Communities of Practice: A new approach for co-ordinating energy-efficiency standards and labeling programmes

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Abstract

An expansion of individual national requirements for energy-efficient products may lead to higher compliance costs, which in turn is likely to raise further barriers to the uptake of efficient products. This paper makes the case for a greater degree of international co-ordination amongst those involved in designing and implementing energy efficiency programs around the world, with the aim of promoting harmonisation. Additionally, it proposes a mechanism for such co-ordination: "Communities of Practice", which can serve to link together experts in different locations and nations through the sharing of e-mail, documents, and proposals for co-ordinated international action. These communities can act as a medium for exchange of information and discussion of proposals for co-ordinated international action. Their advantage over the regular exchange of e-mail is that they provide an open, transparent, and inclusive platform, and can thus result in more informed and broader input into policy and regulatory decisions. Led by Australia, two international Communities of Practice are currently being tested for two product types: compact fluorescent lamps (CFLs) and TV set top boxes.

Introduction

Until a few years ago, national or regional energy efficiency programs tended to be developed with limited interaction with similar programs in other countries or regions. Programme managers commissioned national market studies and assessed the benefit-cost implications of regulating energy-efficiency levels for equipment and appliances. Many good ideas and best practices were swapped at conferences, and in the process many excellent programs and initiatives were spawned. As might be expected, the programs that resulted tended to be well suited to the interests of local manufacturers/suppliers and customers.

Over the past few years it has become increasingly apparent that globalisation has hit the world of energy efficiency. On the one hand, a growing number of countries are designing a range of different national programs to improve the efficiency of products; while on the other there are suppliers dispatching products to markets in all corners of the globe. Not only are markets spread far and wide, but the development cycle for new products (if not new technology) is now far shorter.

The situation is most starkly apparent in the world of consumer electronics and office equipment; where it is not uncommon to see new models appearing every six months. This contrasts with the traditional product development cycles for wet goods, where models may stay in the market for five years or more.

This situation presents particular challenges for those interested in stimulating the market for more energy efficient products.

For example, how should governments meet national requirements in the context of this global marketplace, without creating barriers to trade and excessively increasing compliance costs? How do programs aimed at providing information on the performance of products to consumers remain up to date when new models are entering the market with such frequency?

This paper explores some of these challenges for governments and industry, and also raises some possible solutions, drawing heavily on the evolution of policy in Australia over recent years.

The view from Australia

The Australian Government has approximately 15 years' experience in the implementation of regulations for energy efficiency. These regulations now cover a range of domestic and commercial appliances, and they have proved to be a reliable and effective mechanism, ensuring that energy savings are achieved and sustained over a long period (NAEEEC 2005a). The case of the domestic refrigerator is a good illustration, as shown in Figure 1.

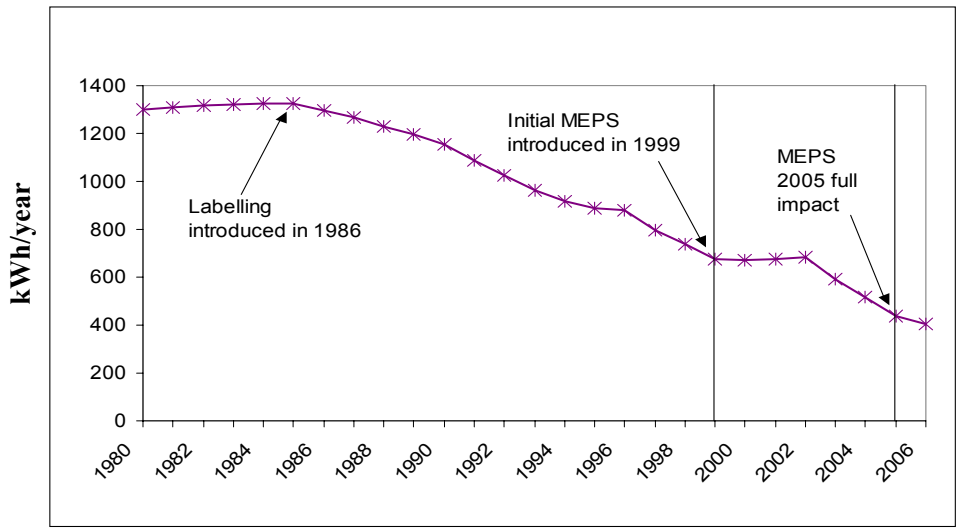

Fig 1: Graph (kWh/year) of average new family refrigerators use 60% less power in Australia than 20 years ago (Source: Australian Greenhouse Office)

Regulations in Australia have also proved to be extremely cost effective. Regulation saves the community on average $US20 for every tonne of carbon abated (NPV 10% discount) as compared with other greenhouse gas abatement projects that cost the community between $30 – $400 per tonne saved (NAEEEC 2005b).

By 2020, the cumulative impact of regulation will save more than 200 Mt and save the Australian economy around $US 4 billion (NAEEEC 2005b).

In setting regulated performance levels, the Australian government policy has evolved. Initially the Government focussed on products in the local market – identifying the range of performances exhibited and picking an appropriate threshold for the minimum energy performance level (or in the case of label, appropriate levels for each star).

This approach was fine, and indeed common elsewhere, but it begged the question – "What if technology used in Australia was less advanced than in other parts of the world?". The problem with this process was that we had no incentive to compare products in Australia with those used elsewhere.

As in many other fields, the Government took the position that there is no reason why Australia should not benefit from the best technology available, so long as it was being used successfully in a similar economy. Policy was therefore altered and the strategy for setting energy efficiency requirements became one of matching the most stringent regulated levels in force in a major trading country.

Australia currently has a policy of matching "international best regulatory practice" when developing new MEPS and labeling requirements. The Australian approach is that its MEPS levels should not be lower than any other economy – or stated another way, if a product is made in Australia, it should meet the energy and environmental criteria and be able to be sold in any market in the world (NAEEEC 2001).

This position also acknowledged that Australia, as a country with a population of 20 million and only 1% of the world's manufacturing industry, imports the majority of its consumer products. Nor are these products made for our market - generally Australia receives products which are primarily designed for Europe or Asia, which have similar electricity supply conditions. Australia has always had a limited capacity to influence product design and performance and now in a global market, that capacity has further diminished. As such a small market, there is a danger that if we set our performance requirements too high, suppliers may simply opt out of this market, which will benefit no-

one. This is why a policy to match the performance of the best products in the world makes more sense for Australia at the current time.
This policy does require that considerable analysis of overseas programs is undertaken prior to the adoption of efficiency levels. In particular, attention is given to the requirements in countries which represent Australia's trading partners.
During this process, we have become increasingly aware of the diversity in test methods and energy performance requirements for a wide range of products. For example, a recent survey of mandatory and voluntary performance requirements for compact fluorescent lamps (CFLs) found that there currently exist over 22 different specifications around the world (MEA 2005).
While setting national requirements is of course the right of any sovereign nation, the existence of disparate requirements almost certainly adds to compliance costs for internationally traded products. For some manufacturers, the cost of doing business is simply too much, and some markets may be limited in the products available.
As we know, the price premium for energy efficient products is an important issue for consumers. It is sufficiently important that governments over the years have put considerable effort into reducing the barrier caused by higher capital costs, through educational programs focussing on payback periods. Where compliance costs are raising the price to consumers, this is therefore a significant issue. It would be ironic if programs designed to promote high efficiency products were in themselves adding to costs and therefore limiting the uptake of these products.
The information available at the current time does not prove the case one way or another – there is simply not enough detailed data available – however it should be recognised as a conceivable possibility and a situation to be avoided (Du Pont 2005). It is a further reason for supporting the harmonisation of test methods, and some rationisation of performance specifications.
Harmonisation is one of those terms that is ubiquitous and may be in danger of losing its meaning. To understand what harmonisation may mean in the energy efficiency world, two recent projects are described briefly.

Case Study: External Power Supplies

In 2003, Australia took the decision to begin investigating the efficiency of external power supplies, those small black boxes used to charge mobile phones and attached to almost all electronic devices nowadays. Every household in Australia has between 5 and 10 of these which remain plugged into the mains electricity supply more or less permanently (E3 2006).
Almost exactly two years ago the US Natural Resources Defence Council (NRDC) hosted a meeting on power supplies in San Francisco. It was attended by manufacturers, researchers and representatives from several energy efficiency agencies, including Australia. In addition to the potential for huge energy savings, what was apparent was that manufacturers did not mind too much what requirements were placed on them in terms of performance, so long as these were uniform across their markets.
This was a different message to the one's we'd been hearing in previous negotiations with local manufacturers of products, such as washing machines, which were not intended for export. It was our first real contact with a mass-produced internationally traded product with global sales of over 1 billion.
Importantly, it was also the first time that most agencies involved in energy efficiency were required to confront the need for a global response. Although there has been contact between different national organisations, these links have previously been sporadic, informal and dependant upon the personnel involved.
What has evolved is a coalition of interested parties which undertake a co-ordination role, including US Energy Star, the Californian Energy Commission, CECP in China, JRC in Europe and the Australian Greenhouse Office (EPS IEMP 2005).
These organisations have all overseen the development of a test method, undertaken tests in their own countries which has contributed to a large database of tested products, and participated in round-robin tests.
This large and diverse database of product performance allowed us to set realistic performance requirements based on a larger sample than any single country would usually have at their disposal.
Early on in the process it became clear that one performance requirement would not suit the needs of the various agencies involved. For example, the Energy Star program is intended to promote the best performing products, while Australia and California wanted to set a minimum performance level to remove the worst products from the marketplace.

Therefore, a system was devised which contains a limited number of performance requirements which, like rungs on a ladder, increase in stringency. The key elements of this system include:

- Countries can still select which 'level' to set their requirements;
- However, the number of different specifications are limited;
- Countries can elect to move requirements 'up the ladder' in due course, for example after 3-4 years when technology improves;
- Manufacturers have clear performance targets set for many years.

One further element to this project is the development of a special 'marking' system as an aid to compliance monitoring (see Figure 2). Comprising a roman numeral which corresponds to each performance level, this 'efficiency mark' is placed on the product nameplate, alongside safety and other compliance information (EPS IEMP 2005). It is not a label for consumers, and indeed will probably be meaningless to most people that see it.
The purpose of the 'mark' is to indicate to those involved in enforcement that the product has been tested according to the unified test method, and claims to meet a certain performance level. This gives regulators in any country the chance to make a first assessment of compliance, and provide a claim to check against. All of this can be done quickly without resort to test reports, which are often difficult to source and may take months to track down from the parent company.

Figure 2: Illustration of the efficiency 'mark' for external power supplies (EPS IEMP 2005).

Some two years after that initial meeting in 2004, there now exists a single test method used by all agencies running programs for external power supplies. Australia and New Zealand have published this as a national standard in 2005 (AS/NZS 4665.1:2005) and are committed to submitting this for adoption by the IEC as an international test method.
We also have a timetable for a variety of national and regional programs in the United States, China and Australia which are all using one of two performance specifications. The pre-existing Code of Conduct program in Europe will also become aligned in a couple of years time.
Most recently, a further six States in the US have announced that they will adopt harmonised standards, and China will also introduce a mandatory minimum energy performance standard. Europe is preparing minimum efficiency standards for external power supplies in the framework of the ecodesign directive.
The important points to note from this example are that all of this has been achieved in a relatively short period - almost exactly two years. Also, there has been a remarkable degree of co-ordination despite that lack of any formal agreements between countries. And finally, there is a framework for a system which meets the needs of manufacturers in terms of harmonised standards, without sacrificing the rights of individual nations.
It is interesting to note that along the way, we have also established something which may make it easier for other jurisdictions to join up to, as with the other US States.

Case Study: Compact Fluorescent Lamps

The second example concerns compact fluorescent lamps (CFLs) which have become something of an icon for most energy programs around the world. They represent an ideal energy efficient solution, being relatively low cost, easily retro-fitted by householders and lead to substantial energy and greenhouse savings (75% compared to the standard incandescent lamps they replace).
However, unlike many other energy efficient products, the degree to which consumers accept them is determined not so much by their energy features as by other characteristics, such as lifetime, colour

and size (Artcraft 2005). As mentioned previously, there are now a plethora of programs which aim to ensure consumers confidence in CFLs thereby encouraging their purchase in increased quantities. The success of these programs is reflected in the phenomenal growth in sales in recent years (see Fig 3), which in turn has helped to reduce the price. In many countries the value of CFL sales now exceeds the value of incandescent lamps.

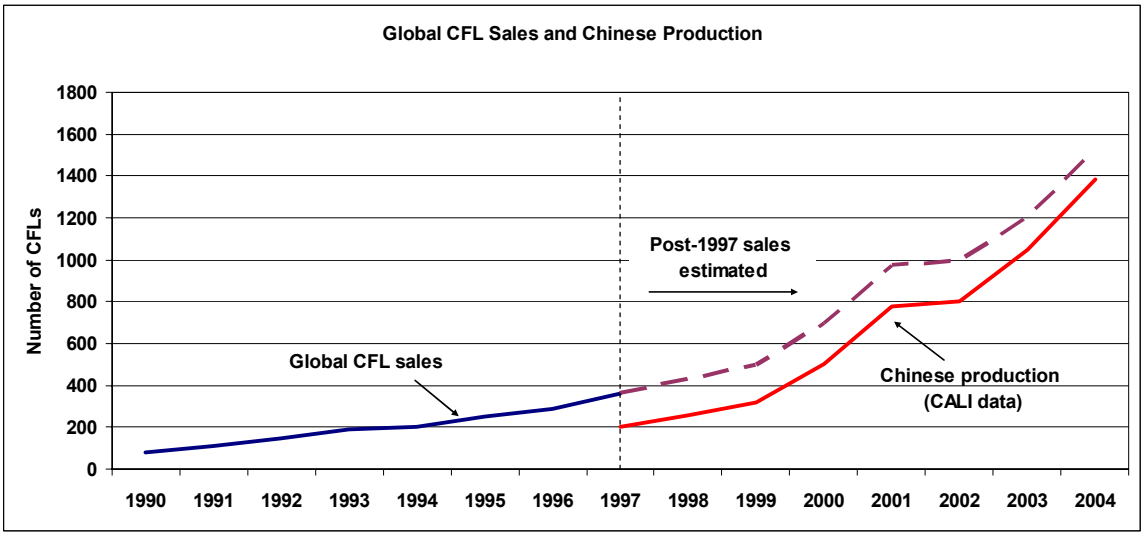

Fig 3: Estimated Global Production of Compact Fluorescent Lamps (CFL) 1990-2004 (Du Pont 2005)

The extent of the growth in international trade of CFLs, and the increasing number of national programmes have highlighted the variation in requirements of these different programs.
In order to maintain the momentum through further cost reductions while maintaining quality, the proposal to initiate a harmonisation process was put to participants at the international Right Lights 6 conference in Shanghai in May 2005. More than 80 delegates from 13 countries attended a Special Session on CFL Harmonization and the majority voiced their in-principle support for the program.
At the same time, five working groups were established, with the following specific goals over the next three-year period:

- Create a uniform *international testing method,* covering the performance features of self-ballasted CFLs;
- Identify a number of *performance specifications* for self ballasted CFLs to facilitate international comparisons of CFL performance requirements;
- Develop and initiative a program for *inter-laboratory comparison* of test results to ensure confidence in the quality and accuracy of testing of CFLs;
- Propose a set of *compliance mechanisms* for CFL testing and performance regimes; and
- Propose and promote these initiatives to the wider international lighting community.

There are several novel aspects to this ambitious project, which reflect a new paradigm for energy efficiency policy development.
The way in which this initiative is organised is neatly described by the term “community of practice”. It is an open community which invites participation from industry, governments and NGOs, using web-based tools to communicate and maintain a dialogue. The input is channelled through a number of “virtual working groups” on specific topics, such as performance specifications, test protocols, and compliance mechanisms) In this way the process, debate and decisions are transparent. (See http://www.apec-esis.org/cfl)
The other feature of this community is its focus. It is a single product initiative, dedicated to achieving a clearly articulated goals within a given timeframe. There is no intention of creating a new organisation, with a structure and a need to maintain itself beyond the lifetime of the project.
This makes it a relatively low-cost exercise. In this instance the Australian Greenhouse Office has provided some seed money, but most organisations are self-financing their participation. A small number of previously scheduled events have been identified for future meetings where further discussion and reporting on progress can take place. Again, most organisations will be funding their attendance at these events.
The Community of Practice concept is being pilot tested through the CFL web site, as well as through a similar web site being established to mediate a discussion on the regulation of set top boxes, the

boxes that sit on top of television, receiving signals from providers of cable TV and other related services. The devices have large energy losses that can easily be reduced through concerted international action.

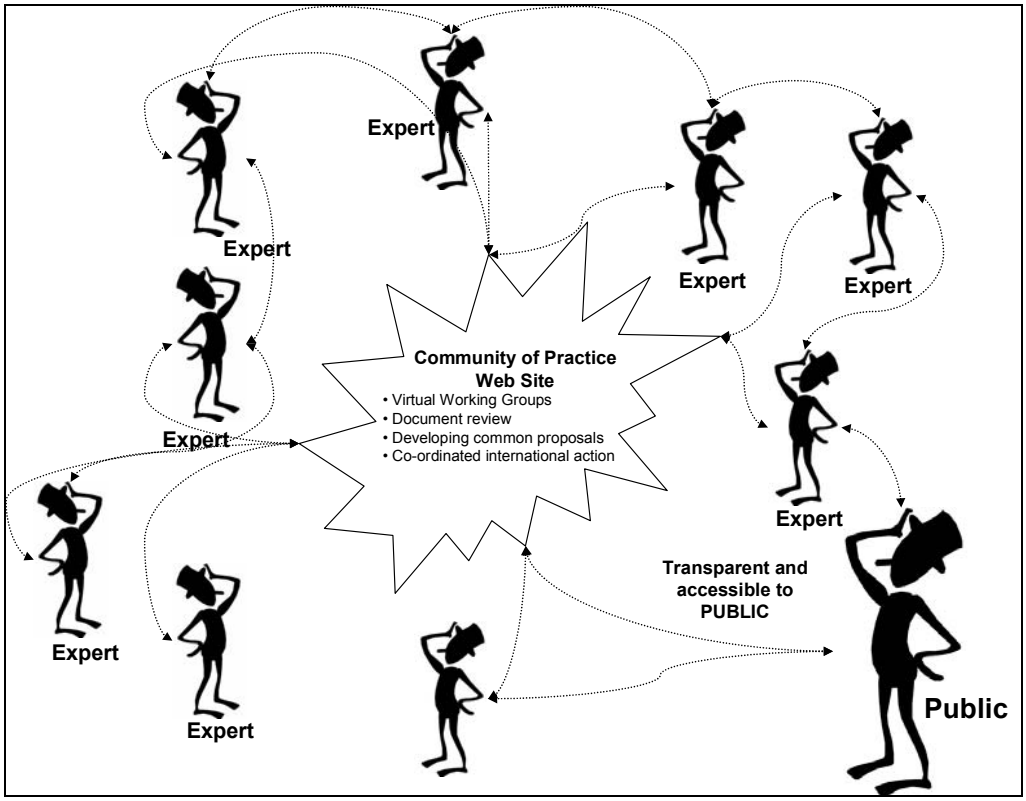

Fig 5: How a Community of Practice works.

The Community serves to link together experts in different locations and nations through the sharing of e-mail, documents, and proposals for co-ordinated international action. It acts as a medium for exchange of information and discussion of proposals for co-ordinated international action. Its advantage over the regular exchange of e-mail is that it provides an open, transparent, and inclusive platform, and can thus result in more informed and broader input into policy and regulatory decisions. Led by Australia, two international Communities of Practice are currently being tested for two product types: compact fluorescent lamps (CFLs) and TV set top boxes.

What is being attempted through these communities of practice is an appropriate multinational response to the globlisation of product markets. Communities of practice establish a means for co-ordinated policy development, but do not in themselves implement measures – this responsibility remains with the participants, such as governments or energy efficiency agencies. Ultimately these bodies retain their sovereign rights to decide on national implementation issues. However, the framework of the community of practice enables nations to readily compare performance levels of products within their country with those elsewhere (using a common test method), and to set appropriate performance requirements.

One of the potential benefits of this transparent 'community' is that countries that do not currently have programs may find it easier to be linked to this international initiative, confident that they are not taking action in isolation.

An additional important aspect concerning the sharing of information, which may bring considerable benefits, concerns verification and enforcement. All programs currently undertake forms of compliance monitoring to ensure that program requirements are met. This is a difficult task but one which is vital to the integrity of all programs and to protect the investment of program participants.

In general it is fair to say that enforcement is not given the emphasis it probably deserves, mainly because of the limited resources available. For CFLs it is proposed that the results of any verification testing undertaken by program managers should be shared with the 'community' through the website. This information will be extremely useful in determining which products other countries should target

for verification, and will therefore go some way towards making better use of the limited resources available for verification activities.

Conclusion

This paper describes challenges caused by both the increase in globally traded products, and the growth of governmental interest in promoting greater energy efficiency levels.
In this context, an expansion of individual national requirements may lead to higher compliance costs, which in turn is likely to raise further barriers to the uptake of efficient products. This paper therefore makes the case for a greater degree of international co-ordination amongst those involved in designing and implementing energy efficiency programs around the world, with the aim of promoting harmonisation. In this context, harmonisation applies to both the test procedures and a rationalization in the number of different performance specifications.
It is suggested that 'communities of practice' provide a focused means of achieving this objective. Based on the examples for external power supplies and compact fluorescent lamps communities of practice can provide a mechanism to advance the harmonisation of test methods and performance specifications. The key features of these communities include:

- A means of drawing together expertise from governments, industry, NGOs, academia, etc;
- International focus on a single device, piece of equipment or appliance;
- A high degree of transparency through the use of electronic media;
- Low establishment costs, and limited on-going commitment;
- International co-ordination without sacrificing national rights;
- Higher efficiency products at lower cost to government industry and consumers.

In addition to set top boxes, it is envisaged that further communities will be established over the next two years for standby power losses, televisions and electric motors.

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