INTERNATIONAL ENERGY AGENCY

ENERGY EFFICIENCY IN EMERGING ECONOMIES

21st Century Energy Efficiency Standards and Labelling (EESL) Programmes

Workshop findings

Energy Efficiency in Emerging Economies (E4) Programme

IEA Energy Efficiency Division

1. Background

An International Workshop on **21st Century Energy Efficiency Standards and Labelling (EESL) Programmes** was jointly organised by the International Energy Agency (IEA), the IEA Implementing Agreement for Energy Efficient End-use Equipment (4E), and the Super-efficient Equipment and Appliance Deployment (SEAD) initiative of the Clean Energy Ministerial and the International Partnership for Energy Efficiency Cooperation (IPEEC) on 15-16 December 2015. The workshop explored the opportunities that information communication technologies (ICT) and network connectivity can bring in improving the development, implementation and evaluation of EESL Programmes.

2. Workshop findings

This section briefly summarises the workshop sessions, the key messages and lists possible next steps.

2.1 Opening session

The objective of this session was to set the scene for the workshop, highlight the importance, achievements and benefits of EESL programmes and strategies used to improve data availability for monitoring and evaluating programme effectiveness.

Key messages from this session include:

- There is a need to raise energy efficiency standards to the global best and allow for continuous improvement.
- There is a need to work with the appliance industry to understand and tackle challenges including those associated with new technologies and approaches.
- There is a need to enhance international and regional cooperation to more effectively share knowledge, experience, approaches and tools to make EESL Programmes as efficient and effective as practicable.

2.2 International experiences with product databases

This session highlighted regional and country experience in developing and implementing registration systems[1] to help data collection and to access and monitor compliance activities. The presenters highlighted some of the key challenges and benefits of their registration systems.

Key messages from this session include:

- Benchmarking the most efficient products in the market can help policy makers update their EESL programmes.
- Development and implementation of an online registration system can be simple, straightforward and can provide significant benefits such as a more effective and rapid monitoring of compliance, as well as decision-making tools for consumers and policy makers.

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[1] A registration system is a process by which the manufacturers and importers of equipment and appliances register eligible products prior to market entry with a regulatory authority. Typically these require the submission of technical documentation to demonstrate product compliance.

- There may be an opportunity to develop a regional online registration system for ASEAN based on recent experience in Vietnam as well as extensive international experience.
- There is a need to work with the appliance industry to address their concerns on the cost-benefit of online registration systems and data confidentiality.
- An online registration system can be the basis for developing a smart phone application, but it is also useful to regulators and consumers in its own right.

2.3 Technologies to help inform and engage consumers

This session showcased different applications being used worldwide to help consumers in their decision making regarding appliance energy performance. The presenters highlighted the different functions and strategies for interfacing with the consumer and securing regular use.

Key messages from this session include:

- Smart phone applications can help consumers make informed decisions but the challenge has been to secure the application's regular use.
- Quick Response (QR) codes[2] can be used to: direct consumers to product registries which provide information for making energy efficiency purchasing decisions; engage consumers in market monitoring; and facilitate regulators' collection of market information.
- There is a need for a study for policy makers to help clarify the advantages and disadvantages of QR Codes, the different approaches available and their limitations. The European Commission is currently conducting research on QR codes.
- Collaboration to develop a QR Code Protocol to enable wider use and international adoption would be beneficial.
- In most countries consumers still rely significantly on retailers for information and advice. Tools targeting retailers can be an effective way of helping consumers make more energy efficient purchases. These can be the same tools as those used directly by consumers but training retailers in their use can make the tools more effective.

2.4 New technologies to help improve data collection to support standards and labelling programmes

A wide range of innovative data collection technology options were presented including web crawling[3], (also known as web scraping) to real time monitoring and smart metering. Presenters showed how these technologies can help improve data availability on appliance energy performance for both consumers and policy makers, thereby supporting policy making for EESL programmes without significant investment.

Key messages from this session include:

- The importance of ensuring that data collected can help consumers and policy makers make informed decisions.
- Web crawling can be as accurate as market research databases at a lower cost. It can also be used to track sales and price data.

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[2] The Quick Response (QR) code is a barcode type matrix label able to efficiently store data that can be read by a range of optical reading machines (including smart phones).
[3] Web crawling or web scrapping is the use of software that systematically browses websites to identify and gather specific available data as specified by the software user. For example, it can be used to gather energy performance data on appliances available on manufacturers' websites.

- There is a growing amount of data available and it is important to understand how to maximise its use including how it can inform and change behaviour.
- The potential for new technologies to track performance and sales data on commercial and industrial equipment has not been explored sufficiently.
- Smart meters can be used to gather end-use data without being intrusive. More research is needed on how policy makers could access and use such information.
- End-use data can also be collected via inexpensive and easy to install equipment.
- Further investigations on different state of the art data collection methods and outcomes from data collection projects would be valuable.
- Guidance on how to analyse, compare and understand different types of data would be useful.

2.5 New approaches and technologies for developing and evaluating the benefits of energy efficiency standards and labelling programmes

In this panel discussion, country representatives were asked to provide insights on how new technologies and approaches could be useful to enhance their existing EESL programmes.

Most countries focused their presentations on the challenges associated with new technologies. For example, one country had implemented a mobile application but it was not updated on a regular basis and therefore very few people use it. If the mobile application had been based on a registration system, the updating would have been automatic. Another country expressed concerns about regulatory and administrative changes needed to adopt a QR Code (e.g. review of energy efficiency labelling design and trademark). In another example, a country stated they need support in developing an online registration system as they have limited staff and resources and product information is held by the certification bodies and not by the government. Another country stated that consumer awareness and education is critical and that they need assistance to understand the most efficient cost-effective technologies and approaches. One country mentioned that while new technologies are important for promoting energy efficiency, a strong, trusted champion, an independent regulatory body and regular communication to consumers are essential for effective implementation of EESL programmes. Finally, two countries stated that engagement with retailers is very important (particularly in rural areas) and that they are looking at new technologies to improve this engagement.

2.6 Moving forward

In this session international agencies discussed potential opportunities for international cooperation and knowledge sharing, including:

- Sharing knowledge on developing an appliance comparison tool suited to the national context and technologies (e.g. smart phone applications).
- Sharing knowledge on developing national/regional online registration systems such as for the ASEAN region.
- Developing a study for policy makers to help clarify the advantages and disadvantages of QR codes, the different approaches available and their limitations. In addition, explore collaboration to develop a QR code protocol to enable wider use and international adoption.

- Exploring how new technologies and approaches can be useful to support retailers in helping consumers choose more efficient appliances.
- Sharing knowledge and experience with web crawling as technology and methodologies develop further and consider developing a web crawling guideline that could be updated regularly.
- Sharing experience on how to address appliance industry concerns on new technologies and approaches used to implement EESLs.

3. Next steps

Based on the workshop discussions, it is felt that there is a need for an enhanced online hub with evolving information and advice on 21st Century EESL programmes **tailored to policy makers and practitioners** across the world.

This hub would build upon and gather knowledge and experience from countries and international agencies as well as contribute to policy guidance and research on new technologies and approaches for EESL programmes. The information would be presented in a simple step–by-step format suited to inform and advise policy makers. The online format would also allow for continued guidance and sharing of research materials and policies on new technologies and approaches for EESLs. A draft layout of the online policy guidance structure is shown in the Annex.

In addition to the need for guiding policy makers to existing resources, the concept highlights some of the existing policy gaps. It would be potentially influential to conduct research on two of these areas as soon as possible:

- Given the unequivocal benefits of registration systems for both regulators and consumers it would be helpful to define the key attributes of the most effective systems, and also to define common data requirements so, whilst the system might differ from jurisdiction to jurisdiction, it would still be possible to provide market transparency from one jurisdiction to another. This would enable trends to be compared and drivers of improved efficiency to be better understood leading to more effective programmes.
- Similarly more guidance for policy makers on the potential use of web crawling as a way of gathering data would be of benefit to many jurisdictions that currently have insufficient data to effectively target policy due to the cost and complexity of conventional data collection and analysis techniques. This too would lead to more effective programmes being implemented more quickly than is currently possible.

We suggest convening a small working group comprising **IEA**, **SEAD** and **4E** as well as **CNIS** (because of their experience with the QR code) and the **Swedish Energy Agency** (because of their web crawling experience) to discuss how to take this work forward in more detail and to propose an implementation plan.

Annex: Proposed concept for discussion

Based on the workshop discussions, it is felt that there is a need for an online hub with evolving information and advice on EESL programmes **tailored to policy makers and practitioners** across the world. This hub would build upon and gather knowledge and experience from countries and international agencies as well as work on developing policy guidance and research on new technologies and approaches for EESL programmes. The information would be presented in a simple step-by-step format suited to inform and advise policy makers. The online format would also allow for continued guidance and sharing of research materials and policies on new technologies and approaches for EESLs. A potential layout of the online policy guidance structure is shown below.
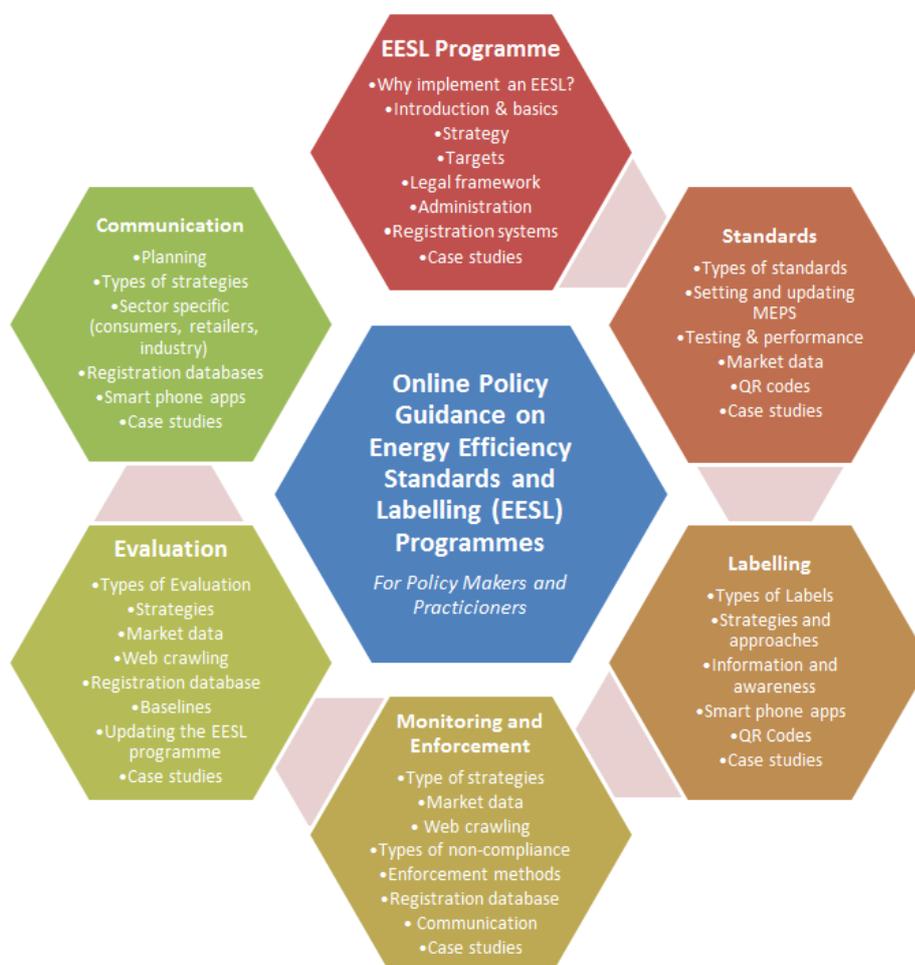
The online hub **would not seek** to duplicate existing efforts and information websites but provide an easily accessible introduction to topics of relevance for energy efficiency policy makers, and give guidance on and provide links to existing resources. Existing resources would be supplemented with new analysis and materials in areas where there are gaps.

Below are **examples of potential topics and additional research needs** on EESL programmes according to feedback received from the workshop.

A.1 New Approaches

A.1.1 How to set up an online registration system

A number of countries and organisations have developed online registration systems (or databases) to support energy efficiency programmes or promote energy efficient products. Online registration systems can facilitate programme development, reduce costs and resources needed to develop compliance mechanisms, provide a more streamlined and transparent system for manufacturers and provide information that can help consumers make informed energy efficient purchasing decisions.

The proposed online policy guidance would deliver up to date information on proven practices and lessons learnt from practitioners involved in the planning, design, set-up, use and upgrading of online registration systems. It would also explore collaboration opportunities to develop common data requirements for registration systems to allow for comparison amongst countries. A further topic to be covered would be how to address appliance industry concerns on new technologies and approaches used to implement EESL systems. These guidelines could be used to support countries in developing national or regional registration systems, for example ASEAN.

A.1.2 Setting minimum energy performance levels

Unless minimum energy performance standards (MEPS) are regularly updated – they cease to be effective i.e. they do not remove inefficient products from the market and do not provide an impetus for manufacturers to improve the efficiency of their products. Updating MEPS is a complicated process that requires up to date information about the market and information about technology development and performance. Different countries use different approaches and methodologies.

There is a need to help policy makers understand when a country should transition to new minimum energy performance levels and how to calculate baselines and evaluate the impact of MEPS on the market. Guidance on how to source and analyse data needed to determine when to upgrade MEPS and appropriate new levels would be particularly useful for countries in the initial phases of their programme development.

A.1.3 Effective compliance systems and methods to assess the cost of non-compliance

The coverage of EESL programmes is expanding both in terms of products and geography. Despite decades of experience, monitoring, verification and enforcement still pose a challenge for many jurisdictions. Inefficient or non-existent compliance systems will lead to much lower energy savings than projected, create unfair market conditions and promote non-compliance, ultimately damaging the purpose of the programme and the reputation of the authority administering the programme. The development and implementation of effective compliance systems is resource intensive.

There is benefit in providing guidance on existing and new technologies and approaches, best practices, and lessons learnt to clearly demonstrate the business case for effective compliance systems and the cost of non-compliance.

A.2 New Technologies

A.2.1 Understanding the value of and how to use QR codes

Quick Response Code (QR code) is a type of two-dimensional barcode (shown on the right). It is a machine-readable optical label that contains information about the item to which it is attached. Applications include product tracking, identification, document management, and general marketing.

Some countries have started or are planning to start using QR codes to guide consumers to information that would support energy efficient purchasing decisions (QR codes can be scanned by smart phones and direct consumers to relevant information). QR codes on labels can also be utilised to facilitate compliance checking by regulators and provide information about what products are on the market and what is the energy efficiency level of the purchased products.

Policy makers need guidance to understand the advantages and disadvantages of QR codes as well as the different approaches available and their limitations. In addition, there is a need to explore collaboration opportunities to develop common data requirements or a QR code protocol to enable wider use and international adoption in the future.

A.2.2 Using new technologies to promote energy efficient purchasing decisions

New technologies and different approaches are quickly evolving and being deployed in the EESL field across the world. Countries are gathering valuable experience and knowledge of what is most successful and how best to engage, influence and help their consumers in their day to day decisions on energy use. It is important to collect the challenges and lessons learnt from these experiences and share them with policy makers and practitioners across the world. This information would help policy makers in the planning and implementation of EESL programmes. Furthermore, in some countries, there is a need for guidance and further research on how new technologies and approaches can support retailers in helping consumers choose more efficient appliances for example by developing an effective appliance comparison tool suited to the national context and technologies (e.g. smart phone applications).

A.3 New data collection approaches

A.3.1 Web crawling

Web crawling (web harvesting or web scraping) is a technique that uses algorithms to automatically collect information from websites. It can be used to collect market data on sales, efficiency levels and types of products in the market. Many countries struggle in getting data needed to develop and evaluate the impacts of EESL programmes and this is a technique that shows promising and useful results.

There are some current and potential future challenges that need to be further explored to maximize the potential of this technique. It would be valuable to share knowledge and experience on web crawling as the technology and methodologies develop further as well as consider developing a web crawling guideline that could be updated regularly.

A.3.2 Data from smart-metering or real-time energy monitoring systems

Smart meters record energy use at frequent intervals and send this information to utilities for billing purposes. This information could potentially be used to generate data on device level energy use and usage patterns. Energy efficiency service providers are developing technologies and approaches that enable real-time device-level energy monitoring that can be utilised to understand energy use, usage patterns and improve efficiency. There are a number of ongoing research studies aimed to access and analyse real-time energy use data.

How such technologies could be utilised to source data needed for energy efficiency policy making has not been sufficiently explored. Such approaches (provided that constraints can be overcome) could potentially provide policy makers with useful data that would enable a much better basis for decision making and allow for better evaluation of policies.