Centre for Energy and Environmental Markets

CEEM and CPVE Submission for the

NAEEEC Proposal to increase MEPS for Room Air Conditioners and harmonise MEPS for single and three-phase units

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Centre for Energy and Environmental Markets

The UNSW Centre for Energy and Environmental Markets (CEEM) provides Australian leadership in interdisciplinary research in the design, analysis and performance monitoring of energy and environmental markets and their associated policy frameworks. CEEM brings together UNSW researchers from the Faculty of Commerce and Economics, the Faculty of Engineering, the Australian Graduate School of Management, the Institute of Environmental Studies, and the Faculty of Arts and Social Sciences, working alongside a growing number of international partners. Its research areas include the design of spot, ancillary and forward electricity markets, market-based environmental regulation and the broader policy context in which all these markets operate.

Centre for Photovoltaic Engineering

The UNSW Centre for Photovoltaic Engineering is internationally recognised for its research in the area of photovoltaics, most of which is now conducted under the ARC Centre of Excellence in Advanced Silicon Photovoltaics and Photonics. It was the first organisation internationally to offer undergraduate training in the area of Photovoltaics and Solar Energy, and the educational programs offered now include Renewable Energy Engineering and postgraduate coursework and research training opportunities.

Preamble

Minimum Energy Performance Standards (MEPS) set minimum efficiency standards for energy-using equipment, and so remove the least efficient models from the market. They provide industry with a target benchmark, giving a clear medium-term signal for ongoing efficiency increases. MEPS are widely accepted to be one of the most cost-effective policy actions available for improving energy efficiency. They can simultaneously reduce energy consumption, its associated greenhouse gas emissions, and customer energy bills.

Air-conditioners represent one of the largest electrical loads in a typical residential household. Furthermore, they tend to be used at the same time on hot summer afternoons. Their physical and hence economic impacts on the electricity industry therefore go way beyond the individual household. Present retail energy markets do not reflect these impacts and there is a clear case for government intervention.

The urgency of such intervention continues to grow. The number and size of air conditioners sold in Australia are increasing, especially in areas of high summer temperatures with housing stock that is unable to maintain comfort levels in such conditions. Air conditioners are expected to significantly contribute to increasing climate change emissions and summer peaks in electricity demand.

MEPS represents a key government intervention in this regard. The National Appliance and Equipment Energy Efficiency Committee (NAEEEC) has released a proposal to increase the MEPS for non-ducted air conditioners of rating up to 10 kW. They also propose to harmonise MEPS for single and three phase units.

This submission from the UNSW Centre for Energy and Environmental Markets and the UNSW Centre for Photovoltaic Engineering addresses the key issues raised in this proposal. In particular, NAEEEC's stated intention to delay the introduction of stricter MEPS than it initially proposed. Our submission draws on a range of work by researchers now associated with the our two research centres. More details can be found at the CEEM website – www.ceem.unsw.edu.au.

The Draft Proposal's arguments and conclusions are inconsistent

The Draft Proposal is characterised by

(i) A large number of extremely coherent, rational and convincing arguments for early implementation of stricter MEPS requirements for room air conditioners (RACs), and

(ii) a set of recommendations that involve notable delay in the initially proposed timeline for introducing MEPS requirements, apparently in response to industry arguments that have actually been refuted in the RIS draft report.

The inconsistencies between the arguments and the subsequent conclusions and recommendations presented for deferral of the October 2007 and April 2006 MEPS are detailed in Table 1, and are summarised below.

(i) The RIS outlines why industry justification for deferral of the MEPS is likely to be unfounded since suitable air conditioners should be available, yet defers the MEPS regardless,

(ii) The RIS provides what it terms “guesstimates” for industry compliance costs of the deferred MEPS which total $12 million – the same as the total compliance costs for the non-deferred MEPS presented in the previous RIS – so even allowing for these estimates being approximate, industry has been unable to make a clear case for deferral of the MEPS,

(iii) Comparing the January and June RIS estimates for the net impact of the MEPS for both users and Australia as a whole indicates deferring results in a loss of over $100 million. This, together with that fact that deferral and non-deferral of the MEPS have indeterminate compliance costs for business, makes deferral of the MEPS a rather surprising outcome,

(iv) In addition to the above financial arguments for not deferring the MEPS, the RIS presents clear evidence for MEPS significantly reducing both energy use and greenhouse gas emissions, yet defers them regardless,

(v) The RIS presents clear evidence for market failure in the RAC market, and so justifies government intervention, then choses to unduly restrict government intervention by delaying introduction of MEPS, and by committing to make no further changes to the MEPS until 2012.

The proposed delay in stricter MEPS is therefore inappropriate

The key issues are the large and growing economic and environmental costs that air-conditioning is placing on Australian society, and the role that ambitious MEPS targets can play in reducing these costs. It is likely the case for even stricter MEPS put in place even earlier than the non-deferred MEPS is now stronger than recognised in either the current RIS or the ‘non-deferred’ RIS in January 2005. In particular, summer peaks in Australian electricity demand are already high and short-lived and are predicted to get worse over the next decade, driven mainly by increased numbers of larger air conditioners that are used more often, especially when marketed as a ‘climate control solution’.[1] This will result in significant investment requirements in network and generation infrastructure, as well as the operating costs and emissions associated with electricity use. – see Appendix on page 10. Owners of residential air conditioners throughout the NEM have been estimated to receive a cross subsidy of between $300 million and $500 million, which is between $110 and $185 per AC-household. This is clearly inequitable and is a serious distortion of the market (Wilkenfeld, 2004).

Investment in this generation and distribution infrastructure results in significant sunk costs. There will be a strong economic incentive to use these investments once they are installed, locking in poor economic and climate change outcomes for many years to come.

There is clear evidence of market failure in terms of air conditioners’ impact on the electricity market, and so government intervention is required (RIS draft report 21 June, Section 1.7). It is also worth recognising the wider context of delaying the RAC MEPS. It will damage the MEPS process in general by setting a precedent: that industry can effectively oppose and impede any such regulation without recourse to either logical argument or facts to support their case.

[1] Use of air conditioners is likely to increase, with supermarket chains now selling DIY split cycle A/Cs of up to 7.5kW cooling rating. These may not be installed correctly, and so have reduced efficiency.

It is also possible that opposition to the MEPS does not necessarily represent the broader industry view, just the most vocal. As stated in the RIS, there are almost certainly a number of players that have already started to prepare for the April 2006 MEPS and who will actually incur costs if it is delayed (RIS draft report 21 June, Executive Summary).

Our recommendations therefore are

1. The proposal should revert to the original intention to introduce the Korean MEPS from October 2007 and bring forward the existing October 2007 MEPS to April 2006.
2. The proposal to make no further changes to MEPS until 2012 should be withdrawn, thereby retaining the flexibility to strengthen these MEPS should it be shown to be worthwhile for the Australian community.
3. The MEPS for single and three phase units should be harmonized; that is, the stringency of the MEPS for three phase units should be increased to be the same as single phase (as here recommended by the original April 2006 and October 2007 timetable). The stringency of MEPS of single phase units greater than 10 kW should be increased to that of three phase equivalents.

Table 1 Comparison of Arguments Presented for MEPS Deferral and the RIS Conclusions and Recommendations

Key issues discussed in the RIS & arguments	Conclusions and recommendations
Availability of suitable systems (pages vi-vii and 13-16) Some industry participants requested deferral of the timetable originally proposed by the NAEEEC because: (i) the high efficiencies claimed for other countries may be illusory and difficult to achieve, (ii) the assumptions about the ready availability of more efficient products and components were unrealistic, and (iii) that the cost and lead time required to identify and redesign models for the Australian market was under-estimated. The RIS also stated, apparently in response to these problems: - All RACs falling within the scope of this proposal in Australia are imported. - The Australian market is dominated by the supplier brands and manufacturing countries that provide high efficiency products to markets throughout the world. - More efficient products are available in all major markets, including very high efficiencies achieved by all of the smaller split models that are supplied to the Japanese market. - Australian MEPS lag behind those of Asian countries, and Australia's major suppliers are Asian, not European. - The development lag allowed by Australia is in addition to development lags in major supplying countries. - Australia does not require new product to be developed from scratch, but for existing products to be modified at most. - In 2004 there was broad industry agreement that the October 2007 MEPS could be brought forward by 18 months to April 2006.	Despite seemingly refuting the industry reasons for deferring the timetable, the NAEEEC have proposed to defer it anyway. It also gave "an undertaking that conflicting claims about the availability of more efficient product will be tested by importing a selection of units from major suppliers and having them tested in independent Australian laboratories". Why has the NAEEEC chosen to preempt the assessment of product availability and defer the proposed timetable? This deferral assumes that such products would not be available. In this case, why is the undertaking to check availability necessary? It is worth noting that comparison of air conditioner efficiencies by Danish Energy Management showed that air conditioners supplied to Australia have on average the worst efficiency performance out of several Asian nations. This included data for Korea and Australia based on test results (du Pont and Vauvert, 2004). The commitment to make no further changes to the MEPS until 2012 is also surprising. Peak load and climate change issues will increase in importance in Australia by 2012. The RAC industry in Australia would be well advised to assume there will be an ongoing process of increased stringency every two years. In fact, it would be in their interests to pro-actively work in concert with manufacturers to coordinate ongoing efficiency increases.
Business compliance costs (pages 27-29 and 33-34) The air conditioning industry was unable to provide estimates of compliance costs and so the RIS made what it calls "guesstimates" taking into consideration the following:	The RIS guesstimates were found to be $9 million and $3 million for the October 2008 and October 2006 changes respectively. The points made in the RIS indicate the compliance costs for businesses should be minimal, in fact difficult to distinguish from normal

(i) There would be no administrative costs, and business compliance costs were based on adjustment costs; (ii) Suppliers understand air conditioners are energy-intensive and expect to be regulated, the energy star labeling system has been in place for over a decade, and MEPS have been discussed almost as long; (iii) Although models are replaced quite regularly due to product upgrades, the MEPS may require faster upgrades and so slightly increase related adjustment costs; (iv) These costs are reduced by the advance notice of MEPS and the 1 year allowed for clearance of pre-MEPS stock, making them quite modest for small residential systems; (v) There may be costs in finding new sources, especially for smaller businesses; (vi) The new MEPS are not expected to reduce demand, and so there should be little effect on profitability; (vii) Suppliers are did not express opposition to the October 2004 MEPS estimate of $3 million. (viii) Some suppliers have already started to plan for the April 2006 timeline and so for them deferral may actually increase costs.	operating costs. This may be why the industry was unable to provide estimates of compliance costs themselves. Industry also claimed the assumptions about the degree to which the MEPS could be deferred by carry over of old stock were unrealistic (RIS draft report 21 June, page vi) - implying high rates of stock turnover that would minimise any compliance costs. Thus it is entirely possible that the $9 million and $3 million compliance costs are higher than actual. The compliance costs for the October 2008 and April 2006 MEPS were estimated to be $3 million and $9 million respectively (Syneca, 2005). This gives a total of $12 million, identical to the deferred proposal. Thus, even allowing for these estimates being approximate, industry has been unable to make a clear case for deferral of the MEPS.
Impact on users (pages 23 and 33) The October 2008 changes are estimated to increase air conditioner costs by $127 million nationally, and to decrease the net present value of operating costs by $209 million, giving a net benefit to users of $82 million. The non-deferred October 2007 MEPS gave a net benefit to users of $161 million (Syneca, 2005). The October 2006 changes are estimated to increase air conditioner costs by $15.5 million, and to decrease the net present value of operating costs by $28 million, giving a net benefit to users of $12.5 million. The non-deferred April 2006 MEPS gave a net benefit to users of $52 million (Syneca, 2005).	NAEEEC has chosen to significantly reduce the net benefit to users by proposing to delay introduction of MEPS. The impacts on user costs and benefits of deferring the October 2007 MEPS to October 2008, and the deferral from April to October 2006 cannot be directly compared because they are for different time periods – the January RIS was for 9.5 years and the June RIS was for 10.5 years – and different discount rates were used. However, it is clear that deferral of the MEPS significantly reduces the net benefit to users, in the order of $100 million.

National costs and benefits (pages vii, 30-31 and 34-35) After allowing for the above impacts on businesses, the deferred October 2008 and October 2006 MEPS were estimated to have net benefits of $72.8 million and $9.5 million respectively. The non-deferred MEPS in October 2007 and April 2006 were estimated to have net benefits of $157.7 million and $43 million respectively (Syneca, 2005).	NAEEEC has chosen to significantly reduce the national benefit (in the order of $100 million) by proposing to delay introduction of MEPS. Although the problems with comparison of the Jan and June RISs remain, the Draft Proposal seems to have decided that a small sector of Australian industry (and possibly only a few vocal stakeholders), that has been unable to justify either why the delay is necessary or provide estimates of compliance costs, is considered to be more important than the welfare of the Australian community. In addition, it is likely a price will be placed on carbon dioxide emissions in the next decade, which would further increase the cost effectiveness of more stringent efficiency standards.
Impact on energy use and greenhouse emissions (pages 21-23, 32) The October 2008 changes are estimated to reduce energy use and emissions by 754 GWh and 0.59 MT CO_2e respectively in 2018, which are 5.8% less than BAU. Over the life of the air conditioners affected by the MEPS energy use and greenhouse emissions reductions are estimated to be 7,808 GWh and 6.1 MT CO_2e respectively. The October 2006 changes are estimated to reduce energy use and emissions by 571 GWh and 0.5 MT CO_2e respectively in 2007 (less in other years because of Oct 2008 changes), which are 7% less than BAU.	It is clear that introducing MEPS reduces energy use and greenhouse emissions. Thus by deferring introduction of MEPS the Draft Proposal increases Australian energy use and greenhouse emissions. Committing to make no further changes to the MEPS until 2012 will exacerbate the problem. It is not possible to directly compare the impacts on energy use and greenhouse emissions of the January and June RISs because the analyses were for different time periods – the Jan RIS was for 9.5 years and the June RIS was for 10.5 years. However, when the Jan RIS impact is calculated for 10.5 years, the energy savings increase from 7,808 GWh to 8,598 GWh (Dempster, 2005). Thus by deferring the MEPS the Draft Proposal has chosen to increase energy use by an estimated 1,716 GWh.
Market failure justifying government intervention (pages 6-7) The Draft Proposal states there is clear evidence for market failure in the RAC market, and so there is a need for government intervention: (i) Consumers do not pay the full costs of electricity use because externalities such as greenhouse emissions are not incorporated into the price, (ii) the cost of generating, transmitting and distributing electricity is different at different times (eg. during peak demand) and this is not reflected in the price, (iii) there are barriers to obtaining the information a consumer may require to determine the costs of running a RAC, including the	The Draft Proposal has chosen to minimise government intervention by delaying introduction of MEPS, and by committing to make no further changes to the MEPS until 2012.

	fact that the consumer may not know what information they need,	
(iv)	split incentives may arise where the RAC is not chosen by the end user because it is offered as part of a package, and	
(v)	the consumer may be focussed on an immediate need to relieve discomfort rather than running costs and not be acting ‘rationally’ at the time of purchase.	

References

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Appendix: Peaks in electricity demand are high and expected to worsen

The electricity load profile in Australia is characterised by peaks in demand during both winter and summer. Figure 1 shows the load duration curves in Australian states for the maximum demand that occured up to 10% of the time in 2004. It is clear that all states use a significant proportion of their supply infrastructure a small amount of the time. The infrastructure required to meet the top 10% of demand is used less than 1% of the time in South Australia, Victoria and NSW, and about 4% of the time in Tasmania and QLD.

Over the last few years increasing use of air conditioners has had a significant impact on the load profile, contributing only 5% to 6% of energy use but 40% of summer peak demand, and this impact is expected to increase over time (Wilkenfeld, 2004). Figure 2 shows the effect of 29°C and 44°C maximum temperatures on demand at the Sydney West bulk supply point. According to the 2004 NEMMCO Statement of Opportunities, summer peaks are expected to result in the Reliability Standard being breached in Queensland (2009/10), NSW (2008/09) and Victoria/South Australia combined (2006/07), assuming current projects of increases in peak demand and that no additional capacity is brought onto the market. Compared to average weather, extreme summer weather is predicted to increase peak demand by 1,058 MW (Victoria/South Australia combined), 770 MW (NSW), and 316 MW (Queensland) (NEMMCO, 2004).

McLennan Magasanik Associates, for the National Framework on Energy Efficiency process, modeled the impact of a number of scenarios including a 1% national energy efficiency target where a high proportion of the energy efficiency savings occur in peak demand periods (*1% diff*), and a 1% target where efficiency reduction is assumed to occur evenly across all hours of the day (*1% flat*). They found that *1% flat* reduced peak demand by about 2,800 MW in 2016, and this resulted in savings with a NPV of $170 million over the period 2004 to 2025 due to deferred need for transmission and distribution infrastructure. They found that *1% diff* reduced peak demand by about 5,300 MW in 2016, and this resulted in savings with a NPV of $236 million (MMA, 2004).

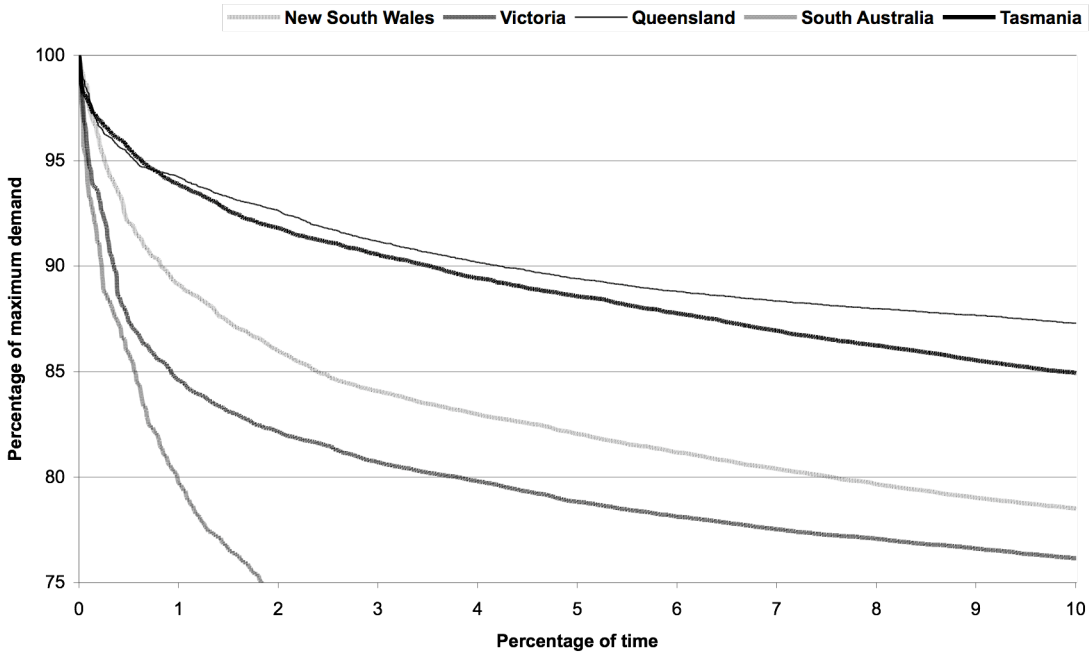

Figure 1 Australian State Expanded Load Duration Curves 2004

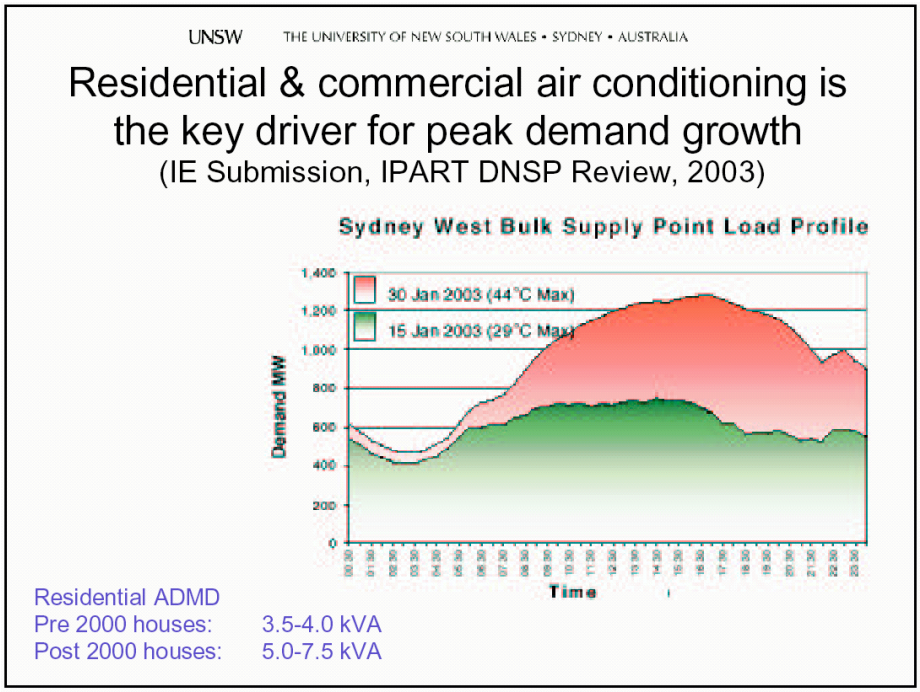

Figure 2 Air Conditioning Effect on Peak Demand
From Outhred (2003)