MEPS SUBMISSION:

Refrigerated Cabinets Regulatory Impact Statement

Alan Pears AM, Senior Industry Fellow, RMIT University

2/78 William Street Brighton Vic 3186

Email: apears@c031.aone.net .au Phone 03 9592 8581 30 August 2016

Sent to energyrating@industry.gov.au

Table of Contents

Overview

The proposed approach reflects serious policy failure: a revised policy package that delivers more aggressive energy and carbon emission savings (potentially more than double those proposed) while still achieving a positive NPV and Benefit Cost Ratio better than 1 must be developed and implemented. Key elements of the proposal recommended in the RIS should also be implemented as a matter of urgency, as interim steps in parallel with development of stronger action.

Recommendations

- As noted above, a much stronger policy package must be implemented, with the aim of maximising cost-effective savings by achieving a positive NPV and BCR between 1 and 2.
- The new package should include:
    - Adoption of international test procedures

    - Interim measures including energy labelling, including inclusion of energy test data on specification plates, MEPS set at no higher than double the energy consumption of the top 5 performers available internationally, and financial incentives for the best performers
    - Inclusion of beverage vending units
- Urgent development and implementation of a package of measures that includes:
    - A revenue-neutral 'feebate' mechanism so that poor performers pay a levy which provides revenue to pay rewards to better performers, with scales of higher fees and payments for products with more extreme performance. This revenue stream should also fund an effective promotional and training campaign and RD&D program, with a budget of at least $2 million per annum for five years. Note this compares with a NPV of $1,800 million for the weak program proposed in the RIS, so this would be a very minor cost, with enormous returns.
    - Initially an incentive, and later a MEPS requirement, for products that incorporate smart diagnostics that alert operators if performance deteriorates. This could be combined with measures that encourage other features such as a high power factor and demand management capability.
    - Introduction of a MEPS automatic update mechanism, so that the threshold is adjusted annually to reflect improvements in the performance of best products available internationally
    - Include beverage vending units in this package
    - A program aimed at identifying inefficient units in the existing stock, and encouraging their replacement. This should also involve development and retrofit installation of 'smarts' to diagnose faults and support appropriate maintenance.

Introduction

This proposal for policies to improve the energy efficiency of commercial refrigeration demonstrates a serious failure of policy makers to capture much of the cost-effective energy saving potential within this area. It is common for public policy to aim for a Benefit-Cost Ratio of 1 to 2 (ie for a net financial return of $1 to $2 for each dollar invested) – for example infrastructure investment and building energy regulation use this threshold. Even lower BCRs can be justified where there are uncosted additional public benefits.

In a context where there is widespread criticism of the supposedly high cost of action to cut climate impacts it is absurd not to aim to capture the maximum cost-effective (ie profitable) outcomes from appliance efficiency measures. Indeed, Australians are prepared to pay extra for renewable energy and measures funded under the Emission Reduction Fund, so they should reasonably expect government to maximise the profitable emission reductions from an effective appliance efficiency program.

So to propose a policy approach for commercial refrigeration that offers a BCR of 7.8 (and 6.9 in New Zealand) or higher, is to lock-in ongoing energy waste, higher greenhouse gas emissions and lack of innovation. The 'preferred option' has a Benefit-Cost Ratio of 7.8 in Australia and delivers a Net Present Value of $1,872 million dollars. While this is impressively cost-effective, it begs the question of why the target is not to achieve maximum energy savings (and emission reductions and innovation outcomes) while still offering a positive NPV and a BCR better than 1. The RIS notes (p.30) that three-quarters of the lifecycle cost of commercial refrigeration units is due to running costs, so the large potential energy savings could offer a very significant benefit for buyers/users.

I recognise that we are starting from a low base of performance, and that a policy package centred on application of Mandatory Energy Standards may play only a limited role in achieving an economically optimal outcome in this area. If this is the case, the policy proposal should include a broader range of actions that will capture more of the cost-effective savings potential.

In the past, I have been involved in design of an improved Beverage Vending Unit, the EcoVend project at RMIT, and an improved Glass Door Merchandising Unit. We identified very large cost-effective savings potential, but met serious market failures in trying to capture them in the market context. Further, the 'topten.eu' website lists a number of refrigerated cabinets that achieve very large energy savings. So the barriers to large, cost-effective savings seem to be cultural industry norms, not technical issues.

I am puzzled as to why Beverage Vending Units have been excluded from this program. My understanding, based on practical experience, is that there are large savings available, despite significant voluntary improvements by some manufacturers. To put this in context, in 1993, when we developed the EcoVend at RMIT, typical consumption was over 10 kWh/day. My understanding is that the present MEPS is about 7 kWh/day. We achieved 4.24 kWh/day and with today's technologies, less than 2 kWh/day seems achievable.

Possible Paths to Capture All Cost-effective Benefits

The Regulatory Impact Statement (RIS) considers a range of policy measures and practical approaches. These include:

- Adoption of international Standards for testing and calculation of performance metrics
- Mandatory Energy Performance Standards at a range of stringency levels
- Appliance labelling on-line, in literature and on products

These approaches are well-proven, and harmonise Australia with international standards in a time of increasing international trade. The key issues are the levels of performance mandated and/or encouraged, and mechanisms that could support improvement well beyond present practices while maintaining a reasonable level of choice in the Australian market and allowing manufacturers time and flexibility to respond. The overarching policy objective should be to capture all cost-effective energy savings and emission reductions, taking into account societal costs and benefits, including those that have not been costed.

Testing and Information

It certainly seems sensible to move to international standard tests. Where these are considered inadequate, Australia should allocate resources to engage in international processes to improve them. Indeed, it could be argued that development of innovation capacity in this area could allow Australian businesses to capture part of the international market, and to sell Intellectual Property internationally.

With regard to provision of information for decision-makers, the principle is obvious: you cannot make informed decisions without appropriate and timely information in a form that can be understood by decision makers. However, an effective information program can go beyond this, by encouraging (and even applying pressure to) decision-makers and the supply chain to innovate and capture larger benefits. It requires significant financial investment to effectively promote such information. In the early days of appliance energy labelling, multi-million dollar budgets were allocated for promotion, training: this was critically important in embedding energy efficiency in the

brains of decision-makers. Given the $1800+ million net benefit identified, significant expenditure on these activities is certainly justified if savings can be accelerated and increased.

The RIS proposes development of a local star rating label, to take advantage of the familiarity of Australians with this approach. This seems reasonable. However, I would also recommend:

- Including in the label reference to the rating of the product on the EU rating scheme: this need not be prominent but it is important as a frame of reference. It will also add to the credibility of our local scheme if it is seen to link to international programs.
- Include the energy performance information (key test results and ratings) on the specification label of the appliance. Many commercial refrigeration units are sold in second-hand markets and, without permanent information, this market would be uninformed.

Role of MEPS and other measures

MEPS plays a clear role to remove from the market products that have 'sub-standard' performance. Historically, economic policy makers such as the Productivity Commission have opposed MEPS on the grounds that they reduce choice, despite evidence to the contrary. So the selection of an appropriate cut-off point is hotly debated among policy makers. I suspect that if consumers were effectively consulted, they would support stringent MEPS where they were clearly cost-effective, on the grounds that laggard manufacturers would and should simply 'lift their game'.

So the question arises: how do we, or can we, introduce measures that capture a larger proportion of the multi-billion dollar potential benefit in this sector? The Japanese have led the way in this area with their *Top Runner* scheme, where all manufacturers are given a period of time to meet the performance of the best product on the market. This provides a 'real world' framework, as it relies on real existing products to set the benchmarks. Of course, if the best products on the market are still relatively inefficient, this is insufficient, unless additional strategies are implemented to drive improvement at the leading edge.

Major disadvantages of the present Australian approach, which is heavily reliant on MEPS, are:

- The implementation and updating processes are glacially slow
- Only the very worst of products are removed: even the most aggressive of the proposals here involve removal of only the 30% worst performers
- Levels are not set within a broad policy context to achieve 'least cost' emission reduction, reduce peak energy demand (and supply cost), drive innovation etc
- MEPS are not very visible to voters (key for politicians who seek to be seen as innovtors) or decision-makers, unless they are heavily promoted. So industry laggards and economic policy sceptics can play a major role in undermining stringency and timeliness of implementation.

So an effective 'MEPS+other measures' package must:

- Have an automatic updating mechanism for MEPS that responds to ongoing improvement, such as regular resetting based on market data.
- Provide an incentive for manufacturers to adopt ongoing improvement strategies
- Be based on community engagement, not formulated behind closed doors (see my later comments on my experience regarding attempts to be involved in the consultation for this process)
- Reflect broader public policy objectives, such as 'least cost' carbon emission reduction across all sectors, and promotion of local innovation.

In the short term, it may not be feasible to fully achieve these objectives with MEPS, so a combination of mechanisms is likely to be needed, as discussed below.

Options for additional elements in the Policy Package

The aims of additional elements in the policy package are to:

- Capture larger savings, closer to the full cost-effective potential
- Improve Power Factor and incorporate demand management capabilities in new products
- Provide adequate funding for key elements, such as education, promotion and support for innovation
- Avoid the need for significant contributions from government funding, which would impact on public debt and, hence be resisted by some policy makers and decision makers
- Encourage removal from the stock of inefficient products, and retrofit of improved monitoring and diagnostics, so that maintenance can be optimised.

Funding

One obvious mechanism for funding is to introduce a levy on products sold. However, it is more effective if the levy is linked to performance. Two examples of this approach are:

- An approach similar to that proposed for carbon pricing of electricity generation, an 'energy intensity trading scheme'. Basically, a threshold for performance would be set, and the further above this energy target a product was, the higher the levy it would pay. Revenue from this levy would be used to fund activities such as education and promotion, support for innovation, and/or payments to leading performers, with higher payments going to better performers.
- The 'feebate' model originally proposed by US energy expert Amory Lovins takes a similar approach. He points out that careful positioning of the payment threshold would mean the approach could be cost-neutral overall. The fees charged to poor performers could fund the 'rebates' to high performers. Given the very large financial savings potential available in this sector, the value of savings for buyers of products would easily offset the cost of the scheme.

There may also be a case, during a transition period, to use funds from the Emission Reduction Fund to incentivise accelerated improvement in performance and a more rapid rate of adoption. State-based schemes such as VEET, NESS and REES could also provide incentives.

Custom and small sales volume products

It is important that there be simple and streamlined mechanisms for certification of efficiency of custom-built, built-in and small production volume products. The RIS suggests a 'deemed to satisfy' approach. I suggest that, in addition to a simple DTS 'recipe' approach, a standard computer model/calculator could be developed that would allow a designer to estimate consumption relative to appropriate benchmarks. In addition to this modelling, the supplier would be required to monitor the performance of the actual constructed unit, either before delivery or in situ, to demonstrate its compliance. By also monitoring ambient conditions and using them in the computer tool, the benchmark could be adjusted to allow fair comparison. This confirmation process is essential, given our extensive experience of big gaps between design and actual performance of equipment and buildings across all sectors.

Ensuring ongoing field performance

Recent US research has shown that the actual performance of many commercial refrigeration units falls far below 'new' performance. Key factors here include the clogging of heat exchangers, build-up of dust on fans, and leakage of refrigerant (which has other impacts).

This research, by the Food Service Technology Centre in San Francisco (www.fishnick.com), found that simply cleaning dirty heat exchangers in fan-forced commercial refrigerators could deliver up to 47% energy savings.

Modern 'smart' technologies allow appliance manufacturers to incorporate real time models of appliance performance into controls, against which actual consumption can be compared. Where there is a significant, sustained deviation from optimal performance, alarms can be triggered, or the appliance can automatically shut down, switch to back-up systems or even email the service agent to alert them to the problem. The Australian-design Siddons Bolt-on solar heat pump has such a system and, of course modern cars have this capability.

Introduction of a new policy package offers an opportunity to incorporate a requirement or incentive for manufacturers to incorporate such a feature.

As an aside, it would make sense to offer incentives for such a feature to be retrofitted to existing refrigeration (and air conditioning) equipment across all sectors.

Opportunity for Australian Industry

Some argue that setting standards higher than those of major economies can reduce choice and undermine competition within the Australian market. One way of driving higher performance is to apply internationally consistent MEPS but also offer complementary strong incentives for higher performance.

But there can be benefits from setting higher mandatory standards. For example, Australia is often used as a 'trial market' by international operators.

Also, the intellectual capital developed in designing and manufacturing leading edge products, and even the products themselves, can be marketed overseas into premium and niche markets, and can build Australia's reputation as a 'smart' country – while also delivering energy savings and emission reductions at home. The commercial refrigeration market involves specialist design and construction, and small volume production, where Australia has greater potential to compete internationally. There may also be excess container capacity in ships travelling from Australia, which could reduce shipping costs.

My less-than-optimal experience of consultation

The RIS included a contact email address to seek participation in workshops being arranged for consultation on this issue. I attempted to make contact, so that I could attend the Melbourne workshop.

Unfortunately, the first email address I pasted from the RIS included a typographical error, and bounced back. I pasted-in another email address from the RIS and re-sent my request. I received no response. See Attachment 2 for copies of my emails.

Conclusion

Introduction of effective energy efficiency requirements for commercial refrigeration equipment offers multi-billion dollar benefits, tens of millions of tonnes of cost-effective carbon emission reduction and business opportunities. But the proposed measures will capture only a small

proportion of these benefits, even though these are still very worthwhile, being cumulative benefits to 2035 of over $1800 million, electricity savings of almost 22 gigawatt-hours and emission reductions of almost 17 million tonnes of CO2. A more effective program could cost-effectively more than double these benefits.

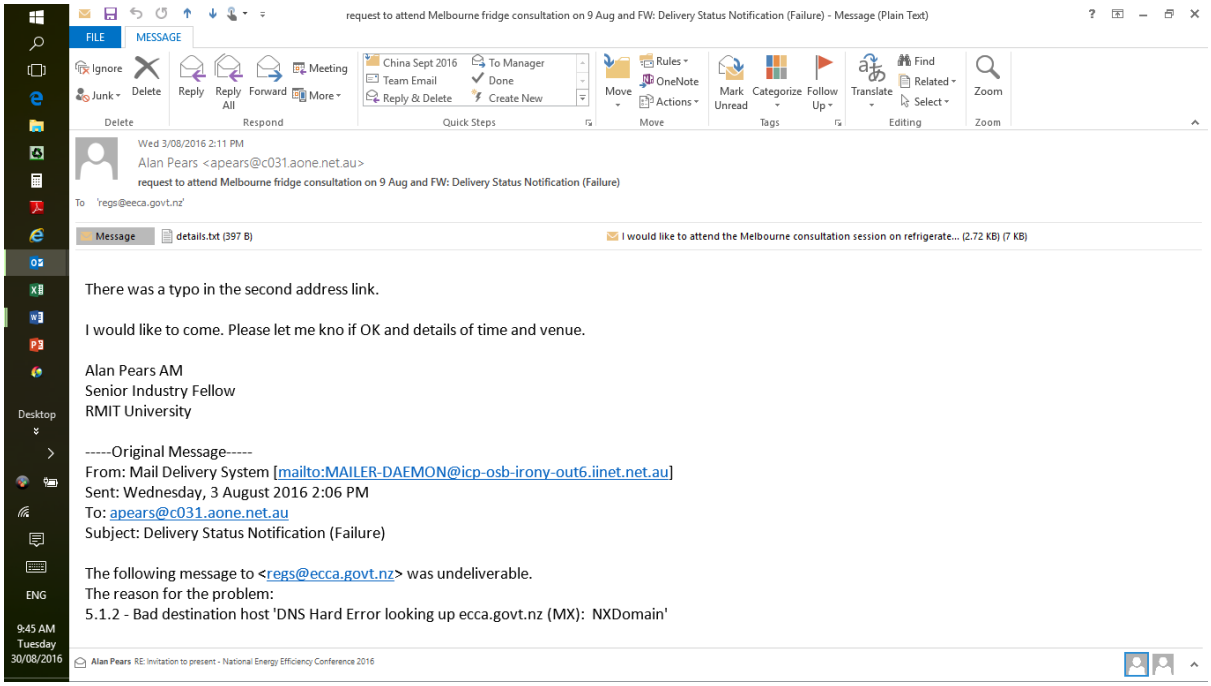
This is a serious policy failure that must be addressed using approaches such as those outlined in this submission.

Attachment 1: Table of savings from RIS

AUSTRALIA	Option 2		3		4		NEW ZEALAND	2		3		4	
	10% + labelling from 2017		Au/NZ MEPS 30% + labelling from 2017		EC from 2017+ labelling			10% + labelling from 2017		Au/NZ MEPS 30% + labelling from 2017		EC from 2017+ labelling	
Costs ($M)	$58		$211		$225		Costs ($M)	$15		$55		$59	
Benefits ($M)	$606		$1,641		$1,748		Benefits ($M)	$142		$383		$408	
NPV ($M)	$548		$1,430		$1,523		NPV ($M)	$127		$328		$349	
BCR	10.5		7.8		7.8		BCR	9.3		6.9		6.9	
Energy savings (GWh)							Energy savings (GWh)						
Year	2020	2035	2020	2035	2020	2035	Year	2020	2035	2020	2035	2020	2035
Annual	91	643	336	1,564	378	1,646	Annual	17	123	65	301	73	318
Cumulative	210	5,976	817	16,749	921	18,130	Cumulative	40	1,146	157	3,223	178	3,501
GHG Emission reduction (kt $CO_{2\text{-}e}$)							GHG Emission reduction (kt $CO_{2\text{-}e}$)						
Year	2020	2035	2020	2035	2020	2035	Year	2020	2035	2020	2035	2020	2035
Annual	85	583	313	1,420	352	1,494	Annual	2	11	8	27	9	28
Cumulative	200	5,481	779	15,381	878	16,653	Cumulative	5	108	21	306	24	333

Option 4 is the ‘preferred option’.

Attachment 2: emails sent to workshop organisers



request to attend Melbourne fridge consultation on 9 Aug and FW: Delivery Status Notification (Failure) - Message (Plain Text)

FILE MESSAGE

Ignore Junk Delete | Reply Reply All Forward Meeting More | China Sept 2016 Team Email Reply & Delete To Manager Done Create New | Move Rules OneNote Actions | Mark Unread Categorize Follow Up | Translate Find Related Select | Zoom

Delete Respond Quick Steps Move Tags Editing Zoom

Wed 3/08/2016 2:11 PM

Alan Pears <apears@c031.aone.net.au>

request to attend Melbourne fridge consultation on 9 Aug and FW: Delivery Status Notification (Failure)

To 'regs@eeca.govt.nz'

Message details.txt (397 B) I would like to attend the Melbourne consultation session on refrigerate... (2.72 KB) (7 KB)

There was a typo in the second address link.

I would like to come. Please let me kno if OK and details of time and venue.

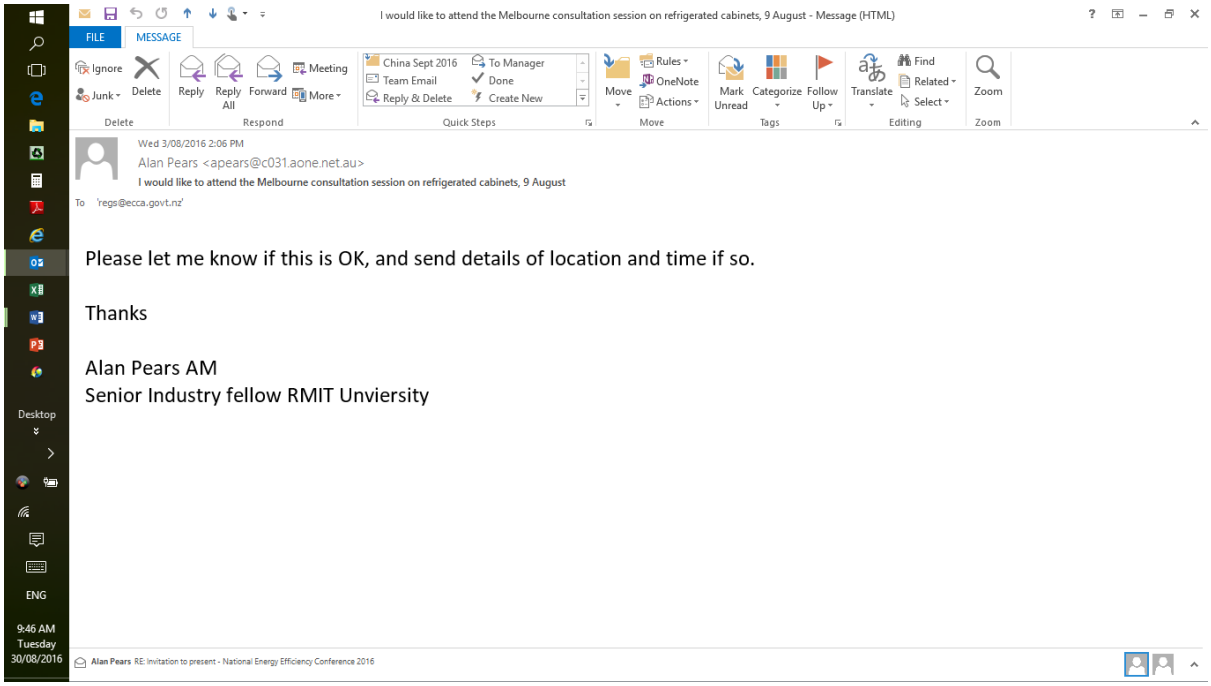
Alan Pears AM
Senior Industry Fellow
RMIT University

-----Original Message-----
From: Mail Delivery System [mailto:MAILER-DAEMON@icp-osb-irony-out6.iinet.net.au]
Sent: Wednesday, 3 August 2016 2:06 PM
To: apears@c031.aone.net.au
Subject: Delivery Status Notification (Failure)

The following message to <regs@ecca.govt.nz> was undeliverable.
The reason for the problem:
5.1.2 - Bad destination host 'DNS Hard Error looking up ecca.govt.nz (MX): NXDomain'

Desktop ENG 9:45 AM Tuesday 30/08/2016

Alan Pears RE: Invitation to present - National Energy Efficiency Conference 2016



I would like to attend the Melbourne consultation session on refrigerated cabinets, 9 August - Message (HTML)

FILE MESSAGE

Ignore Junk Delete | Reply Reply All Forward Meeting More | China Sept 2016 Team Email Reply & Delete To Manager Done Create New | Move Rules OneNote Actions | Mark Unread Categorize Follow Up | Translate Find Related Select | Zoom

Delete Respond Quick Steps Move Tags Editing Zoom

Wed 3/08/2016 2:06 PM

Alan Pears <apears@c031.aone.net.au>

I would like to attend the Melbourne consultation session on refrigerated cabinets, 9 August

To 'regs@ecca.govt.nz'

Please let me know if this is OK, and send details of location and time if so.

Thanks

Alan Pears AM
Senior Industry fellow RMIT Unviersity

Desktop ENG 9:46 AM Tuesday 30/08/2016

Alan Pears RE: Invitation to present - National Energy Efficiency Conference 2016