-program energy use	GWh/yr	749	837	916	1003	1094	1176	1272	1377	1494	1611	1742	1880	2020
Energy savings	GWh/yr	0	0	21	43	66	87	110	133	158	184	210	235	260
Value of energy saved	$M	0.0	0.0	3.0	6.3	9.7	12.8	16.1	19.6	23.3	27.1	30.9	34.6	38.2
Emissions saved (marginal)	kt CO_2-e	0	0	18	36	54	72	92	113	135	151	169	190	211
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	16.1	8.8	0.0	0.0	0.0	0.0	0.0	0.0

Table 42 Tasmania – M+L - benefits and costs (2007 Dollars)

TAS		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAU Energy use	GWh/yr	110	124	139	156	174	193	210	230	251	274	298	324	351
With-program energy use	GWh/yr	110	124	139	151	164	177	183	189	195	203	212	222	233
Energy savings	GWh/yr	0	0	0	5	10	16	27	41	56	71	86	102	118
Value of energy saved	$M	0.0	0.0	0.0	0.6	1.3	2.0	3.3	5.1	6.9	8.9	10.8	12.8	14.8
Emissions saved (marginal)	kt CO_2-e	0	0	0	5	10	16	27	41	58	70	83	97	114
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	0.0	4.0	2.2	0.0	0.0	0.0	0.0	0.0

Table 43 Tasmania - MEPS only - benefits and costs (2007 Dollars)

TAS		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAU Energy use	GWh/yr	124	139	156	174	193	210	230	251	274	298	324	351	379
With-program energy use	GWh/yr	124	139	151	164	177	183	189	195	203	212	222	233	244
Energy savings	GWh/yr	0	0	5	10	16	27	41	56	71	86	102	118	135
Value of energy saved	$M	0.0	0.0	0.6	1.3	2.0	3.3	5.1	6.9	8.9	10.8	12.8	14.8	16.8
Emissions saved (marginal)	kt CO_2-e	0	0	5	10	16	27	41	58	70	83	97	114	131
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	4.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0

Table 44 Tasmania - Labels only - benefits and costs (2007 Dollars)

TAS		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAU Energy use	GWh/yr	124	139	156	174	193	210	230	251	274	298	324	351	379
With-program energy use	GWh/yr	124	139	152	167	182	195	211	229	248	268	289	312	336
Energy savings	GWh/yr	0	0	3	7	11	14	18	22	26	31	35	39	43
Value of energy saved	$M	0.0	0.0	0.4	0.9	1.4	1.8	2.3	2.8	3.3	3.8	4.4	4.9	5.4
Emissions saved (marginal)	kt CO_2-e	0	0	3	7	11	15	18	23	26	30	33	38	42
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	3.2	1.8	0.0	0.0	0.0	0.0	0.0	0.0

Table 45 Northern Territory – M+L - benefits and costs (2007 Dollars)

NT		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAU Energy use	GWh/yr	87	98	109	122	135	147	161	176	193	209	228	247	266
With-program energy use	GWh/yr	87	98	106	115	124	129	132	137	143	149	156	164	171
Energy savings	GWh/yr	0	0	3	7	11	19	29	39	50	61	72	83	95
Value of energy saved	$M	0.0	0.0	0.5	1.1	1.7	2.9	4.4	6.0	7.7	9.3	11.0	12.8	14.6
Emissions saved (marginal)	kt CO_2-e	0	0	3	6	8	14	21	29	37	45	54	62	71
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	2.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0

Table 46 Northern Territory - MEPS only - benefits and costs (2007 Dollars)

NT		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAU Energy use	GWh/yr	87	98	109	122	135	147	161	176	193	209	227	247	266
With-program energy use	GWh/yr	87	98	106	115	124	129	135	142	151	159	169	180	191
Energy savings	GWh/yr	0	0	3	7	11	18	26	34	42	50	58	67	75
Value of energy saved	$M	0.0	0.0	0.5	1.1	1.7	2.8	4.0	5.2	6.5	7.7	9.0	10.3	11.6
Emissions saved (marginal)	kt CO_2-e	0	0	3	6	8	13	19	25	31	37	44	50	57
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	2.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0

Table 47 Northern Territory - Label only - benefits and costs (2007 Dollars)

NT		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAU Energy use	GWh/yr	87	98	109	122	135	147	161	176	193	209	228	247	266
With-program energy use	GWh/yr	87	98	107	117	128	137	148	160	174	188	203	219	236
Energy savings	GWh/yr	0	0	2	5	8	10	13	16	18	21	24	27	30
Value of energy saved	$M	0.0	0.0	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.3	3.8	4.2	4.7
Emissions saved (marginal)	kt CO_2-e	0	0	2	4	6	7	9	11	14	16	18	21	23
Additional appliance cost	$M	0.0	0.0	0.0	0.0	0.0	1.6	0.9	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 9 Calculation Methodology and Worked Examples

The following Appendix describes the assumptions, data sources and calculation steps and methodology for this RIS.

This methodology and the assumptions made are the basis of the Costs, Benefits and Impacts of the RIS. As such, careful scrutiny and feedback is sought from stakeholders in this consultative phase.

Power and Usage
Like any electrical appliance, the contribution of televisions to energy use and emissions is a function of number of units in operation, technical attributes of the units, and usage behaviour of the users.

Stock and sales estimates were made for all Australia as detailed in Appendix 4 These sales, in combination with the survival function, were multiplied by BAU and MEPS power consumption figures for each mode. The BAU and MEPS power consumption values for each category pf television are shown in Table 40. To determine the total energy consumption, these values were multiplied by their respective usage characteristics.

Hours of operation for the Base Scenario are discussed in section 5

Table 48: Hours of Operation of televisions

STB Category	Hours – Base
Television (ON)	10
Television (Passive Stand-by)	14

Table 49: Television MEPS and BAU power consumption.

Type	Screen Size	MEPS 1	MEPS 2	MEPS 1 3 Star Level	MEPS 2 3 Star Level	2007/2008 Average (BAU)
CRT	51cm	91	64	64	45	61
CRT	59cm	109	77	77	54	70
CRT	68 cm	134	94	94	67	85
LCD	66 cm or Less	128	90	90	64	68
LCD	67cm-< 106cm	175	124	124	87	140
LCD	Larger than 106cm	275	194	194	137	270
Plasma	106cm	275	194	194	137	249
Plasma	127cm	380	268	268	189	357
Plasma	128 cm or larger	516	364	364	257	525

Energy and Greenhouse
The sum of direct and indirect energy consumption was used to provide the net energy consumption used for all subsequent calculations. Direct energy consumption was calculated as described above. The indirect energy, that results due to the operation of STBs (e.g. increase in air conditioning energy), is a function of heating and air conditioner penetration, performance of heating and cooling systems, and, number of heating, cooling and temperature neutral days. The indirect energy use calculation parameters are shown in Table 41.

Table 50: Energy Use Calculation Parameters by State

Parameters	NSW	NT	QLD	SA	TAS	VIC	WA
Share Population %	34.77%	1.00%	19.64%	7.55%	2.38%	24.71%	9.94%
AC Saturation %	70%	80%	80%	40%	30%	45%	70%
Heating Saturation %	95%	2%	30%	95%	100%	100%	20%
Average COP (Heating)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Average COP (Cooling)	2.5	2.5	2.5	2.5	2.5	2.5	2.5
% Heating Days	30%	0%	10%	60%	70%	60%	50%
% Cooling Days	50%	70%	70%	20%	10%	20%	25%
% Neutral Days	20%	30%	20%	20%	20%	20%	25%

The GHG emissions used the State energy calculations combined with the Greenhouse Gas Emission Factors in Appendix 9

Cost-Benefits

The PV benefits are calculated for each State using the domestic tariffs as shown in Appendix 6 multiplied by the energy savings calculated earlier. The sum of the customer costs, the supplier costs and government costs provide the total costs for the MEPS option.

APPENDIX 10 Manufacturer Compliance Costs

Compliance costs for manufacturers comprise testing, marking and registration.

Testing.

Testing to the standard is incremental time only to the set up and tests already carried out. The incremental time for testing and reporting is estimated to be 4 hours. The estimate is by two Australian laboratoryies and a UK laboratory.
The testing required in the Australian standard is in accordance with international agreements on test methods for televisions

Marking

A voluntary program to label televisions with their energy rating is already in place. The modelling allows for the cost of adding this label..

Registration
The registration method in Australia is via web site submission. The estimated time to complete registration is one hour.

The bulk of televisions are manufactured in Asia and would be tested there. Labour rates are much lower and even using the conservative $20 per hour, incremental costs for compliance range from very low to insignificant, depending upon quantity manufactured. However, for this RIS we identified a cost of $600 for testing in Australian test facilities. To make the estimate more conservative a figure of $800.00 was chosen for the modelling.

APPENDIX 11 Various news stories on TV energy consumption, Trends and usage

Plasma Efficiency Developments

The following text boxes show selected excerpts from press releases and news stories between 2005 and 2008 that describe efficiency developments for plasma televisions. The web link for each story is provide and is current as of April 2, 2008. The stories are truncated and the efficiency claims are bolded in **red** for emphasis.

http://www2.panasonic.com/webapp/wcs/stores/servlet/prModelDetail?storeId=11301&catalogId=13251&itemId=215174&modelNo=Content01072008044330094&surfModel=Content0107200804433009 4

PANASONIC INTRODUCES NEXT-GENERATION PLASMA DISPLAYS AT 2008 INTERNATIONAL CES

Revolutionary Plasma Technologies Boast Dramatic Energy Efficiency, Less Than One-inch Super-thin Profile and 150-inch Ultra-large Screen

Las Vegas, NV (January 7, 2008) – Panasonic, the leading brand by which Matsushita Electric Industrial Co., Ltd. is known, today announced that the company has developed three prototype plasma display panels (PDPs) using ground-breaking technologies. The prototypes include a 42-inch panel with double efficiency technology that halves energy consumption while maintaining the same brightness*, a less than one-inch super-thin 50-inch PDP and the world's largest 150-inch advanced high definition (HD) PDP. The three prototypes are on display at the 2008 International Consumer Electronics Show (CES) that starts on January 7 in Las Vegas.

At the core of these cutting edge PDP's lies the double efficiency technology used in the 42-inch prototype. After thoroughly reviewing its existing IC technology and panel structures, Panasonic developed new phosphors and cell design technology for improved discharge and new circuit and drive technology to significantly reduce power loss. As a result, the 42-inch prototype has twice the luminance efficiency and provides the same brightness as the existing 42-inch 1080p full HD PDP, while cutting the power consumption by half.

The double-efficiency technology forms the base for next-generation PDPs, enabling even thinner profiles, larger screens, brighter images, higher definition and lower power consumption. The revolutionary technology promises to open up new possibilities for PDPs. Higher density HD PDP's that can be used as master monitors for movie studios will become possible through this innovative technology.

http://www.eetasia.com/ART_8800455 864_480700_NP_24a70954.HTM

3/9/07 PDP driver cuts power consumption by 35%

Samsung Electronics Co. Ltd announced that its new, broad 256-channel display driver IC (DDI) for PDP offers a lower power-consumption rate over conventional PDP driver ICs, and creates greater cost efficiencies by reducing the number of DDIs per panel. According to the company, it has again implemented its energy-recovery circuit technology in its new driver IC to recycle energy loss within the circuit. **The feature lowers the DDI power consumption of a conventional PDP TV by over 35 percent,** eliminating the need for a separate power-saving component feature and enabling a slimmer and lighter TV module.

Samsung 70-inch LCD TV Has Local LED Backlighting

....Samsung ... keeps presenting hot models ... . And some LCD televisions too, like this 1080p 70-inch model they introduced today in Korea, the first commercial Full HD TV ever with selective local LED backlighting. The new system, which will be sold around the world during the second half of the year, allows for some amazing features. To start with, the local backlighting means that the TV can *automagically* turn off the LEDs in dark areas of the image. This not only brings deep blacks and a 500,000:1 dynamic contrast ratio but also, according to Samsung, it reduces the power consumption "by as much as 50%." It also implements LED scanning, in which "LEDs are rapidly shut off in sequence" eliminating flicker and ghosting. Samsung has quite a bit of these technologies lined up. While this one will completely turn off the LEDs in some areas, future versions of the technology will adjust the backlighting dynamically over finer surfaces. – JESUS DIAZ

http://www.eetasia.com/ART_8800460668_765245_NT_f95 13 30b.HTM

Korean engineers tout power-saving tech for PDPs 4/13/07

A team of engineers from the Korea Advanced Institute of Science and Technology (KAIST) led by professor Choi Kyung-cheol has developed a highly efficient, power-saving technology for light-emitting plasma display panels (PDPs) that are used in digital TVs, according to a report from the *Korea Herald.*

The technology boasts of a new cell structure and driving method for light-emitting PDPs that **can boost power efficiency by four times compared to existing methods.** According to the report, the technology features a four-electrode cell structure, which is the core technology for saving power in light-emitting solutions.

"The existing PDPs have used up about 1.5 times more electric power compared to LCDs. However, with this technology, PDP power consumption can be less than LCD consumption supposing the two are emitting the same degree of light," Choi said in the report.

At present, local PDP developers use Fujitsu's three-electrode cell structure. Choi noted that if local developers will use their power-saving technology, "they won't have to pay fees for using Japan or American PDP technologies."

http://news.thomasnet.com/companystory/500654 **11/27/06**

"Panasonic is also making progress on reducing the amount of energy each Plasma TV consumes," said Mr. Thompson. "There is an inaccurate but persistent myth that Plasma TVs consume much more energy than other types of digital television. The truth is that large screen TVs consume more energy than the smaller screened CRT-based TVs they replace. Our research indicates that energy consumption by large-screen Plasma, LCD and DLP TV sets is on average comparable. **But as a relatively new technology, compared with LCD, Plasma is capable of becoming considerably more energy-efficient, and Panasonic plans to lead the way to this goal." -** David Thompson, Panasonic Corporation of North America's director of environmental affairs.

http://www.nzherald.co.nz/section/story.cfm?c_id=5&objectid=1 0461 566&ref=rss **9/4/07**
Hiro Wada, who is in charge of planning for visual products and display devices at Panasonic, said he believed plasma could maintain a share of at least 30 percent of the market for flat-screen TVs bigger than 37 inches in the medium term.
"We have a chance because demand for bigger screens is increasing," Wada told Reuters in an interview at IFA. He said Matsushita, which is investing $1.5 billion ($NZ2.1bn) in a plasma panel factory in Japan, aimed to stay number one in the plasma market. He added that plasma technology, which has only been commercial for about 10 years, still had plenty of room to improve. LCD television technology has been commercial for more than 30 years.
He also said Panasonic aimed to reduce the power consumption of its sets by about 20 percent per year.

http://www.eetasia.com/ART_8800378669_480700_NT_a4acaa62.HTM

10/11/05

A joint plasma display R&D company in Japan has **announced that it has improved luminous efficiency to 5.7 lumens per watt for an 11-inch display prototype and 3.5 lumens per watt for 43-inch prototype,** both being exhibited at CEATEC Japan here this week.

The joint R&D company, Advanced PDP Development Center Corp. was formed in July 2003 by Japanese PDP makers Fujitsu Ltd, Hitachi, Ltd, Matsushita Electric Industrial Co., Ltd, Pioneer Plasma Display Corp. and Pioneer Corp., to develop a low power consumption PDP and a low energy consuming production process.

One target was to achieve a 5 lumen per watt efficiency by refining gas discharge mechanisms, fluorescent materials and driving circuitry for plasma displays. If the luminous efficiency is improved, less power is required to display at the same brightness. Though PDP makers have been working to improve the efficiency for years, they have been previously limited to producing no more than 2 lumens per watt.

The Advanced Plasma Display Development Center expects that a 40-inch panel with the 5-lumen per watt efficiency can lower the power consumption from typical 390 watts to 100 watts.

The other target is to develop a new production process that can cut the energy required to manufacture panels by two-thirds. APDC plans to reduce the 250kWh of energy required to produce one panel in 2003 to 80kWh.

New Energy and Industrial Technology Development Organization (NEDO), an affiliate of the Ministry of Economy, Trade and Industry (METI), subsidized APDC as a part of low power consumption next generation PDP project, which APDC plans to complete in the third year of the project next year. "We have managed to achieve the targets," said Osamu Yamada, president of APDC.

APDC plans to transfer the technologies, whose details were not disclosed, to the founder PDP companies and related organizations when the project ends in March 2006. Both 3.5 and 5.7 lumens per watt are the top emitting efficiencies achievable, said a spokesman of APDC. But it will take time until the panel with 5.7 lumens per watt actually hits the market, he said.

http://www.informationdisplay.org/article.cfm?year=2006&issue=0 1 &file=art2

1/06 Matsushita, Hitachi, Pioneer Jointly Develop Low-Power PDP

TOKYO—In an effort to eliminate what many believe is the biggest shortfall of plasma televisions, Japan's top three plasma-display-panel (PDP) makers have joined forces to create a plasma display that uses less than half the power of a conventional PDP. Matsushita Electric Industrial Co., Hitachi, and Pioneer Electronics have been working together as the Advanced PDP Development Center Corp. (APDC) for about two years to create a low-power PDP, which they debuted in October at the 2005 CEATEC show in Makuhari Messe (Chiba), Japan. High power consumption has long been regarded as one of the biggest drawbacks of plasma displays. But **with power usage of 3.5 and 5 lm/W, the two models developed by the APDC are 2.5 and 4 times more efficient than a conventional PDP,** respectively, according to APDC General Manager Toyoo Kanai. The three electronics giants began work on the low-power PDP in June 2003, Kanai said, and the partnership on the present project will continue through March 2006, when each individual company will integrate the new technology into its own products. "The main reason for the joint develop-ment is that the scale of development is too high to be borne by each company, in terms of monetary and human resources," Kanai explained.

The APDC has also been receiving funding from the Japanese Ministry of Economy, which is hoping the low-power plasma will help combat global warming and enhance international competitiveness through technological breakthrough, Kanai added. SID President-Elect Larry Weber, a pioneer in plasma technology, called luminous efficacy the "No. 1 display parameter" makers of all the television technologies are trying to increase. The higher the ratio of lumens per watt, the better the luminous efficacy, Weber explained. And the better the luminous efficacy, the less energy it takes to power a display. Higher luminous efficacy means lower costs because television manufacturers do not have to spend as much on circuitry, cooling fans, and power supplies. It can also help engineers to build TVs that have brighter displays and are easier to operate. "All of the technologies have a good strategy for increasing the luminous efficacy— LCDs, plasmas, OLEDs and projection TVs," Weber said. "So all these major technologies are racing to try to make efficacies better, and plasma displays are no different than the rest. Plasma displays have a tremendous opportunity to increase their luminous efficacy, and what you saw in Japan at the (October 2005) CEATEC is just sort of an indication of what's to come."

At this point, there is no specific date when low-power PDP TVs will be available to consumers, since each of the three companies will decide separately when to market its own products, Kanai said.**"It's generally understood that the newly developed technologies will be applied to the products in two to three years," he added.**

APPENDIX 12 Indirect Energy Calculations

Indirect energy gains and loses arise from the impact of waste energy from televisions on other energy consuming products. In this RIS, this has been applied only to heating and cooling loads in the residential sector.

The heating and cooling loads depend upon the ambient temperatures in the each region.

To estimate indirect energy, data has been sourced by capital city on the basis of energy consumed in office buildings. [DEW 2006]

Referring Table 42 below; Columns A and B have been estimated from the DEW chart for office energy use [DEW 2006]. The units are MJ /m^2 per annum, however the units are not of interest, as the data has been used to estimate the percentage of heating and cooling time, as shown in columns C and D respectively.

In calculating the no load energy in column F, analysis of office appliance usage patterns provides an estimate that 36% of the total daily no load energy is consumed during office hours, when heating or cooling is required.

From the same analysis of office appliance usage for calculating the active energy losses in column G, it is estimated that 82% of the total daily active energy loss is consumed during office hours when heating or cooling is required.

No load and active energy losses are then apportioned by State on the basis of number of households in column E.

The heating energy saved is calculated by dividing the total energy in column H by a co-efficient of performance (COP) for heating at 3.0. This COP is based upon the E3 report on heat pumps from http://www.energyrating.gov.au/library/pubs/200417-mepsheatpumps.pdf

The cooling energy saved is calculated by dividing the total energy in column H by a co-efficient of performance (COP) for cooling at 2.45 This COP is based upon the average COP for air conditioners in the range of 10 to 65kW from http://www.energyrating.gov.au/library/pubs/ris-ac2001.pdf

COP. Refrigerative air conditioners and heat pumps use a technique called the vapour compression cycle to "move" energy in the form of heat from one space to another. This is generally a very efficient process and the amount of heat moved is typically 2 to 3 times the energy required to run the compressor system. This ratio is called the Coefficient of Performance (COP). The system uses a refrigerant (which exists as a gas at low pressure and as a liquid under compression) which is compressed and liquefied, allowed to cool in a condenser, and then allowed to expand to become a gas in an evaporator (the expansion is accompanied by a strong cooling effect). In this operation the condenser becomes warm and the evaporator becomes cold as the heat is moved from the evaporator to the condenser. The principle is the same as used in a normal refrigerator which "moves" heat from the inside of refrigerator to the outside. In the case of an air conditioner, when in cooling mode the heat is removed from the room being cooled and pushed outside through the refrigeration system. Similarly, if the unit can operate in "reverse" (so called heating mode or reverse cycle), the process runs backwards and the energy is collected from outside and moved inside to the room being heated.

Table 51: Indirect Energy Data

Column	A	B	C	D	E	F	G	H	I
	Heating energy	Cooling energy	% time heating	% time cooling	Households per State	No load Office hours	Active losses Office hours	Total	Heating GWh saved
Adelaide	3	20	13%	87%	635.3	2.43	9.49	11.92	0.39
Brisbane	0	27	0%	100%	1510.1	5.77	22.56	28.34	0.00
Canberra	7.5	17	31%	69%	129.6	0.50	1.94	2.43	0.19
Darwin	0	47	0%	100%	74.3	0.28	1.11	1.39	0.00
Hobart	8.8	9.5	48%	52%	195.8	0.75	2.93	3.67	0.44
Melbourne	5.5	15	27%	73%	1905.5	7.29	28.47	35.76	2.40
Perth	1.5	28	5%	95%	801.1	3.06	11.97	15.03	0.19
Sydney	2	31	6%	94%	2591.9	9.91	38.73	48.64	0.74

APPENDIX 13 Responses to Supplementary Discussion Paper – TV MEPS and Labelling

Panasonic	• Support voluntary labelling – but store display stock only • Support mandatory labelling from April 2009 • MEPS at a later date (than April 2009) to be agreed • 4 year difference between MEPS 1 & 2 • Not include 1080 in MEPS 1. (introduce 6 months after MEPS 1)
Panasonic NZ Ltd	• Same submission points as for Panasonic above. In addition: • Recommends energy consumption differences between MPEG4 and MPEG2 be fully examined taken into account when setting MEPS standards between Australia and New Zealand • Submits that PLASMA FULL HD should be entitled to use the label without a star rating indicated and with the annual power consumption being indicated • Submits that careful consideration is given to the label design and suggests that major retailers should also be consulted in the process of designing and establishing the rules for use and display of the label.
Sustainability Victoria	• Support mandatory MEPS and labelling from April 2009 including 1080 plasma • Support voluntary labelling early 2008
Sony	• Concerned MEPS proposed without sufficient industry consultation • Current star rating proposed doesn't communicate the power savings across the market (most ½ to 1 star) • Every TV type should be included • Don't agree with mandatory requirements in 2009 at proposed MEPS levels (propose 2010 instead) • Think proposed voluntary scheme could cause confusion
Sharp	• Support mandatory labelling from April 2009 • Support introduction of MEPS later than 2009 (April) • Voluntary labelling only when measuring and labelling standards are published, subject to usual RIS • Request voluntary labelling only apply to retail store display stock • 1080 should be introduced and come into effect no earlier than 4 years after introduction of MEPS 1
CESA	• Mandatory labelling April 2009 and MEPS later than that • Separate RIS processes for labelling and MEPS • Voluntary labelling when measuring and labelling standards published – subject to RIS processes, ½ star to start plus a zero star label (prefer drop voluntary process and focus on mandatory) • Industry in general not in favour of exempting 1080 • MEPS 2 announcement to be made 12 months after introduction of MEPS 1
LG	• Support mandatory labelling and MEPS 1 on April 2009 • Don't support 1080 exemption • Would like to see smaller gap between star ratings allowing for longer spread of stars and realise this may mean a review of algorithm in 3-4 years • Concerned test method doesn't require checking of luminance level when determining energy consumption say manufacturers can achieve higher efficiency by reducing the brightness level on the current 'normal' mode

AIG	• Regulation must be nationally consistent and effectively policed • Jurisdictional inconsistencies must be avoided by regulators • Any new regulation should be assessed using robust RIS guidelines • Mandatory requirements either co-regulated or fully regulated, must apply to all suppliers, including importers of product • Government should not recover costs through industry by using stewardship to shift cost burdens • Regulation should only be introduced to the extent that is necessary and consistent with open trade in the electronics/electrical sectors • Regulatory frameworks should guard against unfair competition in the marketplace and inconsistent application • No additional response was needed to the particular recommendations set out in the paper.

APPENDIX 14. Article for Department of the Environment and GfK's Australian website. "Falling Prices Encourage Flat Panel TV Sales"

As flat panel TVs prices declined in the lead up to the Beijing Olympics, these products became more affordable for more Australians, stimulating demand, boosting sales and highlighting the intensely competitive nature of the TV market.

The lead-up towards the Beijing Olympics saw unit sales of LCD TVs increase by 52% (in the first six months of 2008) and Plasma TVs increase by 38% (compared to 1H 2007). Sales of flat panel TVs were stimulated by falling prices as average LCD TV prices dropped by 18% (down $293 to $1,369) between Q2 2007 and Q2 2008. Average Plasma TV prices experienced an even larger proportionate decline, with a year-on-year reduction of 26.3% (down $668 to $1,871).

According to GfK's Retail Tracking service, the TV market is highly competitive, with the top 100 selling models in the year to June 2008 accounting for 61% of the market, and represented by 23 different brands.

GfK's ConsumerScope TV tracking studies indicate that price and 'value-for-money' factors are the most important factors driving flat panel TV purchases. "Price" is the most important factor overall among recent flat panel TV buyers, with "picture quality" the next most important factor. Interestingly, among buyers of larger (over 42 inch), and more expensive ($2,000+) TVs, picture quality is actually a more important factor than price, however buyers of larger, more expensive TVs tend to have higher household incomes.

The importance of price/value has also been observed in GfK's ConsumerScope tracking studies in other consumer electronics categories, where recent PC, mobile phone and digital camera buyers, have also indicated that price/value is the single most important factor when buying these products.

GfK Marketing Services Australia (GfK) specialises in researching and reporting on the market for Consumer Technology, IT products, Telecommunications, Office Communications, Electronic Entertainment, Household Electrical Appliances and Photographic Equipment.

GfK's Retail Tracking data is based on GfK's retail audit panel. Each week, retailers on the panel report their sales figures (units and $ value) for the relevant product groups. These figures are captured on GfK's research database, aggregated, and reported each month to subscribers.

GfK's ConsumerScope studies regularly report on the purchase, ownership and usage of several consumer electronics categories. GfK's ConsumerScope TV study is based on the behaviour and attitudes of a rolling annual sample of 5,000 recent flat panel buyers.

For further information, please contact:
Dr Morten Boyer
GfK Marketing Services, Australia
02 9900-2888

ENDNOTES

1 Laid before the Legislative Assembly on . . .

2 The administering agency is the Department of Employment, Economic Development and Innovation.