



International
Energy Agency

Monitoring, Verification and Enforcement

*Improving compliance
within equipment
energy efficiency
programmes*

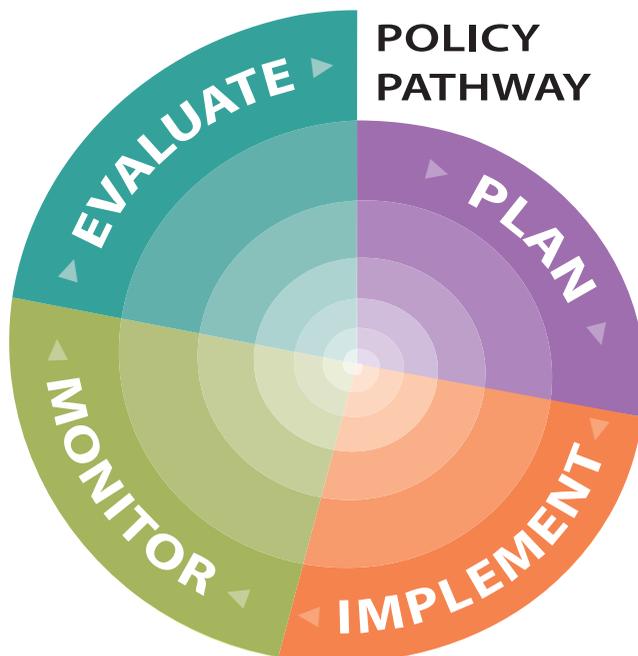
*Policy
Pathway*

Monitoring, Verification & Enforcement

*Improving compliance
within equipment energy
efficiency programmes*

The IEA Policy Pathway series

Policy Pathway publications provide details on how to implement specific recommendations drawn from the IEA's 25 Energy Efficiency Policy Recommendations. Based on direct experience, published research, expert workshops and best-practice country case studies, the series aims to provide guidance to all countries on the essential steps and milestones in implementing specific energy efficiency policies.



The Policy Pathways series is designed for policy makers at all levels of government and other relevant stakeholders who seek practical ways to develop, support, monitor or modify energy efficiency policies in their home country and abroad. The Pathways can also provide insight into the types of policies best adapted to the specific policy context(s) of different countries, so that each country derives the maximum benefit from energy efficiency improvements.

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The International Energy Agency (IEA), an autonomous agency, was established in November 1974. Its mandate is two-fold: to promote energy security amongst its member countries through collective response to physical disruptions in oil supply and to advise member countries on sound energy policy.

The IEA carries out a comprehensive programme of energy co-operation among 28 advanced economies, each of which is obliged to hold oil stocks equivalent to 90 days of its net imports. The Agency aims to:

- Secure member countries' access to reliable and ample supplies of all forms of energy; in particular, through maintaining effective emergency response capabilities in case of oil supply disruptions.
- Promote sustainable energy policies that spur economic growth and environmental protection in a global context – particularly in terms of reducing greenhouse-gas emissions that contribute to climate change.
- Improve transparency of international markets through collection and analysis of energy data.
- Support global collaboration on energy technology to secure future energy supplies and mitigate their environmental impact, including through improved energy efficiency and development and deployment of low-carbon technologies.
 - Find solutions to global energy challenges through engagement and dialogue with non-member countries, industry, international organisations and other stakeholders.

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International
Energy Agency

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International Energy Agency
9 rue de la Fédération
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A team of people within the International Energy Agency (IEA) and beyond worked together to produce this publication, which serves as a catalogue of best practices that encourage compliance. It does so by providing a checklist of the many small, but necessary and frequent decisions that need to be made, measured and reviewed by those striving to improve standards and labelling programmes.

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The topic of this policy pathway was proposed and considered by interested parties at an international Monitoring Verification and Enforcement conference, held in the United Kingdom in mid-September 2010,¹ and released by the IEA in advance of the International Partnership Meeting on Energy and Sustainability in mid-October 2010.

1 www.iea-4e.org/events/compliance-conference

Executive summary

“To measure is to know”²

The Policy Pathway series is designed to guide policy makers on the essential steps in implementing policies from the **25 IEA Energy Efficiency Recommendations**. This specific pathway aims to provide clear guidance to policy makers and relevant stakeholders on best practice compliance (through monitoring, verification and enforcement [MVE]) in end-use appliance and equipment standards and labelling (S&L) programmes.

S&L programmes refer to market interventions that aim to encourage the sale of electrical appliances and equipment using less energy than might have otherwise been promoted. They represent a cost-effective way to overcome market failures in the sale of energy efficient appliances and equipment. At the Clean Energy Ministerial meeting held in Washington, DC, in July 2010, 24 energy ministers endorsed priority actions in six electricity end-use technology categories. Actions across all categories of technologies involve S&L programmes.

As an integral part of S&L programmes, MVE measures energy efficiency actions, assesses the relevant impact of individual actions, and holds entities responsible for their actions. By improving the design and implementation of MVE schemes, it is possible to curtail the unacceptably high levels of non-compliance which have hampered the effectiveness of some S&L programmes in the past.

MVE provides benefits for consumers (who receive the expected product when making a purchasing decision), participant businesses (who are provided a level playing field and do not lose competitiveness by complying) and policy makers (who can assess the effectiveness of their programmes and evaluate where improvements could be made).

Without system-wide measurement, it is impossible to know what is being achieved or whether the programme is successful. Without targeted measurement of individual product suppliers, it is impossible to know which suppliers are not compliant.

Drawing on experiences from practitioners operating within all stakeholder groups across appliance and equipment sectors, and over 30 years of global experience with MVE in national programmes, this pathway proposes four stages in implementing effective MVE programmes:

- **Plan:** programme managers should plan to integrate robust MVE activities from the outset, which will prevent delay, waste and additional costs further down the line. They should involve experts from all stakeholder groups.
- **Implement:** programme managers should focus communications on informing and educating stakeholders about the change in the marketplace and their responsibilities. Compliance will increase when MVE leads to widespread understanding of the purpose and benefits of S&L projects.
- **Monitor:** programme managers should support MVE activities that enhance enforcement capabilities by expanding MVE from general information collection to assessing how well most-at-risk suppliers are meeting their responsibilities.
- **Evaluate:** programme managers should continually evaluate the goals of their programme and not shy away from enforcement actions where needed.

Table ES 1 provides a summary checklist for policy makers beginning the MVE Policy Pathway process.

² The quotation is from Lord Kelvin (Sir William Thomson, 26 June 1824 to 17 December 1907), an eminent British scientist. Throughout the report, other quotations from Lord Kelvin are used to promote the concept of measurement.

Table  MVE Policy Pathway checklist for practitioners

		DONE
PLAN	1 Determine legal framework	<input type="checkbox"/>
	2 Propose shared resource arrangements	<input type="checkbox"/>
	3 Ask the difficult questions	<input type="checkbox"/>
IMPLEMENT	4 Establish transparent procedures	<input type="checkbox"/>
	5 Provide education and support	<input type="checkbox"/>
MONITOR	6 Match data collection and analysis to priorities	<input type="checkbox"/>
	7 Assess compliance levels	<input type="checkbox"/>
EVALUATE	8 Communicate openly	<input type="checkbox"/>
	9 Accept diversity	<input type="checkbox"/>
	10 Evaluate continuously	<input type="checkbox"/>

Introduction

The use of electricity by appliances in IEA countries grew by 53% over the period 1990-2006, accounting for 15% of total electricity consumption (IEA internal statistics, 2010), and in all countries this is forecast to continue to rise. The IEA estimates that, in order to reduce global energy-related CO₂ emissions to half their current levels by 2050, 38% of the savings required will come from end-use energy efficiency. Energy efficiency in lighting and appliances is estimated to have a large energy-saving potential in the order of 3.7 Gt CO₂ emissions per year³ (IEA 2008a) and, according to the *Energy Technology Perspectives 2010 (ETP 2010)* Blue Map Scenario, the bulk of these savings can be achieved in the short to medium-term (IEA, 2010a).

Over 50 countries worldwide implement end-use equipment programmes which seek to improve energy efficiency. These programmes cover energy efficiency schemes for end-use electrical appliances and equipment in the residential, commercial and industrial sectors.

The issues covered in this Pathway relate directly to priorities identified by high-level decision makers. Energy Ministers at the Clean Energy Ministerial (CEM) meeting held in Washington DC (July 2010) endorsed six significant end-use technology areas as priorities for improved energy efficiency through market transformation. These categories were selected based on several factors:

- their wide coverage of the market (residential and commercial);
- their significant use of energy (for example, refrigerators represent 15% of domestic electricity use);
- their projected energy consumption in the future (for example, television electricity consumption increased by 210% in the United States between 1998 and 2008);

- the potential for immediate impact (with respect to available test methods, the tradability of products and the current spread of energy efficiency).

The actions listed in Table 1 for each product category are the result of international projects and collaborations such as the IEA 4E Implementing Agreement. Future work to deliver on these CEM priorities will offer significant leveraging opportunities for other countries and stakeholders. These product types may very well become areas of high focus in other international and regional gatherings in the next few years.

Actions in all six categories of electrical products include standards and labelling (S&L) programmes. These require best practice monitoring, verification and enforcement (MVE) to achieve the desired global transformation of energy efficiency in these areas.

The core focus of this policy pathway is on MVE of programmes which use energy performance standards-setting and labelling schemes to promote energy efficiency in electrical appliances and equipment. These were the subject of several of the **IEA's 25 Energy Efficiency Recommendations**.⁴ The paper provides personal insights into MVE issues, quoting many current practitioners on lessons learnt. These practitioners work in Asia, Europe, North America and Australasia and represent a spectrum of opinion on the subject of MVE within S&L programmes.

The integrity of the energy efficiency information is a primary requirement for any successful S&L programme. MVE is the activity measuring this integrity and holding people to account.

³ Assuming full and immediate implementation of the IEA recommendations relating to appliances and lighting.

⁴ See recommendations 1.3, 3.1, and 3.4 at www.iea.org/papers/2008/cd_energy_efficiency_policy/index_EnergyEfficiencyPolicy_2008.pdf

This document includes:

- A brief overview of MVE in the context of S&L programmes.
- Evidence of the importance of MVE within S&L programmes.
- A detailed set of critical elements necessary for successful MVE.
- Two case studies showing practical applications of MVE to technology types or within a country.
- Suggestions for sources of further information or inspiration.

Table 1 Energy efficiency global market transformation targets

<i>Work task</i>
1. Domestic cold appliances
<ul style="list-style-type: none"> ● <i>Initial focus on assisting the development of a new global test procedure</i> ● <i>Provide assistance to countries adopting suitable minimum performance standards for cold products</i> ● <i>Provide assistance for countries with existing S&L programmes to migrate to the new global test method</i>
2. Domestic lighting
<ul style="list-style-type: none"> ● <i>Globally align test standards and minimum performance standards for light-emitting diodes (LEDs).</i> ● <i>Develop suitable standards for ballasts and compact fluorescent lamps and improved application of (non-energy) quality aspects of lighting</i>
3. Televisions
<ul style="list-style-type: none"> ● <i>Discuss and agree upon aligned global minimum performance standard and labelling initiatives for televisions, now that the global test method is finalised</i>
4. Electric motors
<ul style="list-style-type: none"> ● <i>Align minimum performance requirements and label categories, based on the new test standard</i> ● <i>Focus on programmes that relate to system design and performance (upstream and downstream of the installed motor)</i>
5. Air conditioners
<ul style="list-style-type: none"> ● <i>Harmonise domestic air conditioner standards using the established ISO test method focusing on seasonal energy efficiency rating schemes</i> ● <i>Consider aligning the North American and European certification schemes for commercial air conditioners</i>
6. Network standby power
<ul style="list-style-type: none"> ● <i>Build on existing simple standby power efforts to cover appliances when connected to the internet and other communication systems</i> ● <i>Ensure IEC standards are effective for measuring and controlling network-connected appliances</i>

Source: IEA, 2010b.



What is monitoring, verification and enforcement (MVE)?

Monitoring, verifying and enforcing are all actions that enhance the operation of standards and labelling (S&L) programmes. These terms are defined within the framework and context of the type of S&L programme in which those compliance activities occur.

The goal of MVE activities is to ensure the integrity of S&L programmes by minimising non-compliance cost. They encompass a wide range of actions:

- **Monitoring** is a measurement process that any party can use to check product efficiency. It involves measuring efficiency claims against a nominated standard in a consistent manner, using accurate instrumentation applied by qualified staff in controlled conditions.

- **Verification** is the measurement process where independent third parties confirm the efficiencies claimed by suppliers (manufacturers and/or retailers). This action is generally commissioned by the supplier (to confirm claims), but may be taken by other parties, such as competitors or regulators, to challenge declarations.

- **Enforcement** is the action taken by programme administrators against suppliers of non-compliant products, as a result of finding fault through either monitoring or verification.

Monitoring, verifying and enforcing all involve active measurement concepts linked to notions of accountability within the S&L programme.

Standards & labelling (S&L) programmes

In this publication, S&L programmes refer to market interventions that aim to ensure that services and products (in this case, electrical equipment) use less energy than the market would have otherwise delivered.

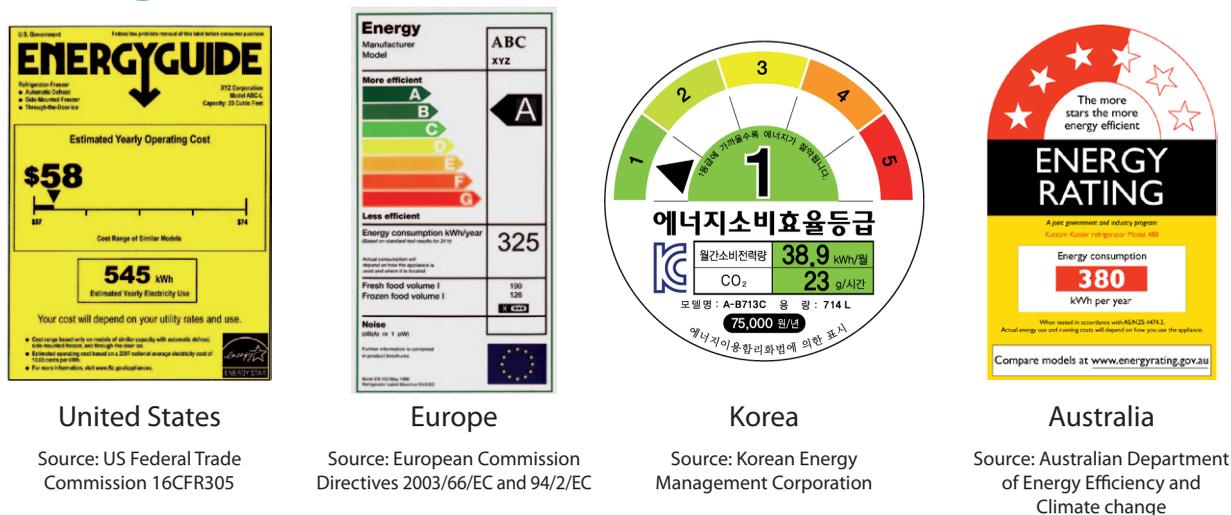
Standards generally take one of two forms: either as minimum energy performance standards (MEPS) applying to every individual product, or as an average efficiency requirement spread across the range of products sold by a particular supplier.

Minimum energy performance standards	<i>Minimum efficiency levels (or maximum energy consumption levels) require that manufacturers ensure that every product attains the stipulated level. This is the approach in most countries.</i>
Class average standards	<i>The average efficiency of all products made by that manufacturer is specified, which permits less efficient models to be sold as long as the overall mix of total sales achieves the efficiency goal. This approach is used in parts of Asia.</i>



Source: www.clasponline.org modified by the IEA.

Figure 1 Examples of energy efficiency labels



Energy efficiency labels are informative labels affixed to manufactured products that describe the product's energy performance (usually in the form of energy use, efficiency or energy cost). The goal of labelling programmes is to enable consumers to have more energy efficient purchasing choices.

Comparative labels, for example, contain energy information that the prospective purchaser can trust because industry and government have agreed upon a set of rules for fairly comparing products. Several examples of mandatory comparative labels from around the world can be seen above (Figure 1).

<p>Endorsement labels</p>	<p>Participant products meeting specified criteria are identified, resulting in the programme endorsement or "seal of approval". This label distinguishes a product from competitive products without the label in the marketplace. Governments and private sector programmes operate these schemes which require participants to opt in.</p>
<p>Comparative labels</p>	<p>Energy use is compared across competitive products across a performance category or on a continuous scale between market extremes. This label is most effective when required to be displayed on all products to make the comparison. Governments generally mandate these labels with sanctions if the label is not displayed.</p>

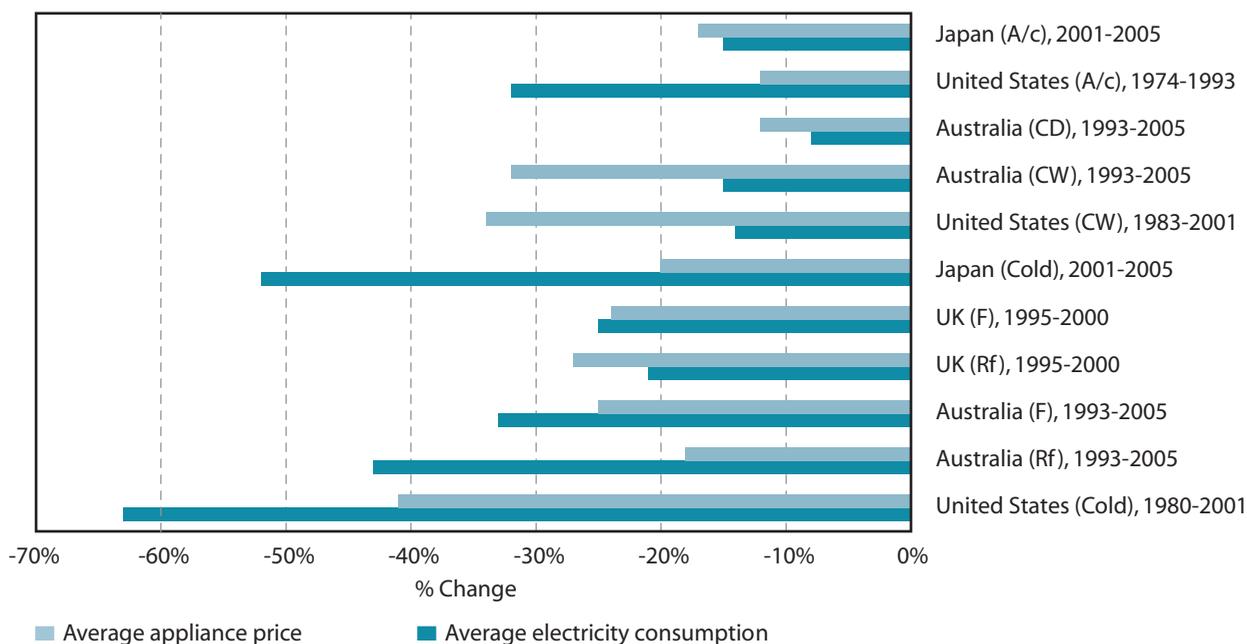
The key benefits of S&L programmes are that they:

- can lead to large energy savings;
- can be very cost effective;
- require change in the behaviour of a manageable number of manufacturers rather than the entire consuming public;
- treat all manufacturers, distributors, and retailers equally; and
- provide measurable energy savings that are comparatively easy to quantify and verify.

The IEA has estimated that if it were not for the implementation of policy measures such as energy labelling, voluntary agreements and MEPS, electricity consumption in OECD countries in 2020 would be about 12% higher than is now predicted.

Source: www.clasponline.org modified by the IEA.

Figure 2 Recorded fall in average electricity consumption and prices for several major appliance types in selected countries



Source: IEA (2009a).

Many countries have had S&L programmes in place since the 1980s. Studies show that while the product price often increases initially following the introduction of an energy performance standard, it generally drops very shortly thereafter. The percentage improvement in both price and energy used by major consumer appliance types like air conditioners (A/c), clothes dryers (CD), clothes washers (CW), and cold products (e.g. freezers [F] and refrigerators [Rf]) in various countries can be seen in Figure 2. The data show that energy efficiency improvements were achieved in these appliances without real price increases.

In 2008, participants at an IEA workshop reported that compliance with S&L policies in equipment and buildings could be anywhere from 50% to 80% (IEA, 2008b). Research into the Australian S&L programme (2010), which comprised consistent MVE and regular enforcement, found the level of compliance to be at 85%.

For these and similar experiences, non-compliance continues to be a major factor which limits S&L programmes in achieving their potential energy consumption, efficiency, and environmental and associated goals (e.g. health).

MVE within S&L

As an integral part of the overall S&L programme, MVE measures energy efficiency actions, assesses the relevant impact of individual actions, and holds entities responsible for their actions. In this sense, MVE:

- is the activity measuring integrity;
- is about identifying non-compliance and convincing all involved parties that compliance is a better outcome than non-compliance;
- is ultimately about programme managers putting in place adequate controls to detect false efficiency claims and minimise the level of non-compliance;
- provides information relevant to managing the risk of non-compliance;
- is about collecting data to measure the effectiveness of the programme.

There is near universal support for the concept of monitoring in terms of measuring public policy effectiveness; at issue is: how much, how often and at what cost? Verification and enforcement activities can generate even more heated debate. Many suppliers want the claims of competitors to be verified and expect enforcement action to be taken in the case of compliance failures. When challenged about their own failures, some of those same suppliers, however, expect only light-handed educative sanctions to apply because of their unique circumstances.

S&L programme managers are therefore faced with finding the appropriate balance between support for companies in helping them comply with the S&L programme rules (*e.g.* training, information, explanations, acceptance of mistakes) and enforcement that punishes participant companies that fail to follow those same rules (*e.g.* sanctions, exclusions and public ramifications). MVE provides essential information to justify support measures or legitimise enforcement action by the manager. MVE for programme managers is ultimately about putting in place adequate controls to detect false efficiency claims and to minimise the level of non-compliance.



Barriers to MVE implementation

Some of the reasons why compliance is a challenge in many S&L programmes are explored in the table below, and may help to explain why sub-optimal outcomes have occurred in some cases.

Based on IEA analysis of existing programmes, five main issues seem to have limited MVE in the past.

Issue / barrier	Response
Cost	
<p><i>MVE can appear to be very expensive: reliable test methods, trained staff and a culture of compliance are the subject of planning, investment and nurturing. Yet many S&L programmes under-estimate the costs and effort needed.</i></p>	<p><i>The costs of MVE need to be seen in the context of considerable potential energy savings, increased energy security and decreased CO₂ emissions. The benefits thus far outweigh the costs.</i></p>
<p><i>When establishing S&L programmes, obtaining the commitment to adequately finance MVE is not always easy.</i></p>	<p><i>MVE costs represent a relatively minor proportion of total programme costs. If they are included at the planning stage and budgeted for during implementation and monitoring, they need not be prohibitive when enforcement action is eventually warranted.</i></p>
<p><i>In addition, non-compliance allegations may lead to expensive litigation proceedings, moving programme managers away from their engineering or administrative expertise.</i></p>	<p><i>Cost-sharing among stakeholder groups should be agreed in advance.</i></p>
Urgency	
<p><i>The time pressures of launching a new S&L programme may be pressing, resulting in MVE being postponed or reduced. This can lead to quick-fix solutions (especially because of scarce resources) which compromise the integrity of the programme.</i></p>	<p><i>MVE should be planned and developed at the beginning of programmes.</i></p>
Negative perceptions	
<p><i>Negative results from MVE may be perceived as proving the failure of the programme rather than supplier non-compliance.</i></p>	<p><i>MVE is the only way of proving that an S&L programme is operating effectively. Where MVE indicates programme failures, this provides valuable insight to ensure that issues are addressed and not replicated in future programmes.</i></p> <p><i>Even without MVE, policy weaknesses or failures could be highlighted by other sources (e.g. the media). By conducting MVE (which may or may not point out failures), policy makers are seen to be proactive in reviewing and managing their programmes, rather than reactive to external criticism.</i></p> <p><i>IEA experience suggests that successful programmes do not hide mistakes, but confront them in a transparent manner to measure success and improve performance.</i></p>

Market interference

After overcoming difficult political hurdles that often accompany the creation of an S&L programme, policy makers may be reluctant to be seen interfering further in the market through excessive monitoring and enforcing product regulations.

If the reasons for choosing to test a certain supplier are not recorded transparently, it could result in allegations that enforcement action was unfairly targeted.

Some businesses may not be initially positive about being subject to S&L programmes. However, once they are involved, the vast majority want MVE to ensure that the standard is properly regulated and they do not lose out by complying.

Without MVE, there is no level playing field for participants. Unchecked non-compliant businesses could reap the reputational benefits of using the standard while avoiding the costs of compliance, which means the programme will be fundamentally undermined.

International responsibility

International standards may mean that policy makers limit MVE funding due to expectations that others are also testing.

Policy makers are also under pressure from industry to consider any implications for unfair competition on exports and imports if they introduce MVE and other countries do not.

A co-operative approach to MVE in S&L programmes is necessary to meet these responsibilities.

In general, the reputation of a government willing to take steps will be enhanced, while the reputation of those not who do not co-operate will diminish.

Why is MVE important?

Economic reasoning

Improvements in appliances and equipment remain an essential part of the portfolio of energy efficiency policies and climate change mitigation programmes. If governments implement successful policies, these improvements remove energy wasting products from the marketplace and stimulate the development of cost-effective, energy efficient technology for the future.

Economic game theory provides theoretical arguments to show that, if left to their own devices, firms will always choose not to comply with regulation since they will always believe their competitors are doing less. Thus, for any S&L programme to be successful in achieving its aims of improving the energy efficiency of appliances and equipment sold, it needs to be enforced through MVE actions.

Market failures

S&L programmes are implemented to correct for market failures that lead to sub-optimal energy efficiency appliances and equipment. These market failures are mainly information failures: incomplete and asymmetric information, and the Principal-Agent problem (see *Mind the Gap* [IEA, 2007]). Equipment energy performance standards correct for these failures, while labelling corrects for consumers' incomplete information.



Governments around the world are establishing policies and programmes intended to improve the efficiency of energy consuming products. These programmes provide consumers and businesses with compelling energy bill savings, help remove strain from the electric grid and reduce the occurrence of blackouts, and prevent the emissions of millions of tons of global warming pollution. Given all these benefits, we need to make sure that manufacturers' energy use claims are real and that the products are performing as promised. Energy efficiency advocacy groups like NRDC are therefore very supportive of efforts underway to enhance market surveillance and enforcement activities.

*Noah Horowitz, Director,
Center for Energy Efficiency Standards,
Natural Resources Defense Council,
United States of America*

Cost-effectiveness

Robust MVE activities can unlock further economic potential existing within S&L schemes. The majority of recent studies evaluating S&L programmes emphasise the cost-effectiveness of this type of programme, especially in comparison to other options, in meeting near-term energy and environmental goals (as seen in the case studies listed in the Annexes).

In circumstances where non-compliance could be as much as 20% to 50%, better compliance is a more cost-effective option than attempting to recover that energy by regulating an entirely new product type (IEA, 2008b). In a climate of historically low levels of enforcement, a modest investment in enhancing compliance is hugely cost effective in improving policy measures undertaken by government and industry.

It does not therefore make economic sense to forego this comparatively cheap abatement and its associated energy efficiency savings if the alternative is to invest in more costly abatement or efficiency savings elsewhere in the economy.

Stakeholder expectations

Benefits from MVE accrue to all stakeholders (policy makers and programme managers, suppliers and industry groups and consumers), although the benefits or motivations are somewhat different for each group.

Policy makers and programme managers

Regulatory agencies have a responsibility to ensure that government policies are implemented as designed. If insufficient investment is made in MVE in order to ensure compliance with a programme, the programme risks failing to meet its goals. Creating an S&L programme should include the obligation to collect sufficient valid data to show that the programme is working.

“ There are now over 1 300 product policies worldwide based on minimum energy performance standards or labels covering most major appliances. Improving compliance rates by even a few percent represents a huge energy saving, and also helps to stimulate further investment by industry in energy efficient technology. By understanding what others are doing, it is apparent that having a compliance regime is not only about good governance, but also happens to be one of the most cost-effective ways to cut greenhouse gas emissions.

Mark Ellis, quoted in *Bright Spark, Efficient Electrical End-use Equipment Implementing Agreement*

”

The Australian experience of investing one third of its national S&L programme budget in MVE activities (rising from a more modest 10%) may offer a case study for the future.⁵ If S&L already offers cost-effective policy interventions, then enhanced MVE to secure all of the possible savings is an even more cost-effective measure.

⁵ Compare the budgets allocated to compliance activities in Australia as reported in *Energy Efficiency Program: Achievements 2007/2008*, and the following year, in *Energy Efficiency Program: Achievements 2008/2009*.

The most obvious benefit of MVE is the subsequent availability of information on the effectiveness of the policy/programme. Without this information, sensible decisions about the future direction or further development of policy are more difficult to make. With this information, government agencies have evidence to inform future S&L negotiations with industry.

Data collection can also help governments to meet their international commitments and better allocate scarce budgetary resources within the country. The IEA recently warned that S&L policy objectives will be undermined if energy measurement standards fail to reflect actual energy use or provide a true end-use efficiency ranking of equipment.

In 2009, my department tested over 300 electrical products sold on the United Kingdom market. These tests explored whether products perform as claimed on their energy label or as required by British law. The initial tests found that 25% of products tested had a case to answer, as that model did not perform as claimed. Those suppliers were given the opportunity to overturn the initial finding by having more samples tested. As a result of the testing programme, many suppliers subsequently modified claims on the energy label and further work was commissioned to improve the robustness of test protocols.

The testing process was carried out in an open and transparent manner with suppliers informed of their initial result and given the opportunity to re-test if they felt the result was not a true reflection of that model's efficiency. My agency published all testing, including brand names and product model details. The re-test results along with supplier comments were also included in a final publication, which was reported in national and specialised press.

Davide Minotti, Market Transformation Programme, Department of Environment, Food and Rural Affairs, United Kingdom

Such information can rarely be found elsewhere. Manufacturers do not always collect performance data (and even where they do, they may not be in a position to, or willing to, share it with government agencies for public consumption).

Industry and the private sector

Robust MVE activities offer protection and reward to honest manufacturers by preserving the integrity of the S&L programme through maintaining or even increasing consumer confidence. Products that are reliably identified to consumers as meeting more stringent energy efficiency performance standards are likely to gain a commercial advantage.



This is the incentive for retailers to sell such products and suppliers to market them.

Regular MVE activities will expose non-compliance and lead to sanctions against manufacturers who attempt to mislead consumers. MVE thus ensures a level playing field for industry, avoiding a situation where compliant businesses incur the increased costs of compliance only to lose out to non-compliant competitors who avoid those costs by falsely claiming to meet the standard.

Businesses need to know that all their competitors are being required to make the same effort to comply; this knowledge provides the motivation to comply. The visibility of the enforcement has a significant effect on the rate of compliance. While some suppliers will always comply and a small proportion will never comply, the conventional wisdom is that the remainder will base their decision about complying upon their own assessment of the consequences of non-compliance. The rate of compliance among suppliers and retailers will rise if enforcement activity is highly visible and the consequences of non-compliance sufficiently undesirable.

“ Minimum energy performance standards might eliminate the worst products from the market, and voluntary endorsement labels steer consumers to better than average products, but neither stimulates cutting edge technology. A policy gap exists as manufacturers have little incentive to innovate and there is no easy way for consumers and procurement officers to seek out the highest efficiency models. Schemes which continuously identify and widely publicise only the very “best” energy efficient products available across a broad spectrum of product categories (e.g. www.topten.info) can fill this gap. To the extent that such efforts can rely on credible MVE regimes associated with government standard & label programs, they will be more cost-effective.

Anne Arquit Niederberger, Board Member,
TopTen United States of America



Consumers

In an imperfect marketplace, where most do not have the time or skill to evaluate competing efficiency claims, consumers rely on efficiency schemes to assist them in decision making, and on the energy performance information labelled on electrical goods to help them make an informed purchasing decision. Even armed with this information, they may still make sub-optimal economic decisions for a range of reasons captured within the notion of bounded rationality (Sorrel *et al.*, 2004). However, robust MVE activity will improve the credibility of the S&L programme and ultimately encourage consumers to purchase more energy efficient products.

For consumers, the benefit of MVE lies in the reassurance that products are as described and warranted by the supplier when they make the purchase. The energy price-conscious consumer, who relies on the representations made in label claims or that suppliers have met the minimum standards, anticipates reduced energy bills after having chosen a more efficient appliance. The environmentally motivated consumer expects that the purchase of an environmentally friendly appliance will result in lower environmental impacts.

For these reasons, it is important that label claims are accurate and that goods sold do actually meet minimum energy performance requirements. Consumers also do not expect that they have any obligation to verify performance after industry and government agencies endorse the claims within the S&L programme.

“ Owing to constraints of time, attention and the ability to process information, individuals do not make decisions in the manner assumed in economic models. As a consequence, they may neglect energy efficiency opportunities, even when given good information and appropriate incentives.

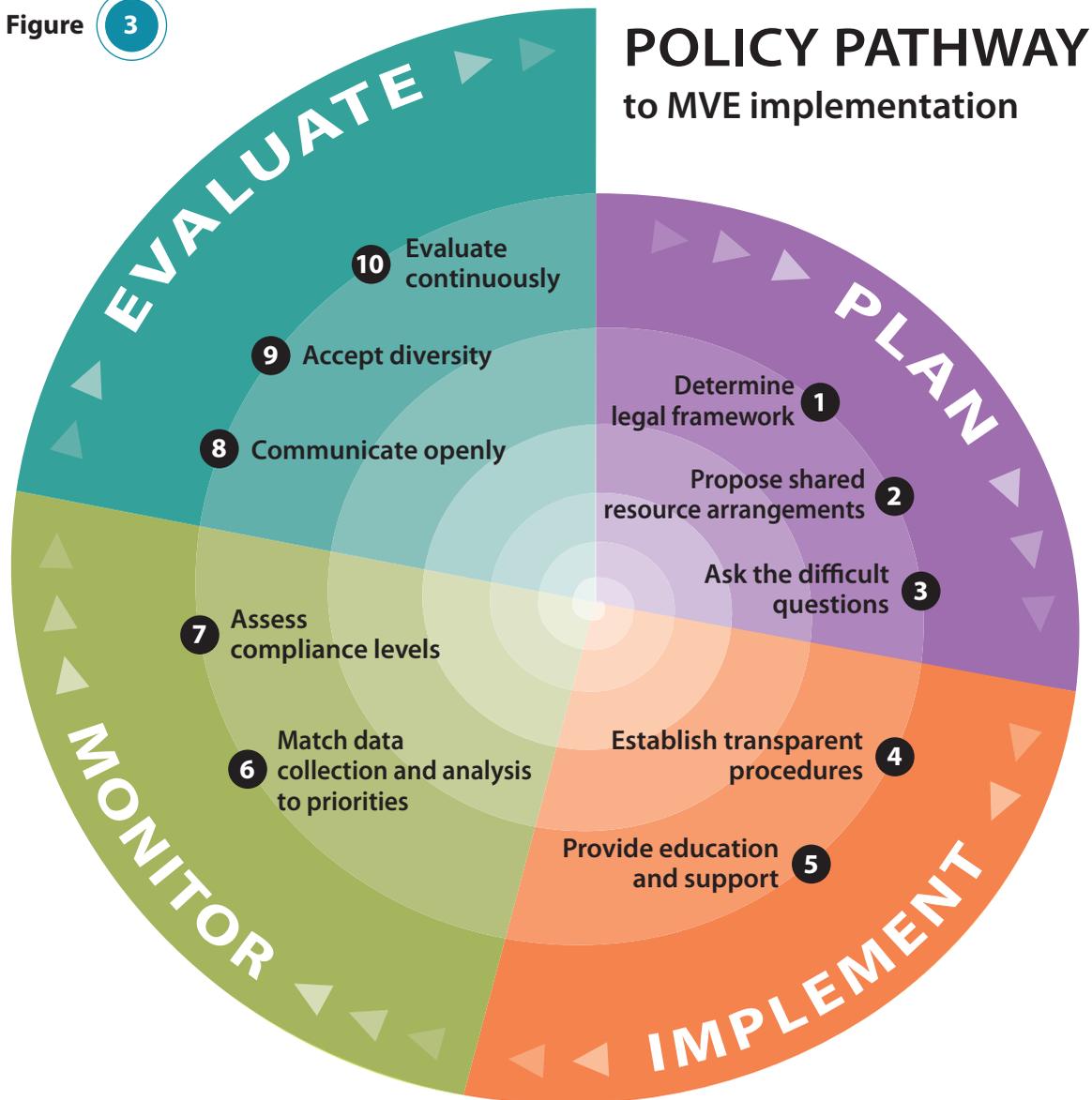
Sorrel *et al.* (2004)

How to deliver MVE: The Policy Pathway

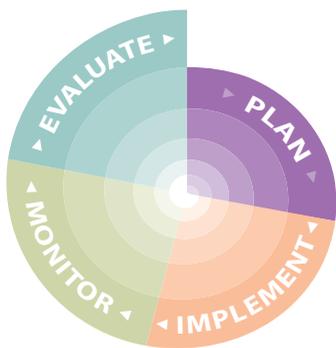
Figure 3 illustrates the four stages of MVE planning, implementing, monitoring and evaluating. These stages are further broken down into ten critical MVE elements that structure the 33 steps mapped in this policy pathway.

These steps are supported by experience drawn from practitioners and are further demonstrated in two case study examples.⁶

Figure 3



⁶ The case studies focus on priorities drawn from one country and from one technology type to demonstrate application of MVE activities in a given context. Some of the material in the case studies was presented by the IEA at the Clean Energy Ministerial held in Washington, DC (July, 2010).



PLAN

From the outset, it is critical that policy makers and programme managers integrate robust MVE activities into every aspect of their S&L programme. Careful advanced planning of MVE ensures that the programme can move towards implementation without delay, confusion, repetition or waste.

The planning stage needs to include relevant statutory, industry and consumer stakeholders to comment on proposals and critique ideas. Non-government experts in end-use equipment energy efficiency have much to offer policy makers and programme managers within government in terms of designing practical, cost-effective MVE in S&L schemes.

Some matters, like shared funding and mandatory information disclosure, are much more difficult to change later (as parties will incur costs as a result of the oversight which will then open discussions about who should pay compensation for the change). Underestimating compliance costs can have major consequences for government agencies. Obtaining significant post-implementation funding, outside budget cycles, is a difficult and time-consuming task. While improved MVE can be bolted onto programmes at later stages, it comes with significant stakeholder complaint and criticism, as well as cost.

1 Determine the legal framework

Framework elements are best developed by the programme manager as a package for discussion with stakeholders.

- Incorporate compliance measures from the start.** It is self-evident that methods of measuring must be decided with some consideration for issues like repeatability (*i.e.* the variation in measurements taken by a single person or instrument on the same item and under the same conditions) and reproducibility (*i.e.* the variation in measurements taken for the same test performed in different facilities or with different personnel) at the start of a programme. Performance levels have to be agreed upon and published, so all can comment and eventually be held accountable. Laws should be clear or, in voluntary programmes, suppliers should be required to clearly state the efficiency of each product to facilitate subsequent MVE testing.
- Determine whether voluntary or mandatory.** This simple decision has fundamental impacts on further programme design. Voluntary schemes rely on co-operation and partnership between participants who work together to ensure the success of the programme. Mandatory schemes are formalised in regulation, whereby suppliers and retailers are legally obliged to comply. In both cases, participants still need to be told what is required of them, the benefits of participation and the sanctions for non-compliance.

Voluntary: Participants need to know and accept from the outset the S&L rules of the scheme they are entering and understand the ramifications of non-compliance.

Mandatory: A regulatory programme is government branded and, by its nature, carries expectations of credibility and trustworthiness.

Both need to be underpinned by MVE to ensure that all suppliers live up to these responsibilities.

“ Standards and labelling programmes are designed to promote energy efficient products, leading to energy savings. The Indian scheme was launched in May 2006 with 11 products with clearly defined standards and labels. Four products are now mandatory, effective since January 2010.

Programme maturity is measured by the level of compliance. In India, programme compliance is inching towards maturity as we meet challenges encountered along the way:

- The challenge of providing reliable market product data is being met by the label implemented initially on a voluntary basis with the capacity to be made mandatory as our capacity to enforce increases.
- The challenge of undertaking verification testing has been learnt from international experience and we recently collected over 100 samples from the market for testing.
- The challenge of holding manufacturers accountable for mislabelled product in India (where recalling non-compliant products is not currently legally possible) remains a hurdle we have yet to clear, though we are keen to hear how other countries are dealing with this issue.

The most important compliance in 2010 is ensuring that our energy labelling scheme provides accurate information to the consumer. In the event of this not happening, we will look for ways to build sanctions that would work in India. Self-certification by manufacturers presents risks that independent testing by competent organisations could lessen. Consumer interest must be protected, though our legal system would need to be oriented to avoid delays in settling consumer claims. We are working to ensure that consumers have faith in our labelling scheme.

Sandeep Garg, Energy Economist and Manager, Standards and Labelling Programme, Bureau of Energy Efficiency, India

- **Prepare a compliance budget.** Planning should include budgeting for all aspects of MVE. This involves support to develop test methods, fund capacity building and train at test facilities, and possibly fund inter-facility testing of common equipment to establish competency (known as round-robin tests). This budgeting should also consider the potential costs of addressing non-compliance, especially in cases where the targeted participant is no longer willing or able to pay for rectification. The budget might even anticipate involvement in priority international measurement activities.
- **Share information.** A central database of declared product performance and test results should be created with differing levels of accessibility for different stakeholders. In MVE terms, the full dataset can be used by regulators for cross-matching data, identifying responsible persons, communicating with stakeholders about changes, and offering support and training. Locating all suppliers, especially small manufacturers, is very important to ensure that all are informed of their legal responsibilities or participation rules. A less detailed register from the database is also a major compliance tool enabling competitors to inform the programme manager of suspected non-compliance. Finally, a public version of the database can even be accessed by interested purchasers. It should be decided which groups will have access to the collected data at the monitoring stage.

“ Lighting Council Australia works with regulators to improve the efficiency of lighting products, in part, because it makes good business sense. As awareness of global warming and the need to conserve energy grows, consumers are demanding the most energy efficient products available. In addition, Lighting Council Australia members want to be seen working with government improving product efficiency because of the perception of good corporate citizenship such co-operation bestows.

Bryan Douglas, Chief Executive Officer, Lighting Council Australia

- **Learn from comparable schemes.** Rather than designing from first principles, adopting the best practices of similar, existing MVE schemes (possibly of a country of a similar size or development) will expedite the planning process and minimise mistakes. A mentor from that programme can provide guidance on why particular steps exist and insight into potential problems. The IEA regional energy efficiency and training bodies can help build contacts. See “Sources for further information” on other relevant bodies in this regard.

“Local government agencies are generally responsible for installing and maintaining street lights in most countries. Their lack of up-to-date product knowledge on, for example, light quality, efficacy and lifetime, dimming and other controls, and payback periods, makes them somewhat hesitant to experiment with more efficient technologies in case the light output does not meet accepted legal requirements. As a consequence, reliance on the status quo is often “the rule”.

In 2009, local government agencies in New Zealand developed an innovative approach to overcome this problem. They developed an infrastructure design standard for street lighting which was provided to all local councils. It supplied resources to compare lighting technologies and better assess economic benefits, while taking steps to ensure relevant minimum lighting standards were still met.

The package also explained the need for metering measurements and showed how to take those measurements to create a robust business case for investing in the more efficient technology. In this case, measurement was the key.

Gerald Strickland, Energy Expert and past Secretary-General of the European Lighting Industry Association

2 Propose shared resource arrangements

Resource issues generally require consultation with stakeholder groups, but should be decided at the outset. It is difficult to change negotiated arrangements after a programme has begun.

- **Discuss sharing the costs.** It is important to explore whether stakeholder groups will share MVE costs with government, as they stand to gain from a more credible and workable programme. There are several models of shared resourcing. For example, a programme placing compensation costs on just non-compliant companies generally gains favour from the majority of companies, but is difficult to create and administer.

The more usual arrangement is to pass MVE costs on to all suppliers by establishing a form of user-pay programme. This approach is fair to all and means that the costs can be conveniently collected at the time of certification or registration. Alternatively, the costs can be internalised by government agencies. Whatever the model, it is important to discuss proposals with all parties from the outset. An open discussion with stakeholders as to the amount, if any, they are willing to contribute towards the programme’s MVE is always helpful for planning and budgeting purposes.

“ The US ENERGY STAR programme is one of the most recognised brands in America, saving participants USD 17 billion in energy in 2009. Currently, 40 000 individual products carry the ENERGY STAR label. No voluntary programme can require its label to be affixed to all the most energy efficient products, but we can ensure that the labelled products are energy efficient and deliver the expected cost savings.

A US Government Accountability Office report (2010) provided evidence of insufficient protection of the ENERGY STAR label. In response, the programme is moving away from manufacturer self-certification towards testing, review and approval by independent, accredited expert bodies.

This is being achieved by:

- temporary shutdown of the product approvals process to build in software and verification improvements, with trained staff reviewing all applications;
- requiring manufacturers to submit data year-end showing that products meet measurable energy efficiency requirements, including a test report from an accredited facility;
- requiring all manufacturers to participate in verification testing which involves the government commissioning “off the shelf” third-party testing.

With these changes, ENERGY STAR will remain a trusted brand used to identify energy efficient products. My department is conducting verification activities:

- We are purchasing from retail settings and testing some of the most common appliances (freezers, refrigerator-freezers, washers, etc), which account for more than 25% of a household’s energy bill, to expand testing to many more products.
- We recently launched action against 35 manufacturers for failing to meet ENERGY STAR Programme Requirements.

In 2009, an independent review found that 98% of sample products tested met or exceeded ENERGY STAR requirements. The MVE activities in 2010 aim to maintain or improve that level of compliance.

Richard H. Karney, Testing and Verification Program, Office of Building Technologies, Energy Efficiency and Renewable Energy, US Department of Energy

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- **Explore co-operation and partnerships.**

Consider combining resources (particularly in terms of testing, financing and data collection) with other governments or organisations with common motivations, in order to save money or expand testing. These could include efficiency advocacy and consumer bodies that regularly test equipment performance claims. It could also entail international co-operation with other energy efficiency agencies, possibly assigning tests by region, resulting in data pooling and avoiding duplication.

Another option involves bringing in national bodies with an interest in electrical or gas safety, communications equipment and even power utilities. The aim should be to expand testing coverage and minimise budget outlay. A co-ordinated international approach can also help allay concerns that the MVE programme might become a non-tariff barrier to trade.



3 Ask the difficult questions

Once a plan to execute MVE has been decided, explore the reaction of stakeholder groups through an open dialogue.

- **Seek advice on programme weaknesses.** Stakeholders will communicate deficiencies in the S&L programme and, by listening to all views, help weigh the importance of amending MVE activities. While avoiding scrutiny may expedite the process of implementation, leaving too many MVE problems unattended will require costly patch-up work at a later stage.
- **Invite solutions.** Stakeholders can often propose novel ways to overcome perceived problems, *e.g.* with measurement. This process not only facilitates the planning stage for the MVE protocol, but anticipates the request for additional resources should these be needed to overcome the acknowledged shortcomings of an S&L programme.
- **Fix policy goals and reporting requirements.** When an S&L programme is just starting, it is reasonable to adopt an initial educative response to breaches of a minor or procedural nature, *i.e.* perhaps providing training or workshops to explain the nature of the new compliance regime. It is also reasonable to expect compliance from major suppliers long involved in deciding S&L performance requirements. Whatever the plan, it is useful to consider explaining to stakeholders which MVE activities are scheduled to be held in the short and longer term, and the potential escalation of sanctions for non-compliance. It is also crucial to settle the precise type, amount and frequency of information required from stakeholder groups.

Circulating pumps for central heating systems were the subject of a voluntary Europump (European manufacturer trade association) A-G labelling scheme. This had been successful in bringing about some market change, but it was apparent that little further improvement would occur without legislation.

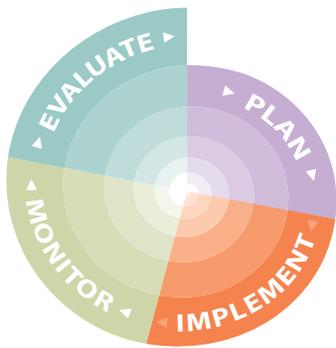
The European Commission preparatory study undertook detailed eco-analysis which demonstrated that the least life-cycle cost circulator would be a highly efficient permanent magnet type.

The resulting two-stage European Union Parliament regulations, coming into force in 2013 and 2015, will make a circulator beyond the previous Grade A the regulatory requirement or minimum energy performance standard (MEPS). The previous voluntary labelling scheme will then become superfluous and will be withdrawn.

Hugh Falkner, Industrial Equipment energy efficiency advocate, United Kingdom

- **Encourage open debates on sanctions.** Competitors offer an interesting perspective on rival explanations and excuses. In addition to testing the accuracy of the information supplied, using a peer review forum to develop general policy guidelines related to sanctions adds to the transparency of the programme and builds stakeholder support.





IMPLEMENT

During the implementation stage, clear and effective communication is essential to moving MVE from concept to reality. This communication should focus on informing and educating various stakeholders about the change in the marketplace, the benefits they will experience and their responsibilities. Information for consumers should measure how effective labels and other information tools are in providing reliable explanations of the long-term benefits of buying energy efficient appliances to purchasers. Manufacturers and importers need simple and easy access to the rules they need to follow, supplemented with information sheets and practical seminars, possibly organised through their professional associations.

Public acceptance of the MVE programme will increase when there is widespread understanding of its purpose and benefits. Success will depend on programme managers' ability to communicate the importance of the programme and its value to the individual, stakeholder groups and society as a whole.

4 Establish transparent procedures

MVE should measure only the information stipulated in the programme documentation. The exercise of rule-making will encourage programme managers to consider how to establish compliance and non-compliance (which will shape MVE activities and eventual enforcement action). Documenting information requirements improves the prospects of compliance.

- Publish guidelines.** MVE programme rules need careful documentation to ensure that participants are fully aware of expectations and sanctions. These guidelines should be made widely available in the form of a manual or handbook for participants and other interested parties. Programme managers should work with existing information channels, like trade associations, to maximise dissemination and keep records of community and especially supplier consultations; these help programme managers to decide on enforcement actions at a later stage.

“ One of the most successful appliance label market transformations I know of took place in Thailand. In the early 1990s, the Electricity Generating Authority of Thailand (EGAT) operated a series of demand-side management (DSM) programmes, including a refrigerator labelling programme, to reduce electric demand by more than 200 MW. EGAT built a refrigerator testing lab in Bangkok and established a voluntary labelling programme under which refrigerators were rated on a 1-5 scale based on their energy efficiency, with a “5” being the most efficient. EGAT promoted the programme in a variety of ways including running a series of television advertisements explaining the advantages of 5-rated products for households and for the nation. Sales of 5-rated units climbed substantially, and manufacturers began to develop and market efficient 5-rated products. When 5-rated refrigerators made up more than 90% of product sales, the rating system was recalibrated to encourage further efficiency improvements. It worked because EGAT had a real interest in measuring refrigerator efficiency to confirm claims and because of the extensive marketing campaign.

Steve Nadel, Executive Director, American Council for an Energy Efficient Economy

- **Document sanctions.** List the hierarchy of responses to breaches, offering firm but reasonable enforcement action that is flexible enough to encompass all foreseeable circumstances. Enforcement action needs to be seen to be commensurate with the value of lost energy savings. It is vital to communicate the compliance rules as the programme is being implemented, making clear that future MVE results will be published.
- **Establish fair testing procedures.** This will include activities such as specification of the test methods as well as the frequency and scope of monitoring activities. Fair and transparent testing procedures can be benchmarked against other countries or regions and updated when necessary. Testing procedures should be reproducible, representative and understandable. Test elements should be separately quantified and reported for ease of use. It is critical that test protocols facilitate international comparisons and do not include local usage parameters or specific climate-related elements rendering such comparisons more difficult.

“The Consumer Electronics Association strongly supports reasonable efforts to ensure credibility and accuracy for ENERGY STAR and other successful market transformation programmes supporting energy efficiency. Particularly in the case of voluntary, market-oriented programmes, we recognize a trade-off between programme participation and the costs and burdens of participation. Especially for the dynamic consumer electronics sector, qualification and verification requirements that increase costs or delay time-to-market for products, such as third-party certification, must be avoided.”

Douglas Johnson, Vice President, Technology Policy, Consumer Electronics Association, United States of America

“Although it draws more flak from industry than any other element of our standards programme, we continue to believe that third-party verification is a cost-effective way to ensure compliance. It is, in its essence, a way of contracting out compliance in a way that ensures that the cost of compliance is borne by the purchasers of the products. Equally important for an importing country (which to a great extent everybody is) is the development of a modern reporting system that relates specific shipments to a qualified products list. In Canada this is accomplished by electronic means that in 2009/10 processed 1.5 million transactions. Finally, I think we do a pretty good job of communicating with stakeholders who are either subject to the regulations or participants in the programmes. The principles are: make sure they know what they are supposed to do, be there to help them do it if they run into trouble and get them if they don't.”

John Cockburn, Natural Resources Canada

5 Provide education and support

Most stakeholders expect more from government agencies than merely a copy of the rules on a website. Best practice MVE encourages programme managers to actively engage stakeholders in a debate about their needs as the S&L programme develops. The failure to adequately communicate new responsibilities to suppliers and retailers will undermine the programme and limit the range of sanctions that might realistically be considered at later stages.

- **Provide training for manufacturers.** Training should be provided to increase awareness of the rules and assist suppliers (particularly smaller entities or foreign suppliers not previously engaged in regulatory reporting) to become compliant. This is especially important toward the start of any S&L programme, where all suppliers will have limited experience in complying with the new information requirements and declarations. Professional and trade associations have experience in this field and can maximise the effectiveness of training.

- **Provide support for test facilities.** All test houses (in-house or independent) will need to build testing capacity (e.g. familiarise themselves with new test equipment, testing conditions and requirements) especially where industry and independent facilities have not been using the test method previously for regulatory purposes. In the initial implementation phase, independent facilities may need support to maintain or improve services for enforcement purposes. Regular testing by participating facilities can increase testing capacity, accuracy and reliability.
- **Give public access to product information.** Consumers need reliable information on which to base their purchasing decisions, especially if these are subject to new labelling schemes.

“ China’s energy efficiency labelling programme covers a wide array of over 21 domestic, commercial, lighting and industrial products. Originally, like most other countries, the scheme was based on self-declaration information from suppliers. This information was subject to some checking by suppliers’ own laboratories or bodies independent of suppliers. CNIS has improved the system by:

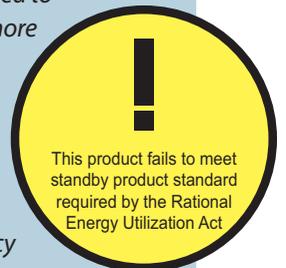
- strengthening laboratory management by developing laboratory recording, scene verification and checking consistency of testing results;
- investing over USD 3 million to establish a new, fully independent laboratory to undertake comprehensive compliance product testing and empirical data research for energy efficiency standards formulation and energy efficiency labelling implementation.

The laboratory is already capable of testing air conditioners, refrigerators, washing machines, gas water heaters and lighting products, with capacity for other products being developed rapidly.

Li Aixian, Director, Sub-institute of Resource and Environment, China National Institute of Standardisation

Many of the products of great interest to these programmes (e.g. refrigerators and air conditioners) are not everyday purchases, so consumers need accessible information showing them the benefit of their investment in more efficient products. MVE can then assess the effectiveness of this information.

“ In 2008, the Korean government wanted to signal to suppliers that future electronic products should reduce the power being consumed in low-power (standby) modes, when the appliance was on but not doing its main task. Existing policy tools were to either ban the product from sale (which seemed harsh especially for products efficiently using power when providing their main function) or to impose the costs of mandatory labelling upon all products of that type, just to show standby power consumption. The Korean government determined to adopt a new form of policy that more equitably imposed costs only on those suppliers who continued to market electronic appliances not meeting the published standby power target – the negative label.

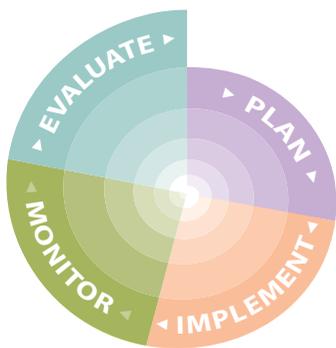


This product fails to meet standby product standard required by the Rational Energy Utilization Act

Products not meeting the efficiency target are still able to be sold but are required to attach the label to all models. Most purchasers do not want to buy them. These products are subject to the usual verification and enforcement processes, though only 0.8% of products have so far chosen to attach the label. KEMCO has found very strong support for this policy among industry because it equitably links compliance costs to efficiency. Suppliers of appliances already meeting the government efficiency target need take no other action. Almost all Korean manufacturers have chosen to market products meeting the government’s target which is good for the environment, and saves energy without undue cost.

Source: Supplied by the Korea Energy Management Corporation

Yung-Rae Kim, Team Leader Korea Energy Management Corporation



MONITOR.....

Monitoring could also be described as a maintenance phase during which the programme moves from support activities toward enforcement capabilities. Programme managers should modify MVE from the more general information collection, in the implementation stage, to targeted data collection and analysis. They can then assess not only how well the programme is working, but whether the most-at-risk suppliers are meeting their responsibilities. Without system-wide measurement, it is impossible to know what is being achieved, or whether the programme is successful. Without targeted measurement of individual suppliers, it is impossible to know which suppliers are not compliant.

6 Match data collection and analysis to evolving priorities

Shifting the focus of data collection to specifically target suppliers for eventual enforcement action is not a simple or easy task.

- **Decide what data to collect and from whom.** This depends on the nature of the matter being measured. In the planning stage, guidelines should determine the general data to be collected. Within these rules, more detailed decisions on data measurement and collection will need to be made as experience grows. For example, it could be to verify:
 - whether products comply with certification or registration requirements (requiring market surveys checked against a database); or
 - the percentage of products with attached labels (requiring inspections of appliances in retail stores).

The method of collection needs to reflect products in the market in a way that can withstand scrutiny by all stakeholder groups. The source of the data can also be important in terms of ease, availability and cost. For example, data may be collected from:

- The supplier at the time the product is placed on the market or after a complaint to the regulatory agency.
- An independent product-certifying body commissioned by the supplier (rather than relying on supplier self-declarations).
- Bodies that collect sales and other information from the marketplace (as another means to verify self-declared supplier data) as they may be willing to sell this information to interested government agencies.

One of the most important issues when considering compliance is to take particular care to work with businesses and individuals so that they meet their legal obligations without unnecessary expense. The primary goal is to encourage voluntary compliance through the use of education, advice and guidance.

The best enforcement strategy is one that produces the highest reasonable level of sustainable compliance within the least time. Moreover the kind of compliance that compulsion brings about is usually limited in nature. Traders then obey the letter of the law rather than the spirit of the law.

It is true that some traders will only comply if they are coerced, but on balance, voluntary compliance is both more effective and cheaper to secure.

Terry Collins, Chair of the APEC Energy Efficiency and Conservation Experts Working Group and Products Manager, Energy Efficiency and Conservation Authority, New Zealand

- **Decide what equipment to test.** Testing products for performance will show whether they are meeting their claims (in the case of labels) or minimum requirements (in the case of energy standards). Large random samples are expensive and may not necessarily provide all the answers. Testing targeted at particular suppliers who are suspected of non-compliance may be a more cost-effective option, although it does not provide an accurate picture of overall compliance rates for statistical purposes. Schemes that use publicly available selection criteria when conducting targeted MVE are able to better defend their selection, should parties subsequently complain of bias or unfairness.



- **Decide how to analyse the results.** Merely collecting data is not enough: it must be assessed by experts to determine general trends and individual model compliance. Programme managers must gain experience in managing the review of the data and confidence in the accuracy of assessments. Reporting trends and masking particular product or supplier identities are legitimate ways to build capacity in test companies and analysts before seeking to hold individual companies to account for particular failures during compliance assessments.

Energy Saving Trust Recommended is a voluntary product labelling scheme that helps consumers identify the best-performing energy saving products in the United Kingdom. For us the most important issue in compliance is the credibility it provides for the scheme, in the eyes of both industry and consumers.

In fact 85% of our members see this as an important aspect of their membership. We favour a stratified random sampling methodology to test at least 5% of certified products, annually. Making sure we have a fair representation from each manufacturer, we test from each of our 31 product categories as required by various internal and external influences.

Tom Lock, Certification Manager, Energy Saving Trust Recommended, United Kingdom

7 Assess compliance levels

A range of data sources will provide a balanced portfolio of information. A visible monitoring process has the effect of encouraging compliance. If companies are aware that they are being or may be measured, they are more likely to adjust their behaviour.

- **Assess non-compliance.** Measuring the extent of compliance or non-compliance is essential to effective programmes. It can be crucial to adjust resources and future work plans to match the developing risks uncovered by those measurements. All schemes have some level of non-compliance. Collecting and analysing a broad range of data improves effectiveness of, and builds confidence in, the programme and can be crucial in making the case for additional resourcing, if compliance is measured at unacceptable levels.

- **Consider different types of non-compliance.** Non-compliance may take different forms and represent different levels of severity. For example, a product may not comply in terms of performance, or because a mandatory label is not consistently affixed to eligible products, or suppliers have not completed all the procedural requirements of the programme. While a failure to perform, as claimed, is the most important form of non-compliance, failure to affix mandatory labels or complete registration or certification processes might also be an indicator of other forms of non-compliance. These failures represent differing levels of risk to the programme and policies should be adjusted to reflect the outcomes of measurements.

“ Industry believes that the most important issue is ensuring fair competition in the market. To that extent, industry calls for effective market surveillance able to check the compliance of products placed on the market to the declared energy efficiency values. Fair competition and fair compliance checking go hand-in-hand to enhance market transparency for the benefit of consumers.

Paolo Falcioni, Vice Director General, Conseil Européen de la Construction d'appareils Domestiques (European Appliance Association - CECED)

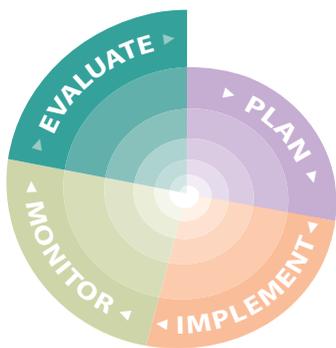
- **Focus on risk.** Focusing on those products at a greater risk of non-compliance may prove the most cost-effective route to assess compliance. Targeting factors can include products with:
 - extraordinarily high energy efficiency claims (which attract the more motivated purchaser);
 - energy efficiency levels just meeting minimum requirements (which raise the prospect of tolerance issues in testing);
 - very large sales (which represent a greater risk to purchasers and the programme);

- suppliers with a poor compliance record (whose past history is a strong indicator of future risk);
- significant numbers of customer complaints (because this may indicate a greater risk);
- information from competitors or other expert intermediaries indicating non-compliance (because this is an indicator of possible conflagrations).

“ In early 2010, the US Government Accountability Office reported it had obtained ENERGY STAR certification for 15 out of 20 bogus product applications. While the supplier self-certification system to obtain the ENERGY STAR endorsement is also subject to after-market testing and competitor policing which would have uncovered these shams, this investigation created a furore at the time.

Rather than ignore the findings, my agency used this opportunity to strengthen the overall integrity of the scheme to ensure ENERGY STAR remains a trusted symbol for environmental protection through superior efficiency. The US government is planning to pursue enhancements for product qualification and verification through qualification prior to labelling, laboratory qualification, and comprehensive verification testing. The subsequent changes to the certification process have rebuilt confidence in this almost 20-year long programme, which is the foundation of the US government's commitment to identify the most energy efficient products in the marketplace.

Christopher Kent, ENERGY STAR Labelling Branch, Environment Protection Agency, United States



EVALUATE

Effective evaluation of the MVE process is crucial to ensuring that the goals of the S&L programme are reached and the measurements within MVE remain relevant. Evaluation is most valuable if the results are fed continuously back into the system. By taking account of findings, better programmes can be designed and improved in light of this experience.

Ongoing evaluation of the effectiveness of the programme ensures that MVE achieves its original and revised goals. It requires an element of flexibility and openness to change, taking into account the circumstances in which it must operate.

Measurement and evaluation are concerned with identifying the outcomes from action and the counterfactual; what would have happened anyway. Well-considered evaluations of S&L programmes will generate reliable, robust data about programme performance, help to communicate impact to funders and other stakeholders and identify what the programme is doing well and what can be improved.

Charles Michaelis, Fellow of the Market Research Society, Databuild Pty Limited

8 Communicate openly

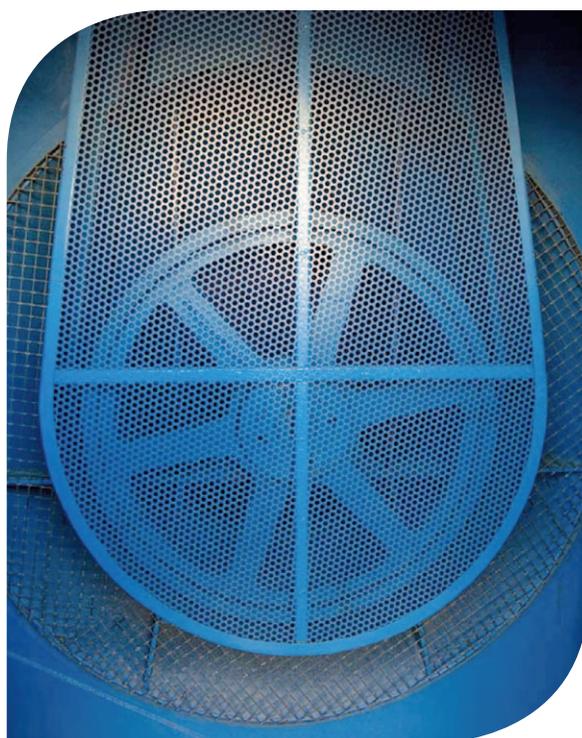
MVE reinforces compliance, especially if the application of sanctions is communicated effectively. Disclosure of results gives praise to suppliers who comply with requirements, identifies suppliers who fail to comply, and enables governments and programme managers to take more effective action to strengthen the programme and enforcement action against non-compliance.

Failure to disclose breaches could result in discrediting the programme itself, especially if the media or consumer groups are seen to expose non-compliance. The public has a right to know, particularly if the programmes are accessing public funds. For S&L programmes, the measuring and reporting of their enforcement capability is crucial.

- **Report test results.** Test results should be reported regularly to the supplier involved and, after due process, publicly to the wider community. This reporting is not just to emphasise a negative message; it can lead to an improved understanding in the market of what is possible and what market leaders are achieving. Suppliers will value confirmatory reports from MVE that show their in-house testing to be accurate.



- **Establish channels of communication.** Sharing information with industry may be achieved through a regular newsletter, or by posting results onto a website. If consumers need to know about non-compliance, e.g. in the case of a product recall, there are various options, often dependent on the numbers involved. These include direct contact with purchasers or media advertising about registering a claim. When a problem is uncovered, a best practice MVE programme will already have agreed upon communication protocols to ensure that those concerned are informed about the problem.
- **Name non-compliant suppliers.** “Naming and shaming” manufacturers that fail verification testing can take place once any regulatory or disciplinary action arising is concluded, and provided that this sanction has been clearly outlined in the programme rules. While individual suppliers may resist this action vigorously, it is a very important action to build support among the wider community, compliant suppliers and consumers.
- **Decide who has access to the data.** In some cases, it is clear who needs to have access to the information. For example, the regulator will need to know everything concerning non-compliance. However, decisions need to be made about how much access manufacturers should have to MVE data collected about them or their competitors. For example, should the same access rules apply to the monitoring data as to the central database, or should greater restrictions apply? Giving more access to supplier-declared data can assist greatly in prioritising compliance actions, but only if all parties have a clear understanding of the rules for data access.



9 Accept diversity

At this stage of the process, administrative decision-making gives way to following legal advice about fair enforcement processes. MVE activities need to be conducted with due regard for the ramifications for all parties and the commercial consequences should allegations be aired prematurely in public.

- **Respond proportionately.** The response to non-compliance by a small local firm selling a few models may be different to non-compliance by multinational corporations selling many thousands of models. Enforcement must be fair and reasonable and meet the expectations of all stakeholders; not only those of the company failing to comply, but also those of competitors who are making the effort to comply, and those of consumers. Options to match enforcement with sanctions include measures such as:
 - recompensing the consumer for the additional and unexpected lifetime energy cost, in the form of a payment;
 - compensating for damage to the environment caused by the additional lifetime greenhouse impact, in the form of carbon offsets;
 - recompensing the MVE programme in the form of a recovery of the additional costs incurred as a result of the non-compliance;

- protecting the programme from future non-compliance by raising the requirements for those companies and test facilities with a history of non-compliance.

In 2006, Australian energy efficiency regulators were faced with a supplier marketing a series of air conditioners that did not meet their energy efficiency claims when tested. Efficiency regulators had adopted an educative approach in 2003, accepting undertakings about improved quality control procedures. Testing of the replacement product in 2004 confirmed another failure and resulted in more detailed undertakings. When another model failed in the following year, all Australian energy efficiency regulators decided to support a very different approach.

Complaints were formally made to the national consumer protection body. Efficiency regulators provided all the supporting test data, agreed to make expert witnesses available and disclosed the previous test history of the company. In a settlement between that consumer protection regulator and the company, AUD 3.1 million was made available by the company in rebates for eligible consumers who had bought 15 000 units of five air conditioner models that did not comply with the energy efficiency values claimed on rating labels.

The nature of enforcement testing changed in Australia from that date. Energy efficiency and consumer protection regulators have since entered into formal co-operation arrangements and the consumer protection body has published guidelines for suppliers making environmental claims. I am told that many air conditioner importers now self-report efficiency problems to regulators together with their proposals for corrective action rather than face the prospect of litigation.

Tony Marker, Senior Consultant, Pitt and Sherry, Australia (formally with the Australian Greenhouse Office)

- **Involve other stakeholders.** Bringing in stakeholders, such as regional and/or international trade bodies and other industry representatives, increases the efficiency and capacity of MVE programmes and reduces duplication of effort. It enables data sharing and leverages limited resources. It also benefits general compliance activities. The involvement of others can inform policy development, ensure that sanctions are applied consistently without bias or favour, and, in some cases, protect government agencies from allegations of unfairness.
- **Respond to international obligations.** Acknowledging market differences is critical to successful international co-operation. There are differences in energy pricing, rates of market development and levels of economic activity, which mean that optimum efficiency levels should be a national decision. In an ever-changing world of technology, attempting to apply one standardised performance level to every country is unrealistic. However, international collaboration on issues such as harmonised test procedures and sharing of data can significantly reduce the cost of national MVE programmes and provide benefits to all, including the product manufacturers themselves. It can also help alleviate concerns that the MVE programme may become a non-tariff barrier to trade.

The Japanese government and industry have been the catalyst, working in the Asia Pacific Partnership (APP) and within the International Electrotechnical Commission's committee system, to develop a new globally relevant energy test method that overcomes the shortcomings of existing test methods. This process has involved industry experts and efficiency advocates from a wide range of countries in an effort to not only improve on some of the testing concepts that originated in Japan but also quantify the key energy characteristics of refrigerators in a generic way to ensure that the test procedure will be suitable for adoption elsewhere in the world.

With the advent of sophisticated electronics in refrigerators, the objectives of a fair energy test capable of reflecting consumer use need to be balanced against the goals of test affordability, repeatability and reproducibility. The development of the new test method is being supported by field measurements as well as tests in state-of-the-art test facilities. Measurements during normal use are critical to verify that the test method is capable of broadly reflecting real usage while still being accurate and affordable in testing facilities. It is designed to be robust enough to hold any manufacturer accountable for claims about energy consumption.

Lloyd Harrington, Australian delegate to the IEC Refrigerator Standards Committee

In early 2010, Australia media reported that as many as a third of all products subject to mandatory energy efficiency laws were not meeting those requirements. The reports were citing the results of enforcement testing conducted over more than a decade showing test failures of that order. What the media did not report was that this enforcement testing was not a random sample representing the current market, but rather products specifically targeted because of a complaint or risk assessment.

Choice and its test facility, Test Research, had tested and published energy measurements for 270 refrigeration products over the last 20 years and we were happy to work with government officials to explore what the historical compliance rate was in the Australian marketplace. Based on these results, it indicated a historical compliance rate for these appliances in the order of 85% (representing less than half the non-compliance reported by the media). While this percentage still leaves room for improvement, it shows the value of collecting data that can be used to evaluate efficiency programmes accurately.

John Ashes, Australian Consumers Association, publisher of Choice magazine

10 Evaluate continuously

The function of enforcing rules may be seen as the end-point of a regulatory process; the outcome once all other options have been exhausted. In fact, it is just one option within a range of possibilities presented when MVE discloses problems. At this stage, government agencies should balance their obligations to the supplier accused of wrong-doing and their primary function as programme-administrator.

- **Enforce vigorously.** Government agencies that do not enforce the rules lose credibility. Purchasers of the incorrectly described product or competitors who have lost sales will not be satisfied with that outcome. Enforcement action against an individual company is not an admission that the programme has failed, rather the contrary. The more successful an agency is at enforcing, the less likely it will be required to enforce.
- **Adjust policies to new circumstances.** As technology develops and standards of energy efficiency in the marketplace rise, it may be necessary to recalibrate the system in order to avoid devaluation, so that only the very best products achieve the top grading. It will be necessary to respond quickly to developments in the prevailing technology and in the market to ensure that the programme and its enforcement remain relevant.

- **Measure success.** Specify both quantitative and qualitative measures as necessary elements to assess the success of any S&L programme. These will also include an awareness of the pitfalls to be avoided.

The result will be improved compliance

MVE activities are a means to an end. Ultimately this end is enhanced compliance through selective enforcement against the worst instances of non-compliance. The final two comments might act as a summary of this section on how to institute MVE activities. These views from a government official and a consumer advocate emphasise the need for MVE. Despite their unique perspectives, both agree that society will benefit as a whole from robust MVE compliance activities.



“ At the MVE Policy Pathway workshop, environmental non-governmental organisation advocates reminded participants that increased market surveillance is needed in many parts of the world, as energy efficiency policies become more and more essential. Although probably no system will ever be able to ensure a 100% level of compliance, there are many ways by which authorities can avoid consumers being duped by cynical, deliberate marketing strategies aimed at profiting from false or misleading energy efficiency and environmental claims. This is also in the interest of businesses to be confident in a fair, level playing field. Therefore monitoring, testing and enforcing the rules is a key benefit for consumers, businesses and the environment.

Edouard Toulouse, European Environmental Citizens Organisation for Standardisation

“ When considering market surveillance and enforcement activities, it is essential the authority has a full suite of enforcement actions available to it: not only criminal or civil sanctions, but a wider range of administrative provisions which can be used to encourage any business to become compliant and to discourage business to be non-compliant.

The authority can then choose either a partnership or adversarial approach depending on the circumstances. The first option builds a relationship with the company, helping them comply with the legislation and getting them to accept social responsibility for their products. The second approach should be used when the partnership approach does not result in compliance. In this case, a full suite of legal powers, formal procedures, administrative notices, and a capacity to litigate need to be available and used proportionally.

Enforcement effectiveness can be measured in terms of compliance by local, national, international and global companies all of which should comply with the legislation.

Hans-Paul Siderius, Chair, IEA Efficient Electrical End-use Equipment Implementing Agreement and Agentschap, NL Agency, Netherlands



Conclusions and considerations

For programme managers, implementing robust MVE activities as an essential component of S&L programmes, as stipulated in the IEA 25 Energy Efficiency Recommendations (IEA, 2008), is a means to measure and to motivate compliance, and ultimately improve the energy efficiency and performance of appliances and equipment.

The collective messages that can be drawn from the MVE framework and the case studies in the Annexes can be summarised as follows:

- MVE is about measuring compliance in the context of S&L programmes. It is a learning process striving for continuous improvement.
- MVE activities are not simple and may not be obvious to everyone at every stage of the Policy Pathway. MVE requires training and support for new programme managers. The complexity can be addressed through applying a checklist approach to avoid simple mistakes. Better practice involves reflecting on the data and information throughout the process to improve compliance.

- MVE activities chosen by the programme manager should be robust and adaptable enough to match needs with resources and the changing goals of maturing S&L programmes. MVE activities have to be tailored to legal requirements, the capacity of the people involved and the time available to complete the actions.
- People, experiences and information are readily available to provide advice. While each project manager must satisfy specific project needs, there are many lessons to be learned from comparable programmes and from those managing them.

MVE reports have been produced around the world for over 30 years. Any programme review should take these multiple experiences to improve their own programme. These key messages might be encapsulated by corrupting an old adage into a MVE proverb for engineers and policy makers alike: **If you need an MVE wheel, don't re-invent it yourself.**

Measuring and monitoring are important... ..

These conclusions are reinforced through four statements by Lord Kelvin (a 19th century British Scientist famous for encouraging measurement to validate theories). They showcase the progression from taking valid measurements to resultant enforcement action.

“To measure is to know”

MVE is measuring to uncover information

MVE in S&L programmes is about collecting data to measure compliance of the programme throughout its various stages (planning, implementing, monitoring and evaluating).

“If you cannot measure it, you cannot improve it”

MVE is repeating those measurements to confirm information

MVE is ultimately a tool for governments and policy makers to assess their own success as well as for stakeholders to make their own independent judgements about programmes. MVE schemes will reward S&L programme managers who undertake careful planning with low-cost, targeted outcomes establishing the effectiveness of programmes, and provide information to improve the programme. MVE can also penalise S&L programme managers who ignore it when this fact becomes known in the wider community.

“If you keep measuring it, you will know even more about it”

MVE is replicating the measurements to be certain of the information

The IEA encourages S&L programme managers to compare and evaluate their programme against other similar programmes, to learn from those experiences. This comparison might also lead to enhanced co-operation between programmes where sharing information about common activities can lead to economies of scale for MVE activities. No S&L programme should operate unilaterally, even those which believe themselves at the global cutting edge. This is because best practice is continually being reinvented within the numerous product types and various programmes now operating around the globe. Programme managers must make the time and secure resources to apply those lessons to their programmes if they are to improve their own schemes.

“The true measure of a man is what he would do if he would never be caught”

MVE at its heart is about action to enforce the rules

S&L programme managers who undertake MVE need not be concerned by this fourth statement. By actively undertaking MVE activities, they are helping participant suppliers to avoid circumstances where they might have to answer this question for themselves.

MVE is about measuring for a reason, a rationale, a purpose: to hold suppliers to account by monitoring, verifying and eventually enforcing the rules.

...but verification and enforcement need urgent attention

Finally, the IEA (and many of the experts contributing to this publication) encourage those undertaking MVE activities to place as much emphasis as possible, as quickly as possible, on verification and particularly enforcement activities. This is because historically they have received much less attention than monitoring activities.

Enforcement action that only results in further measurement and monitoring is a trap to be avoided by S&L programme managers. When S&L managers first embark on verification and enforcement activities, a common experience is the call by the party accused of wrong-doing to be provided with more information (to prove the complaint or for the tests to be repeated in the future so their engineering staff may be present). Another common tactic is to request a suspension of verification testing and enforcement action while the test method is updated, to take account of recent technology developments found within the tested product.

Sometimes, there is great value in prudent retesting to be certain of measurements which have significant commercial ramifications. However, this retesting is best carried out by the programme administrator before approaching the targeted supplier with serious allegations.

It may be convenient to compromise quickly and quietly between the accused company and the S&L programme manager on enforcement action. The terms of the result, however, must be available to other stakeholders (especially competitors) in order to be fair to all. The costs of S&L programmes are borne by all stakeholders, directly or indirectly, so they have an interest in ensuring that verification and enforcement outcomes are reasonable for the entire community.

It is surprising that so little enforcement is done when experience shows that just one instance of publicly reported enforcement can have positive compliance ramifications for not only the supplier involved but also on others for years to come.

Four phases	Ten critical elements	Thirty-three steps
PLAN	1 Determine legal framework	Incorporate compliance measures Determine whether voluntary or mandatory Prepare a compliance budget Share information Learn from comparable schemes
	2 Propose shared resource arrangements	Discuss sharing the costs Explore co-operation and partnerships
	3 Ask the difficult questions	Seek advice on programme weaknesses Invite solutions Fix policy goals and reporting requirements Encourage open debate on sanctions
IMPLEMENT	4 Establish transparent procedures	Publish guidelines Document sanctions Establish fair testing procedures
	5 Provide education and support	Provide training for manufacturers Provide support for test facilities Provide public access to product information
MONITOR	6 Match data collection and analysis to priorities	Decide what data to collect and from whom Decide what equipment to test Decide how to analyse the results
	7 Assess compliance levels	Assess non-compliance Consider different types of non-compliance Focus on risk
EVALUATE	8 Communicate openly	Report test results Establish channels of communication Name non-compliant suppliers Decide who has access to the data
	9 Accept diversity	Respond proportionately Involve other stakeholders Respond to international obligations
	10 Evaluate continuously	Enforce vigorously Adjust policies to new circumstances Measure success



Annexes

The following case studies illustrate how MVE activities have been applied in a specific country and for a specific technology type. They are presented to reinforce the lessons drawn from the critical elements of the Policy Pathway, and as representative of how to consider applying MVE activities to particular geographic and/or technological circumstances.

The two case studies provide just a taste of the range of past MVE practices and experiences. With as many as 1 300 types of appliances and equipment subject to S&L policies, additional case study experiences are readily available (see **Sources for further information**).

Case study 1: Selected MVE experiences from the Australian S&L programme

When the various states in Australia agreed in 1992 to operate consistent national labelling for energy efficiency programmes, best estimates were that maybe 20 regulatory officers were involved at the time. In 1998, when the Australian Greenhouse Office was created by the federal government, it added another four full-time staff. In 2010, close to 40 staff work in the relevant federal agency and at least that same number work in the various state agencies on S&L projects.

While the reasons for the staff increases go well beyond resourcing the necessary levels of MVE activities, the positive and negative experiences arising from the Australian S&L programme did contribute to positive decisions to increase MVE activity and the staff involved.

Four technology examples are provided in this case study about the Australian experience, as follows:

- mercury in fluorescent lamps sold in Australia;
- benchmarking air conditioners sold in Australia with those sold overseas;
- appliance energy efficiency labelling in Australia;
- satellite set-top boxes sold in Australia.

The first two examples were revealed to all stakeholders when national or international MVE activities discovered the results. The reported MVE activities provided reliable information against which all stakeholders were able to review past decisions, thus creating a climate where consensus was reached quickly to institute or accelerate regulation.

MVE is not always a negative experience for stakeholders. The third example illustrates that consistently repeated work with motivated stakeholders can create a culture of compliance, even if specific enforcement action is taken along the way. The final example shows how creating a positive investment environment for industry can lead to very positive energy efficiency and environmental outcomes for the wider community. These examples are drawn from four technology types using significant amounts of energy in the Australian residential sector: lighting, air conditioning, white goods (major household electrical appliances), and home entertainment.⁷

⁷ Each of the four examples are introduced using a quote from Lord Kelvin.

Mercury in fluorescent lamps sold in Australia

Fluorescent lamps are a type of gas-discharge lamp that uses electricity to stimulate mercury to produce ultraviolet light which, in turn, causes a phosphor to fluoresce, producing visible light. Other substances can achieve the same outcome as mercury, but are generally more expensive. Higher mercury content is a cheap means to improve energy efficiency.

Mercury, however, is hazardous to humans and was already the subject of a worldwide voluntary agreement between environmental agencies and the global lamp manufacturers. In place for many years, it was agreed that manufacturers would not use more than 15 mg in any form of fluorescent lamp.⁸

The European Union directive on *Restriction of Hazardous Substances (2002/96/EC)* was announced to go further, imposing a regulatory limit of 8 mg mercury per lamp for linear fluorescent lamps with a long life, and 5 mg mercury for lamps with a normal life within its territory.

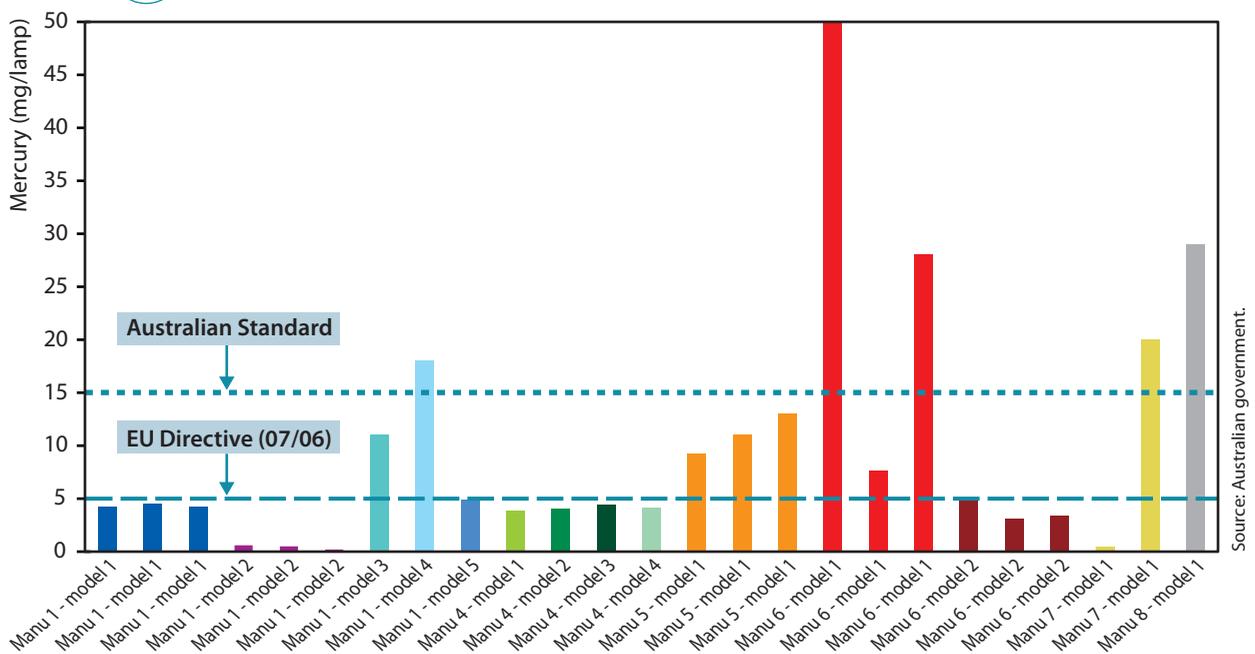
8 www.rohs.gov.uk/content.aspx?id=18

The Australian government had previously established efficiency standards for linear fluorescent lamps and was developing standards for compact fluorescent lamps. Environmental groups raised the issue of also imposing mercury limits at the same time. Other interests opposed that suggestion, arguing that mercury testing was not necessary given that European regulations would reduce mercury below the proposed Australian regulatory level. When data confirming the claim could not be provided, energy regulators determined to test 25 linear and 14 compact fluorescent lamps in close co-operation with 8 participating major suppliers and Lighting Council Australia.

MVE results

Most linear models met the proposed Australian regulatory limit of 15 mg. Of the 20% of linear lamps that did not, of most concern was the extremely high value (83 mg or more than five times the proposed limit) found in one lamp. A higher percentage of compact fluorescent lamps tested met the 5 mg limit, but of the two exceptions, the worst had 44 mg (almost three times the proposed Australian limit and nine times that proposed in Europe).

Figure A1 Results of mercury content tests in linear fluorescent lamps



Source: Australian government.

MVE considerations

This resulted in Australian government regulatory agencies recommending to ministers that:

- mercury in all lamps types should be regulated to not exceed 15 mg in consumer lamps as a matter of urgency; and
- a second regulatory tier matching Europe should commence several years later, subject to due regulatory processes.

The unexpected test findings also resulted in a debate about public disclosure of the findings. Ultimately, none of the companies selling lamps with excessive mercury was named for various reasons: mercury restrictions were not in place in Australia; some of their products met the proposed requirements; and the action of naming sub-optimal suppliers was not agreed with participants prior to testing. Had discussions about disclosure been held prior to testing, the decision might have been different.

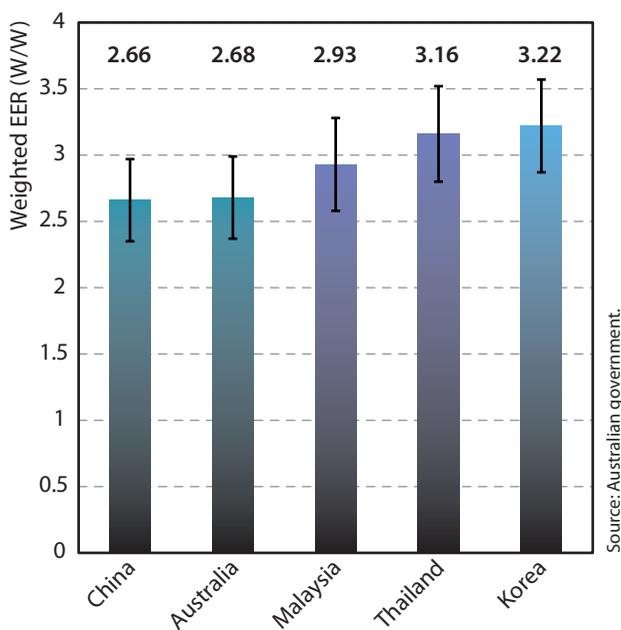
Benchmarking Australian air conditioners against supplying countries

Mandatory energy efficiency labelling for air conditioners has been in place in Australia since 1994. Prior to the introduction of new efficiency regulations in October 2004, a regional benchmarking comparison of air conditioners was commissioned. The objective was to examine the effectiveness of the Australian labelling scheme by comparing the energy efficiency of the existing stock of air conditioners in Australia with those in supplying country markets. The other countries measured (China, Malaysia, Thailand, and Korea), together with Japan, represent the five major countries supplying air conditioners to the Australian market, which is dominated by products sourced from China (50%).

MVE results

Figure A.2 shows an indicative sales-weighted energy efficiency ratio based mainly on catalogue data collected for all major known brands in each of the five countries (higher values represent more efficient products). The methodology was replicated in all locations; the error bars correspond to the largest deviation found by using average brand energy efficiency ratios.

Figure A2 Five-country air conditioner efficiency comparison, 2004



The study showed that despite mandatory labelling of air conditioners for more than ten years to encourage more efficient purchasers, the Australian marketplace was very similar to the brand-name market in China and trailed other supplying countries, especially those with aggressive standards schemes already in place.

MVE considerations

As a result of the study, the Australian air conditioner industry agreed to accelerate the second regulatory efficiency level for air conditioners. This enforcement date had been already agreed to and scheduled for October 2007, but was brought forward to April 2006. Without this international comparison, such acceleration would never have been proposed by regulatory agencies or accepted by the domestic Australian industry. This second regulatory level was aligned with that in Korea, thus giving all parties in Australia the certainty that efficient products would be available on the Australian market (because they were already available in Korea).

Appliance energy efficiency labelling in Australia

Mandatory labelling requirements for major consumer appliances like refrigerators, dishwashers, clothes washers and dryers have been in place in Australia since 1992. By the end of the 1990s, the market only sold efficient products at the top end of the scale with new efficient models planned for release that were off-the-scale, making it difficult for consumers to choose efficient appliances. In 2000 regulators decided to increase the stringency of the various categories within the label, and undertook a national survey in 2001 to measure compliance with the new label algorithms.

Three national surveys have since been conducted. Each followed a similar pattern: appliances for sale on retail showroom floors (in about 400 stores spread across store types and locations examining around 25 000 units each time) were inspected to determine whether the appliances displayed the mandatory label. This survey represented the inspection of almost 10% of appliances displayed in showrooms throughout the country at the time.

MVE results

Figure A3 shows the small but steady improvement found by these surveys, from 94% in 2001 improving to 98% on average across the nation in 2009. The improvement could be a result of three factors, reflecting: 1) increasing support among suppliers and retailers for labelling; 2) the response to increasing community awareness about climate change; and, according to Australian energy regulators, 3) the subsequent compliance action taken after each survey. The survey results were presented to stakeholders in a variety of forms; the national average, tallying the results from six states and the Australian Capital Territory, can be seen in the figure.

MVE considerations

When the overall results for each survey were finalised, government authorities not only reported the general outcome to the wider community and store associations, but also wrote to each examined store showing them their results in comparison to local competitors. Some of the poorest performing stores were formally warned about breaching the labelling regulations. Appliance suppliers were also given information about their comparative results.

Western Australia recorded the worst result of any state in 2001. The local regulator subsequently launched three successful proceedings where courts imposed fines on three stores that offered appliances for sale without displaying the mandatory label. It is interesting to note that Western Australia led all states in the 2009 survey with 99% compliance. Australian measurements rival the best reported compliance rates in the world of this form of S&L requirement.

Figure A3 Comparative results of three appliance labelling surveys in Australia



Key: WA = Western Australia; Tas = Tasmania; Vic = Victoria; SA = South Australia; QLD = Queensland; NSW = New South Wales; ACT = Australian Capital Territory.

Satellite set-top boxes in Australia

Australia implemented a regulatory standard setting limit for standby and on-mode power used by terrestrial free-to-air set-top boxes (STBs) in 2009 after several years of negotiation. This followed existing regulatory process in Australia and these products have been regulated in other jurisdictions like California. This was easy in comparison to improving the efficiency of Digital TV used in connection with subscription television services (satellite STBs). These appliances do not fit the usual regulatory process mould.

The imposition of mandatory energy efficiency standards for satellite STBs has proved difficult everywhere. The reasons are numerous: the diversity of the devices, the speed of technological development, the technical complexity of platforms on which they operate, differing market conditions, and complex legal issues associated with how they are marketed to consumers. In 2007, Australian energy regulators recognised that a dynamic marketplace and product would be better served with a policy tool that could respond to the goals of encouraging product innovation and efficient energy consumption.

Discussions with the industry association representing the Australian subscription broadcasters led to a voluntary agreement beginning in 2010. This agreement not only accelerates retirement of less efficient STBs, but also agrees to only specify cutting edge technology for all new STBs sourced from manufacturers in the future. Although this is a voluntary agreement, subscription broadcasters are bound by the arrangements once they agree to the terms.

These arrangements require that they deliver more efficient satellite STBs to the marketplace at rates beyond what the companies have delivered in the past. Subscription broadcasters (who supply more than 99% of satellite STBs in Australia) agreed to these arrangements and also the MVE activities monitoring, verifying and enforcing those terms. Regulators describe this S&L arrangement as quasi-regulatory because it delivers measurable improvements and action for non-compliance can still be taken.

MVE results

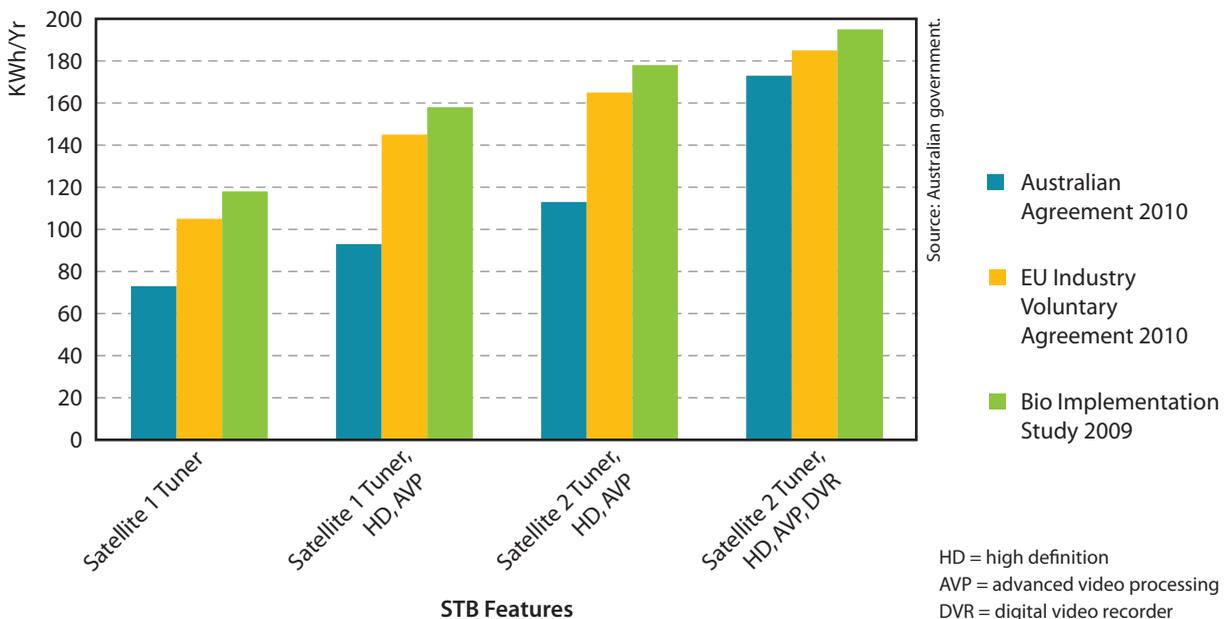
Against this backdrop of a quasi-regulatory compact between energy efficiency agencies and subscription broadcasters, it might have been expected to lead to conservative targets being agreed by the parties. However, this is not the case. Australian satellite STBs providers agreed to arrangements they know they can meet.

These deliver better efficiency outcomes than the alternative arrangement operating in Europe, based on the needs of the Australian operating platform, on a voluntary basis. MVE is critical to delivering these claimed energy efficiency improvements.

MVE considerations

The agreement will be monitored by agents of the energy regulators who may pose as customers to test whether accelerated retirement schedules are being met. The contracts specifying future satellite STB purchases are also passed through to regulatory experts to ensure that new purchases meet energy efficiency goals. In the unlikely event that broadcasters breach the agreement, they are aware that one of the sanctions could possibly be proceedings brought by the national consumer protection agency. In summary, the agreement includes market surveillance, punitive measures for non-conformance, an annual energy consumption study, and a process to establish and review more stringent tiers to the agreement in future.

Figure A4 Energy consumption comparison of three agreements/proposals for efficiency of satellite set-top boxes



Case Study 2: Lighting

This technology case study tracks the developing global co-operation for residential lighting around the world. Such co-operation is gathering pace, but it is still some way from delivering globally significant energy efficiency improvements. It is fair to say that the important steps already taken provide a level of confidence that the very negative experiences surrounding past lighting technology types do not have to be repeated.

This case study was used as an example by the IEA in papers produced for the Clean Energy Ministerial. This revision focuses more on MVE activities and consensus on S&L projects needed for lighting.

“As countries throughout the world transition to newer lighting technologies such as LEDs, it is critical that lessons are learnt from the CFL case study. Consumers are happy to try new technologies but once disappointed they are lost for a long period, irrespective of later lamp improvements. Consumers need to be protected so their first new lighting experience is not sacrificed, because the product was brought to market quickly to maximise industry returns or even to satisfy the green agenda. Regulators and suppliers have to agree on compliance systems (with standards for performance requirements and testing capacity) that protect the consumer from that initial negative experience and conversely ensure quality lamps can be recognised and rewarded. Developing world industry and governments must be intricately involved in this compliance process because increasingly their companies supply the world and their populations are the majority of consumers.”

*Stuart Jeffcott,
Lighting Energy Efficiency Advocate*

Past history

Compact fluorescent lamps (CFLs) were an early target of market transformation programmes in many countries. Early gains in market share in some developed countries were offset by slow adoption in others as lingering perceptions of poor product performance combined with other market barriers hindered widespread use. Product availability was also limited until manufacturers ramped up production in the late 1990s and early 2000s.

There were a number of market barriers: absence of a widely accepted, international test measuring CFL energy performance; limited facilities to test products and verify compliance; a wide range of efficiency performance but seemingly unrelated to price or brand name; and the proliferation of inconsistent or poor performing products.

Many countries wasted resources in developing their own performance specifications, test methods, compliance and verification procedures seemingly in competition with other schemes. Poor lifetime and light quality threatened to dissuade consumers from continuing to use CFLs.

Global market transformation efforts, including the creation of a harmonised test method and a suite of performance tiers, helped redefine manufacturing expectations and lay the groundwork for the broader phase out of incandescent lamps in many countries.

The opportunity

Lighting is a major electric end-use, accounting for 2 650 TWh per year of electricity: 19% of global electricity production in 2005. Throughout the world, incandescent lamps remain the most common source of lighting in the residential sector. These lamps account for 30% of global lighting electricity consumption with an average of 20 incandescent lamps per household in IEA member countries (IEA, 2006).

Incandescent lamps are extremely inefficient, converting only 5% of the energy they consume into visible light. More efficient alternatives represent one of the best opportunities for large-scale, cost-effective, and rapid reductions in global electricity consumption and greenhouse gas emissions, but those alternatives faced competition from the ubiquitous, very cheap incandescent lamps (even with poor energy performance and a short lifetime).

Compact fluorescent lamps (CFLs) were first introduced in the 1970s and still represent a viable, energy-efficient alternative to incandescent lamps used for general service lighting. CFLs produce approximately four times the light per watt of electricity compared to incandescent lamps (in other words, 75% energy savings) and should last six to ten times longer. The first generation of CFL technology had a number of drawbacks that limited their widespread adoption. As with all gas discharge lamps, CFLs require a ballast to operate. The development of self-ballasted, screw-based CFLs that could be readily installed in existing light fixtures was delayed, limiting its initial appeal to a broad audience of consumers. Early CFLs were bulky and oddly shaped making it difficult to use them in many existing light fixtures. They also exhibited flickering, long warm-up times, and colour shifts leading many consumers to abandon the technology after trials. These problems continued for some time, contributing to negative perceptions of the technology and aversion by many consumers.

By the mid-1990s, the major lighting manufacturers had addressed all such issues, and were marketing high-quality CFLs in a range of sizes and shapes to fit most fixtures and sockets where incandescent lamps are typically used. Moreover, the maturing technology was attracting new manufacturers offering a new generation of low-cost but poor quality CFLs. This continued the negative perception of many consumers. An improved infrastructure for CFL performance testing and compliance became a critical component in efforts to ensure consumer acceptance and viability of CFLs and deliver the tremendous energy savings opportunity they represent.

Market transformation efforts

CFLs represent one of the earliest attempts at market transformation. The significant energy savings, number of existing light sockets, frequency of lamp replacement, and relatively low cost compared to other energy-using products made CFLs extremely attractive as one of the cheapest and easiest ways to save energy.

In 1990, market share for CFLs was well below 1% in IEA member countries where early production and promotion was focused (PNNL, 2006). Co-ordinated national promotional campaigns and bulk procurement efforts in Europe and Japan resulted in rapid and significant increases in CFL penetration. By the mid-1990s, surveys showed that around 50% of households in many northern European countries, and 20% of households in the United Kingdom had tried using CFLs (Calwell *et al.*, 1999). CFLs and linear fluorescent lamps accounted for 80% of residential lighting in Japan (PNNL, 2006).

CFLs were slower to catch on in the United States. Throughout the 1990s, utilities and regional energy efficiency organisations focused on addressing the barriers to greater adoption of CFLs. Rebates, coupons and bulk purchasing opportunities were provided to address high CFL prices. Marketing and educational campaigns were launched to improve consumer awareness and address consumer confusion about CFL selection and use. Retailers were targeted with incentives and training to encourage better stocking, and promotion to increase the availability of CFLs in a wide range of retail outlets, including grocery stores where most consumers typically purchase incandescent lamps.



Despite these efforts, the adoption of CFLs grew very slowly throughout the 1990s as consumer perceptions of poor lighting performance lingered and, in some cases, was reinforced by an increase in the number of low-cost, low-quality products entering the market from newer sources. In 1999, the United States Department of Energy (DOE) released the first ENERGY STAR specification for screw-based CFLs. In order to qualify for the endorsement label, products had to meet energy and performance criteria. The ENERGY STAR programme provided a common set of performance criteria and a marketing platform; it became the basis for market transformation activities in the United States. Similar criteria and programmes were also developed in the United Kingdom by the Energy Saving Trust, and in Denmark by their Danish equivalent.

Although market share continued to grow throughout the developed world, albeit slowly in some countries, several factors served to drive a greater urgency for an accelerated market shift towards CFLs and the recognition that only by concerted global action could effective market transformation occur. Growing concern about climate change and aggressive national commitments to reduce carbon emissions led many countries to redouble their efforts at capturing the energy savings available from CFLs.

At the same time, the shift to manufacture in China led to a high volume of CFLs of inconsistent quality which threatened to reverse gains made with consumers (or result in a repeat of the early CFL situation in countries where CFLs were being introduced widely for the first time). The need for an international infrastructure for effective performance measurement, verification and compliance became increasingly clear.

In 2005, the International CFL Harmonisation Initiative (CFLI) was launched as the result of an initial dialogue on the need for a harmonised CFL test method and performance specifications to improve product quality, reduce compliance costs and increase industry capabilities. Eighty individuals representing 13 jurisdictions signed the initial communiqué outlining five key priority actions for the CFLI (CFLI, 2005):

- **Testing methodology:** developing an agreed test procedure for self-ballasted CFLs for submission to the International Electrotechnical Commission for publication as an international standard.
- **Performance specifications:** developing a number of performance specifications for self-ballasted CFLs of increasing stringency for use by government or private sector bodies for regulatory or voluntary programmes.
- **International test facility product testing** (proofing the scheme): establishing a product-testing programme to proof the test methodology developed under the CFLI, benchmark the performance of testing facilities around the world, and take steps to increase the capacity of testing facilities.
- **Compliance mechanisms:** developing common procedures to demonstrate CFL compliance with reported performance level based on testing in accordance with the agreed test method.
- **Informing the international lighting community:** developing transparent procedures to communicate the activities of the CFLI and to allow for the participation of all interested stakeholders.

Past results

Between 2005 and 2008, the CFLI convened ten meetings to share progress and further co-ordinate activities within the priority areas identified to help lay the foundation for an accelerated transformation of the global CFL market. This group of experts from industry, governments and testing houses drove the creation of global co-operation in just three years (after 30 years of ineffectual action). Over the course of the initiative, a number of accomplishments were realised.

The existing IEC test methodology was fully revised by participants to better reflect the needs of the rapidly developing consumer demands and the associated regulator requirements to manage the market. To ensure as widespread adoption as possible, the revised methodology was re-submitted to the IEC for formal revision and adoption.

Three tiers of performance were developed which allowed for the identification of good, better and best performing lamps in the marketplace, as well as tiers for use in minimum standards, major procurement programmes and identification of premium products.

A network of laboratories in North America, Europe, China, the Philippines and Australia conducted round-robin testing to verify the viability of the test methodology and the practicability of the performance level. This testing met the technical needs of the project. Simultaneously, it helped forge mutual understanding and trust between the laboratories that has led to ongoing collaboration and mutual recognition of testing laboratories by a number of disparate programmes in various parts of the world.

Laboratories in China and India have also been working together and recently completed a comprehensive market investigation of the performance and mercury content of over 3 000 CFLs purchased in six Asian countries. This once more highlighted the need for ongoing collaboration and market regulation as 50% of the lamps were rated below “good” with a significant proportion of these actually rated as “very poor”.

However, it must be said that the initiative was not an unbridled success. Despite the development of the performance tiers, few countries or programmes have been able to adopt them.

Due to the late development of an effective test standard and set of performance levels at an international level, most countries already had adopted and revised the IEC standard locally and developed their own level of performance. Consequently, each country/region had significant political capital associated with “their” standard and adopting an “international standard” was made more difficult.

Key manufacturers failed to fully embrace the initiative due to the slow adoption in Asia and the apparent “solution” to quality issues in Europe and the United States, through regulation and voluntary programmes, made the creation of a globally recognised product registry next to impossible.

Nevertheless, the CFLI has led to two major breakthroughs in Asia.

- **LITESASIA:** Although the performance levels developed under the CFLI have yet to be adopted in many Asian countries, the initiative itself highlighted the need for closer co-operation between these increasingly linked trading nations. This view is endorsed at ministerial level in both APEC and ASEAN. Further, as most countries in Asia are under a policy mandate to adopt IEC standards wherever possible, the CFLI highlighted effective routes to influence the IEC in ways not previously envisaged by most Asian countries. This resulted in the formation of LITESASIA which has two express goals.

A forum was created where a wide range of stakeholders meet on a three to six-monthly basis to share information on the standards and regulatory developments in their jurisdictions. This is exciting because the stakeholder groups are not just from manufacturers and test laboratories, but also involve policy makers, utilities and major purchasers. This brings a much wider understanding of overall market needs both locally and within the trading block, leading to more appropriate regulatory outcomes.

The second goal is to create a focal point for Asia to interact with the IEC lighting development committees. While not participating in the IEC lighting standards committees (this can only be done by country representatives), LITESASIA ensures that all key stakeholders within Asia are aware of ongoing developments within the IEC. Thus LITESASIA facilitates the effective consideration of proposals in the region, gives appropriate and timely feedback on the IEC standards development process, and voices Asian needs.

- **Asia Lighting Compact:** Despite multinational manufacturer reticence in developing global standards of performance for CFLs, they have wholeheartedly adopted the concept within Asia. This has resulted in the formation of the Asia Lighting Compact (ALC) which is an independent, incorporated body that establishes performance standards and manages a database of qualified products from across the region. Initially only focusing on CFLs, this member-funded initiative is now seeking to move into other areas of regional need including light-emitting diodes (LEDs).

The CFLI has made one international breakthrough, in establishing that global co-operation is possible, which can provide all stakeholders with mutually beneficial outcomes. However, co-operation must be started at the earliest possible opportunity to ensure national positions do not become entrenched and overwhelm the common good.

Conclusions

CFLs are a global co-operation success story of sorts. The global market for CFLs has grown exponentially over the past two decades. In 1990, worldwide sales of CFLs totalled 83 million (with the majority in the commercial sector), but by 1997 global sales had grown to 356 million CFLs (PNNL, 2006). From 2005 to 2007, global production of CFLs increased by 70% with more than 3.7 billion lamps produced in 2007 (Waide, 2010). As of 2009, China accounted for more than 90% of global CFL production with 60% of lamps produced for export and the remainder sold within the Chinese market (Jeffcott, 2010).

Market penetration of CFLs has grown in all regions and continued growth is expected in light of mandatory requirements to phase out incandescent lamps in the most common wattages and applications in jurisdictions around the world. Australia, Canada, the European Union, the Philippines, South Korea, the United States and many other countries have enacted regulations mandating the phasing out of general service incandescent lamps between 2009 and 2014. The specific performance requirements and scope of the regulations vary from country to country. CFLs are expected to fill the majority of light sockets where incandescent lamps were previously installed. Some countries have adopted minimum efficiency standards and/or mandatory performance specifications for CFLs to keep poor quality lamps out of their markets. In countries without these requirements, ongoing efforts to identify and promote high quality CFLs may be required. Some countries have announced aggressive subsidy programmes to phase out lower quality lamps.

Lessons learned

International experience with CFLs yields a number of valuable lessons for future market transformation efforts. These lessons may prove particularly salient for the emerging market for solid-state lighting.

- A single test method, accepted globally by stakeholders, can minimise the burden on manufacturers, governments and others involved in product regulation or promotion.
- Alignment of performance specifications across the globe can provide clear guidance to manufacturers about expectations for product performance while maintaining flexibility for different jurisdictions to establish regulatory requirements or design voluntary recognition programmes suited to their market.
- A set of established performance specifications is needed which can be measured by qualified persons in accredited testing facilities. This has the advantage of holding suppliers accountable and offers a means to counter negative consumer experiences from poor quality products. This is particularly important for new lighting technologies because end-users are very sensitive to lighting quality.
- Early adoption of common test standards and performance metrics can lower compliance costs and help to reduce product costs, leaving less room for low-quality products to gain a foothold or dampen consumer interest in the new technology.
- A transparent process open to input from all interested stakeholders will gain wider and quicker acceptance, and is more likely to identify potential barriers or points of contention before final decisions are made (while they can still be addressed).
- Minimum energy performance standards may be required to phase out an inferior technology that is well established due to low cost, market structures, consumer habits and preferences.
- Consumer education is crucial, especially on the most appropriate applications for the technology. So is providing accurate information on how the technology will function (including information about any limitations or differences in the technology relative to conventional alternatives). Promote, but do not oversell, the non-energy benefits and other attributes of the new technology.
- Successful market transformation is built on relationships with manufacturers, retailers and other trade allies to leverage their expertise in developing customer-friendly programmes, advertising and education to build consumer awareness and interest.

Sources for further information

A range of other bodies are working in or advocating enhanced MVE as part of appliance S&L programmes. Interested persons should contact any or all of these bodies to ascertain if their past or forthcoming activities are of interest.

The bodies listed below are representative only, space constraints do not allow for a full listing of all the organisations involved in or commenting on MVE activities.

IEA Efficient Electrical End-use Equipment Implementing Agreement (4E)

Eleven IEA member countries joined forces in an international collaborative programme to promote wider use of more energy-efficient electrical equipment. This co-operation was created by the IEA Governing Board in March 2008.

The Implementing Agreement focus is on efficiency of electrical end-use equipment. More than ever, energy efficiency is the top priority on the international agenda. They claim that very substantial gains are possible if energy efficiency issues are addressed through international co-operation and interaction, especially crucial when responding to governments' need for guidance. The IEA Implementing Agreement provides this essential collaborative tool.

In undertaking MVE activities, more emphasis should be put on Verification and especially Enforcement activities, because here lies the real information gap.

*Hans-Paul Siderius,
Chair of the IEA Efficient Electrical End-use
Equipment Implementing Agreement*

The Implementing Agreement held an International Conference on Compliance in Energy Efficiency Programmes for Electrical Equipment on 14-16 September 2010 in London.⁹ The conference examined the following issues:

- Effective compliance regimes are needed to ensure that efficiency programmes continue to deliver energy and greenhouse gas savings at low cost.
- High compliance rates safeguard these programmes from losing consumers' and industry's confidence.
- Compliance is a major concern to all market participants who have an interest in maximising energy efficiency.

Interested persons should examine the conference proceedings and explore what further activities 4E plans to conduct about MVE.

For more information, visit www.iea-4e.org

The Collaborative Labelling and Appliance Standards Program (CLASP)

CLASP is a non-profit corporation which started in 1996. It claims to serve as the world's voice and resource for energy efficiency S&L worldwide. CLASP promotes best practice in S&L by:

- working with in-country technicians and officials responsible for S&L programmes;
- providing assistance with S&L programmes conducted by 57 countries, covering 46 different energy-consuming products;
- developing S&L tools (a guidebook for S&L policy makers and implementers, a comprehensive website, data collection protocols, and an impact evaluator), disseminating information, and otherwise supporting S&L practitioners worldwide;

⁹ Conference programme available at: www.iea-4e.org/files/otherfiles/0000/0087/MVE_Conf_Programme_Agenda_250810.pdf

- facilitating regional collaborations directed at adopting common procedures, mutual recognition of test results, and/or alignment of performance standard levels and energy labelling criteria for particular appliances.

“CLASP encourages holistic approaches to S&L development including strong MEPS, labelling and communication best practices, rigorous MVE, and complementary compliance and market transformation policies, based on the needs and contexts of individual country programmes.”

Christine Egan, Executive Director, Collaborative on Labelling and Standards Programs

CLASP produced a guidebook on monitoring, verification and enforcement in appliance standards and labelling programmes which is a comprehensive publication of more than 100 pages (CLASP 2010). This text is a useful guide for those who seek more detail. CLASP also offers training courses for government officials and other stakeholders interested in aspects of S&L. CLASP gave financial support to persons from developing and transitioning economies to attend the 4E conference.

For more information, visit www.clasponline.org/index.php

The Energy Charter

The importance of energy efficiency and its relation to a cleaner environment was underlined in the 1991 Energy Charter Declaration. The subsequent Energy Charter Treaty, in particular, Article 19 of the Treaty, requires that each Contracting Party minimises, in an economically efficient manner, harmful environmental impacts arising from energy use.

The emphasis in the work on energy efficiency activities in the charter process is not on legal obligations, but rather on the practical implementation of a political commitment to improve energy efficiency. This is promoted through policy discussions based on analysis and exchange of experience between the member countries, invited independent experts and other international organisations.

The Energy Charter provides its member countries with a menu of good practices, and a forum in which to share experiences and policy advice on energy efficiency issues. Within this forum, particular attention is paid to aspects of a national energy efficiency strategy such as taxation, pricing policy in the energy sector, environment-related subsidies and other mechanisms for financing energy-efficiency objectives.

Energy Charter staff participated in the IEA MVE workshop and several members attended the 4E conference in London presenting their experiences.

“The Energy Charter is keen to expose our member countries, which are emerging and developing economies, to proven energy-efficiency and environmental mitigation policies and measures. Standards and labelling are such programmes, but, if countries are just commencing policies or measures, they really should focus on planning for the necessary monitoring, verification and enforcement steps that are affordable, acceptable and effective in their country.”

Boris Petkov, Senior Expert, Energy Efficiency, Energy Charter

For more information, visit www.encharter.org

Renewable Energy and Energy Efficiency Partnership

The Renewable Energy & Energy Efficiency Partnership (REEEP) is a non-profit, specialist change agent aiming to catalyse the market for renewable energy and energy efficiency, with a primary focus on emerging markets and developing countries.

- REEEP initiates and funds projects, and targets interventions in two specific areas that offer the greatest potential for developing the market for sustainable energy: 1) assisting governments to create favourable regulatory and policy frameworks and 2) promoting innovative finance and business models to activate the private sector.
- REEEP develops and supports policy-maker networks with initiatives such as the Energy Efficiency Coalition (EEC), the Sustainable Energy Regulation Network (SERN) and Renewable Energy and International Law (REIL).
- REEEP disseminates and replicates learning through news items, publications, its website and events.

The Partnership was established at the 2002 World Summit on Sustainable Development in Johannesburg, South Africa. It now has 300 partners including 45 governments and a range of private companies and international organisations. The REEEP Regional Secretariats around the world, including China and India, ensure that activities are locally relevant and focused.

In the S&L field, REEEP is seeking support to hold a workshop in the Pacific during 2011 to promote the benefits of compliance activities for local programmes which are in the process of being launched.

For more information, visit www.reeep.org

“ There are many areas where funding can support energy efficiency in developing countries. Of utmost importance, is in filling in the gaps with real information about enforcement issues, here we see a critical role for standards and labels of appliances and specific codes for buildings and transport. What seems to be the most important precondition is to gather exact data and information about energy consumption in different sectors.

Marianne Osterkorn, Director General,
Renewable Energy and Energy Efficiency
Partnership

Other relevant sources

The **American Council for an Energy-Efficient Economy** (ACEEE), a non-profit organisation founded in 1980, is dedicated to advancing energy efficiency as a means of promoting economic prosperity, energy security, and environmental protection. ACEEE's programme areas include:

- Energy Policy (primarily federal and state).
- Research (including programmes on buildings and equipment, utilities, industry, agriculture, transportation, economic and social analysis, behaviour and human dimensions and international energy efficiency issues).
- Communications (including conferences, publications, and development, including all programmes).

For more information, visit www.aceee.org

The **Asia Pacific Energy Standard Information System** (APEC ESIS) is part of the APEC Expert Group on Energy Efficiency & Conservation (EGEE&C) and provides the following services:

- Up-to-date information on appliance and equipment energy standards and regulations.
- Links to experts and information related to standards and regulations being used by APEC and other economies.
- A regular newsletter with news updates and a listing of new and proposed standards in the region (APEC Standards Notification Procedure).

- A user-friendly way for Key Contacts in APEC economies to review the listing of standards for their economies so that they can be updated systematically and regularly.
- “Communities of Practice” for experts and officials to discuss efforts to harmonise and rationalise the testing, labelling, and minimum energy standards for specific appliances and equipment.

For more information, visit www.aceee.org

The **Alliance to Save Energy (ASE)**, a non-profit organisation founded in 1977, supports energy efficiency as a cost-effective energy resource under existing market conditions. It advocates energy efficiency policies which minimise costs to society and individual consumers, and also lessen greenhouse gas emissions and their impact on the global climate. ASE undertakes research, educational programmes, and policy advocacy, designs and implements energy efficiency projects, promotes technology development and deployment, and builds public-private partnerships in the United States and other countries.

The ASE promotes energy efficiency worldwide to achieve a healthier economy, a cleaner environment and greater energy security.

The ASE strives to be the world’s premier organisation promoting energy efficiency to achieve a healthier economy, a cleaner environment and greater energy security. To achieve this goal, the ASE:

- Leads worldwide energy efficiency initiatives in research, policy advocacy, education, technology deployment, and communications that impact all sectors of the economy.
- Provides vision and activism through its board of directors, which includes leaders from business, government, the public interest sector and academia.
- Initiates and participates in public-private partnerships, collaborative efforts, and strategic alliances to optimise resources and expand its sphere of influence.

- Executes its mission through a team of recognised energy efficiency experts and professionals.

For more information, visit www.ase.org

The **European Council for an Energy Efficient Economy (ECEEE)** is a non-profit organisation

based in Stockholm. ECEEE participates in a number of EU policy making and advisory forums, and frequently comments on European energy policy through position papers and responses to public consultations, holds expert workshops and briefings for policy makers, and co-operates with the European Commission, Parliament and European Union presidency to hold expert seminars.

For more information, visit www.eceee.org

The **Energy Saving Trust** is the United Kingdom’s leading independent organisation helping consumers to save energy and reduce carbon emissions by:

- providing expert insight and knowledge to industry and media about saving energy, conserving water, and reducing waste
- using our national advice network to provide impartial advice tailored to each individual’s circumstance
- helping local authorities and communities with energy saving projects
- providing quality assurance for products, services and installers
- training businesses to give accurate, reliable energy-saving advice to their customers.

Energy Saving Trust Recommended is a voluntary product labelling scheme covering 31 products across home appliances, consumer electronics, IT, insulation, heating, lighting and glazing sectors. It was developed 10 years ago to help British consumers identify the most energy efficient products available on the market. Consumers look for the logo on products to save money and help reduce carbon emissions.

Manufacturers, suppliers and retailers join to satisfy their customers' demand for clearly labelled, high performing energy-saving products, as well as to meet their own environmental responsibilities.

The label promotes only the most energy efficient products which have to meet strict criteria on performance. These are peer-reviewed by industry experts before introduction or change. To maintain credibility, Energy Saving Trust Recommended independently tests 1 in every 15-20 certified products each year to make sure they meet the criteria.

For more information visit:

www.energysavingtrust.org.uk/estr

ENERGY STAR is a joint programme of the United States Environmental Protection Agency and the United States Department of Energy helping to save money and to protect the environment through energy efficient products and practices. The programme website reports:

- By using unbiased information, market-based partnerships, objective measurement tools, and consumer outreach, the programme identifies and dismantles market barriers. Since its launch in 1992, the programme has transformed the marketplace by providing trusted, unbiased information to homeowners, businesses, and consumers on reliable, cost-effective, efficient products, services, and practices that reduce greenhouse gas emissions.
- As of 2009, more than 17 000 organisations have partnered with ENERGY STAR to realise significant environmental and economic benefits. The programme prevented 45 million metric tonnes of greenhouse gas emissions in the United States and saved United States consumers nearly USD 17 billion on utility bills.

Across the residential, commercial, and industrial sectors, businesses, institutions, organisations, and consumers continue to address global climate change by adopting energy-efficient products and practices. A diverse set of public and private organisations nationwide are joining forces to protect the environment, while bringing the value of energy efficiency to their customers, the public, and themselves.

The report on its 2009 achievements highlights:

- Nearly 3 000 manufacturers used the ENERGY STAR to label and differentiate more than 40 000 individual product models.
- More than 1 500 retail partners brought ENERGY STAR qualified products and educational information to their customers.
- Over 8 500 builder partners constructed new homes that qualify as ENERGY STAR in every state and the District of Columbia, thus saving home-owners money while improving comfort.

For more information, visit www.energystar.gov

The **International Electrotechnical Commission** (IEC) is a worldwide organisation for standardisation, made up of all national electrotechnical committees (IEC National Committees).

The IEC aims to promote international co-operation on all questions concerning standardisation in the electrical and electronic fields. It publishes International Standards, Technical Specifications, Technical Reports, and Guides.

For more information, visit www.iec.ch

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The IEA Policy Pathway series

Policy Pathway publications provide details on how to implement specific recommendations drawn from the IEA's 25 Energy Efficiency Policy Recommendations. Based on direct experience, published research, expert workshops and best-practice country case studies, the series aims to provide guidance to all countries on the essential steps and milestones in implementing specific energy efficiency policies.

The Policy Pathways series is designed for policy makers at all levels of government and other relevant stakeholders who seek practical ways to develop, support, monitor or modify energy efficiency policies in their home country and abroad. The Pathways can also provide insight into the types of policies best adapted to the specific policy context(s) of different countries, so that each country derives the maximum benefit from energy efficiency improvements.

www.iea.org/efficiency