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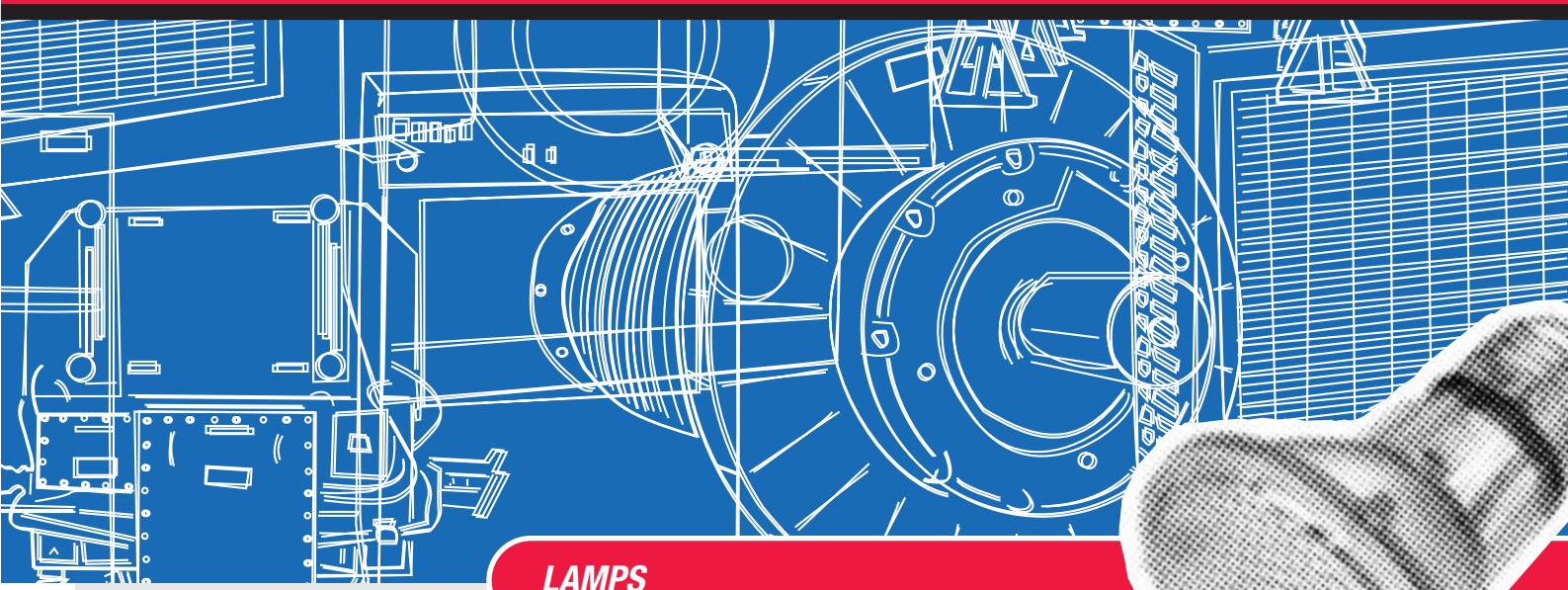
NATIONAL APPLIANCE AND EQUIPMENT ENERGY EFFICIENCY COMMITTEE

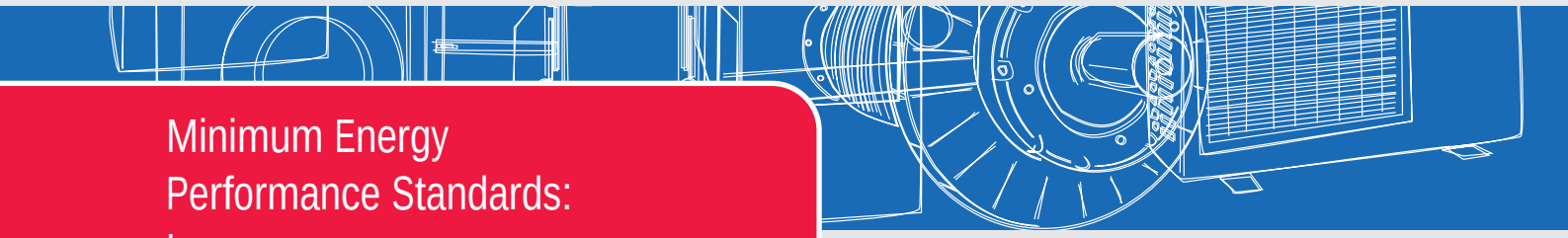
Minimum Energy Performance Standards



LAMPS

The August 2002 plan by the National Appliance and Equipment Energy Efficiency Committee to improve product energy efficiency

AN INITIATIVE OF THE MINISTERIAL COUNCIL OF ENERGY FORMING PART OF THE NATIONAL GREENHOUSE STRATEGY



Minimum Energy Performance Standards: Lamps

OVERVIEW

The National Appliance and Equipment Energy Efficiency Committee (NAEEEC) is collecting information for consideration by the Australian and Ministerial Council on Energy (MCE) with regard to Minimum Energy Performance Standards (MEPS) for lamps, and supporting this program with a range of other measures.

MEPS is a government regulatory program stipulated in state and territory law that excludes from the market products which do not meet the minimum energy performance levels. NAEEEC is a Commonwealth, State and Territory group of energy efficiency officials and regulators that implement the program. MCE comprises the Minister of State from each Australian jurisdiction responsible for energy matters.

This summary represents the first stage of a public process to develop nationally consistent standards for lamps. At its essence, NAEEEC seeks community and stakeholder comment on proposals to improve the energy efficiency of these products by:

- mandating MEPS for linear tube fluorescent lamps within relevant state and territory legislation commencing in or around January 2004 that match the New Zealand standards which came into effect in July 2002;
- a labelling program for all domestic lamp types in Australia based on EU programs, which may become mandatory should a trial voluntary scheme prove unsuccessful.

PUBLIC COMMENTS INVITED

NAEEEC seeks comment on the proposals contained in this plan from any interested person or organisation. Please address you comments in writing to:

AUSTRALIAN Greenhouse Office

Energy Efficiency Team
Australian Greenhouse Office
GPO Box 621
CANBERRA ACT 2601

Facsimile: (02) 6274 1884
Email: energy.efficiency@greenhouse.gov.au

Comments received by 1 October 2002 will help NAEEEC shape the future program.

INTRODUCTION

Program goals

Energy consumed by equipment and appliances is a major source of greenhouse emissions. Codes and performance standards programs are amongst the most effective and widely used measures throughout the world to reduce greenhouse emissions attributable to this source.

The Australian Appliance and Equipment Energy Efficiency Program provides an important stimulus for the development of world-class energy efficient products. Benefits can flow through to the general community in the form of monetary savings from lower operating costs and increased employment levels resulting from Australian industry's ability to exploit potential export markets.

Under the 1998 National Greenhouse Strategy, responsibility for this program rests with MCE. It is committed to improving this national program and has authorised NAEEEC to develop and publish plans for those products targeted for MEPS. These plans represent a transparent way for government agencies to explore community and stakeholder support (for both mandatory and voluntary measures) to reduce greenhouse gas emissions produced by these types of equipment.

1999 Expansion

In 1999, MCE accepted proposals from NAEEEC to include in its program any items of industrial or commercial equipment identified as a significant contributor to the growth in energy demand or greenhouse gas emissions. Each product proposed for MEPS will be subject to both a feasibility assessment and public consultation before any final decision is made. These assessments will include technical and economic cost-benefit analyses as well as consideration of all supervisory measures available (voluntary, mandatory or a combination of both) to ensure that the most appropriate energy efficiency regime for that specific product is chosen.

The NAEEEC work program contains a list of all products scheduled for consideration and is available from the Australian Greenhouse Office.

This lamps plan plays an important role in the MCE process, communicating the potential levels and timetable for regulatory initiatives in general terms. It also demonstrates the extent to which Governments want all stakeholders to participate in the development of policies to meet the challenge of reducing the climatic affects of energy intensive products.

LAMPS

Lighting systems generally consist of the light source, comprising one or more lamps, and the luminaire, which controls the distribution of light as well as providing fixings, electrical wiring and connections.

The following lamps types are commonly used in domestic, commercial and industrial applications and have been considered within this analysis for MEPS:

- Incandescent types, including tungsten filament and tungsten halogen lamps;
- Fluorescent types - linear (double ended) and compact (single-ended); and
- High Intensity Discharge (HID) types, including metal halide, high and low pressure sodium, mercury discharge and others.

Luminaires have not been considered at this time and Government is already committed to the introduction of MEPs for lighting ballasts during 2002.

The Australian market has been supplied predominantly by imports, supplemented by a sole Australian manufacturer, ELMA. With the recently announced closure of the ELMA plant, the lamp market is now 100% supplied by imports.

The table below summarises the estimated stock and market information for lamp types in Australia in 2001.

A more detailed description of these products can be found in a report commissioned by NAEEEC held at www.greenhouse.com.au/energyefficiency/

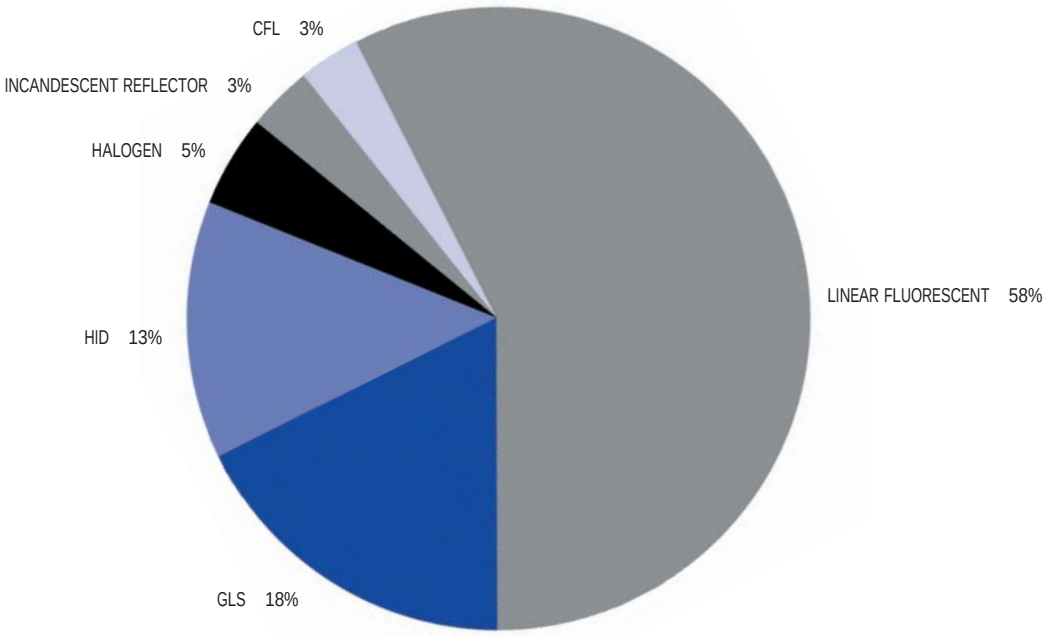
WHY ARE LAMPS BEING CONSIDERED FOR MEPS?

The main reasons for considering minimum energy performance standards (MEPS) for lamps are:

- Lighting causes significant greenhouse gas emissions in Australia. In 2001, total emissions resulting from lighting are in the region of 22Mt CO_2-e per annum.
- In terms of sector greenhouse gas emissions, lighting is responsible for 7% of total industrial emissions, 33% of commercial and 10% of total residential emissions. A breakdown of greenhouse emissions by lamp type is shown in the figure below.
- Although efficient lighting technology is highly cost effective, market failure in the commercial sector in particular currently prevents optimum penetration. The majority of commercial buildings are tenanted and the tenants typically do not participate in the purchase and replacement of lamps, which is the task of building managers. Since the tenants pay the electricity bills for lighting, there is little incentive for purchasers to buy efficient lamps if they have a higher capital cost.

LAMP TYPE	ESTIMATED STOCK (MILLIONS)	ESTIMATED SALES (MILLIONS/YEAR)
Incandescent	80	81
Straight fluorescent tubes	78	23
Compact fluorescent	9.6	4
HID	3.9	Not estimated

GREENHOUSE EMISSIONS BY LAMP TYPE (2000/01)



In developing policies for the regulation of lamps in Australia, the following issues have been taken into account:

- Due to the high proportion of imported lamps and the small size of the Australian market, there is little ability for Australia to influence lamp technology specific for this country. Any MEPS for lamps should therefore focus on moving the Australian market towards lamps that are widely available here and in other world markets (or which could be manufactured in Australia).
- Significant savings could be achieved through switching sales of standard incandescent lamps to halogen incandescent lamps or some kind of new 'super incandescent' lamp. However, neither of these approaches are practical. Instead, the replacement of standard incandescents with relatively high running hours with compact fluorescents is likely to bring greater benefits.
- Low voltage tungsten halogen system losses can be high due to the use of copper/iron transformers. However, targeting these transformers would be difficult except in the case of a national policy to reduce losses from transformers for small electronic appliances.
- Compact fluorescent and HID lamps generally have significantly higher efficacy than their alternatives, and in the case of HID lamps, are selected for their suitability for particular commercial and industrial applications.

LINEAR TUBE FLUORESCENTS

Issues relating to Linear Tube Fluorescents are summarised as:

- Linear tube fluorescents account for over half (58%) of the combined lighting energy consumption and greenhouse gas emissions in Australia's industrial, commercial and residential sectors.
- Linear tube fluorescent lamp technology is mature and there are relatively few types of lamp on the market. Recent technological advances include introduction of the T8 and T5 lamp styles and the introduction of triphosphor coatings, in place of the traditional halophosphate coatings. These have significantly improved the efficacy levels of linear tube fluorescents.
- Triphosphor lamps provide greater light output for the same energy consumption as

an equivalent length halophosphate linear fluorescent tube. To realise energy efficiency savings therefore requires a reduction in the number of lamps used during refurbishment, or new installation.

- The potential exists for benefits achieved through using triphosphor lamps to be eroded over time if they are replaced with halophosphate lamps. Therefore other countries, including the US, Canada and New Zealand, have moved to mitigate this risk by removing halophosphate lamps from the market completely.

ELEMENTS OF THE PLANNED PROGRAM

Regulatory

NAEEEC proposes to regulate the efficiency of linear tube fluorescent lamps. Significant opportunity exists to improve the efficiency levels of these lamps through MEPS.

The MEPS levels proposed are consistent with Canadian, USA and NZ requirements for linear tube fluorescents, including requirements for colour rendition (Minimum Average CRI) and Minimum Average Lamp Efficacy (lm/W).

The benefit of implementing MEPs for other lamp types will be reviewed at a later stage, probably around 2008.

Voluntary

NAEEEC considers that there is also opportunity for additional information to be provided to consumers in the domestic sector.

In addition to the proposed MEPS, a voluntary trial of a standardised labelling program is proposed for all lamp types used in the domestic sector, based on the European labelling program. This would allow purchasers to make more informed purchasing decisions based on lamp lumens, wattage and life, as well as an energy efficiency class rating, and provides scope for manufacturers of more energy efficient lamps to exploit their advantage.

It is proposed that the impact of the labelling program should be monitored to assess its effectiveness. Labelling may then become mandatory if agreed targets have not been met after a limited period.

NAEEEC also wants to work with stakeholder organisations to consider initiating a best practice information program covering lighting design, lighting levels and luminaires as well as lamps. Industry assistance is sought to ensure the development of appropriate materials and their dissemination to key sectors.

PROPOSED AUSTRALIAN MEPS LEVELS

It is proposed to introduce Australian MEPS which are broadly consistent with the Canadian, USA and NZ MEPS for linear tube fluorescents. This will result in the effective elimination of halophosphate lamps from the Australian market, thereby ensuring that savings are maintained.

The proposed Australian regulation will cover products from a length of 600mm to 1800mm. The Canadian and USA standards do not include specifications for 1500mm and 1800mm lamp sizes, while the NZ standard includes specification for lamp sizes up to and including 1500mm.

In order to be consistent with the NZ standard, it is proposed to specify both initial and maintained minimum average lamp efficacy figures

The following table shows the proposed MEPS for linear tube fluorescent lamps.

Nominal Lamp Length	Minimum Average CRI	Minimum Average Lamp Efficacy (Initial lm/W) 100 hours	Minimum Average Lamp Efficacy (Maintained lm/W) 70% life
600mm	69	≥ 70	≥ 57.5
1200mm	69	≥ 85	≥ 70
1500mm	69	≥ 85	≥ 70
1800mm	69	≥ 85	≥ 70

Note: NZHB 4782 allows for four classes of efficacy (P, Q, R, and S). Here we have recommended minimum allowable efficacy that would qualify for the NZ MEPS in class Q or R.

Australian Standard AS 1201, which is identical to IEC 60081, is the proposed test methodology for determining the 'Initial' and 'Maintained' efficacy levels.

GREENHOUSE REDUCTION POTENTIAL

Annual greenhouse gas emissions resulting from the use of linear tube fluorescent lamps have been estimated at around 13 Mt CO_2-e and growing.

Growth takes into account increasing demand for light (for example from increasing building stock) as well as the increasing efficacy of lamps due to the steady introduction of T8 and T5 lamp styles, electronic ballasts and triphosphor lamps.

Since, little quantitative information is available on the installed stock of each of the linear tube fluorescent types, a range of scenarios have been modelled to assess the potential impact of the proposed MEPS on greenhouse gas emissions.

Assuming that MEPs is introduced in 2004, the potential annual emissions reductions in 2010 ranges between:

- 120kt CO_2-e, assuming the low efficacy T12 halophosphate tubes are already being rapidly replaced;
- 570 kt CO_2-e, assuming a modest decline in stocks of T12 halophosphate tubes and rapid uptake of high efficacy T5 triphosphor lamps.

Taking into account the reduced air conditioning load in buildings with improved lighting efficiency, it is estimated that annual greenhouse gas savings will range from 160-730 kt CO_2-e in 2010 for the scenarios identified above.

ECONOMIC IMPLICATIONS

Preliminary indications are that moving to exclude halophosphate linear tube fluorescent lamps from the market will be approximately cost neutral to the market.

While the retail prices for triphosphor lamps sold in bulk are typically in the order of twice the purchase price of halophosphate lamps, their lamp life is approximately double. Additionally, labour costs for lamp replacement of triphosphor lamps in the industrial and commercial sectors will be reduced.

In the case of new installations and refurbishments, the higher light output from triphosphor lamps allows the same lighting task to be achieved with fewer luminaires, leading to additional savings in installation costs. In most applications, using more efficient triphosphor lamps will also lead to economic savings due to reduced air conditioning requirements.

More detailed analysis of the potential economic impact of the introduction of MEPS will be conducted at a later stage.

TIMETABLE AND IMPLEMENTATION

NAEEEC proposes to recommend to MCE the following target timeframe for the introduction of MEPS, giving industry an appropriate period of notice to undertake any necessary modifications to production procedures. This proposed timeframe might be modified to take into account specific circumstances that may arise:

	TIMETABLE
1. DEVELOPMENT STAGE Following the publication of the desk-top review (the full report is available upon request) of the energy impacts of mandatory and / or voluntary measures, the following steps will occur • A steering committee will work to refine the initial MEPS proposals. • Cost/benefit analysis of potential legislative options. • Industry and stakeholder consultation on potential legislative proposals. • Development of Australian and New Zealand Standards for inclusion in regulations. • Ministerial approval required before introduction of any new regulations.	Commenced from August 2002 and completed by March 2003
2. NOTIFICATION STAGE Period of notification will depend on the level of manufacture undertaken in Australia. Longer periods would apply if Australian industry required to undertake substantial development or re-tooling	The Australian standard will be published by March 2003 containing the MEPS levels and the MEPS will come into effect from around January 2004
3. DURATION STAGE This is the 'stability period' in which no changes to regulations are made (ie MEPS levels unchanged).	Commenced from January 2004 and scheduled for reconsideration by not earlier than January 2008

This timetable provides 18 months until implementation of the proposed minimum energy performance standard for lamps. NAEEEC has accelerated that stage because of the significant consultation that occurred prior to the release of this plan involving key stakeholders. While this timetable cannot accommodate any unforeseen delays, NAEEEC believes the development stage for this product can be completed in that time with the goodwill of all stakeholders.

In addition to commenting on this paper, stakeholders will have further opportunities to comment through the process to the Australian Greenhouse Office and others. For example, Standards Australia seeks the views of the public when circulating discussions drafts of standards and the regulatory impact statement process provides everyone with the chance to comment on the detailed cost benefit studies and the draft regulation.

COMMENTS SOUGHT

The Australian Greenhouse Office would like to hear your views on these proposals. The contact details are contained on the inside cover of this plan.