FINAL TECHNICAL REPORT (2007/18)

PHASE-OUT OF INEFFICIENT INCANDESCENT LAMPS AND STANDARDS FOR COMPACT FLUORESCENT LAMPS

Prepared for The Australian Greenhouse Office

December 2007

Beletich Associates
energy consultants

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Dear Stakeholder

CONSULTATION TECHNICAL REPORT – PHASE-OUT OF INEFFICIENT INCANDESCENT LAMPS

Australian Government agencies responsible for product energy efficiency are currently investigating the implementation of the Government's announced intention to phase-out inefficient incandescent lamps.

A technical report addressing this proposal is available at http://www.energyrating.gov.au/whatsnew.html. You or your organisation may be interested in commenting on this proposal.

The technical report aims to communicate to stakeholders the rationale and most important issues and questions relating to the regulatory proposal and to seek stakeholder comment and industry/market data to better inform the development of the regulatory proposal.

Currently incandescent lighting and compact fluorescent lamps are not subject to minimum energy performance standards (MEPS). The measure will be implemented by introducing MEPS for incandescent lamps in order to remove the poorest performing products from the Australian market place between 2008 and 2015.

The Equipment Energy Efficiency (E3) Program in Australia is managing the process of obtaining stakeholder views and data on the regulatory proposal. E3 will accept written submissions from stakeholders until close of business 1 February 2007 on any of the issues raised in the document.

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Please address your written submissions to:

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Or via email to:
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Please use this opportunity to comment on the regulatory proposal.

Yours faithfully

Melanie Slade
Chair
Equipment Energy Efficiency Committee
14 December 2007

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ABBREVIATIONS

ABS	Australian Bureau of Statistics
CFL	compact fluorescent lamp
CRI	colour rendering index
ELV	Extra low voltage
GLS	general lamp service
IES	Illuminating Engineering Society
IRC	infrared coating
LED	light emitting diode
lm	lumens
lm/w	lumens per watt
MEPS	minimum energy performance standards
w	watts

NOTE

1 INTRODUCTION

1.1 Background

In February 2007, the Australian Minister for the Environment announced the Government's intention to phase-out inefficient incandescent lamps. The aim of this project is to significantly reduce Australia's greenhouse gas emissions, and it places Australia at the forefront of international efforts to tackle climate change.

The measure is part of the Australian Government's comprehensive climate change response strategy, which is underpinned by an investment of almost AU$3.5 billion. The strategy has several goals: to support world-class scientific research to continue to build our understanding of climate change; to ensure we meet our Kyoto greenhouse gas emissions reduction target; to stimulate the development of the new low emissions technologies; and to identify those regions and industries that are most vulnerable to the impacts of climate change.

The measure will be implemented by introducing minimum energy performance standards (MEPS) for incandescent lamps, in order to remove the poorest performing products from the Australian marketplace between 2008 and 2015. At the same time, a MEPS for compact fluorescent lamps (CFLs) will also be introduced to ensure that only high quality CFLs are sold in Australia. The latter MEPS is necessary to ensure consumers are satisfied with the performance of CFLs and that they become the preferred lamp choice wherever possible.

Other background documents relevant to this project include:

- Greenlight Australia - A strategy for improving the efficiency of lighting in Australia 2005-2015. Available from: http://www.energyrating.gov.au/library/details200418-greenlights.html.
- MEPS Profile - Compact Fluorescent Lamps. Available from: http://www.energyrating.gov.au/library/details200512-mepscfls.html.
- MEPS Technical Report - Analysis of Potential for Minimum Energy Performance Standards for Lamps. Available from: http://www.energyrating.gov.au/library/detailstech-lamps2001.html.
- Media release regarding incandescent lamps. Available from: http://www.environment.gov.au/minister/env/2007/pubs/mr20feb07.pdf.

1.2 Purpose of this Report

The purpose of this report is to outline a plan for applying MEPS to incandescent and compact fluorescent lamps. This plan represents the culmination of discussions between the Author, Lighting Council Australia and its members, and the Australian Greenhouse Office, held between February and December 2007.

2 LAMP TECHNOLOGY AND EFFICACY

The two lamp technologies relevant to this report are compact fluorescent lamps (CFLs) and incandescent lamps. CFLs employ gas discharge technology together with a phosphor coating to produce visible light. They are significantly more efficient than incandescent lamps.

Incandescent lamps typically utilise a tungsten filament as the light source. There are numerous types of incandescent lamps relevant to this report, which can employ any combination of the following attributes:

- Mains voltage or extra low voltage (ELV).
- Reflector or non-reflector.
- Filled with an inert gas or halogen gas mixture.

Halogen lamps have a tungsten filament suspended in a gas mixture which contains a halogen gas. These lamps achieve better efficacy, have a longer operating life and produce a whiter, brighter light than conventional incandescent lamps filled with inert gas. The halogen gas suppresses degradation of the filament by a chemical regeneration process known as the halogen cycle.

Halogen lamps are designed for either mains voltage or extra low voltage operation (the latter requiring a transformer or voltage converter). Extra low voltage halogen lamps run at higher current, which allows for a shorter filament and thus a smaller light source which is suitable for focusing into a tight, directional beam. As the filament is shorter, it runs hotter and thus extra low voltage halogen lamps are typically more efficient than mains voltage lamps.

For the purpose of this report, incandescent lamps are grouped into the following categories with the following definitions:

- **General lamp service (GLS) lamps**. These mains voltage incandescent lamps are the typical pear-shaped lamps used commonly throughout Australia. They do not utilise a halogen gas fill.
- **Mains voltage halogen non-reflector lamps**. These non-reflector lamps employ a halogen gas fill and are used in similar applications to GLS lamps.
- **Candle-shaped, fancy round and decorative lamps**. These mains voltage incandescent lamps are available in a range of varying shapes for decorative purposes e.g. in chandeliers.
- **ELV halogen non-reflector lamps**. These extra low voltage 'capsule' lamps utilise a halogen gas fill.
- **ELV halogen reflector lamps**. These extra low voltage reflector lamps utilise a halogen gas fill and include 'dichroic' lamps.
- **Mains voltage reflector lamps**. These mains voltage reflector lamps utilise either a halogen or inert gas fill and include PAR, R, ER and other lamp shapes (see Appendix A – Examples of Lamp Types for example illustrations of these lamps).
- **Pilot lamps, refrigerator and oven lamps**. These mains voltage, non-halogen lamps are typically used in appliances and for indication purposes.

A example list of commonly-found incandescent lamps, grouped into these categories and accompanied by pictures, is included in Appendix A – Examples of Lamp Types.

The efficacy of typical incandescent lamps varies from approximately 5 to 30 lumens per watt (lm/w). Figure 1 illustrates the efficacy of a range of typical incandescent lamps, taken from manufacturers' catalogues (labelled 'catalogue'), from actual lamp testing commissioned for this project (labelled 'test') and calculated from manufacturer-supplied IES files (labelled 'IES'). Note that the efficacies for extra low voltage lamps do not include transformer/converter losses.

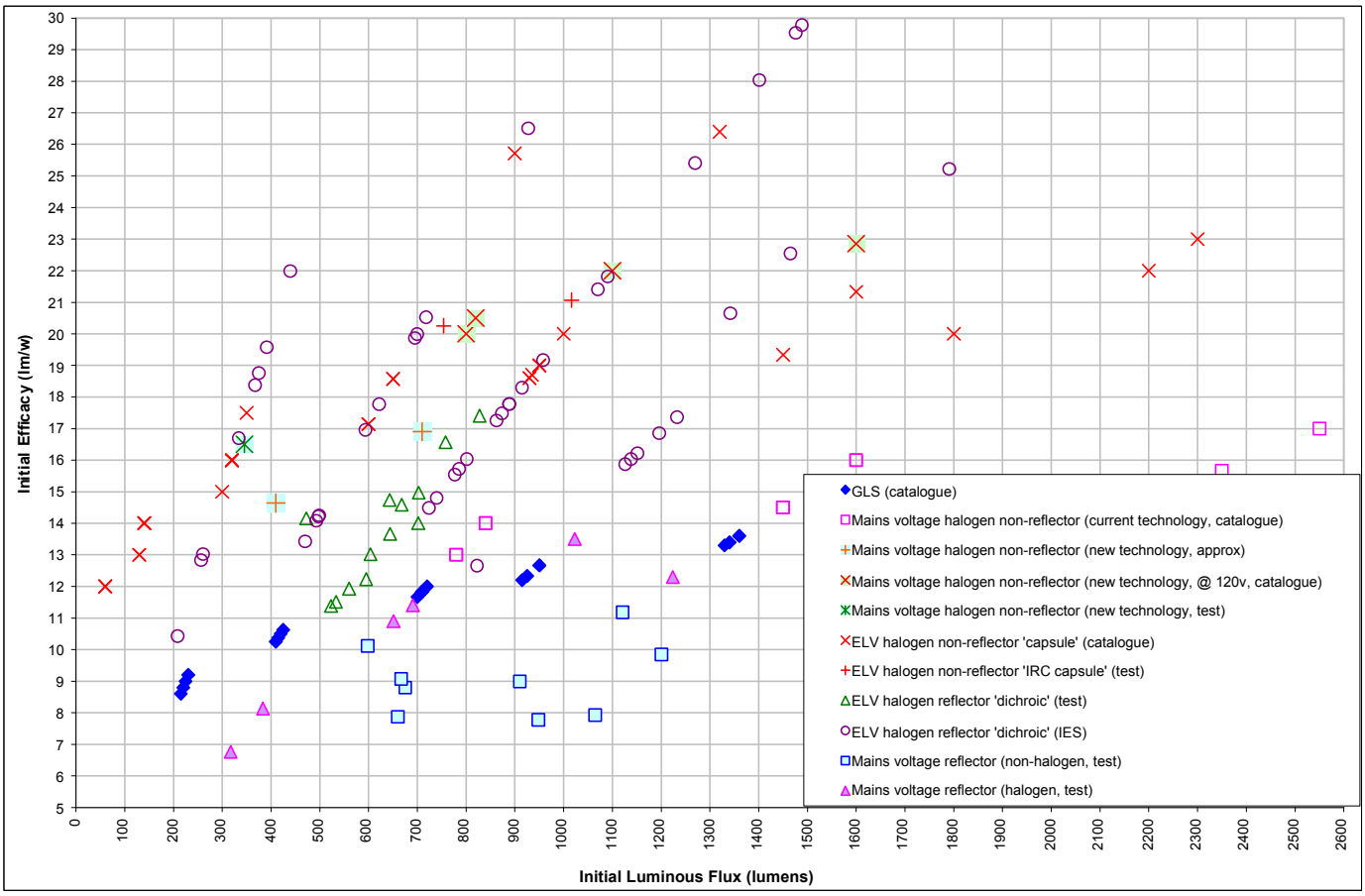

Figure 1 – Efficacy of incandescent lamps

From Figure 1 the following conclusions can be drawn:

- Lamp efficacy varies with lamp output. Higher output lamps are generally more efficient.
- Extra low voltage lamps are generally more efficient, as discussed above.
- Halogen lamps are generally more efficient, as discussed above.
- Reflector lamps are typically less efficient, due to light losses occurring at the reflector surface.
- There are a number of new-generation halogen lamps emerging, which demonstrate significant improvements in efficacy.

Manufacturers' catalogues and previous testing indicate that CFLs have significantly higher efficacies, ranging from approximately 45 to more than 70 lm/w (including ballast losses).

3 THE AUSTRALIAN LAMP MARKET

3.1 Imports

Since the closure of the ELMA manufacturing plant in Newcastle in April 2002, no general purpose lamps have been manufactured in Australia (note that production data from the ELMA plant is not readily available). Thus from 2002 onwards, lamp imports approximate domestic sales, although this is of course not the case for pre-2002 imports. Lamp imports are shown in Figure 2

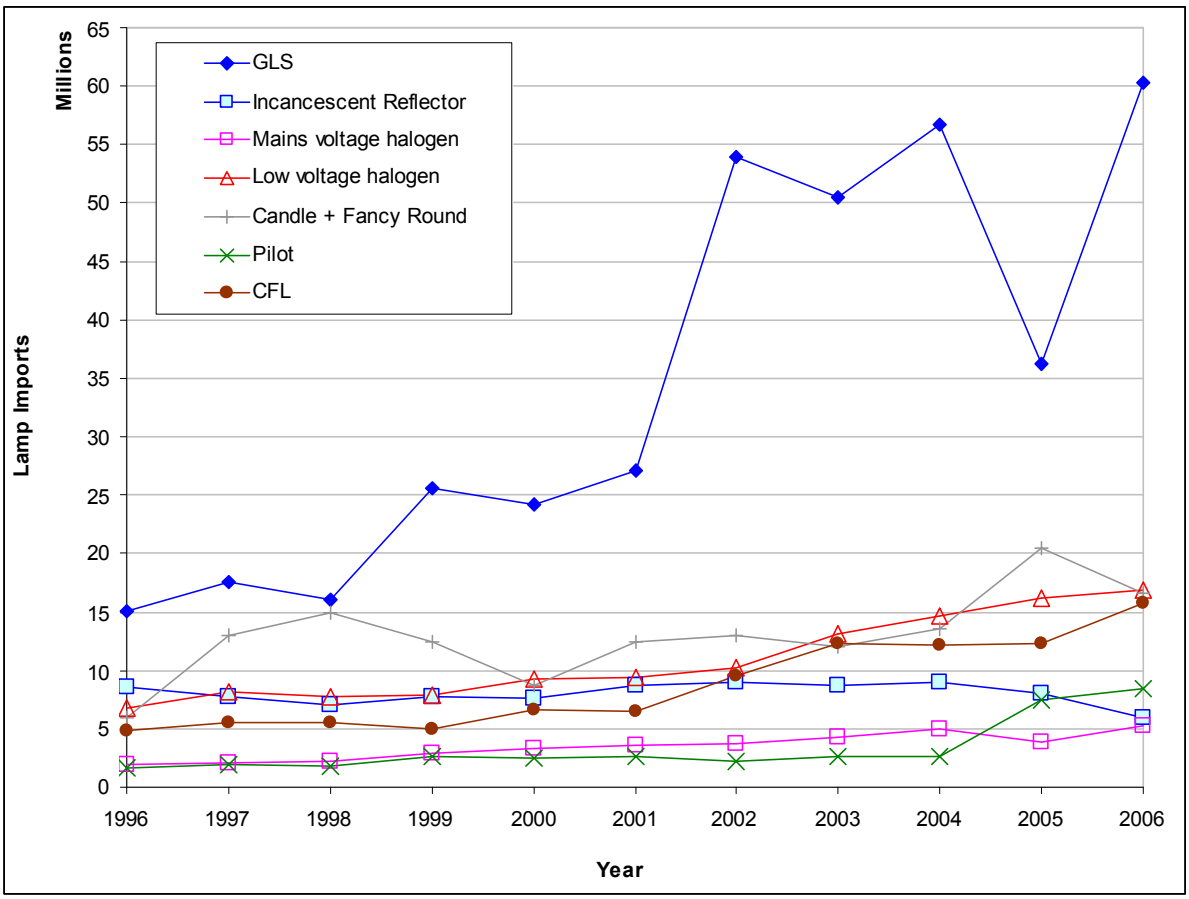

Figure 2 – Lamp imports (source: ABS import data)

From the above figure we can deduce the following:

- Lamp sales are somewhat volatile.
- GLS lamp imports have increased dramatically in 2002, presumably due to the closure of the ELMA plant. Since then, GLS lamp imports have been somewhat volatile, although the import trend is increasing.
- With the exception of incandescent reflector lamps, the imports of incandescent lamps have increased over recent years.
- CFL imports have more than doubled in the last 10 years.

Figure 3 illustrates lamp import by country of origin.

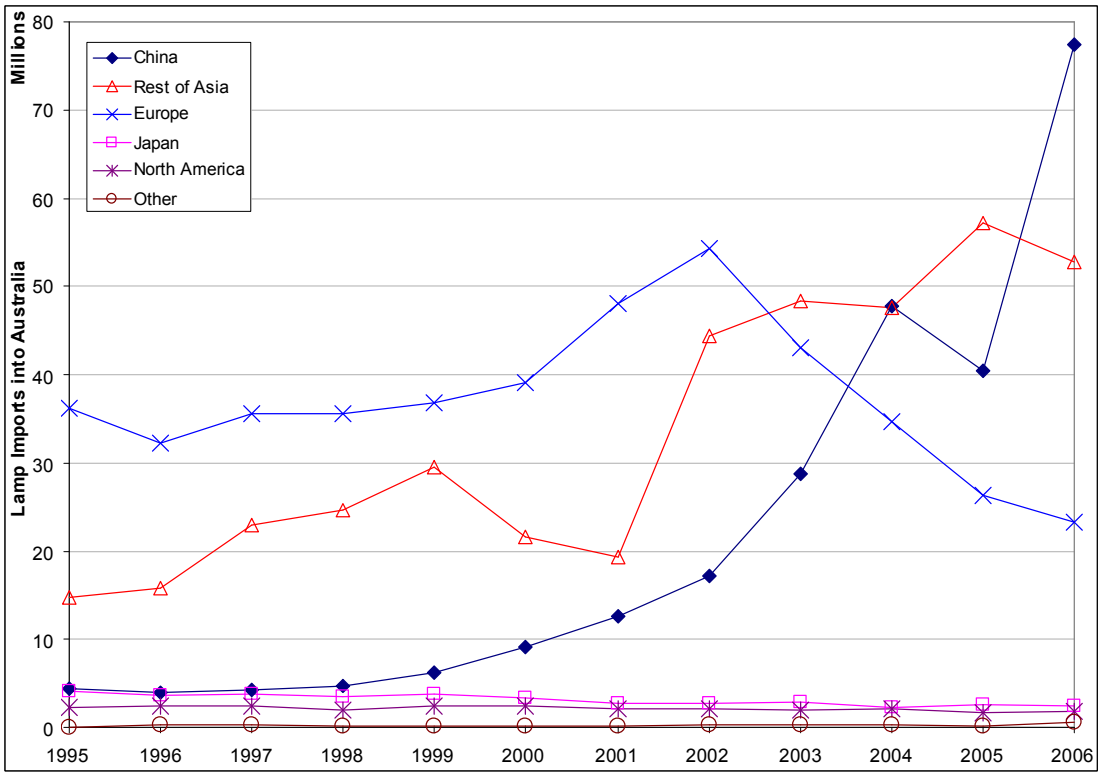

Figure 3 – Total lamp imports by country, including linear fluorescent, HID, etc.

As shown in Figure 3, lamp imports from China and Asia have increased dramatically over recent years, with a corresponding decrease in imports from Europe.

3.2 Market Developments

Extra low voltage halogen

Extra low voltage halogen reflector lamps (or spotlights) are often referred to as 'dichroic' lamps. This is because the majority of these lamps are fitted with an integral dichroic reflector, which projects light forwards and infra red radiation (heat) rearwards. They were originally developed for use with slide projectors in order to prevent melting the slide film. Subsequently these lamps were use to light works of art and other heat-sensitive visual displays. Today they are used in large quantities to light open spaces, which is not their intended application. Whilst, being extra low voltage and halogen, they are a more efficient lamp technology than GLS, however their narrow beam angle (typically 10° to 60°) means that very large numbers of lamps are required to light open spaces.

In December 2006, the author visited nine randomly-selected project display homes at HomeWorld in Kellyville, Sydney. All houses were 3-4 bedroom with each having approximately 300m^2 total floor. Dichroic lamps in each house were counted and the average number of lamps found was 38 and the maximum 56. The entranceways/hallways and living areas contained 80% of the dichroic lamps counted. If all switched on and undimmed this represents lighting loads of 1.9kW and 2.8kW respectively, not including other light fittings or voltage converter losses. Anecdotal evidence from discussions with lamp manufacturers reveals that project homes are regularly constructed with more than 100 dichroic lamps and in some cases more than 200.

CFLs

In recent years, sales of CFLs have increased dramatically in Australia, and their price has correspondingly decreased (source: ABS import and cost data). Anecdotally, there has also been an increase in the quality of CFLs being sold in Australia, particularly with respect to the quality of light emitted and product longevity.

LED

LED lighting technology continues to develop rapidly and increase in efficiency, with many products now available for use in accent lighting applications, and a small number of LED fittings available for downlighting. In the US, general purpose lighting LED lamps are more common, and their popularity is increasing in Australia.

Other Recent Developments

Philips Lighting has recently announced the launch of a halogen lamp which reportedly uses 50% less energy than conventional incandescent lamps. More information is available from: http://www.newscenter.philips.com/about/news/press/article-15721.page.

GE Lighting has also announced that it will soon be manufacturing super-efficient incandescent lamps with efficacy levels of around 30 lm/w. GE state that ultimately their HEI technology is expected to have an efficacy of around four times that of conventional incandescent lamps. More information is available from: http://www.geconsumerproducts.com/pressroom/press_releases/lighting/new_products/HE_lamps_07.htm

Osram has also recently announced the introduction of a range of mains voltage halogen lamps in which higher efficacy is extracted as lower power rather than increased light output.

With these developments in mind, it is considered an appropriate time for Government to intervene in the Australian lamp marketplace, in order to accelerate the transition to efficient lighting.

3.3 Dimming and 2-Wire Control Equipment

Anecdotal evidence supplied by Australian equipment manufacturers suggests that many CFLs will not operate reliably on circuits that incorporate a dimmer switch or other control device such as a motion detector, daylight sensor or timer. This appears to be the case for 'two-wire' controls, where no neutral is connected to the control device and thus the control device relies on a bleed current through the connected lamp to power its electronics. Many standard CFLs do not function well with this current, and control circuitry can also interact adversely with CFL electronics, leading to unpredictable effects. These problems do not appear to be as prominent in some other countries, and this is the subject of ongoing investigation. The implications of this issue are discussed in section 4.2.1.

4 RECOMMENDATIONS FOR MEPS

These recommendations represents the culmination of discussions between the Author, Lighting Council Australia and its members, and the Australian Greenhouse Office, held between February and December 2007.

4.1 General Philosophy

The humble incandescent lamp was invented some 125 years ago, and the basic technology has changed little since its conception. In recent times, the quality, cost and penetration of compact fluorescent lamps has improved considerably. However, there remains a significant proportion of consumers who still do not consider or value the energy savings that CFLs and other efficient lamps represent. For this reason, there are opportunities for the Australian Government to intervene in the Australian lighting marketplace.

The recommended objectives of such an intervention are:

- To remove inefficient lamps from the marketplace where efficient replacement alternatives exist.
- To remove poor quality CFLs from the marketplace, in order to improve consumer perceptions of CFL quality and performance.

For the following reasons, MEPs for incandescent lamps should be conducted in stages:

- To allow efficient technologies to mature in particular market segments where efficient alternatives for incandescent lamps are not currently available.
- To allow for resolution of compatibility issues between compact fluorescent lamps (CFLs) and the current generation of '2-wire' dimmers, motion sensors, daylight sensors and timers (discussed in section 3.3).
- To allow sufficient lead times for the lighting industry and associated supply chain to respond.
- To allow for a degree of harmonisation with other countries who are pursuing similar objectives.
- To commence the program quickly, even though it will not initially cover the full spectrum of incandescent lamps.
- To take account of the costs associated with some lamp replacements and replacement of light fittings.

A minimum lamp efficacy target has been agreed with Lighting Council Australia. The associated MEPS curve has been plotted on Figure 4. Note that in this figure, the lamp luminous flux has been used as the determinant (x axis) rather than lamp power. The reasons for this are as follows:

- It is considered more appropriate to categorise lamps by their service, i.e. light output, rather than input power.
- This encourages manufacturers to produce lamps with improved efficacy rather than simply dimmer lamps which may not be satisfactory for consumers and may encourage a migration to higher-wattage lamps in order to provide adequate light levels.

The equation for the MEPs curve is as follows:

Initial efficacy ≥ 2.8 x ln(initial lumens) - 4.0 (note 'ln' represents natural logarithm)

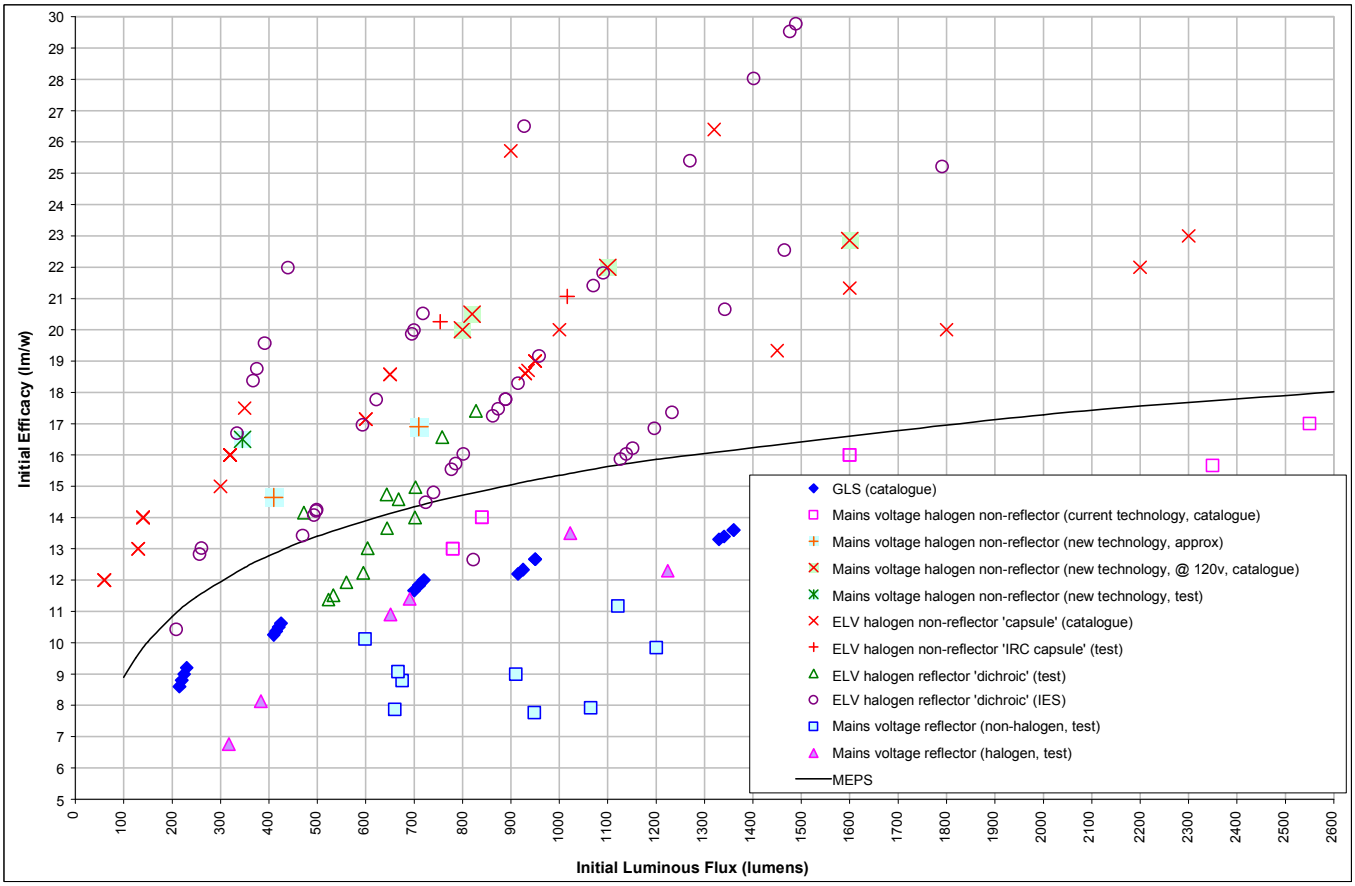

Figure 4 – MEPS level for incandescent lamps

With the exception of specialist lamps such as those used for medical and theatre applications, the majority of incandescent lamps should conform to this MEPS level by 2015. As discussed in the following sections, the MEPS level shall apply initially only to a limited number of lamps, the immediate impact of which will be to eliminate typical GLS lamps from the Australian marketplace. Other lamp types would follow over time, as discussed in detail in the following sections.

To prevent efficient but poor quality lamps from entering the marketplace, it is recommended that lamps should also have a minimum life of 2000 hours and a lumen maintenance limit of 80% (measured at measured at 75% of rated life).

In addition to the MEPS curve, it is recommended that a similar, but higher, "high efficiency" line be established. Only lamps that meet this efficacy curve are able to be termed "high efficiency". The efficacy curve for the high efficiency level has yet to be determined.

4.2 Staging

Staging is proposed as shown in Table 1. This timetable has been agreed with Lighting Council Australia.

Table 1 – Staging of phase-out

Enforcement Date for Import* (subject to annual review)	**Enforcement Date for Sale** (subject to annual review)	**Products Required to Comply**
Oct 2008	Oct 2009	– GLS – ELV halogen non reflector – CFLs (see section 4.2.3)
Oct 2009	Oct 2010	– >40w Candle, fancy round and decorative lamps – Mains voltage halogen non-reflector – ELV halogen reflector
Oct 2011	Oct 2012	– Mains voltage reflector lamps including halogen (PAR, ER, R, etc.) – >25w Candle fancy round and decorative lamps
To be determined dependent on availability of efficient replacement product		– Pilot lamps 25w and below
Beyond 2015		– All incandescent lamps

* The feasibility of import restrictions is the subject of ongoing investigations

4.2.1 GLS Lamps

At the time of implementation of MEPS, GLS lamps will be required to meet the MEPS curve illustrated in Figure 4, which will have the effect of phasing out current-technology GLS lamps. Consumers whose GLS lamps are connected to 2-wire control circuits such as dimmers (discussed in detail in section 3.3) will still be able to purchase mains voltage halogen lamps. These lamps are more efficient than GLS lamps, and at least one manufacturer has announced the introduction of a range of mains voltage halogen lamps whose increased efficacy is extracted as lower power, rather than more light (see section 3.2).

Thus when GLS lamps are effectively removed from sale, consumers will have two alternatives:

1. Purchase a CFL for around $3-8.
2. Purchase a mains voltage halogen lamp for around $3-5.

It is not possible to predict how many consumers will purchase CFLs versus how many will choose mains voltage halogen lamps. However, if the balance is deemed unacceptable, E3 has several options, including the following:

- Accelerate the exclusion of mains voltage halogen lamps from the Australian marketplace, with a greater emphasis being placed on ensuring CFL compatibility with dimmer and control circuitry.

- Include in the scope of MEPs a requirement that the efficacy of mains voltage halogen lamps is extracted as lower power rather than increased light output. This should result in an energy saving of approximately 15-20%, as opposed to 70-80% that would result from a switch to CFLs.

Decisions as to the response chosen should be made rapidly, following analysis of monthly ABS import data and market surveys to determine the relative sales of CFLs versus other lamps.

4.2.2 ELV Halogen Non-Reflector Lamps

At the time of implementation of MEPS, extra low voltage halogen non-reflector lamps ('capsule' lamps) will be required to meet the MEPS efficacy curve (see Figure 4).

4.2.3 Compact Fluorescent Lamps

At the time of implementation of MEPS, minimum standards will be applied to CFLs to ensure that when GLS lamps are removed from the market, consumers have access only to high quality CFLs. MEPS for CFLs has been under development for several years now, well before incandescent MEPS was announced. This has been part of a global effort to harmonise CFL performance and testing.

CFLs will be required to meet the attributes listed in Table 2 in the column entitled "Local" or alternatively must be certified by one of the overseas schemes listed in the other columns. More information on these schemes is available from www.efficientlighting.net and www.energysavingtrust.org.uk.

Table 2 – Proposed CFL performance attributes.

<table>
<tr><th>Attribute</th><th>Local</th><th colspan="3">ELI</th><th>UK Energy Saving Trust (EST) Version 5</th><th>UK Energy Saving Trust (EST) Version 6</th></tr>
<tr><td>Maximum starting time (seconds)</td><td>2.0</td><td colspan="3">1.5</td><td>*</td><td>2.0</td></tr>
<tr><td>Maximum run-up time (min)</td><td>1.0</td><td colspan="3">*</td><td>*</td><td>1.0</td></tr>
<tr><td rowspan="8">Minimum efficacy in lm/w (bare lamps)</td><td rowspan="8">$\frac{1}{\frac{0.24}{\sqrt{F}}+0.0103}$
Where F = initial luminous flux in lumens</td><td rowspan="4"><4500 K</td><td>≥5 to <9 W</td><td>50</td><td rowspan="8">$\frac{1}{\frac{0.24}{\sqrt{F}}+0.0103}$
Where F = initial luminous flux in lumens</td><td rowspan="8"></td></tr>
<tr><td>≥9 to <15 W</td><td>55</td></tr>
<tr><td>≥15 to <25 W</td><td>60</td></tr>
<tr><td>≥25 to < 60 W</td><td>65</td></tr>
<tr><td rowspan="4">≥4500 K</td><td>≥5 to <9 W</td><td>46</td></tr>
<tr><td>≥9 to <15 W</td><td>52</td></tr>
<tr><td>≥15 to <25 W</td><td>57</td></tr>
<tr><td>≥25 to < 60 W</td><td>62</td></tr>
<tr><td rowspan="8">Minimum efficacy in lm/w (covered lamps)</td><td rowspan="8">$\frac{0.85}{\frac{0.24}{\sqrt{F}}+0.0103}$
Where F = initial luminous flux in lumens</td><td rowspan="4"><4500 K</td><td>≥5 to <9 W</td><td>43</td><td rowspan="8">$\frac{0.85}{\frac{0.24}{\sqrt{F}}+0.0103}$
Where F = initial luminous flux in lumens</td><td rowspan="8"></td></tr>
<tr><td>≥9 to <15 W</td><td>47</td></tr>
<tr><td>≥15 to <25 W</td><td>51</td></tr>
<tr><td>≥25 to < 60 W</td><td>55</td></tr>
<tr><td rowspan="4">≥4500 K</td><td>≥5 to <9 W</td><td>39</td></tr>
<tr><td>≥9 to <15 W</td><td>44</td></tr>
<tr><td>≥15 to <25 W</td><td>48</td></tr>
<tr><td>≥25 to < 60 W</td><td>53</td></tr>
</table>

Attribute	Local	ELI	UK Energy Saving Trust (EST) Version 5	UK Energy Saving Trust (EST) Version 6
Minimum efficacy in lm/w (reflector lamps)***	$\frac{0.6}{\frac{0.24}{\sqrt{F}}+0.0103}$ Where F = initial luminous flux in lumens		Based on minimum 'centre beam candela efficacy'	
Minimum lumen maintenance	2000 hrs = 0.88 5000 hrs = 0.80 10000 hrs = 0.75	0.8		2000 hrs = 0.88 5000 hrs = 0.80 10000 hrs = 0.75
Maximum premature lamp failure rate	10% at 30% of rated life			10% at 30% of rated life
Minimum lifetime (hours)	6000	6000	6000	Not less than 10,000 hrs (not more than 15,000 hrs)
Minimum power factor	0.55 (0.9 for lamps claiming high PF)	0.5		0.55 (0.9 for lamps claiming high PF)
Colour appearance	IEC 60081 Graph D-16 for CCT 2700. Other temps to be approved but following same diagram	5	CCT 2650-2800 K	IEC 60081Graph D-16 for CCT 2700. Other temps to be approved but following same diagram
Minimum CRI	80	80	80	80
Maximum mercury content (mg)	5**	*	*	5
Minimum switching withstand	1000 Cycles			
Harmonics	AS/NZS 61000.3.2	AS/NZS 61000.3.2	IEC 61000.3.2	

* If the lamp manufacturer chooses to adhere to ELI or EST version 5, for which starting time, run-up time and mercury content may not be specified, then the lamp model shall comply with or exceed the local criteria for these three attributes (2.0 s, 1.0 min and 5 mg respectively).

** To be measured in accordance with AS/NZS 4782.3

*** Effective enforcement in 2010 for import (the subject of ongoing investigations) and 2011 for retail.

4.2.4 Candles, Fancy and Decorative Lamps

At the time of implementation, candle, fancy round (including globe-shaped) and decorative lamps will subject to the MEPS efficacy curve illustrated in Figure 4. Many of these lamp shapes are already available in an efficient CFL format, and it is expected that this product range will expand rapidly in coming years as has occurred overseas.

4.2.5 Mains Voltage Halogen Non-Reflector Lamps

At the time of implementation, mains voltage halogen non-reflector lamps will be included in the scope of MEPS and will be required to meet the MEPS efficacy curve (see Figure 4). As discussed in section 4.2.1, these lamps provide a suitable replacement lamp for circuits controlled by dimmer and other 2- wire control devices.

4.2.6 ELV Halogen Reflector Lamps

At the time of implementation of MEPS, extra low voltage halogen reflector lamps (including 'dichroic' lamps) will be required to meet the MEPS efficacy curve (see Figure 4). Whilst reflector lamps are less efficient than non-reflector lamps, these lamps operate at extra low voltage, giving them a compensating efficiency advantage.

4.2.7 Mains Voltage Reflector Lamps

At the time of implementation of MEPS, mains voltage reflector lamps (including those with halogen gas fill) will be included in the scope of MEPS, and will have to meet the MEPS efficacy curve (see Figure 4). There are already CFL replacements for some applications currently served by incandescent reflector lamps, and it is expected that the range of CFL and LED reflector lamps will expand rapidly as has occurred overseas.

4.2.8 Pilot and Other Lamps

At the time of implementation, pilot lamps (≤25w) will be subject to MEPS. The objective of the phase-out project is that, by 2015, all incandescent lamps will be required to meet the MEPS efficacy curve. There may be some exceptions such as speciality lamps used in medical and agricultural applications.

4.3 Other Requirements

In addition to efficacy requirements, the following performance requirements will be placed on lamps as they are included in the scope of MEPS, in order to ensure that lamps are of acceptable quality and well understood by consumers:

- Lamp lifetime requirement (2000 hours).
- Lumen maintenance (80% at 75% of life).

Currently under discussion with industry is the requirement for appropriate marking of lamps and their packaging. This may include such attributes as luminous flux, which is the primary determinant for lamp choice, rather than lamp power.

4.4 Standards

At the time of writing of this report, the following Australian Standards were in the process of being drafted:

- AS 4934.1, Incandescent lamps for general lighting purposes, Test methods for energy performance.
- AS 4934.2, Incandescent lamps for general lighting purposes, Energy labelling and minimum energy performance standards requirements.
- AS 4847.1, Self-ballasted lamps for general lighting services, test method - energy performance.
- AS 4847.2, Self-ballasted lamps for general lighting services, Energy labelling and minimum performance standards requirements.

When completed (expected January 2008), these standards will describe, in detail, the scope and performance requirements of MEPS for incandescent lamps and CFLs, as well as the test methods for determining lamp performance.

4.5 Review Process

Each year, the lamp types excluded from the scope of MEPS should be reviewed by a committee consisting of lighting industry and Government representatives. Exempt lamp types should only be included as viable, efficient alternatives become available.

A target for a 20 lumens/watt efficacy standard by 2013 should be applied to each class of lamps. A review (involving lighting industry and government representatives) of the feasibility of the stage 2 target date should commence in 2011. The review shall take into account the availability of viable, efficient alternatives for each class of lighting. The efficacy standard should only be applied to classes of lamps where viable, efficient alternatives are available. The target dates for each class of lighting may be revised (to be delayed, or brought forward) on the basis of the review.

5 ENERGY AND GREENHOUSE GAS EMISSIONS

As part of the planning process for the lamp MEPS program, the expected impact on energy consumption and greenhouse gas emissions has been modelled. More detailed modelling is currently being undertaken for the purpose of preparing a Regulatory Impact Statement (RIS) for this project.

APPENDIX A – EXAMPLES OF LAMP TYPES

Lamp Type	Example	Cap Types	Typical Wattage
GLS			
GLS conventional (incl. frosted, clear, longlife)		B22, E27	25 -100w
GLS coloured		B22, E27	25w
GLS high wattage		B22, E27, E40 (500w+)	150 - 1000w
Candle and Fancy Round			
Candle		B15, B22, E14, E27	25 - 60w
Fancy round		B15, B22, E14, E27	25 - 60w
Globe shaped		B22, E27	60 - 100w
Mains Voltage Halogen Non-Reflector			
Mains voltage halogen non-reflector lamps		E27	100 – 250w
Mains voltage halogen non-reflector lamps (double-ended)		R7s, Fa4	60 – 1500w
Mains voltage halogen reflector lamps		E14, E26, E27, GU10, GZ10,	35 - 100w
Extra Low Voltage Halogen, Reflector and Non-Reflector			
Extra low voltage halogen capsule lamps		G4, GY6, GY6.35	5 - 100w
Extra low voltage halogen reflector lamps		GZ/GU4, GX/GU5.3, G53, GZ/GU10, BA15D/19, B15D/24X17	15 - 100w

Lamp Type	Example	Cap Types	Typical Wattage
Mains Voltage Reflector Lamps (including halogen)			
R & ER		B22, E14, E27	25 - 150w
PAR		E27	60 - 150w
Crown silvered		E14, E27	40 - 100w
PAR 38 coloured		E27	80w
Infra-red heat lamps		B22, E27	250 - 375w
Pilot Lamps, Refrigerator and Oven Lamps			
Pilot lamp(15-25w)		B15, B22, E14, E27	15 – 40w
Oven lamp (temperature resistant)		E14, E27	15 – 40w
Refrigerator lamp		E14	15w
Other Incandescent Lamps			
Traffic signalling lamp		E27	65-100w
Heavy duty and surge resistant			
Anti-insect lamp		B22, E27	60-100w
Double-ended tubular		S15s	30 - 60w