MINIMUM ENERGY PERFORMANCE STANDARDS

SUBMISSION BY THE NEW ZEALAND BUSINESS ROUNDTABLE

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EXECUTIVE SUMMARY

This paper is a critical review by the New Zealand Business Roundtable of the December 1994 report by Energetics Pty Ltd and George Wilkenfeld & Associates (the EPl/GWA report) for the Energy Efficiency and Conservation Authority of New Zealand (EECA).

The EPL/GWA report does not take an economic approach to the evaluation of energy standards. It purports to assess the feasibility of introducing Minimum Energy Performance Standards (MEPS) for a range of household appliances and business equipment but is unconvincing in its support of MEPS. In particular, it makes two kinds of overstatement:

- it overstates the degree to which market forces will not work to promote efficiency; and
- it overstates the degree to which a mandatory set of minimum standards could overcome any instances of market failure.

We have identified the following flaws in the EPL/GWA report:

- the view that relatively small purchases are not made with proper care and attention by producers and consumers is not supported by the evidence;

- in relation to the efficiency effects of compulsory energy standards, the report fails to recognise that:

    - functional aspects besides energy performance, such as appearance and compactness, are relevant to many consumers;

    - publicity efforts by the government and other agencies on the saving of energy are likely to have already shifted attitudes and actions (surveys by the International Energy Agency across several countries show high awareness levels);

    - by making equipment more expensive and thereby reducing spending power, compulsory standards may deter new purchases and have perverse effects on energy efficiency overall (especially in lower income households); and

- the methodology used to decide if and how compulsory standards should apply appears to be *ad hoc* and impressionistic, relying unduly on research in Australia and on a framework which is incomplete from an economic viewpoint.

A 1994 report by Australia's Bureau of Industry Economics on electric motors recommended against mandatory efficiency standards, favouring instead a voluntary labelling scheme.

It is incorrectly asserted in the report that New Zealand industry in general supports compulsory energy standards. Based on the analysis available to date, it is the view of the New Zealand Business Roundtable that minimum energy performance standards should not be imposed and that there are better approaches, such as proper commercial pricing of electricity and roading, for pursuing energy efficiency goals in New Zealand.

1 PROPOSALS FOR MINIMUM ENERGY PERFORMANCE STANDARDS

The EPL/GWA report begins by identifying eight types of equipment which fit their *a priori* criteria as candidates for MEPS. The equipment, ranging from household freezers to fluorescent tubes, is said to account for 40 percent of total New Zealand electricity consumption (though the list also includes two classes of gas heater and one class covering solid-fuel space heaters (pp3,5)).

The report claims that "mandatory implementation of MEPS is the course known to be favoured by most elements of the industry" in the case of *refrigerators and freezers* (p6) and goes on to recommend mandatory implementation, along with spending on an information programme.

It recommends that a mandatory MEPS be introduced for *electric storage water heaters,* notwithstanding evidence of resistance to the introduction of heaters of that standard where minor alterations to buildings are required (pp6-7).

With *gas storage water heaters*, the relatively high price of natural gas in New Zealand provides incentives to search for economies in consumption though the appliance range is small. "Further research" rather than a compulsory MEPS is recommended in this case, along with "formalisation" of Australian-style labelling (pp7-8).

With *gas space heaters* progress towards labelling is again recommended, but neither a compulsory MEPS nor a need for more research is mentioned (p8). *Solid fuel space heaters* are similarly treated (p9).

For *electric motors*, "market barriers" are said to inhibit the informed selection of more energy-efficient models. A compulsory MEPS which would remove from the market the least efficient models is proposed. The report favours standards ahead of information programmes on the basis of North American experience, but compulsory labelling, uniform advertising and a publicity campaign are recommended (pp9-10).

In the case of *fluorescent lamp ballasts*, compulsory MEPS are recommended at a level that would exclude the conventional ballasts from the market. With a narrowing of the product range in New Zealand and Australia through MEPS it is claimed that manufacturing costs should fall, raising the cost-effectiveness for more users.

A MEPS is recommended for *fluorescent lamps* which would take the majority of the lamps currently in use off the market. It is asserted that labelling and information programmes would be ineffective. Suppliers would come to enjoy scale economies. As with fluorescent lamp ballasts, low cost administration by the government is seen as a benefit.

EPL/GWA claim that compulsory application of their recommended MEP would push energy use 4 percent below the trend for the electrical products in question (the gas and solid fuel space heaters are declared unsuited to MEPS) and allow a 1 percent saving in New Zealand's projected electricity consumption by the year 2010. They also claim that this electricity, being marginal, would be thermally generated, meaning that by 2010 CO_2 emissions would be reduced by about 295,000 tonnes per year. Half the savings would come from lighting (p5).

The fact that compulsory MEPSs are proposed for refrigerators and freezers in Australia is advanced as an argument for New Zealand adopting them too, and at the same levels (pp1,5).

2 EVALUATION OF THE MEPS PROPOSALS

2.1 Problems with the General Approach

Outline of the main economic defects

Several aspects of the general line of argument put forward in the report in defence of the use of government intervention to encourage energy efficiency are faulty when viewed from an economic policy perspective. In particular:

- there seems to be a mistaken belief that when the amount of a purchase is small relative to *total* production costs, or *total* consumption expenditure, decision making will be faulty. In fact, successful businesses which survive in a competitive environment pay close attention to costs. Successful household management entails a similar cost-consciousness which outside observers may easily overlook.

- there is no evidence or objective basis for the view that in general users do not pay attention to energy efficiency. The idea, for example, that energy efficiency considerations are overlooked in the relationship between landlords and tenants seems implausible and certainly not a basis for policy on energy use. All cost elements are likely to be monitored and adjusted to the extent

that there is a pay-off from doing so because they will affect demand for products and services and hence the profitability of their suppliers.

- while a *prima facie* case can be made that information produced in the ordinary course of events about all manner of things, including energy-using equipment, is likely to be defective in some respects, there is no reliable way of knowing what the actual shortcomings will be. The government is unlikely to have better information in this regard than firms and individuals.

- for this reason any case for intervention should be approached with caution, in particular because regulation:

  – ossifies and becomes out of date;

  – becomes captured by vested interests; and

  – requires costly and often inefficient bureaucratic administration.

New Zealand's regulatory experience amply confirms these observations.

Particular problems with MEPS from an economic perspective

- Need for a Wider Perspective on Consumer Preferences

One of the assumptions implicit in MEPS is that the value of equipment is purely functional: in the case of refrigerators, for example, to keep food and drink cold. In fact there are a whole range of qualitative factors involved in a purchase decision. The EPL/GWA report tends to dismiss these aspects of consumer preferences as irrelevant if functional and energy efficiency criteria are not met.

What influences consumption of durables is not only a careful calculus of the marginal usefulness of additional or more expensive purchases but preferences for such attributes as convenience, appearance and ease of operation. Any standards which lead to the denial of these demands must be seen to cause a clear loss of consumer welfare.

It has to be recognised that the driving motivation behind the purchase of some appliances is primarily functional but not energy-related - such as to fit an available space. If MEPS were to work to restrict the range of model sizes and shapes, some

buyers would be obliged to effect costly re-designs to their kitchens, factories and laundries, costs not allowed for in the EPL/GWA figuring.

- **Market failure?**

Even if some information deficiency were thought to prevail, before instituting a heavy-handed measure such as MEPS it is important to consider whether government measures already being taken to raise consumer consciousness in relation to energy efficiency might have already caused enough of a 'correction', without the need for any further measures to be put in place.

This possibility seems realistic particularly if one considers the evidence from other policy initiatives. For example, it is clear that from both an economic and energy perspective recycling has been promoted past the point of optimum efficiency. Research on the behaviour of people in the face of well-publicised health risks suggests a similar outcome.[1]

Administration and compliance costs are also important in considering a case for any regulatory intervention. For this reason alone, it is by no means clear that it is worth attempting to correct many alleged market failures. The EPL/GWA study fails to properly account for such costs.

- **Could Income Effects Outweigh Price Effects?**

This possibility arises because by increasing the cost of production and thus the prices of appliances, MEPS measures could do more to deter new purchases of any appliances than they do to shift the mix of appliance purchases towards the more energy efficient end of the appliance market.

Whether this is a genuine likelihood turns on the price elasticities and income elasticities of the goods concerned. All price rises have some impact on the incomes of consumers. The EPL/GWA report does not examine this issue.

- **Instruments and Targets**

Economic policy analysis requires attention to whether the choice of instruments is appropriate to the targets. It is customary, in considering intervention in the

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1 Wesley A. Magat and W. Kip Viscusi, *Informational Approaches to Regulation,* MIT Press Cambridge, 1992.

marketplace, to evaluate alternative means of arriving at a specified policy objective. One commonly applied alternative to regulatory standards is a pricing (or taxing) regime, a significant advantage of which is that responses can be graded or prioritised. That is, market signals continue to be visible and to operate as economising instruments, rather than being completely obscured (as they are with a prohibition).

If the energy efficiency performance of particular pieces of equipment can be measured then, in preference to the MEPS approach, there could be merit in applying financial penalties to appliances below the standard *varying in proportion to the extent to which their performance falls short* and in providing financial incentives to more efficient appliances in proportion to their efficiency. In the economics textbooks, the superiority of price measures over rigid standards (if some kind of regulation must be instituted) has long been recognised.

2.2 Problems with the Methodology Applied

The methodology of the EPL/GWA report is questionable in a number of respects. The nine criteria to select potential areas for the application of MEPS mostly relate to the absolute size of potential savings if energy-use were reduced. Three, however, are 'economic' criteria which on the face of it are laudable:

- that there is market failure not amenable to market solutions;
- that the move is cost-effective for customers; and
- that standards would have a benefit-cost ratio greater than one for the nation.

However, the criteria are not applied in a rigorous way. In describing the evaluation methods applied, the report first lists "Cost Benefit Evaluation" at three levels of complexity:

(a) Full Statistical Cost Benefit Evaluation (needed, it claims, for refrigerators and freezers, gas space heaters and solid fuel space heaters, where size relationships are continuous and yet often complex);

(b) Simplified Cost Benefit Evaluations (seen as relevant for electric storage water heaters, fluorescent lamps and ballasts, and to a lesser extent for gas storage water heaters, where types are discrete and the energy/price relationship is consistent); and

(c) Preliminary Cost Benefit Evaluation (for situations where markets are homogenous and/or where data are unavailable).

The report then describes the analysis that was carried out.

On first reading, this description of the methodology might convey an impression of objectivity and rigour. In reality it is not at all robust.

The so-called cost benefit procedures merely estimate the *energy savings* if the least energy efficient equipment were removed from the market. This is not really cost benefit analysis in the sense that it is capable of showing which actions would generate a gain for society and which would not, and even this limited exercise is set up with doubtful assumptions.

Another problem is that no account is taken of the energy savings that are likely to occur in the absence of MEPS. Normal market incentives mean many of the expected savings are likely to be made anyway. Adjusting for this error would substantially lower the savings claimed for MEPS and the estimated benefit cost ratio.

The scores and rankings framework is essentially non-quantitative and impressionistic. Some of the criteria (such as the idea that the use of renewables is necessarily favourable from an environmental viewpoint) are not soundly based.

Sections 4 to 9 of the EPL/GWA report look more closely at individual types of equipment. They confirm that the approach has been insufficiently rigorous. For example, section 4 begins with a description of the market for refrigerators and freezers. It points to evidence that, model for model, New Zealanders pay about 10 percent more than Australian consumers for refrigerators, perhaps due to GST. The key assumptions are then listed:

- a starting price for appliances 10 percent above Australian levels;
- identical assumptions to those made in the Australian study about increasing energy efficiency trends without MEPS (i.e. 1 percent p.a. for 4 years, and then 2 percent p.a.);
- MEPS effect of raising energy consumption efficiency to 6 percent p.a. in years 3 and 4, slowing to 1.5 percent thereafter for 6 years and then returning to the background rate;

- average price increases of 1 percent p.a., except for 2 years around the time of introduction of MEPS, when it would increase to 1.5 percent for 2 years around the time of its introduction;

- programme costs of $20,000 in year 0 and $50,000 p.a. thereafter, plus $20,000 for a market survey in year 3 and $20,000 per year from year 3 for random check testing; and

- electricity costs starting at $0.081/kWh increasing at 0.8 percent p.a.

According to the report, the introduction of MEPSs at proposed ANZMEC levels would:

- reduce projected annual electricity consumption 7.1 percent p.a. by year 15 (i.e. 2010) over and above the reduction already expected;

- create a 1 percent increase in the average price; and

- lead to a benefit cost ratio of $18.1m÷ $9.5m = 1.9.

In relation to a labelling scheme, the report assumes:

- a campaign promotion cost of $1000,000 p.a.;

- $1 cost per label;

- that the campaign would cause a modest additional "improvement" of 0.5 percent p.a. in energy efficiency;

– and that it would have:

- a benefit cost ratio of 5.7.

Adopting both MEPS and labelling, it was estimated, would deliver a benefit cost ratio of 2.5.

Leaving aside for the moment the speculative nature of many of the assumptions used and the obvious sensitivity of the results to a few key, but conjectural, assumptions (e.g. about the price impacts on appliances of MEPS in years 3 and 4 of 6 percent p.a.), the problem with this kind of analysis from an economic viewpoint is

that it takes no account of some classes of cost likely to fall upon users and manufacturers. In particular, it ignores:

- cash costs relating to the need for some users to find different models, or alter their wall and floor layout, to accommodate the model now purchased. (These costs will not be captured in the purchase cost assumptions.);

- losses of consumer surplus and producer surplus by virtue of the restriction of users' choice of appliance whether in relation to size, shape, added features, internal/external dimensions, or even colour; and

- losses of consumer surplus and producer surplus associated with the increase in average price.

In summary, little original analysis appears to have been done on the New Zealand situation. Rather, the report either has done only "preliminary" work or has extrapolated from its more comprehensive work on Australian appliances. The framework employed is incomplete from an economic viewpoint.

2.3 Robustness of the Australian Analysis

The Australian work acknowledges that the implementation of MEPS could lead to a 3.1 percent increase in average retail price of the appliances. The broader effects on the economy of such an increase were not addressed by the Australian report (this report covered household electrical appliances).[1]

Moreover, the Australian report adopted the criterion for refrigerators and freezers that at least half of all models, sales and brands now on the market should pass the recommended MEPS level, "so preserving consumer choice and containing the impact on suppliers". Clearly, this only preserves "at least half" of the previous consumer choice and there could be a differential effect on the product range of some manufacturers.

The report suggests that removing 50 percent of the existing models from the market would not constitute an excessive adjustment cost to industry. However, it does state (p182) that three of 13 imported brands of refrigerators and freezers would

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1 "Benefits and Costs of Implementing Minimum Energy Performance Standards for Household Electrical Appliances in Australia", George Wilkenfeld and Associates, April 1993.

have their entire model range affected by MEPS. It is not stated how locally manufactured brand ranges would be affected.

The report acknowledges (p183) that MEPS would certainly have a major impact on the water heater industry, since every single model would have to be redesigned, albeit with a recommended three year adjustment period. There are no imports into this market in Australia.

The report (p158) estimates the purchase price of a typical 250 litre off-peak heater would increase by 5-10 percent due to MEPS requirement. It adds that:

> ... this cost would not be imposed on gas water heaters, and so may have some impact on the preference of customers for one fuel rather than another. However, this impact is likely to be very minor.

In view of the intense competition between gas and electricity in the hot water market in Australia, this assertion could be difficult to sustain. Given New Zealand's lower electricity prices and higher gas prices, gas has a much smaller market share of this market in New Zealand than it does in Australia.

The report (p171 to 175) does address the incidence of price impacts of MEPS. On the basis of a BIS Shrapnel survey the report concludes:

The data suggest that the impact of the small increases in the price of whitegoods which could come about as a result of the implementation of MEPS would not impact disproportionately on lower income groups (even in the unlikely case that the market does not introduce models with a more favourable efficiency-price relationship). These groups are less likely to purchase new appliances than middle and upper income groups.

Table 1: Household Income of New Appliance Purchasers, Australia 1991

Household Gross Income	Refrigerator	Freezer	Dishwasher	Clothes washer	Clothes dryer(a)	Air conditioner	All households (b)
<$15,000	16%	15%	3%	15%	7%	9%	19%
$15-25,000	15%	13%	12%	15%	15%	16%	14%
$25-35,000	13%	18%	12%	14%	13%	19%	15%
$35-45,000	13%	18%	15%	14%	15%	10%	11%
$45-55,000	9%	5%	11%	9%	11%	10%	6%
>$55,000	12%	12%	24%	11%	20%	16%	9%
Not stated	22%	19%	24%	21%	19%	20%	25%

Source: BIS 1992b; (a) No MEPS levels recommended. (b) Weighted response n=5528 households. [extracted from GWA Report p172.]

As shown by the above table, this statement is supported by the data for 'luxury' domestic appliances, such as dishwashers, but not for refrigerators or freezers. These comments covered only whitegoods. The report also comments that:

It should also be pointed out that the highest projected price increase would be for water heaters: about 8% retail, and perhaps 6% on the total capital cost after installation. Since water heaters are essentials rather than discretionary purchases, and as there is no market in second hand water heaters, all purchasers of electric water heaters would be faced with this increment. However, the energy and LCC savings projected from MEPS are higher for water heaters as for any other appliance, and these benefits would also be just as widely distributed.

This is a dismissive treatment of a 6 or 8 percent up-front price increase.

More detailed analysis of GWA's Australian work is set out in Appendix 1.

The GWA/EPL report on New Zealand does not mention a 1994 Australian study by the Bureau of Industry Economics (BIE) 'Energy Labelling and Standards'. This study concentrated on the possibilities for 'no-regrets' actions relating to high efficiency electric motors (HEM) and recommended against mandatory efficiency standards because they limit choice in the market. Rather, it proposed a voluntary labelling scheme. The BIE study did attempt to consult industry. The survey indicated that of the 40 firms which indicated that HEM labelling would be of benefit to them, only half were willing to pay. The average acceptable price increase was 1.2 percent, from which the report imputes benefits to the manufacturing sector of at least $0.6m from the labelling scheme. It is doubtful whether this 'contingent valuation' approach is reliable.

These doubtful benefits can be compared with the estimated cost of a national HEMs labelling programme of $1m-$2m. Although not explicitly stated, this is apparently the cost to the government of running the programme and does not include the costs to industry of doing the labelling.

The BIE's economic analysis also indicated that the price of electricity would need to rise from 8c/kWh to 10c/kWh before a HEM standards programme showed a net social benefit (Australian electricity prices are generally higher than those in New Zealand). Hence a standard would be analogous to a tax on electric motors and as such inferior to appropriate pricing of electricity in achieving efficient energy consumption. Competitive electricity markets, now being established in both Australia and New Zealand, are therefore the first best option in this regard.

The EPL/GWA report makes no mention of the competitive electricity market now evolving in New Zealand. First and foremost, such a market should unwind cross-subsidies and so provide electricity consumers with appropriate pricing signals. This is likely to be a much better method of introducing energy efficiency than a cumbersome and intrusive set of standards which even the EPL/GWA report says will reduce electricity consumption by only 1 percent in the year 2010, with energy use falling 4 percent below the trend for the products in question. This reduction is interesting in the light of the following comment of page 145 of the report:

The voluntary programmes (in Japan and Germany) operated during a period (1978-84) when easy efficiency gains could be made, and in all probability would have been made anyway. For example, the mean annual rates of improvement in the

efficiency of cyclic defrost refrigerators over the periods in question were 3.7 percent in Japan and 4.6 percent in Germany. The mean improvement rate in Australia in the period 1975-83, when neither standards nor labelling were in place, was estimated at 4.9 percent

Thus, by admission, the effect of standards is becoming increasingly marginal as technological improvements flow on to the market.

Judging by recent New Zealand experience, competitive electricity markets also bring forth energy service companies whose whole raison d'être is to make profits through selling energy advisory services and equipment.

The experience with energy efficiency is that industrial users are well aware of the savings from more efficient equipment but will not invest unless the payback time is relatively short. While some may regard such high implicit discount rates as inefficient, the bulk of the evidence is that they are being chosen, rather than applied through ignorance. Modern investment theory (mentioned briefly in the Appendix to this submission) provides insights as to why this may be the case. In addition, there may be pragmatic considerations for such decisions, such as the fact that low efficiency electric motors can be rewound but HEMs cannot.

The report makes the assumption (p.5) that "the greenhouse gas savings associated with these energy savings would be significant as marginal electricity demand is currently met in large part by thermal fired power plants. The currently accepted figure for the carbon dioxide emissions associated with marginal electricity generation in New Zealand, including the allowance for average transmission losses, is 0.624 kg/kWh." This assumption is dubious, because much of the operating time of the appliances would be when demand is low and the marginal generator would be hydro, with zero carbon dioxide emissions. As a result the quoted reduction in carbon dioxide emissions of 295,000 tonnes is likely to be significantly overestimated. Even if it were not, the reduction of 295,000 tonnes is trivial in a global context.

APPENDIX

MORE DETAILED ANALYSIS OF GWA'S AUSTRALIAN WORK

The following are some more detailed comments on GWA's Australian report on which the majority of the New Zealand recommendations are based.

Electricity Prices and Discount Rates

The Australian report notes (page xiv) that the value of MEPS to society is higher when discount rates are low, energy production costs are high and the actual cost of the appliance is low.

Electricity production costs in Australia are already low in world terms and historically domestic tariffs have been cross-subsidised. These cross-subsidies are being removed, particularly in Victoria. To that extent, domestic consumers might see tariffs increase as follows (GWA assumptions):

- 1992–97 0% per annum
- 1998–2002 1% per annum
- 2003–2007 2% per annum
- after 2007 0% per annum

However, the advent of a competitive national electricity market should see price decreases, estimated at about 25 percent for Victoria (ANZ-McCaughan, 1994). If this comes about, the GWA estimates for electricity prices look pessimistic. If instead there are price falls, the benefits of MEPS would be commensurately reduced.

Net savings of 2.0 percent in aggregate life cycle costs are estimated at a discount rate of 8 percent. The choice of discount rates is a complex area but it is well known that both domestic and industrial customers typically apply higher discount rates than 8 percent to energy efficiency investment. The report recognises this, quoting ABARE work showing discount rates in the range 39 percent to 300 percent for the appliances in question.

However, these estimates are *implicit* results from a crude analysis. They do not reflect modern economic views of investment decision making as set out, for example, in the work of writers such as Dixit and Pindyck. This draws attention to the important

interactions between the irreversible nature of many investment decisions, uncertainty, and the choice of timing. Studies which do not reflect these factors fail to yield estimates of discount rates which are reliable for policy analysis. In any event, the 8 and 10 percent real interest rates tested in the GWA report seem reasonable.

MEPS Programme Costs

The GWA report says little about the costs of implementing and running a MEPS programme, although it does cover in detail the additional costs to manufacturers. It notes that the total costs to industry to June 1992 of the appliance labelling programme (three states only) were $4.22 million, increasing the retail price of each appliance by $3.20.

In addition, the costs to the government and the relevant utilities of administering and promoting the programme totalled $7.23 million, adding about $6 to the retail price of each appliance.

At an average appliance cost of $636, GWA estimates that the MEPS-induced increase would average $20. This does not include programme costs, the GWA report concluding that these would be small in comparison with the labelling programme costs and indeed could largely be absorbed in them.

This latter comment is valid to the extent that the infrastructure for running the labelling programmes is in place and so can be regarded as a sunk cost. However, it ignores the fact that labelling is at present undertaken in only three states as well as the extra workload imposed by MEPS. This is addressed in Section 10.2 of the GWA report, which lists without costing the following administrative stages and functions:

- decision to implement MEPS;
- establishment of regulatory powers;
- public comment and consultation;
- State and/or Commonwealth legislation;
- publicising of regulations, e.g. to manufacturers, investors and importers;
- media advertising;
- registration and compliance testing, noting that:

It would be prohibitively expensive and time consuming for the registration agency to commission independent tests on each appliance. The system of formal random compliance checking by administration agencies, and informal reporting of suspected non-compliance by competitors and by consumer groups, works reasonably well for energy labelling and could be used to check MEPS compliance (p194);

but also that:

In the case of MEPS, non-complying products cannot even be sold. Consequently, there will be greater incentive for suppliers to:

- lodge inaccurate registration details, especially with regard to tested energy consumption but also with regard to product dimensions and capacities, and non-energy aspects of product performance;
- dispute the results of check tests;
- forgo the margin of safety sometimes used for label registrations, in order to register appliances near the MEPS borderline.

Consequently, the check testing function will need to be well resourced and organised, particularly just after implementation, when some suppliers may be testing the integrity of the MEPS programme and the resolve of the registration agencies (p195).

- disputes and penalties, including possibly one or more of the following:
  - a fine, perhaps scaled to the level of non-compliance, the sales of non-complying product and the consequent excess life cycle costs incurred by purchasers;
  - immediate withdrawal of the product from further supply to retailers;
  - retrieval of all units already in, or on their way to, points of sale;
  - a prescribed programme of advertising to bring the breach to the notice of the public;

  - offering redress to purchasers in the form of compensation for excess life cycle costs incurred;

- programme monitoring and evaluation;

- setting new MEPS levels, leaving open the possibility of revised MEPS levels for each appliance based on complete engineering analyses of the cost-effective potential for more energy-efficient design, together with detailed manufacturing cost data. As noted elsewhere in the report, these complete engineering analyses are costly. They are intensely data-intensive (including proprietary data from manufacturers) and resource-intensive. For example, LBL has estimated that its costs for development and review of the US DOE standards were about US$2m per year between 1976 and 1983, and $1m per year since. This is aside from the expenditure by other US government agencies on the development of appliance test standards. LBL currently has 5 to 7 staff engaged full time in the development of appliances and lighting standards.

The costs of these measures are apparently lacking from the GWA benefit cost analysis.

Energy Savings from MEPS

The cumulative energy savings for all appliances projected to be purchased in the period 1993-2007 from MEPS are estimated at 3870GWh for refrigerators and freezers and 8058GWh for water heaters, totalling 11928GWh. This would be about 0.5 percent of the total electricity generated in Australia over that period, assuming no growth in electricity demand.

The GWA report also notes (pp127-128) that the single most cost effective energy-efficiency measure available in most Australian households would be installation of low-flow shower heads. At a conservative estimate, this would reduce the total hot water requirement by 15 percent, compared to 3-7 percent via MEPS (page 143 - the range depending on MEPS stringency).

The Impact on Industry

The GWA report makes it clear that consultation with industry was not part of its study brief. Some consultations are understood to have taken place subsequent to the GWA report and some manufacturers have been reported as supporting MEPS, rather than voluntary standards which could tilt the playing field.

Manufacturers are at present grappling with development of zero-CFC foams for insulation. The GWA report addresses this issue as follows (pp7-8):

The impending phaseout of CFCs may be seen as a *low-cost* opportunity for improving energy-efficiency. If the costs of redesign, retooling and repacking have to be incurred anyway to meet CFC-phase-out requirements, then any increases in insulation material costs to reduce heat loss can be considered marginal. However, only the manufacturers will be in a position to estimate and to optimise the costs associated with satisfying the twin objectives of CFC phaseout and MEPS; the present study makes no attempt to do this.

The manufacturers interviewed for this study by GWA expressed a desire to meet only one mandatory design change at a time. The GWA report acknowledged that until the choice of zero-CFC foams is made it is difficult:

- to be confident about the likely heat loss levels of water heaters produced from 1994 on, and hence what design changes would be necessary to meet any given MEPS level; and

- to assess the fully absorbed (as opposed to prototype) costs of meeting those changes for water heaters, refrigerators and freezers, and hence verify the assumptions made in this study about the cost-effectiveness of given MEPS levels.

The GWA report concludes that it is nevertheless already possible to make reasonable estimates and allowances for the performance and cost impacts of the new foams, whatever they may ultimately be, and this has been done in this study.

These comments reinforce the need for adequate consultation with the appliance manufacturers. They also cast some doubt on the robustness of the GWA study's results.