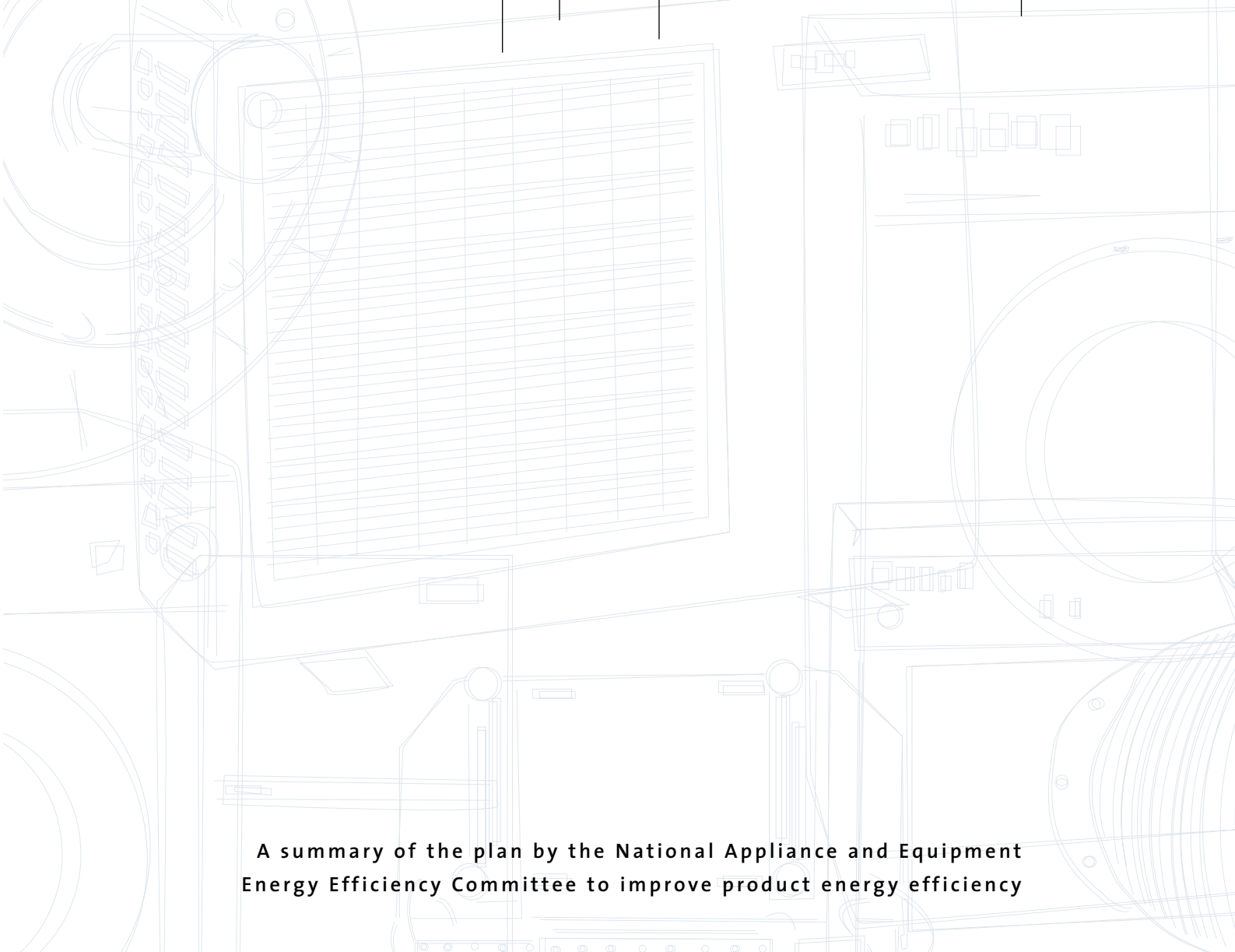
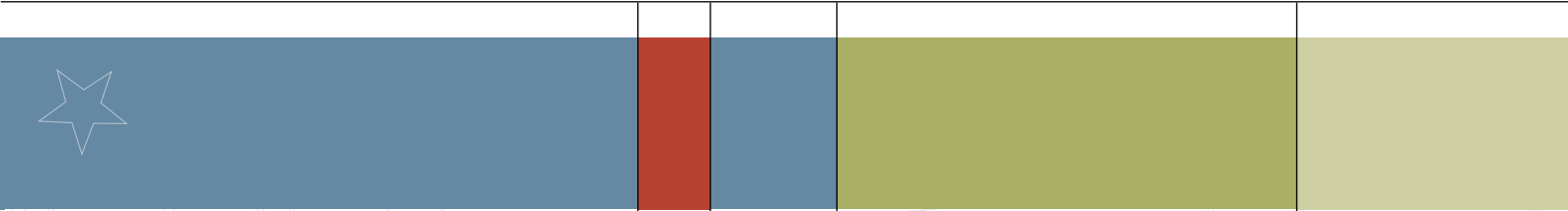




NATIONAL APPLIANCE & EQUIPMENT ENERGY EFFICIENCY PROGRAM

**Review of the Minimum Energy Performance Standards for
Mains Pressure Electric Resistance Storage Water Heaters**



**A summary of the plan by the National Appliance and Equipment
Energy Efficiency Committee to improve product energy efficiency**

Overview

The National Appliance and Equipment Energy Efficiency Committee (NAEEEC) is collecting information for consideration by the Ministerial Council on Energy (MinCoE) about the appropriateness of increased minimum energy performance standards (MEPS) and/or a range of voluntary measures, for further improving the efficiency of electric water heaters.

MEPS are a government regulatory program stipulated in state and territory law that excludes from the market products that do not meet the minimum energy performance levels. NAEEEC comprises energy efficiency officials and regulators that implement the MEPS program in Australia and New Zealand. The Ministerial Council on Energy (MinCoE) comprises the Minister of State from each Australian jurisdiction responsible for energy matters.

This plan for Australia represents the first stage of a public review process to maintain nationally consistent standards for water heaters, which are equivalent to world's best practice. NAEEEC seeks community and stakeholder comment on proposals to further improve the energy efficiency of these products by lowering the MEPS levels for mains pressure electric resistance storage water heaters (AS1056 Part 1) to match those levels for products with tank sizes of 80-250 litres contained in the new US MEPS. A comparison of the Australian situation with other countries indicates that the efficiency of these size heaters are the only ones that need attention at this stage, bearing in mind the separate work that is being done for heaters with capacities up to 80 litres. The US MEPS are scheduled to come into effect on 20 January 2004 and the proposed new levels for Australian MEPS are targeted to come into effect around July 2005.

Public comments invited

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

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

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

Comments received by 1 March 2002 will help NAEEEC to advise MinCoE of stakeholder views on the approach being proposed for miscellaneous electric storage water heaters and also to shape any future voluntary program.

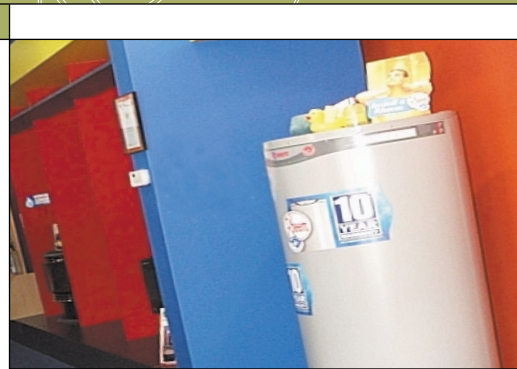
Introduction

Program goals

Energy consumed by equipment and appliances is a major source of greenhouse gas 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. In 2000 for example, 25 of the 29 OECD countries had such programs and, within our region, New Zealand announced plans to institute a similar program in the near future.

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 National Greenhouse Strategy, responsibility for this program rests with the Ministerial Council on Energy (recently replacing ANZMEC). It is committed to improving this national program and has authorised NAEEEC to develop and publish plans for those products that are either being targeted for MEPS or whose MEPS levels are due for review. 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, MinCoE (in its previous guise as ANZMEC) 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 is subjected to both a feasibility assessment and public consultation before any final decision is made. These assessments 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.

To maintain the momentum of continually improving the energy efficiency of appliances and equipment, existing Australian and New Zealand MEPS levels are scheduled to be routinely reviewed and a similar process is undertaken when that time arrives.

The NAEEEC work program contains a list of all products scheduled for initial consideration or review and is available at the Australian Greenhouse Office website: www.greenhouse.gov.au

This latest plan for electric resistance storage water heaters plays an important role in the MinCoE 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.

Electric Resistance Storage Water Heaters

This report covers mains pressure, electric resistance, unvented storage water heaters, ranging in size from 25 to 630 L rated hot water delivery capacity. Not included are heat exchange water heaters, calorifiers, low pressure (vented and unvented) and electric boosted solar water heaters which are covered in a separate profile .

Current MEPS levels for all mains pressure electric storage units are included in AS1056 Part 1: Amendment 3 and apply to units manufactured or imported from 1 October 1999. MEPS levels are defined as a maximum allowable standing heat loss.

Table 1: MEPS Levels contained in AS1056 Part 1 for Unvented Water Heaters

Rated Hot Water Delivery (Litres)	Maximum Heat Loss, kWh/24hours
25	1.4
31.5	1.5
40	1.6
50	1.7
63	1.9
80	1.47
100	1.61
125	1.75
160	1.96
200	2.17
250	2.38
315	2.66
400	2.87
500	3.15
630	3.43

Source: AS1056.1:1991 Amendment 3, 5 August 1996, Table 2.1

Since 1999, Australian MEPS levels for mains pressure electric storage units have represented world's best practice for water heaters above 80 litres.

International Comparison of MEPS Levels

A comparison between Australian MEPS levels and those required by a range of other countries has been undertaken by converting each country's MEPS to the equivalent standing heat loss levels if tested under AS1056.1. The results of this analysis are summarised below and shown in Figure 1.

USA

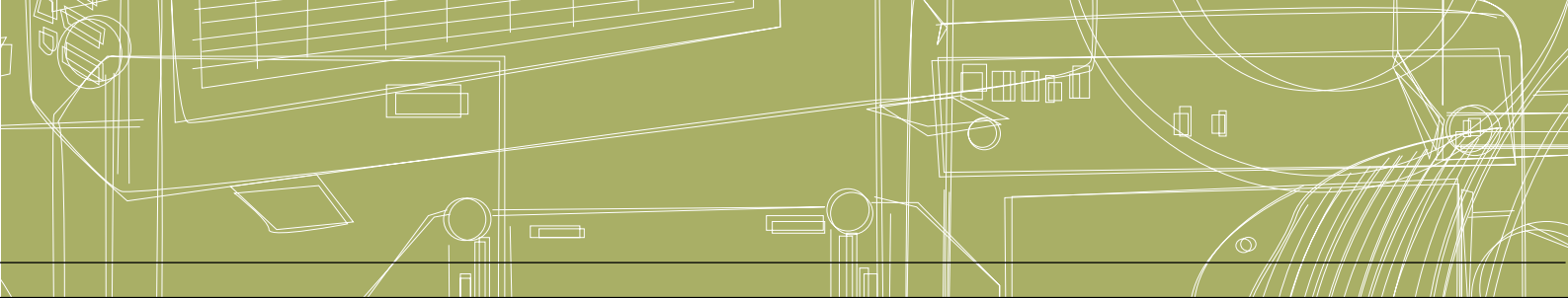
The final rule published by the US Department of Energy will make the new USA MEPS levels for 2004 more stringent than Australia's 1999 levels for tank volumes of up to 250 Litres and slightly less stringent for larger tank volumes.

Table 2 illustrates the differences between the USA 2004 MEPS levels and the Australian MEPS levels when converted to minimum AS1056 heat loss requirements. For example, the Australian MEPS would need to be 31% more stringent for a tank with a delivery capacity of 80 litres compared to the present levels.

Table 2: USA New MEPS compared with Present Australian MEPS

Volume (Litres)	Delivered (Litres)	Aus 1999 MEPS (kWh/day)	New USA 2004 MEPS (kWh/day)	% Aus MEPS Exceeds USA New MEPS
90	80	1.67	1.14	-31%
110	100	1.81	1.30	-28%
135	125	1.95	1.50	-23%
180	160	2.16	1.85	-15%
225	200	2.37	2.20	-7%
270	250	2.58	2.55	-1%
360	315	2.86	3.25	14%
450	400	3.07	3.95	29%

Note: All heat loss values converted to an equivalent heat loss under AS1056.1.



Chinese Taipei

The Chinese Taipei minimum efficiency levels do not represent very stringent MEPS levels compared to other countries. The structure of the minimum efficiency levels result in requirements that are more focused on performance and hot water delivery than energy consumption and efficiency.

Canada

The Canadian requirements are similar to but slightly less stringent than current US (1991) requirements for most water heater sizes. Canadian heat loss requirements are significantly less stringent than Australian 1999 MEPS for all tank sizes. However, it is expected that Canada will adopt the new US 2004 MEPS levels in due course.

New Zealand

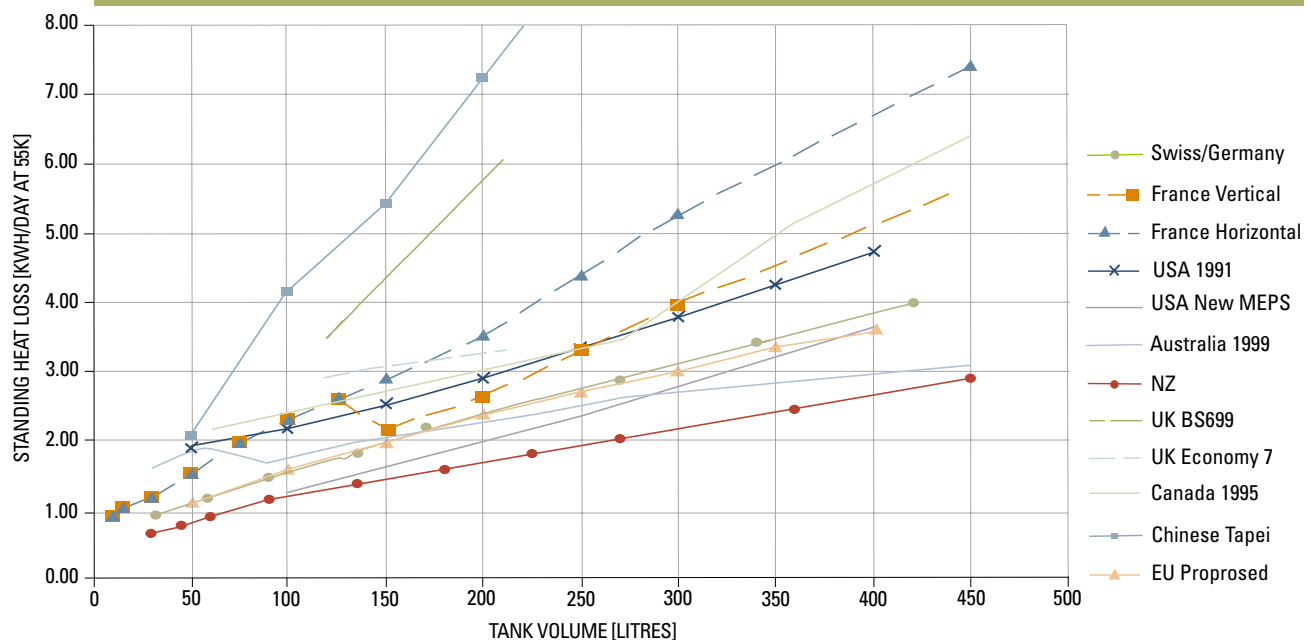
The proposed NZ requirements are somewhat more stringent than Australian MEPS requirements for all tank sizes up to 270 litres, and then the levels tend to converge for

larger sizes. However, at the time of publication these levels are not yet mandatory in New Zealand.

European Union

French requirements are slightly more stringent than Australian 1999 MEPS requirements for tanks sizes up to about 70 litres and then the Australian requirements are significantly more stringent for larger tanks. The Swiss/German requirements are somewhat more stringent than Australian MEPS requirements for tanks sizes up to about 90 litres, they are roughly equivalent from about 90 to 150 litres and the Australian 1999 requirements are more stringent for tanks over 150 litres. It is important to note that the bulk of the German market is smaller units under 100 litres, while about 40% of the Australian electric water market is estimated to be under 125 litres. The English requirements (BS699) are very weak by world standards. The Economy 7 requirements are similar to, but weaker than, the Canadian requirements, which are significant less stringent than the Australian 1999 requirements for all tank sizes.

Figure 1: Comparison of International MEPS Levels



Notes: Australian voluntary MEPS for non mains pressure models are not shown. New US 2004 MEPS levels for Tabletop units are equivalent to 1991 levels.

Why electric water heating technologies have been targeted for MEPS

The main reasons for considering MEPS for electric water heating technologies are:

- Electric water heating technologies are estimated to account for 14.8 Mt CO₂-e in 2000, or approximately 81% of emissions from all types of water heaters in Australia. Emissions from electric storage water heaters (excluding low pressure units, heat exchangers and calorifiers) are estimated to total 12.1 Mt CO₂-e in 2000.

The new standards adopted in the US for 2004 provided a trigger to review the MEPS levels in Australia. Analysis of international MEPS levels indicates that:

- For tank sizes below 80 litres, Swiss/German requirements are the most stringent by a significant margin, with French requirements also slightly more stringent than the Australian requirements.
- For tank sizes of 80 litres to 250 litres, the new US requirements for 2004 will be the more stringent than the Australian standard.
- For tank sizes of 250 litres and above, Australia currently has the most stringent requirements internationally.
- No other country differentiates between vented and unvented types of water heaters, except for Australia, where MEPS levels for vented tanks have until now been voluntary. However consultation is currently being undertaken in respect of a proposal that is likely to make them mandatory from July 2005. (Similar timing to this proposal).

International comparison therefore suggests that adjustment to the current Australian 1999 MEPS levels for some of the product range is required in order to match world's best practice.

As the majority of water heaters under review are manufactured locally, the implementation of new standards should have sufficient lead times to allow existing manufacturers to allocate capital to pay for re-designing products and adjusting manufacturing processes, to minimise potential economic impacts and arbitrary changes in market share. The NAEEEC proposed timetable provides a three year notice period for local industry to adjust to the MEPS proposals after finalisation.

Elements of the Planned Program

Regulatory

- Tank sizes below 80 litres

Since 1999, the Australian Greenhouse Office has engaged stakeholders in a debate about an appropriate MEPS level for these small electric water heaters. Public consultation and regulatory impact processes are close to finalisation and the Ministerial Council will be asked to decide the issue before year's end. The new MEPS level will commence not earlier than October 2004.

NAEEEC proposes to complete the process of determining the appropriate MEPS levels for these products outside this process.

- Tank sizes of 80 litres to 250 litres

NAEEEC proposes to review MEPS levels for these products with a view to matching US MEPS levels for 2004 (or developing a proposal with industry that is equivalent). NAEEEC will propose amending the Australian Standard to reflect the improved stringency levels.

- Tank sizes over 250 litres

NAEEEC does not propose any change to the existing MEPS levels, which will be maintained.

Voluntary

NAEEEC does not propose to require mandatory energy efficiency labelling of all water heater technologies. Instead, NAEEEC will seek to develop a range of initiatives in conjunction with stakeholder organisations, as described below.

NAEEEC considers that there is a role for the water heating industry to provide information to consumers on the relative running costs and greenhouse gas emissions for various water heater types. This should cover a range of water heating technologies, fuel types, climates and usage patterns. This may be achieved through a public listing on a website, for example www.energyrating.gov.au.

NAEEEC also wishes to work with stakeholders to develop 'best practice' information programs aimed at hot water installers, and the development of modules in existing training courses for the building trades. NAEEEC is interested to hear whether parts of the industry are interested in operating and promoting these initiatives, supported by government.

Proposed Australian MEPS levels

NAEEEC's proposal is to update the Heat Loss requirements in AS1056 Part 1 such that they are equivalent to the US MEPS levels, for tank sizes of between 80 litres and 250 litres, as follows:

Table 3: Proposed NEW Australian MEPS Levels

Volume (Litres)	Delivered (Litres)	Proposed New Australian MEPS (kWh/day)
90	80	1.14
110	100	1.30
135	125	1.50
180	160	1.85
225	200	2.20
270	250	2.55

Greenhouse Reduction Potential

Energy consumption in water heaters is due to both hot water usage and standing heat losses, with the heat loss component accounting for around 30% of total energy consumption. Total greenhouse gas emissions from electric storage water heaters (excluding low pressure units and heat exchangers) are estimated to be approximately 12.9 Mt CO₂-e in 2000.

In calculating the impact of the proposed MEPS, the following assumptions have been made:

- The new USA 2004 MEPS levels have been applied to AS1056 minimum Heat Loss requirements for water heaters with a delivery capacity of 80–250 litres inclusive, from 2004.
- New installations of water heaters are 420,000 pa from 2004 with a estimated growth rate of 3% per annum.
- Energy Savings per annum and per unit is the difference in heat loss from the USA MEPS levels (2004) and the current Australian MEPS levels, multiplied by 365 days.
- An average conversion rate of 0.897 kg/kWh.

Based on available information concerning the market share of new installations, it is estimated that the annual greenhouse savings in 2010 resulting from the implementation of the proposed MEPS levels for electric storage water heaters will be 121 kt CO₂-e per annum. Annual savings are predicted to rise to 225 kt CO₂-e in 2015.

Economic Implications

Incremental increases in water heater efficiency generally are highly cost effective, since most of the technology improvements involved are not complex. This generally means that on-costs are small per unit and that these are covered by fuel savings to customers over a short period.

This is likely to be the case in this instance, with the possible exception of water heaters with tank sizes close to 250 litres where the improved performance will be small and may therefore warrant a more flexible approach.

Timetable and Implementation

NAEEEC proposes to recommend to MinCoE 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:

1.	Development Stage	Timetable
	<p>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</p> <ul style="list-style-type: none"> > 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 2001 and completed by July 2002
2.	Notification Stage	Timetable
	<p>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</p>	The Australian standard will be published by July 2002 containing the MEPS levels and the MEPS will come into effect from around July 2005 (ie 3 years notice)
3.	Duration Stage	Timetable
	<p>This is the 'stability period' in which no changes to regulations are made (ie MEPS levels unchanged).</p>	Commences from July 2005 and scheduled for reconsideration by not earlier than July 2009 (ie fixed for at least 4 years)

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.