DEVELOPING LIGHTING PRODUCT REGISTRATION SYSTEMS

GUIDANCE NOTE
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FOREWORD

In 2014, lighting accounted for approximately 15% of global electricity consumption. The United Nations Secretary-General's Sustainable Energy for All initiative identified energy efficient lighting as a "high impact opportunity", with the potential to reduce countries' greenhouse gas emissions, generate significant economic benefits and improve people's wellbeing.

High efficiency lighting technologies, such as light emitting diode lamps and smart control systems, offer up to an 85% improvement in efficacy, compared with conventional lighting technologies, while providing a better quality service.

Minimum energy performance standard programmes are a crucial policy tool for improving the energy efficiency of lighting, by contributing to the elimination of the least efficient products from the market, and accelerating the phase-in of energy saving technology replacements. However, while an increasing number of countries are adopting minimum energy performance standards, the continued availability of non-compliant, inefficient products jeopardises the achievement of countries' energy efficiency goals.

Robust monitoring, verification and enforcement schemes are crucial to safeguarding the energy efficiency benefits of performance standards and regulations. These activities protect markets from products that fail to perform as declared, or required; guarantee that products meet consumers' expectations; and ensure that policymakers, government regulators and programme administrators attain their energy saving objectives. Monitoring, verification and enforcement activities also protect suppliers' competitiveness by ensuring that they are all subject to the same market entry conditions.

Successful monitoring, verification and enforcement implementation requires long-term policy commitment and planning. The Government of Australia has long been committed to the development and implementation of monitoring, verification and enforcement policy and activities on its own territory, as part of its Equipment Energy Efficiency Program. Since 2009, Australia has been assisting other developed and developing countries to follow the same path, by sharing its expertise and best practices, and making its resources available to other countries[1].

Most recently, the Government of Australia has provided its financial and technical support to the United Nations Environment Programme-Global Environment Facility en.lighten initiative to strengthen capacities for monitoring, verification and enforcement in Southeast Asia and the Pacific. As part of this project, and drawing on the experience and knowledge of international experts and practitioners, the United Nations Environment Programme developed a series of six guidance notes on specific aspects of monitoring, verification and enforcement.

This guidance note and its associated publications are designed as manuals for government officials, technical experts and others around the world responsible for developing, implementing and refining structured and effective monitoring, verification and enforcement programmes. They describe the technical, methodological and institutional resources required, and provide easy-to-use, generic tools and templates that readers can adapt to their particular country situations.

We hope that these guidance notes will convince governments of the importance and benefits of monitoring, verification and enforcement and assist with implementation. We strongly encourage policymakers and those involved in implementing monitoring, verification and enforcement policies to take advantage of the practical advice presented.

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1   Including: International Electrotechnical Commission (IEC), International Energy Agency 's Energy Efficient End-use Equipment Solid State Lighting Annex (IEA 4E SSL Annex), lites.asia, Pacific Appliance and Labelling Programme (PALS), Vietnam Energy Efficiency Standards and Labels (VEESL), and others

ABOUT THE UNEP–GEF EN.LIGHTEN INITIATIVE

The United Nations Environment Programme (UNEP)-Global Environment Facility (GEF) en.lighten initiative was established in 2010 to accelerate a global market transformation to environmentally sustainable, energy efficient lighting technologies, as well as to develop strategies to phase out inefficient incandescent lamps to reduce CO_2 emissions and the release of mercury from fossil fuel combustion.

The en.lighten initiative serves as a platform to build synergies among international stakeholders; identify global best practices and share this knowledge and information; create policy and regulatory frameworks; address technical and quality issues; and encourage countries to develop National and/or Regional Efficient Lighting Strategies.

The United Nations Secretary General's Sustainable Energy for All (SE4ALL) initiative selected the UNEP

en.lighten initiative to lead its lighting 'Energy Efficiency Accelerator'.

The initiative is a public/private partnership between the United Nations Environment Programme, OSRAM and Philips Lighting, with the support of the Global Environment Facility. The National Lighting Test Centre of China became a partner in 2011, establishing the Global Efficient Lighting Centre, and the Australian Government joined in 2013 to support developing countries in Southeast Asia and the Pacific.

In 2015, based on the lessons learned from the en.lighten initiative, UNEP launched the United for Efficiency (U4E) initiative to support countries in their transition to energy efficient appliances and equipment, including room air conditioners, residential refrigerators, electric motors, distribution transformers and information and communication technologies.

ABOUT THE UNEP–GEF EN.LIGHTEN INITIATIVE MONITORING, VERIFICATION AND ENFORCEMENT SERIES

This guidance note is one of a series of six publications on monitoring, verification and enforcement (MVE) commissioned by the UNEP-GEF en.lighten initiative under its Southeast Asia and Pacific Monitoring, Verification and Enforcement Project, funded by the Australian Government:

• *Developing Lighting Product Registration Systems;*
• *Efficient Lighting Market Baselines and Assessment;*
• *Enforcing Efficient Lighting Regulations;*
• *Good Practices for Photometric Laboratories;*
• *Performance Testing of Lighting Products;*
• *Product Selection and Procurement for Lamp Performance Testing.*

The series provides practical tools in support of lighting policy compliance frameworks and to help countries achieve a successful transition to energy efficient lighting. These publications build on the existing guidance given in the UNEP-GEF en.lighten reference manual, *Achieving the Global Transition to Energy Efficient Lighting Toolkit*. They focus on individual aspects of an effective MVE infrastructure and how these contribute to improved product compliance and the success of policies that aim at transforming the market to efficient lighting.

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ABBREVIATIONS AND DEFINITIONS

API	application programming interface
APLAC	Asia Pacific Laboratory Accreditation Co-operation
CFL	compact fluorescent lamp
GEF	Global Environment Facility
GEMS Act	Greenhouse and Energy Minimum Standards Act 2012
HTTPS	Hypertext Transfer Protocol Secure
ICSMS	Information and Communication System for Pan-European Market Surveillance
IEC	International Electrotechnical Commission
ILAC	International Laboratory Accreditation Co-operation
ISO	International Organization for Standardization
LED	light emitting diode
MEPS	minimum energy performance standard
MVE	monitoring, verification and enforcement
SEAD	Super-efficient Equipment and Appliance Deployment initiative
UNEP	United Nations Environment Programme
VEESL	Vietnam Energy Efficiency Standards and Labelling Programme

GLOSSARY

A

application programming interface: a set of programming instructions and standards for accessing a Web-based software application or online tool.

C

compliance: conforming to a rule, such as a law, policy, specification or standard.

E

endorsement labelling: endorsement labels are a seal of approval to indicating that a product meets certain specified criteria. Typically, these are applied to the top tier of energy efficient products in the market.

F

fluorescent lamp: a discharge lamp of the low pressure mercury type in which most of the light is emitted by one or several layers of phosphors excited by the ultraviolet radiation from the discharge. Note: These lamps are frequently tubular and, in the UK, are then usually called fluorescent tubes. (IEC)

H

halogen: elements in Group VIIA of the periodic table, including fluorine, chlorine, bromine and iodine.

I

incandescent (electric) lamp: lamp in which light is produced by means of an element heated to incandescence by the passage of an electric current (IEC)

L

lamp: source made in order to produce an optical radiation, usually visible. Note: This term is also sometimes used for certain types of luminaires. (IEC)

light emitting diode: solid state device embodying a p-n junction, emitting optical radiation when excited by an electric current. (IEC)

S

screen-test: a preliminary assessment of products to determine which are likely to fail a full verification test.

EXECUTIVE SUMMARY

This guidance note provides practical guidance for policymakers on how to design, establish, commission and maintain a robust and reliable registration system for lighting products. It primarily targets countries that wish to establish a product registration system either because they lack a system in any form, they are considering upgrading from a paper-based system to an online registration system, or wish to upgrade an existing online registration system to include more features.

A product registration system is an initial compliance gateway wherein manufacturers and importers register eligible products with the regulatory authority prior to market entry. A registration system for lighting products can assist energy efficiency programme officials in transitioning their national market to energy efficient lighting products. A registration system can be developed on a national, or regional, scale and can range from a basic list of policy-compliant products to a comprehensive, searchable online database. It may include both public and confidential information and serve a variety of uses and users.

The three primary user groups are: government officials (or their third party contractors); product manufacturers and importers; and consumers. For all three groups, the registration system serves as the authoritative source of information on the performance of products in the market. It can serve as a comprehensive online platform for registering products on the market (the registration system for manufacturers or importers), for storing product characteristics and compliance information (the registration system for government), and for informing consumers about the performance of products (the database for consumers). Additionally, this information may be useful for other entities that need product performance data, such as think tanks/non-profit organisations, eCommerce players/online retailers, and others.

The registration system provides an initial compliance gateway wherein manufacturers register products with the regulatory authority (providing technical documentation to demonstrate product compliance with applicable efficiency policies) prior to market entry. A registration system supports the monitoring, verification, and enforcement (MVE) components of an

energy efficiency programme. Regulators can use it to track individual models for performance verification, possible enforcement action, and to track the evolution of the market as a whole. It can be mandatory, where products must be registered in order to be legally offered for sale, or voluntary, where the products may be registered according to specific set of criteria, but it is not mandatory for products to be registered.

To maximise the registration system's effectiveness and usefulness, it must be planned, developed, and operated with careful attention to many details. The following step-by-step approach is recommended:

1. **Determine objectives and infrastructure requirements:** Establish leadership and institutional prerequisites, including securing stakeholder and expert engagement and clear mandates for different actors. Determine the purpose and scope of the registration system. Perform situation analysis (policy, technology, markets), and review existing registration systems in other countries, or your own country, for other products (apart from lighting) or uses such as safety that could be expanded or modified for lighting products.

2. **Plan and specify:** Determine the desired end product and the required functionality for the registration system. Gather detailed requirements. Draft terms of reference and select a contractor to design and build the registration system.

3. **Design and build:** Design and build the user interfaces and all other aspects of the registration system, relying on key experts. Test the registration system, prepare training materials and develop a communications plan in anticipation of launch.

4. Launch: Initiate communications campaign with the user community, put the registration system into use and train key users.

Once the registration system has been launched, it can support a successful transition to energy efficient lighting. A well maintained registration system (as part of an effective compliance programme) can serve to build credibility and enhance consumer trust in the energy efficiency programmes and policies supported by the registration system.

Steps in developing a product registration system

DETERMINE OBJECTIVES AND INFRASTRUCTURE REQUIREMENTS

- Establish leadership and institutional prerequisites
- Determine the purpose and scope of the registration system
- Perform situational analysis, including review of policies and procedures
- Review existing product registration systems

PLAN AND SPECIFY

- Specify detailed requirements
- Identify roles and responsibilities
- Draft terms of reference/requirements
- Select a contractor or contractors, as required

DESIGN AND BUILD

- Develop user interfaces
- Develop machine interfaces
- Develop system architecture
- System security
- Test the registration system

LAUNCH

- Notify and train users
- Put the system into use and update as necessary

1 | INTRODUCTION

A registration system for lighting products can assist energy efficiency programme officials in transitioning their nation's market to energy efficient lighting policies. This guidance note offers practical guidance and examples on how to develop, operate and maintain a registration system for lighting.

A registration system provides an initial compliance gateway wherein manufacturers register eligible products with the regulatory authority (providing technical documentation to demonstrate product compliance with applicable efficiency policies) prior to market entry. Establishing the registration system through regulatory policy guiding market entry conditions is recommended. It can be developed on a national or regional level and can range from a basic list of compliant products to a comprehensive, searchable online database. It may include both public and confidential information.

A registration system can also support the monitoring, verification and enforcement (MVE) components of an energy efficiency programme. The database housed within the registration system is a valuable tool to track product performance and compliance over time. The database can provide evidence to support enforcement actions, and inform verification testing programmes by providing a wealth of data on registered and sample products. With relatively easy access to such product detail, a registration system provides transparency of MVE actions and programme policy to manufacturers, consumers and other stakeholders. Enabling manufacturers and importers to view the declared performance information of their competitors' products has also been shown to enhance competitive pressure and improve compliance rates on a market-wide scale. As more products become compliant, consumers gain confidence in energy efficient products, leading to increased sales and overall energy savings, which is the overarching objective of a national energy efficiency programme.

This guidance note is intended to support policymakers, programme administrators and others responsible for developing, designing, commissioning and maintaining a registration system for energy efficient lighting products. Although registration of products can be either voluntary or mandatory, this guidance note focuses on government-developed mandatory product registration systems and their components. The information provided in this guidance note is specific to lighting products, but could easily be applied to other products, appliances, and equipment, moving toward comprehensive market transformation.

The best practices outlined in this guide can serve as a blueprint to help countries that do not have a registration system or have a paper-based system and intend to establish an online registration system. It is also useful for those countries that already have an online registration system and may be seeking to improve its functionality.

⇨ **CHAPTER 2** provides an overview of product registration systems, including detail on the different types of online systems and their use by different user groups, such as policymakers, manufacturers and consumers;

⇨ **CHAPTER 3** describes the steps necessary to create a registration system, including the preliminary needs assessment, policies and procedures, data systems and capacity building of the users;

⇨ **CHAPTER 4** gives an overview of the typical registration process that applicants follow, as well as the reviews undertaken by policymakers for the approval/rejection of applications. This chapter also provides information on hosting details of approved products in the database;

⇨ **CHAPTER 5** gives an overview of best practice for maintaining the user records, information technology infrastructure, providing technical support and collecting user feedback and upgrading the registration system. This chapter also provides indicative values for the cost of developing and maintaining such systems;

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⇨ **CHAPTER 6** offers some detailed examples of global best practice in online registration systems that could be adopted by policy-makers for their country or region;

⇨ **CHAPTER 7** contains key recommendations for developing, operating and maintaining product registration systems, which include following the structured approach to develop the registration system, take advantage of the international best practices etc.;

⇨ **CHAPTER 8** signposts resources that provide additional information for policymakers and stakeholders.

2 | OVERVIEW OF PRODUCT REGISTRATION SYSTEMS

For any lighting regulatory programme, capturing the details of, and facilitating access to, product performance information for eligible products, contact details of suppliers, and market data can ensure the smooth operation of a national scheme. A registration system can provide easy access to this information in an orderly manner, giving governments the data to support important policy decisions. This chapter provides an overview of product registration systems, including details on the different types of online systems, and their use by different user groups, such as policymakers, manufacturers and consumers.

A registration system provides an initial compliance gateway wherein manufacturers register eligible products with the regulatory authority. The registration process usually requires manufacturers to test their products and submit those test results to certify that the product performance meets the minimum energy performance standards (MEPS), and/or any labelling requirements, before the product can enter the market. Information in the registration system can include energy performance data, technical product specifications, sales figures, and product prices. In order for registration systems to form the basis for both policy and monitoring activities, it is essential that they include a workable and accurate database.

2.1 TYPES OF REGISTRATION SYSTEM

Product registration systems can support both mandatory and voluntary energy efficiency programmes. Enrolling products in these systems can also be mandatory or voluntary, depending on the legal requirements, or stage of development, of the energy efficiency programme. For example, the Indian Bureau of Energy Efficiency registration system for the Star Label[2] covers both voluntary and mandatory energy efficiency programmes. Manufacturers who wish to participate in the Star Label programme must register their product in the registration system.

When governments set up mandatory product registration systems, they have to do so via legislative and/or regulatory authority. Mandatory registration systems are in place for products with MEPS or energy labelling in Australia, Canada, China, New Zealand, Singapore and the United States, among others.[3] As an example, details of the Australian registration system are provided in Chapter 6 of this guidance note.

Voluntary product registration systems can be broadly categorised into two types: those managed by government, and those managed by private-sector organisations. Government-managed voluntary product registration systems include the United States ENERGY STAR programme (see Box 1) and the Vietnam Energy Efficiency Standards and Labelling Programme (VEESL). Details of these programmes are provided in Chapter 6.[4]

The DesignLights Consortium Qualified Products List (see Box 2) provides an example of an industry-managed voluntary registration system. This project, led by the Northeast Energy Efficiency Partnership, a regional non-profit organisation, serves efficiency programmes and the lighting industry by maintaining a public list of high quality, high efficiency light emitting diode (LED) products for the commercial sector.[5]

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2   For more information on the Bureau of Energy Efficiency Star Label see: http://www.beestarlabel.com
3   SEAD Initiative 2015
4   Chapter 6 also provides details on the European Ecodesign Compliance Project (Ecopliant) database (piloted by some authorities in the European Economic Area). While not a product registration system per se, in that it does not provide the initial gateway for a model's participation in a voluntary or regulatory programme, the Ecopliant Database does provide a useful example of how governments can share model-specific compliance-related information with each other
5   DesignLights 2015

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Box 1	**Case study: The United States ENERGY STAR programme**

ENERGY STAR is a national voluntary programme in the United States, administered by the United States Environmental Protection Agency (EPA). It is a voluntary labelling programme designed to identify and promote energy efficient products in the United States, setting energy and performance specifications for more than 70 product categories including lighting. These products must adhere to the specifications to bear the ENERGY STAR label. EPA maintains a registration system of certified products at www.energystar.gov/productfinder.

EPA has also entered into agreements with eight international governments or entities to promote ENERGY STAR-qualified products in their markets: Australia, Canada, European Union, Japan, New Zealand, Switzerland, Taiwan and the European Free Trade Association (Iceland, Liechtenstein, Norway and Switzerland). These partnership agreements are intended to unify voluntary energy efficiency labelling programmes in major global markets by providing a single set of energy efficiency specifications. This can help manufacturers reach global markets and can boost the efficacy of sustainability programmes.

Organisations or manufacturers that partner with the United States EPA to sell ENERGY STAR-qualified products outside the United States are held to the same technical and eligibility requirements as the United States programme.

For more information see:
http://www.energystar.gov

Box 2	**Case study: The DesignLights Consortium Qualified Products List**

The DesignLights Consortium is a project of the Northeast Energy Efficiency Partnership. It promotes quality, performance and energy efficient commercial-sector lighting solutions through collaboration among its federal, regional, state, utility and energy efficiency programme members, luminaire manufacturers, lighting designers and other industry stakeholders throughout the United States and Canada.

Since 2010, the DesignLights Consortium has administered the Qualified Products List, a resource that distinguishes quality, high-efficiency LED products for the commercial sector. The Qualified Products List sets the bar for efficiency programme incentives across the United States and Canada to inform manufacturer product development.

For more information see:
http://designlights.org/QPL

- **Public record of registered products:** Offers users an online database of eligible registered products, and usually provides general model information, regulated energy performance metrics and other metrics as necessary. Product database functionality can include search filters, product comparison tools, historical archiving, indexing and other tools.

- **Public record of products complying with energy programme or other legal requirements:** Offers users information about which products satisfy the requirements, e.g. MEPS, comparative or endorsement labelling, etc.

- **Contact database for notifications of regulatory changes:** Provides an information system that governments can use to notify stakeholders of new regulations, revisions or amendments to existing laws, etc.

2.2 ASPECTS OF A PRODUCT REGISTRATION SYSTEM

Although registration of products can be either voluntary or mandatory, this guidance note focuses on government-developed mandatory product registration systems and their components. The objectives of the energy efficiency programme will determine the product performance data to be gathered. Product registration systems can offer the following aspects and features for interested parties:

- **Searchable internal database of products with confidential information:** Provides the regulator with confidential product related data, including product details, test results and any proprietary information.

- **Data exchange:** Offers the option for manufacturers to be provided with (digital) data frameworks and transfer protocols to submit their product data, while market intermediaries may be able to rely on application programming interfaces (APIs) or other means to extract the information they need from the registration system.

2.3 REGIONAL HARMONISATION OF REGISTRATION SYSTEMS

As many of the same (or similar) products are sold across a region, establishing a regionally harmonised registration system can help coordinate MVE planning and activities. It may also help facilitate regional evaluation programmes and energy efficiency policy harmonisation at the regional level. Compatible registration systems (and programme criteria) simplify the ability to share test results and other compliance verification information.[6] This coordination of MVE efforts can reduce costs, avoid duplication of effort, facilitate global trade and ultimately improve product performance.

The specific information that needs to be included in a registration system will vary by economy; however, there are important product datasets such as technical information on registered products, results of product testing, and lists of non-compliant products which could be shared among countries.

When working toward regional coordination of national, or regional, product registration systems, consideration of the following issues is recommended:

- **Legal requirements:** Before entering into regional harmonisation of registration systems, a country must ensure that relevant laws allow sharing of information on registered products and of verification testing results. Formalised agreements between countries can support both programmes, where the regulatory or programme requirements are similar among various countries.

- **Procedures and mechanisms:** Creating standardised formats, procedures and mechanisms between

countries can simplify the process of sharing information. Using or developing common templates for data collection or test reporting can support sharing efforts.

- **Testing requirements:** Countries can require laboratories to be accredited to the international standard ISO 17025[7] with relevant test methods included in their scope of accreditation. Where feasible, requirements for test procedures and laboratory accreditation can be harmonised so that the test results of one country are valid in another and suppliers can satisfy the reporting requirements of multiple countries with a single application.

- **Performance requirements:** The scope of covered lighting products as well as the specific energy efficiency or labelling requirements often vary from country to country. Similar or identical requirements can facilitate cross-market comparison and cooperation.

- **Language:** Language can be a barrier to working together. Implementing measures and registration systems are often produced in national languages, thus finding a common language for a regional registration system can be challenging. (Note: Section 3.3 of this guidance note discusses language support).

Addressing these challenges can enable sharing and coordination of compliance-related information within the region. Increased harmonisation can reduce pressure on public resources and facilitate greater cooperation to establish key standards for technological advancements. For example, through the Equipment Energy Efficiency Program[8], Australia and New Zealand work together on harmonised product energy efficiency standards and regulatory requirements (MEPS and labelling) and operate a joint product registration system. More information on this harmonised registration system is given in Section 6.1.

2.4 REGISTRATION SYSTEM USERS

Registration systems are usually required to meet the needs of many different stakeholder groups and must be designed accordingly. Table 1 outlines the potential needs of key stakeholder groups and how these may be met by a product registration system.

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6   Ecopliant 2015
7   ISO/IEC 17025:2005, *General requirements for the competence of testing and calibration laboratories*
8   Equipment Energy Efficiency Programme in New Zealand

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■ Table 1

Users of the registration system and their potential needs

Users	Potential User Needs
Policymakers/ government	**Record of baseline data to support policy decisions** The product registration system database hosts an array of information, such as product efficiency, energy consumption, size/volume, technology, etc., thus identifying current market scenarios and establishing the baseline for the product categories. This helps policymakers project future trends, arrange benchmarking studies and prioritise products for energy performance policy revision. Ease of data access can help policy and programme officials review policy impact, evaluate the programme and set up comparisons with other regions/countries. In addition, this data can be used to develop energy savings and product comparison calculators for policy analyses and consumer use. **Market surveillance** Data from the registration system can provide evidence for MVE activities. It supports these activities at the products' initial market entry and during its continued market presence, either as MEPS change or any reports of non-compliance are made (and recorded). **Repository of ancillary information** The registration system can serve as a storehouse of information that can be used in communications and notification tasks.
Manufacturers and importers	**Platform for registration and reporting** The registration system is a platform for manufacturers to demonstrate compliance with regulatory and voluntary requirements. **Information for innovation in product design** As a record of the models available on the market and their energy performance, the registration system can serve as a source of competitive intelligence, inform manufacturers' research and development agendas, and foster more competition and innovation. **Credibility** Public evidence of product compliance with regulations builds confidence in the products and the manufacturers. **Level playing field** The registration system helps protect compliant businesses by eliminating unfair competition from non-compliant products. It allows for reporting and provides evidence of non-conformance.
Consumers	**Product-specific information in public domain** The registration system provides access to product compliance and performance information, as well as performance trends in the market, enabling more informed decision making for consumers. **Advanced features** Databases of the registration system can have advanced capabilities such as product searches, filter options and product comparisons. The registration system may even allow consumers to identify and report on unlabelled or mislabelled models.
Distributors	**Product compliance verification** Retailers and other distributors can verify that the products they stock are compliant with national standards and use it to promote more efficient products.
Other market intermediaries	**Information to inform programme design, implementation and evaluation** The information stored in the registration system enables these users to determine which models meet certain performance criteria and thus are eligible for financial incentives, subsidies, prizes, etc. The information may be used to create market transparency, engage consumers and offer incentives (financial or non-financial).

3 | DEVELOPMENT OF THE REGISTRATION SYSTEM

This chapter describes the steps necessary to create a registration system, from initial preparations to launch. Some implementation details may vary, depending on particular national or regional circumstances, including legal and regulatory frameworks; however, the fundamental steps remain the same.

Figure 1 outlines the stages and steps that should be considered when developing a product registration system. The guidance note goes into more detail about each stage and step throughout the rest of this chapter.

Figure 1

Steps in developing a product registration system

DETERMINE OBJECTIVES AND INFRASTRUCTURE REQUIREMENTS

- Establish leadership and institutional prerequisites
- Determine the purpose and scope of the registration system
- Perform situational analysis, including review of policies and procedures
- Review existing product registration systems

PLAN AND SPECIFY

- Specify detailed requirements
- Identify roles and responsibilities
- Draft terms of reference/requirements
- Select a contractor or contractors, as required

DESIGN AND BUILD

- Develop user interfaces
- Develop machine interfaces
- Develop system architecture
- System security
- Test the registration system

LAUNCH

- Notify and train users
- Put the system into use and update as necessary

3

3.1 DETERMINE OBJECTIVES AND INFRASTRUCTURE REQUIREMENTS

3.1.1 ENSURE LEADERSHIP AND INSTITUTIONAL PREREQUISITES

Before project planning can begin in earnest, it must be clear: who will lead the effort; what resources are available; who will play the role of the project manager; and what roles other stakeholders will have. It is helpful to involve representatives from all stakeholder groups, such as those who will be submitting data to the registration system. Involving a diverse group of stakeholders early in the process is a proactive method to address their needs and concerns, reduce costs by matching the system's functionality to the needs of the users, build goodwill in the energy efficiency community, and increase the effectiveness of the registration system. A system that is well accepted by the user community (and contains clear instructions) is well placed to minimise application errors, bolstering the system's credibility and reducing administrative costs.

3.1.2 DETERMINE THE PURPOSE AND SCOPE OF THE REGISTRATION SYSTEM

This step focuses on carefully examining why a registration system is needed and will help ensure that the resulting registration system will satisfy current and future requirements. In addition, this step will help calculate, and make the case for, the funding to develop and operate the system. The following questions should be considered:

1. Why create a registration system?
2. Who will use the registration system?
3. Where will the data to populate the registration system come from?
4. Who will maintain the registration system?
5. How will the registration system be funded?

The answers to these key questions will inform decisions about the scope of the registration system, i.e. the types of products it will contain and the geographic area it will cover. The answers will also help to identify the key stakeholders in the registration system development process, and to determine whether the registration system can be sustained over the long term and how to accomplish that goal.

3.1.3 PERFORM SITUATIONAL ANALYSIS, INCLUDING REVIEW OF POLICIES AND PROCEDURES

Before building a registration system, it is essential to verify that all essential legal authorities are in place. The registration system will need to have certain policies and procedures in place to define how manufacturers/importers should input data, and how the data can be used by governments and other stakeholders. Thus, the registration system will require policies on collecting and maintaining data, for interacting with those who supply the data, and for a host of other purposes. Some of these policies and procedures may already be in place while others will need to be developed and implemented throughout the process.

A few examples of questions that should be considered during this step are given below.

- Does the organisation that will administer the registration system have the legal authority to require product suppliers to submit product data?
- Do government recordkeeping requirements allow the administering agency to recognise the online submission of product data?
- Can the government legally make detailed information about individual product models publically available?
- If the ongoing costs of hosting the registration system will be partly or wholly covered by fees charged to product suppliers, is there a legal mechanism in place for collecting these fees?

3.1.4 REVIEW EXISTING PRODUCT REGISTRATION SYSTEMS

Reviewing the work of other regulatory authorities can also help improve the quality of the registration system. Existing registration systems can help in assessing the need and informing registration system design. Annex A offers a list of some existing online product registration systems. Selected examples are also profiled in Chapter 6.

Box 3	**Policymaker resource: The en.lighten Prototype Lighting Product Registration System**

As part of the Efficient lighting MVE capacity building project in Southeast Asia and the Pacific, UNEP is developing a prototype registration system for policy makers in Southeast Asia and the Pacific with the objective to illustrate the capabilities, and highlight the benefits, of product registration systems. Policymakers may review the prototype and consider whether to use it (in whole or part) as a basis for their product registration systems.

The prototype registration system is informed by global best practices, including the examples profiled in Chapter 6 of this guidance note. It contains the essential elements of a registration system, including user input forms, data tables, and output reports.

For more information about the prototype, please contact UNEP at en.lighten@unep.org

3.2 PLAN AND SPECIFY

After determining broadly what is needed and why, the next step is to specify more precisely what the registration system will do and how it will be developed. This includes identifying the individual(s) who will manage the project and the agencies and companies that will contribute to the effort.

3.2.1 SPECIFY DETAILED REQUIREMENTS

A highly detailed assessment of needs will refine and clarify the purpose, scope and necessary output of the registration system. This assessment should produce a document describing in detail what the registration system needs to do. This document is sometimes called a 'functional requirements specification.' It is a useful tool for aligning stakeholder expectations and gaining agreement on final plans for the registration system development project.

Once the registration system needs have been determined, the product-specific requirements of the system need to be determined to ensure they reflect the mandatory requirements in place for products under a MEPS or labelling programme. Identifying these product-specific requirements can be time consuming, depending on the complexity of the underlying standards or specifications. Employing the services of a designated business analyst, involving a range of stakeholders, and examining existing registration systems is recommended.

3.2.2 IDENTIFY ROLES AND RESPONSIBILITIES

⇨ **The administering agency and developer hired to build the information technology infrastructure** are responsible for carrying out the needs assessment for the product registration system.

⇨ **A designated business analyst or subject matter specialist** can support the needs assessment process. Identifying product-specific requirements for a registration system can be time consuming, depending on the complexity of the underlying standards or specifications. Their primary responsibility is to translate the often detailed and complex technical and legal requirements into a form (specification) that the information technology developer can understand.[9] Usually the subject matter specialist will also conduct detailed user acceptance testing of the system before it is released. (See Section 3.3.5 for more information on testing.) The necessary skill set may be available within the administering agency, the information technology contractor, or elsewhere.

⇨ **A project manager** plays a critical role in developing the product registration system. The project manager may be an employee of the administering agency, the information technology firm or elsewhere. Regardless of organisational affiliation, however, this person must have the ability to bridge the gap between the administering agency, the users and/or stakeholders, and the programmers.

3.2.3 DRAFT TERMS OF REFERENCE/REQUIREMENTS

Typically, the project manager will need to put the information technology developer and business analyst or specialist roles out to tender. Agencies that already have registration systems in place may be able to provide referrals to experienced contractors. A detailed terms of reference document is important to clearly set out the tasks required by the contractors, and to specify the roles, responsibilities, requirements, timelines, and costs. An example of a terms of reference template for this activity is available in Annex B.

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3.2.4 SELECT A CONTRACTOR, OR CONTRACTORS, AS REQUIRED

Most agencies with registration systems outsource at least part of the process of developing, and sometimes maintaining, the registration system to a company specialising in information technology. If some of the work is outsourced, it is helpful to understand what skills and experience should be required of the information technology company, to ensure a smooth registration system development and maintenance process.

An information technology contractor should demonstrate skills and experience in relevant areas, such as:

- Building databases containing technical data;
- Building web-based interfaces for inputting, maintaining and reporting data;
- Building password-protected, secure information technology systems that include users of different types with permission to access different parts of the registration system;
- Gathering requirements through interaction with multiple and varied stakeholders (if applicable).

Once the detailed needs assessment is complete and all necessary parties have formally agreed the functional requirements specification, the project can proceed into the design and build phase. It is best to gain agreement on the functional requirements before proceeding with the detailed design and software programming, as changes later in the process can be very expensive.

3.3 DESIGN AND BUILD

As with all information technology projects, there is a risk that the system will be overly complex, and therefore costly. To avoid unnecessary complexity and cost, it is recommended that the simplest and easiest-to-understand solution that meets the stated objectives is sought. The following four sub-sections address some key design considerations: user interfaces, machine interfaces, system architecture, and security. The fifth sub-section covers testing.

3.3.1 DEVELOP USER INTERFACES

Typically, registration systems are used by at least three different user groups: government agencies (or third-party contractors), product registrants (e.g. manufacturers,

importers, etc.), and the public consumer. Users may interact with the database in different ways, depending on their needs.

User interfaces can be stand-alone spreadsheets, web-based forms and query tools, and even static web pages. Most product registration systems feature a mix of user interfaces serving different purposes. All interfaces should be easy to use and matched to its core functions and the appropriate user group.

⇨ **Language support**. Designing a user-friendly interface that can provide support for multiple languages is recommended. This is important for those countries with a large import market or with cross-country registration and monitoring agreements. It is best to determine at the outset whether, and how, multi-language support will be provided, as adding such functionality to a single-language system later on can be difficult and costly.

Language support can be delivered in a number of ways. For example:

1. Using 'tooltips' that appear when a user hovers over a given piece of text;
2. Displaying text in multiple languages simultaneously;
3. Allowing the user to select a language when first interacting with the registration system, then subsequently displaying all text in that language.

⇨ **Accessibility concerns**. Understanding how users with disabilities will interact with the registration system is important. For example, some jurisdictions, such as the United States, require government-funded information systems to accommodate those who are visually impaired.[10] Consensus developed guidance, the *Web Content Accessibility Guidelines (WCAG) 2.0*, on web content accessibility produced by the World Wide Web Consortium (W3C)[11] provides a single shared standard that may be used to address accessibility concerns.[12] These guidelines have been adopted by many organisations and governments, such as Australia, who have applied them to their Energy Rating website.[13] Planning ahead for compliance with these, or similar requirements, will be easier to do in the development stage rather than later on.

⇨ **Adapt or link to existing interfaces**. Existing interfaces (e.g. websites or databases) used for other purposes (e.g. customs or product safety) may offer a useful starting point for either developing a new registration system or for expanding an existing one to incorporate energy efficiency

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10   United States Access Board 2000
11   www.w3.org/Consortium
12   World Wide Web Consortium 2015
13   www.energyrating.gov.au

components. Not only would users be familiar with the registration system, but it could also reduce the burden on users having to access or input similar information across multiple platforms.

3.3.2 DEVELOP MACHINE INTERFACES

In addition to interfaces through which users directly interact with the registration system, most registration systems also have APIs through which the registration system can interact with other computer systems. Other systems might be public-facing websites, submitter's own databases, or even a mobile application designed to put accurate and reliable product performance data in the hands of shoppers. APIs allow for the automated exchange of data among these systems.

An API can be designed to pull data into the registration system and/or provide data from the registration system itself to other applications. For example, Australia has developed an API that permits product data from its database to be pulled into retailer websites. The United States ENERGY STAR programme has a similar API that enables its database to feed ENERGY STAR-certified product data into utilities' and other energy programme sponsors' databases.[14] It also has an API that permits its network of certification bodies to supply the programme's core database with up-to-date product data.[15] Table 2 summarises the use of APIs by some selected registration systems.

Table 2

Use of application programming interfaces in registration systems

Registration System	Data Flows Out of the Database			Data Flows into the Database
	To Public Web Site	To Mobile App(s)	To Other Third-Party App(s)	
Australia and New Zealand Energy Rating System	Yes	Yes	Yes	No
India Star Label Product Database	Yes	(in future)	(in future)	No
United States ENERGY STAR Certified Products Lists	Yes	Yes	Yes	Yes, via web services

3.3.3 DEVELOP SYSTEM ARCHITECTURE

The overall design of the registration system, and the choice of components, will be dictated mainly by the functions the registration system must serve and the available budget. Other considerations include: the total number of anticipated users; the background of, and equipment available to, those users; the total anticipated simultaneous (peak) demand on the registration system; and the presence of legacy systems.

⇨ **Number of users:** How many users are there? The larger the number of users, the more streamlined the registration system must be, i.e. there is less room for manual processes and for customising the user experience. (Automated processes are recommended in any case, as manual processes are typically more prone to error and open to manipulation).

14 United States EPA 2015a
15 United States EPA 2015f

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⇨ **Equipment available to users:** Do the intended users have reliable continuous internet connections or only intermittent access? Can they work with spreadsheet tools (e.g. Microsoft Excel workbooks)? The availability of internet and equipment would determine the type of registration system to be developed.

⇨ **Simultaneous (peak) demand:** How many users could successfully access the database at any given time? For example, a more consumer-friendly registration system might be made available as a mobile application intended to be used by shoppers. It would therefore need to be able to accommodate hundreds, or even thousands, of simultaneous queries and data requests.

⇨ **Data storage:** Will the registration system store test reports (in PDF format) for each model? How many individual models might eventually be registered? Will the registration system be expanded to cover additional product categories? All of these factors will influence what types and amounts of data the registration system may eventually contain.

⇨ **Legacy systems:** What other data systems is the administering agency currently maintaining? If the administering agency is currently maintaining other systems, it can be useful to look closely that the components of the other systems to see if they can be shared, or repurposed, in the product registration system.

Box 4	Case study: The SEAD global data framework and data standard for appliances

In October 2013, under the SEAD Data Access Project (SEAD Initiative 2013), the Super-efficient Equipment and Appliance Deployment (SEAD) Initiative published a report establishing a global data framework and data standard for appliances.

The report describes a system for capturing, updating and maintaining data on products (the data framework). The associated data standards specify what fields are required for each product type, how those fields should be named, and what values are acceptable for each field. The global data framework and data standard for appliances was a reference in the development of this guidance note.

The report, and the global data framework and data standard for appliances in particular, are based on a careful study of the leading product certification databases available at the time, including Australia's Energy Rating database and the United States Department of Energy's certification database. The report both identifies poor practices and codifies best practices through the global data framework and data standard for appliances.

The global data framework and data standard for appliances includes recommendations that may be of interest to those designing lighting product registration systems, such as:

• Identifying each model by an individual manufacturer part number and Universal Product Code/International Article Number code;
• Normalising manufacturer and brand names so that, for example, 'GE' and 'General Electric' are recognised as the same brand;
• Tying all energy performance data to a specific source, allowing, for example, for the quick and easy resolution of conflicts between manufacturer-declared data and verified/tested consumption data;
• Attaching units of measure to all numerical values.

The data framework is suitable for systems designed to pull many types of product data (including market data, product features, and energy performance) from multiple sources, such as retailer websites and other product registration databases. Data standards were only developed for televisions and air conditioners, not lighting products. Nevertheless, the guidance contained in the report could be extremely useful to those developing lighting product registration systems.

For more information on the SEAD Data Access Project, and the global data framework and data standard, see :
http://www.superefficient.org/dataaccess.

3.3.4 SYSTEM SECURITY

Product registration systems typically contain both public and private data and may contain different 'levels' of private data as well. Some of the product-specific data is likely to be business confidential, meaning that commercial harm could come to the owner of the information if it were to fall into the wrong hands. In addition, users may have profiles on the registration system that contain personal data that should not be shared freely with others.

Once the registration system is up and running, many users will come to rely on the registration system. With the rise of cybersecurity breaches, it is important for users to feel they can trust the integrity of the system. In addition, incidents that result in registration system downtime will be inconvenient and could prove costly for some users. Thus, reasonable efforts must be made to secure product registration systems against cyber-attacks, hackers and other intrusions, and to protect the data they contain.

Incorporating standard user group-based permissions goes a long way toward protecting data against unauthorised access. In addition, it is standard practice to use Hypertext Transfer Protocol Secure, or HTTPS, the secure version of HTTP, for sessions in which users are expected to log into a website using their username and password. HTTPS ensures that communications between users and the website are encrypted, preventing those communications from being intercepted.

In designing the registration system, it is good practice to consider what privacy notices and other cautions and warnings to present to users. Typically, new users are asked to accept 'Terms of Use' as a condition of registering to use a system. These terms of use may: contain privacy notices; briefly provide guidelines for system use; and explain what is done to protect the integrity of the data. The registration system may also be designed to present certain privacy notices and/or disclaimers to users when they attempt to conduct particular transactions, such as logging into the registration system or submitting a new product to the registration system. Figure 2 shows an example of a notice to users covering privacy and acceptable use.

Figure 2
Login notice for United States Department of Energy Compliance Certification Management System
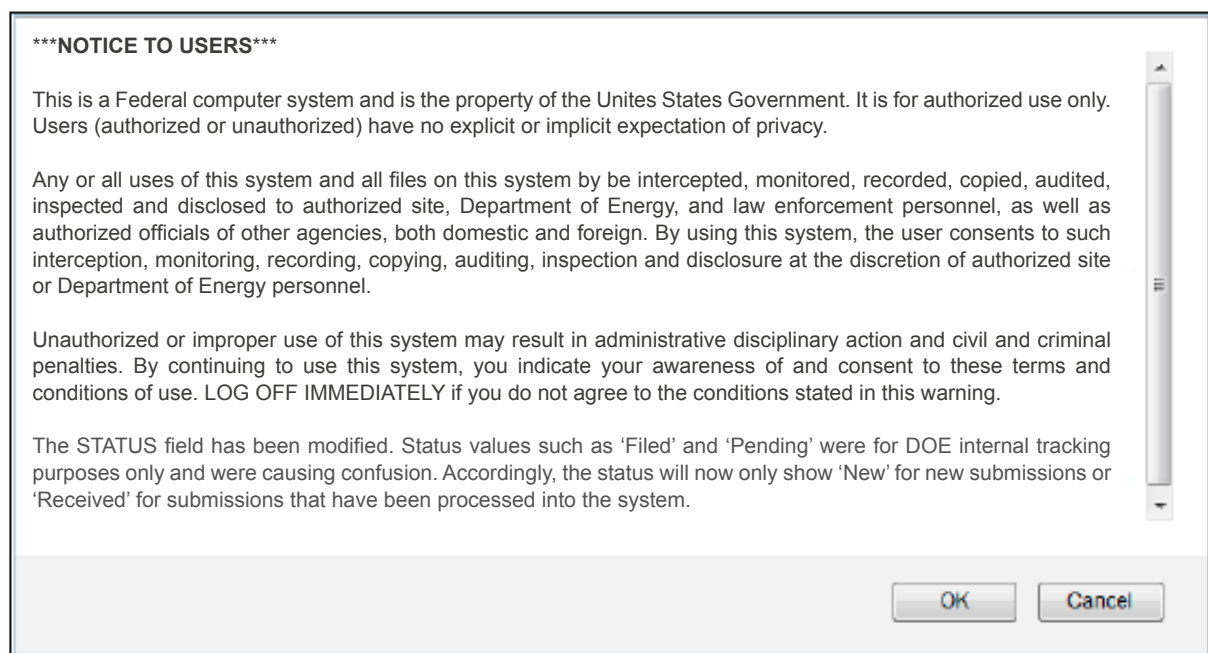
Source: United States Department of Energy 2015

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3.3.5 TEST THE REGISTRATION SYSTEM

Once the registration system has been built, it is best practice to test it with a subject matter specialist, and a small group of stakeholders, to verify that it works as expected. This step can ensure that the registration system meets the detailed functional requirements laid out by the agency, and that all necessary policies and procedures are in place to ensure the smooth and efficient functioning of the registration system and the administering agency. A test plan is an indispensable part of successful testing. It can be derived from the functional specification document, or even developed at the same time as that document.

Before external stakeholders test the system, both a subject matter specialist and developer should test the system, to check that all of the regulatory and technical requirements have been met and that the data validation rules are working correctly. (External stakeholders may be focused more on ease-of-use than other aspects).

As a registration system is likely to have different types of users, involving different types of users, with varying needs, in the registration system testing process should be considered. Doing so will improve the chances that any remaining problems are identified and can be resolved before the registration system is put into widespread use.[16]

Box 5	Case study: Lessons from the European Ecopliant project

The Ecopliant online database was designed to pilot facilitated compliance information sharing between market surveillance authorities of countries of the European Economic Area. It allows these authorities to upload, search and communicate their plans for, and the results of, performance testing of products with others in the region.

Market surveillance authorities log data into the system for each model tested. Users can then sort, filter, and search these data for compliance information on an individual model, or a set of models meeting certain criteria. This enables participating agencies to avoid the unnecessary cost of inspecting or testing models that other agencies have already investigated.

Several lessons emerged from the database development process that could be valuable to others setting out to create a product registration system or a compliance database:

1. It is beneficial to convene a group of future users and other stakeholders early in the process, and to meet with them periodically to seek their input and gain buy-in to the project.
2. Detailed requirements gathering can be tedious and time-consuming, in particular understanding exactly what data must be collected for each type of product. Using a business analyst for this purpose can reduce the time burden on the agency.
3. The technology contractors that design and build the registration system are usually best positioned to create the test plans.
4. Including a group of core users in testing the registration system before launch can help to uncover bugs, missing features and sources of potential confusion before the registration system is rolled out to all users.

More information on the Ecopliant database is given in Chapter 6 and at www.ecopliant.eu

3.4 LAUNCH

Once the registration system has been designed and built, tested and corrected, it is time to plan the rollout. Training and communicating to users are key activities in the launch sequence.

3.4.1 NOTIFY AND TRAIN USERS

Good communication is key to successfully launching a new product registration system. It is essential that users be notified that the registration system is available, and they should be instructed on how to use it. This is especially important for those that are required to use the registration system.

16 Gary Brazil, Ireland Department of Communications, Energy and Natural Resources, telephone interview, 26 May 2015

Reengaging the stakeholders involved in the development of the registration system can be useful to support communication. Internal stakeholders may include staff within the administering agency or other government officials. External stakeholders might include trade groups representing manufacturers, retailers, and others in the supply chain, or other government agencies, such as Customs and Excise, who may incorporate information on the registration system in their ongoing communications. Industry groups could also serve as conduits to their members, helping the administering agency to efficiently spread the word about the registration system to key user groups.

Planning for, and taking time to train users is important, particularly for those who will be using the registration system frequently or contribute significantly to the accuracy of the data in the registration system. These users can include major manufacturers or importers, those who will review submissions, and customs officials at major ports of entry.

User guides or similar written guidance can support user training. These documents should be prepared in advance of launch. Australia and New Zealand have created a user guide to help those registering products on their shared registration system. The user guide is a training resource that is readily available to users online at any time.[17] Ecopliant also developed a user guide for market surveillance authorities to train them to use the database.

3.4.2 PUT THE REGISTRATION SYSTEM INTO USE AND UPDATE AS NECESSARY

Developing a new registration system and putting it into use is a major accomplishment, but is just the beginning of the process. Ongoing operation and maintenance of the system, which includes updating the system, is the subject of Chapter 5, while Chapter 4 provides additional detail on the core process of registering products in the registration system.

17   Equipment Energy Efficiency Program 2015a

4 | THE REGISTRATION PROCESS

The registration system provides an initial compliance gateway wherein manufacturers register products with the regulatory authority (providing technical documentation to demonstrate product compliance with applicable efficiency policies) prior to market entry. This chapter gives an overview of the typical procedures that registrants follow, as well as the registrant application reviews that policymakers undertake for the approval/rejection of applications. It also provides information on hosting approved products in the registration system's database.

A registration system can be either online or offline, or a combination of the two. Online registration systems are easy to create, distribute and revise. If proper quality assurance protocols are included, they are also less prone to error. Online systems allow for quick processing of applications, and easy access to the information at later times. For example, applications for Australia's online registration systems are typically processed within 28 days.[18]

Offline registration systems fulfil traditional recordkeeping requirements. However, offline registration systems have no automatic validation at the time of completing the forms. In addition, the manual records are time consuming to process, which delays product entry to the market, and they are generally more susceptible to human error.

The steps for registering a product in a typical registration system are shown in Figure 3 and are discussed further below.

■ **Figure 3**
Steps for registering a product in a typical registration system

Applicant applies for registration

Regulatory authority assesses the application

Regulatory authority approves or rejects application

Regulatory authority hosts approved models on database

MVE practitioners enter results of verification testing in the database
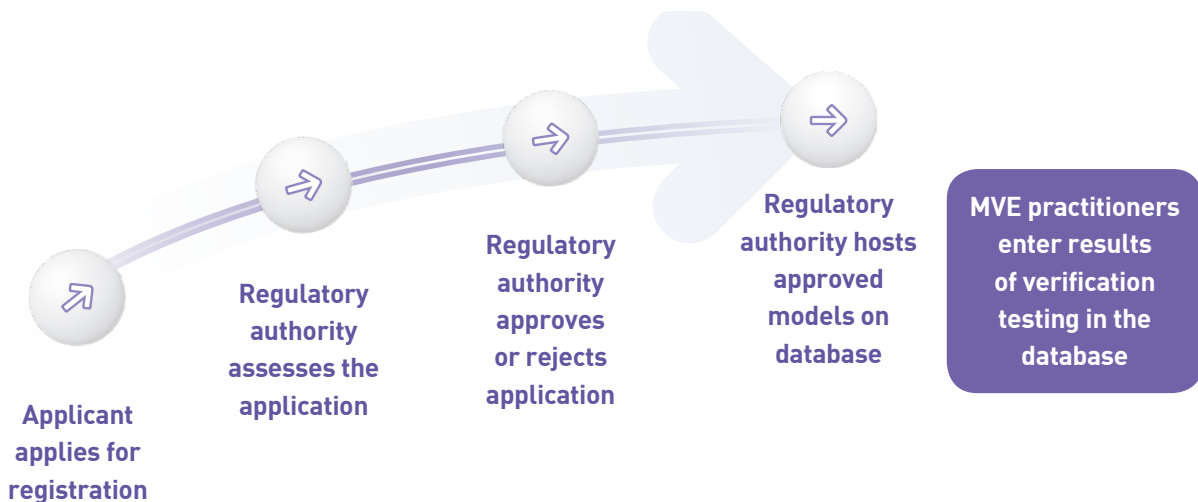
18 Equipment Energy Efficiency Program 2015b

4.1 APPLY FOR REGISTRATION

Before applying for registration, the applicant should always check if the product is subject to energy efficiency requirements or regulations, and what legal requirements may need to be fulfilled. Energy efficiency requirements and/or regulations include MEPS, and either mandatory or voluntary comparative, or endorsement, labelling.

The first step in the registration process is for the applicant to register as a user on the registration system by providing relevant information, including the organisation's contact details, along with a point of contact. Following successful user registration, the system notifies new users when their application has been approved.

Once the applicant is registered, the second step in the registration process is for the applicant to complete the application form to register a product and submit it to the regulatory authorities. Best practice is for regulatory authorities to require a fee for registration, as this can support funding of the programme. Applicants bear the legal responsibility for the accuracy of their applications, and governments hold them responsible for application information. The applicant could be a manufacturer, trader, third party organisation or importer of the product.

Online application forms usually require the applicant to register via the web portal of the regulatory authority. In countries where the registration process is offline, applicants will usually submit documents and information in predefined, product-specific templates, developed in Microsoft Excel, Access, or similar software programs.

Both online and offline application forms can be designed to accommodate multiple models within a single application. This kind of 'batch processing' can be especially helpful for lamps, where one company may need to enter data for dozens, or even hundreds, of similar models.

Product models must meet energy performance requirements before they may be registered. Typically, more than one registration for the same product model is not allowed. Some governments allow the registration of a group of models as a family of models. That is, the applicant can register multiple models using a single registration; however, the technical parameters of all the models under a family of models must be the same.

The information required at registration includes both general and technical information. Table 3 shows some of the typical information required for registration.

Table 3
Information required when applying for product registration

General Information	Technical Information
• Contact details of the applicant and manufacturer • Address of applicant • Details of contact person • Testing laboratory contact information • Test report signatory and contact details • Date of manufacture of the model • Production data, i.e. number of products of the particular model manufactured • Sales information, i.e. country/ies where the product will be sold, and country of production/import	• Model number of the product. If it's a parent model, then model numbers of the basic models covered • Brand details that apply to the product, i.e. brand names the product is sold under • Energy performance and energy ratings claimed by the manufacturer, as determined by laboratory testing. If applicable, the 'star' rating it would have • Lamp technology , incandescent, LED, CFL, halogen, etc. • Lamp type, e.g. omnidirectional, directional, dimmable, covered, etc. • Product attributes as determined through laboratory testing (measured values) such as lamp efficacy, lamp wattage, luminous intensity, luminous flux, lumen maintenance, lamp life, cap type, beam angle, colour rendering index, correlated colour temperature, power factor, etc. • Technical product attributes (nominal values) • Test standard used for testing the product • Retail price of the product; not usually mandatory, but may support various policy analyses

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In addition, the following documents may be required:

- Testing laboratory report on product test results;
- Energy rating label;
- Letters of authorisation, in case the applicant is an agent or third party applying on behalf of the manufacturer;
- Product images;
- Proof of registration of manufacturer;
- Universal Product Code (UPC) barcode and/or Quick Response (QR) code for the product;
- Other documents as deemed relevant.

The testing laboratory report demonstrates whether the product meets the MEPS and determines what is declared on the product's energy rating label. It is recommended that the original test report be submitted with the application for registration.

Box 6	**Case study: India's mutual recognition arrangements for testing**

The Bureau of Energy Efficiency is the implementing organisation for the energy labelling programme in India. It accepts test reports from laboratories located abroad, but only if those laboratories are accredited by the accreditation body of the respective country, and if that accreditation body is a member of International Laboratory Accreditation Co-operation (ILAC) and Asia Pacific Laboratory Accreditation Co-operation (APLAC). These laboratories must be accredited under the scope of ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*, and the scope of this accreditation should cover the relevant national/international standards for lighting products.

India's accreditation body for test results, the National Accreditation Board for Testing and Calibration Laboratories, is a signatory to the ILAC and APLAC mutual recognition arrangements. These international arrangements facilitate acceptance of test or calibration results among the countries which the mutual recognition agreement partners represent.

For more information see the programme documents at: www.beestarlabel.com

According to the requirements relevant to their country or region, policymakers will typically accept reports from two types of testing laboratory or facility:

- Manufacturers' own laboratory; or
- Independent laboratory, i.e. a third-party independent laboratory offering testing services.

Some countries require that the testing facilities used maintain accreditation from international standards organisations or accrediting bodies.

Additionally, contact information requirements can vary from country to country. As is the case in many countries, Australia asks for contact details of three types of contact persons to ensure that relevant people receive the notifications:

⇨ **Primary administrative contact** - the officer within the applicant's organisation who is authorised by the applicant to take responsibility for the application and subsequent registration. This is generally someone in a senior or technical position in the applicant organisation. This person will receive notifications when the registration status changes (such as being approved, rejected or needing renewal). If there is only one contact person indicated for a given model, it is the administrative contact.

⇨ **Primary technical contact** – the person who is authorised to prepare applications and handle the registration process on behalf of the applicant. It is usually the technical person at the applicant organisation, or a third-party consultant or agent. This technical contact will respond to any technical questions that the regulatory authorities may have regarding the product.

⇨ **Primary accounts payable contact** - the person who will receive notifications regarding payment. If no accounts payable contact is specified, payment information is sent to the primary administrative contact.

Often, the contact details of additional contacts in each of these categories are requested.

Some countries, such as Australia, allow agents to register on behalf of manufacturers. In such cases, agents will not list their own contact information on the application, but the details of their customer, the registering organisation. However, the agents' details may be requested in the administrative and technical contact sections of the application. In addition, governments may

require an authorisation letter for applicants using an agent to submit product registration applications. This letter should confirm that the agent is authorised to act on behalf of the applicant. This letter should be provided on the applicant's letterhead and contain the applicant representative's original signature.

4.2 ASSESS THE APPLICATION

A regulatory authority or agency is usually responsible for reviewing applications received through the registration system. The regulatory authority either carries out the assessment itself or may contract other organisations for part, or all, of the assessment.

The regulating agency (or contractor) typically reviews all information and documents submitted by the applicant to check for completeness, validity, consistency and correctness, in line with the statutory requirements for MEPS or labelling. The assessment includes both general and technical checks.

⇨ **General check of application**. This includes the check of documents for completion and to ensure that the documents contain all the information required regarding the applicant and the product.

⇨ **Technical check of application**. This involves reviewing the information for correctness and consistency. The test results and performance values entered on the web portal or the template are checked against the values claimed in the test report for consistency and accuracy. This check also includes assessment of technical parameters such as the: test results; test standard used; accreditation of the testing laboratory which carried out the test; compliance with MEPS and labelling requirements and parameters for label design, etc.

In countries using online registration systems, most of the fields containing MEPS compliance and labelling requirements can be checked automatically. Online registration systems can calculate values in pertinent fields based on the information entered by the applicant. For countries where the registration system uses paper and spreadsheet templates, requirements are checked manually. Some fields can be validated automatically via embedded checks in the spreadsheet template. However, values mentioned in the test report must be

checked manually against the values entered into the spreadsheet- or paper-based system or online portal.

If follow-up, or additional, information is needed, the authority will contact the applicant. Authorities communicate discrepancies and seek responses. The application is put on hold pending a satisfactory response. In case of a further discrepancy, inaccurate information or non-complying values, the application may be rejected.

4.3 APPROVE OR REJECT APPLICATION

After ensuring that all the data submitted by the applicant complies with the legislative, or MEPS, requirements of the product, the application is approved. The regulatory authority generally grants approval by issuing a letter or certificate of approval to the applicant. If the assessment is outsourced, then the contractor agency forwards its recommendations to the regulatory authority, which then approves (or rejects) the application.

Each new product application submitted in the registration system is assigned a record identification, or ID, number. When, or if, the application is approved, the model will be assigned a unique registration approval number to differentiate it from any other models with the same or similar names, as well as any subsequent updates to that model.

4.4 HOST APPROVED MODELS ON A DATABASE

The registration system database can contain a large amount of information about the approved models, ranging from technical information of the product, MEPS values, and validity of label, to manufacturer's information, sales data, etc. This data is grouped into that which is available to the public and that which is confidential. For example, information on production or sales of the registered model, name/contact details of company staff and results from verification testing are not usually made available to the public. The content that will be available on the public aspect of the database should be well thought out in advance, and regulators must ensure that the applicant agrees to make the information public, for example, by signing a declaration while applying for registration. The regulator must also ensure that there

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are no restrictions in the relevant regulations regarding sharing the information in public domain.

The database can help consumers make informed decisions or report on non-compliance of a product. Ideally, the public facing database should be consumer-friendly and offer an easy-to-use search functionality for existing records in an easily downloadable format. Allowing data to be downloaded in a variety of formats such as PDF and Microsoft Excel, or more sophisticated approaches such as APIs, is an important user feature. The online database is often developed and maintained by third-party information technology developers and managed by the government.

Box 7	Case study: United States ENERGY STAR programme

The United States ENERGY STAR programme covers more than 70 products, including CFLs and LED lamps and luminaires. The voluntary programme's database contains a list of all ENERGY STAR-certified products. It allows the products to be filtered on the basis of bulb type, technology, special features, base type, wattage equivalency, efficacy, life in hours, and market (United States or Canada).

The database also allows users to compare up to four listed products. The data is typically updated every 24 to 48 hours. A snapshot of the ENERGY STAR database product finder tool (United States EPA 2015e) is shown below. More programme details are given in Chapter 6.

Snapshot of the ENERGY STAR Database Product Finder Tool

Available at
http://www.energystar.gov/productfinder/

4.5 DETERMINE AVAILABILITY OF VERIFICATION TEST RESULTS

Most countries do not upload verification testing results to a publically viewable database. Many countries may even struggle to share such information with other countries, as legislation may specifically prohibit it. However, some governments, such as India and Singapore, have published the results of verification testing on their websites; and some countries consider sharing verification information among market surveillance authorities to be an important tool for carrying out more targeted, and more resource-efficient, market surveillance. The European Ecopliant project is an example of this (see Box 4, Box 8 and Chapter 6).

Box 8	Case study: Ecopliant prototype database

Market surveillance authorities in Europe are piloting the Ecopliant database to share verification test results of energy-using products. Verification test results are a major output.

Ecopliant, the European Ecodesign Compliance Project, was initiated to strengthen market surveillance and increase compliance with the Ecodesign Directive.[19] It proposes best practices for cost-effective coordination of MVE activities, including a web-based database that allows various authorities in Europe to share market surveillance data, verification testing results, and enforcement actions.

Ecopliant enables a market surveillance authority that is considering inspecting a given model to learn whether another country has inspected that model, and whether it was found compliant or non-compliant. There are 37 registered Ecopliant users from 18 member states. Ecopliant currently holds data for approximately 200 products in the database. The European Commission is currently considering how and whether to formally adopt this database.

For more information see
www.ecopliant.eu

19 Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products.
http://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficient-products

5 | OPERATING AND MAINTAINING A REGISTRATION SYSTEM

Awell-designed registration system should be relatively easy to operate and maintain. There are certain ongoing activities and occasional tasks that should be anticipated throughout the duration of the registration system's operation. This chapter describes the considerations involved in operating and maintaining a registration system.

Operation and maintenance activities are summarised in Table 4 and described below. The associated resource requirements are discussed at the end of the chapter.

Table 4

Activities required for effective operation and maintenance of a registration system

Ongoing activities	Occasional activities
Maintain the user records: • Add and remove users • Modify user profiles • Communicate with users **Maintain the product listings:** • Review product registrations (including data validation) • Remove products from the registration system • Resolve disputes • Provide mechanism for users to report data errors **Maintain the information technology infrastructure:** • Maintain server(s) • Backup data regularly • Renew domain names • Update software • Enhance security **Provide technical support** • Support users • Solicit and collect user feedback	**Upgrade the registration system to:** • Accommodate changes to product performance standards • Add new products • Fix bugs • Add new features **Evaluate the registration system's performance** • Identify key performance indicators • Monitor and evaluate to validate government spending on the tool

5.1 MAINTAIN THE USER RECORDS

There are two key reasons for maintaining records of those who use a registration system:

⇨ **So that users can be notified of changes to the registration system**. These types of notifications could be: general, such as announcements of the addition of a new product type, or of upcoming scheduled downtime for registration system maintenance; or more targeted, such as reminders to individual users that a specific model registration is about to expire, or making contact regarding a compliance matter.

⇨ **To ensure accountability** by linking organisations and individuals with the models in the database that they are responsible for.

For both of these reasons, the administrator must maintain accurate user records and may need to review and approve new users/applicants.

Ideally, the registration system would include a module for creating and maintaining user profiles and would give users the ability to update their own contact information and to queue up for review any changes that require administrator approval.

It is best to design the registration system to automatically generate, and send, targeted notifications whenever possible. However, some notifications will have to be initiated by the registration system administrator, such as a notification that the reporting requirements for a product will soon change. Situations in which automatically generated emails are commonly used include:

- Notifying new users when their application to use the registration system has been approved;
- Notifying an applicant when a new application for a model has been approved;
- Notifying a model 'owner' when that model's registration will soon expire.

There may also be users who want to be notified of changes to the system, yet do not have full user profiles on the system. For these users, the system administrator could maintain an email distribution list to which users can subscribe. As an example, the ENERGY STAR programme maintains such a list for software

developers who use the programme's APIs, discussed in Section 3.3.2. See Box 9 for more on how ENERGY STAR programme administrators keep in touch with this community of stakeholders.

Box 9	**Case study: ENERGY STAR third-party software developer community**

Some product registration systems, such as the ENERGY STAR database, have published APIs that allow third parties to automatically pull the registration system data into their own applications (United States EPA 2015c). The database administrator must inform these parties when there are changes to the data streams they rely on. The most common changes are adding new fields and retiring old fields. Such changes are usually driven by changes to programme requirements.

The United States EPA has created a Google Groups forum for discussing ENERGY STAR data feeds and invites software developers to join this group and follow new updates on Twitter @ESProductAPI. The EPA can then easily notify interested parties when an API changes.

Learn more about these APIs on ENERGY STAR's website at https://data.energystar.gov/developers

5.2 MAINTAIN THE PRODUCT LISTINGS

Arguably, the most important responsibility of the registration system administrator is to maintain the credibility and accuracy of the actual list of product models in the registration system. This typically involves: reviewing new product registrations (or 'applications'); removing expired products from the list of active models (through a change in the model's 'status'); and resolving disputes over whether a given model should be listed. The review of new model applications can be partly, or entirely, automated or outsourced; this process is discussed in detail in Chapter 4.

5

The removal of expired models can also be automated. Some registration systems, such as those in India and Australia/New Zealand, assign an expiration date to newly registered models. Unless its registration is renewed, a model is automatically removed from the list of active registered models when it expires. Additionally, requiring that applicants periodically confirm that each registered model is still on the market can help minimise the number of models appearing in the public list of registered products when they are no longer commercially available. The system can be designed to send reminder emails at the appropriate times, obviating the need for suppliers to keep track of the expiration date for each individual model.

Disputes over whether a given model should be listed may arise at any time. For information on how to handle such challenges, see UNEP-GEF en.lighten initiative guidance notes, *Enforcing Efficient Lighting Regulations* and *Performance Testing of Lighting Products*.

5.3 MAINTAIN THE INFORMATION TECHNOLOGY INFRASTRUCTURE

Computer hardware and software, just like buildings and other facilities, requires regular maintenance. The administrator should plan, and budget, to keep the servers that host the registration system available on an ongoing basis, whether they are housed within a government facility or elsewhere. The amount of server space needed for the database is likely to increase over time as the number of registered users and models grows. It is recommended that 'copies' of all essential data (backups and archives) be created and maintained, ideally at an off-site facility.

The database and other software may need to be updated periodically to remain stable and serviceable, and to enhance the security of the registration system against electronic intruders. If the registration system makes use of any special Internet domain names, these names will need to be renewed periodically.

5.4 PROVIDE TECHNICAL SUPPORT AND COLLECT USER FEEDBACK

If the registration system, and especially its user interfaces, is well designed, few people should have problems using the registration system. A user manual or

Frequently Asked Questions document or webpage can help users who do encounter problems (see Section 3.4).

Inevitably, some users will encounter technical issues or need some help using the registration system. Responding to these users is both a responsibility and an opportunity for the registration system administrator, as these users can help identify processes or instructions that are unclear, features that are missing or not correctly implemented, and other issues. Technical support is an excellent vehicle for: learning about users' needs and concerns as they evolve over time; and identifying errors in the software or system that should be corrected and requirements/opportunities for potential upgrades. Where an information technology contractor is hired to design and build the registration system, it is recommended that the contract contain provisions for some level of ongoing technical support to users.

There should also be a mechanism for users to report errors, or perceived errors, in the public product database. A simple 'contact us' online form that generates an email to the system administrator is one way to meet this need.

5.5 UPGRADE THE SYSTEM

In addition to the ongoing operation and maintenance activities described above, the registration system will likely require upgrades over time. Common reasons for upgrading registration systems are:

- To accommodate changes to the performance standards for a product type in the registration system;
- To facilitate the addition of a new product type to the registration system;
- To add new features or fix errors that have been identified in the registration system.

5.5.1 ACCOMMODATING CHANGES TO THE PERFORMANCE STANDARDS

The most significant reason to upgrade a registration system is to accommodate changes to the performance standards for a product type in the registration system. Such modifications could include a change in the underlying test standard, an increase in the stringency of the MEPS, a recalibration of categorical label thresholds, or the addition of a new product class.[20]

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20   Reviewing and updating MEPS is discussed in the UNEP-GEF en.lighten initiative guidance note, *Developing Minimum Energy Performance Standards for Lighting Products*

A transition to new requirements for a given product type requires some careful planning on the part of the registration system owner. There are a number of decisions to make, particularly with respect to timing. For example:

- Will currently registered models that meet the new requirements remain on the list, or must suppliers renew their applications or submit new applications for such models?
- Will currently registered models that do not meet the new requirements be automatically removed from the list when the new requirements take effect or remain on the list for some time thereafter (while existing stocks in warehouses and on store shelves are sold)?
- Will applications under the new requirements be accepted before the new requirements take effect? If so, for how long before?
- Will the public have access to data on a model under both the new and old requirements? (e.g. if the test standard changes, a lamp model might have a rated lifetime that is longer under the old standard than under the new standard)
- In the case of label rescaling, how will the product registration system make clear which scale is being used to determine the category a given model is assigned to, the new scale or the old scale?

Existing registration systems answer these questions in different ways. Administrators facing a transition to new requirements for the first time will have to answer these questions as suits their own unique circumstances. Regardless of how these questions are answered, a best practice for dealing with changing requirements is to ensure that the 'history' of each model can be traced back to its initial registration and tied to the product requirements in place at that time. Old versions of the product requirements should remain in the system, and each application and renewal should be linked to the specific version in place at that time.

5.5.2 ADDING A NEW PRODUCT TYPE

The addition of a new product type to the registration system will also require an upgrade. Most often this happens when a new product type is added to the scope of a MEPS or labelling programme supported by the registration system. While most of the infrastructure for submitting and processing applications for a new product (and displaying the product in the registration system) will already be in place, the administrator

may have to make some changes to accommodate the particular features or requirements of the new product type. Using a product that is already in the registration system as a template, and then adding and subtracting fields as necessary, should save time and expense.

5.5.3 ADDING NEW FEATURES OR FIXING ERRORS IN THE SYSTEM

The administrator may also choose to make other occasional changes to the registration system to add new features or simply to fix errors that have been identified, either by users or during routine maintenance. One new feature expected to become more prominent in registration systems is the ability to take advantage of the presence of quick response, or QR, codes on energy labels; and having these link to the data in the registration system and online product database. These codes are already being added to the energy label in China. Each model on the market will feature a unique code. A shopper can easily scan the code with a smartphone and obtain further information about the energy performance of that model, beyond what is available on the product's packaging or the energy label. Easy and quick product identification also enables shoppers to use mobile applications to compare products on a lifecycle cost basis.[21]

5.6 EVALUATE SYSTEM PERFORMANCE

Like any other government programme, periodically monitoring and evaluating a product registration system is recommended. These evaluations can be used to verify that government funds are being spent wisely and to improve the effectiveness of the registration system. The registration system may be evaluated on its own, or as a component of a broader energy efficiency or compliance programme.

Typically, evaluators can glean a large amount of transactional data from computers that can be used in these evaluations. Nevertheless, it pays to think ahead and identify key performance indicators when setting out to design a new product registration system. Advance planning will make it much more likely that the data needed to evaluate the performance of the registration system are available.

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21 Examples of existing mobile applications are available on the SEAD website at http://superefficient.org/en/Tools/Energy-Rating-Mobile-Apps.aspx

5

5.7 RESOURCE REQUIREMENTS

Development, operation and maintenance of a registration system requires resources. This section outlines those resources and how they can be funded.

5.7.1 STAFFING

The operation and maintenance of a registration system is usually the responsibility of the agency administering the programme - the primary user of the registration system. In addition to the overall management of the registration system, staff are needed to review product submissions/applications, answer technical and programmatic questions from users, oversee the maintenance of, and occasionally upgrade, the information technology infrastructure, and periodically evaluate the performance of the registration system.

Certain roles and responsibilities may be delegated to other parties or contracted out. For example, the United States Environmental Protection Agency is responsible for administering the ENERGY STAR programme, but delegates responsibility for reviewing and approving new product submissions to a network of certification bodies. Certification bodies are independent, accredited entities that work with suppliers and test laboratories and meet certain requirements specified by the agency.[22] Registration system administrators also commonly contract an information technology services firm to support the ongoing maintenance of the databases, websites and associated applications that comprise the registration system.

5.7.2 COSTS

The total costs of effective registration and compliance processes vary according to the programme design, scope (number of product categories) and market size. There are limited public data available on the cost to build and operate product registration systems. Usually, these costs are difficult to disaggregate from other programme costs.

As an example, the Department of Communications, Energy and Natural Resources in Ireland estimated that development of the Ecopliant database cost 93,000 euros in total. About half of this covered the costs of building the system and the other half covered maintenance costs.[23] The European Commission plans to spend 1.5 million euros developing a European Union-wide product registration system, and a further 150,000 euros per year maintaining it.[24]

Registration system costs can also be considered in terms of proportion of overall programme costs. For example, the Government of Australia provided indicative estimates of the cost to operate its compliance programme. It estimated that 55 per cent of its ongoing operating costs are related to maintaining the product registration system, while the remaining 45 per cent covers other compliance activities.[25] A further breakdown of the product registration system costs is shown in Table 5.

Table 5

Indicative distribution of operating costs for Australia's Energy Rating Compliance Programme

Category	Activity	Share of Total Cost
Registration system	Application processing	30%
	Administration, finance, and management support	15%
	Technical support to users	5%
	System and database maintenance	5%
Other compliance activities	Store inspector training	45%
	Store audits	
	Verification testing	

Source: Equipment Energy Efficiency Program 2012

22   United States EPA 2015b
23   Gary Brazil, Ireland Department of Communications, Energy and Natural Resources, telephone interview, 26 May 2015
24   European Commission 2015a and European Commission 2015b
25   Mark Ellis & Associates 2012

5.7.3 SOURCES OF FUNDING

The most common source of funding for the development and ongoing operation of registration systems is the government's general operating budget. However, this need not be the only source of funds. Cost recovery from suppliers could be another source. Efficiency programmes are increasingly seeking to introduce some cost-recovery elements to protect against future funding cuts. Cost recovery could be partial, or complete, and may be achieved in various ways, such as through registration fees, verification testing fees, etc.

Several programmes collect funds from suppliers during registration. This may take the form of an annual payment, a one-off payment for a specified period, or a higher initial fee followed by a smaller annual payment. Registration fees are generally levied on product models rather than brands or suppliers, as this best reflects the costs involved.[26]

In India, the total fees a supplier must pay to the Bureau of Energy Efficiency increases with the number of models registered and the number of individual lamps of each model sold in India.

An increasing number of programmes require that products have third-party certification, from an independent body, as a condition of entry to the programme. While this is not cost-recovery per se, it can reduce the costs of the programme because the system administrator is in effect delegating some of the responsibility for ensuring products meet the necessary requirements to third parties that are paid by the product suppliers. In addition, several programmes now require a supplier to fund the cost of full verification testing on several samples of any model that has failed a screen-test conducted by the regulatory authority.

Regardless of the approach adopted, communicate to stakeholders clearly and in advance about fees and fee schedules, any planned changes, and, when appropriate, the rationale for those changes.

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26   Mark Ellis & Associates 2012

6 | EXAMPLES OF LIGHTING PRODUCT REGISTRATION SYSTEMS

This chapter profiles some of the leading lighting product registration systems. The profiles highlight key features of each registration system and call attention to best practices. Particular attention is given to cases where registration systems, or data within them, are shared among multiple countries. Annex A provides a complete list of the lighting product registration systems known to the authors at time of publication, including those profiled in this chapter.

6.1 AUSTRALIA AND NEW ZEALAND

Through the Equipment Energy Efficiency Program,[27] Australia and New Zealand work together on harmonised product energy efficiency standards and regulatory requirements (MEPS and labelling) and operate a joint product registration system. This joint product registration system and database could be used as a model for cooperative product registration in those regions seeking to develop aligned regional databases. Each country contributes to the costs of maintaining this registration system. The key elements of this product registration system are summarised in Table 6.

The Equipment Energy Efficiency Committee has representatives from the Australian and New Zealand national governments and the Australian state and territory governments. It develops the agenda for MEPS and labelling activities for approval by governments. The test standards for products are usually developed cooperatively, within joint standards committees with representatives from both countries.

Table 6

Key elements of the Australia/New Zealand product registration system

Name of Registration System	Energy Rating Product Registration System
Web address	www.energyrating.gov.au http://reg.energyrating.gov.au/comparator/product_types/
Geographic coverage	Australia and New Zealand
System administrator	Equipment Energy Efficiency Committee
Programme types supported	MEPS and mandatory comparative labels
Access to verification test results	No. The system contains verification testing details, but they are not publically available. At present, there are almost 2,000 verification test results in the system.
Lighting products included	Ballast, incandescent lamp, linear fluorescent lamp compact fluorescent lamp, and other products under MEPS and labelling
Primary input modes	Web form via user login
Primary output modes	Public web portal and mobile application
Special features	• Mobile application for consumers • Harmonised efficiency standards and data sharing between Australia and New Zealand

27 Equipment Energy Efficiency Programme in New Zealand

Both countries implement energy performance standards through their own national legislation, which usually refers to the joint Australian and New Zealand standard for detailed specifications. For example, under the Australian Greenhouse and Energy Minimum Standards Act 2012 (GEMS Act), the regulatory instrument for CFLs refers to AS/NZS 4847.[28]

Once a performance requirement is in place, a manufacturer or supplier may register products online. Suppliers have the option of applying for registration in either one or both countries. Registration data for products registered in one country is only available to officials in that country. However, in accordance with regulations, some registration data is made available on a public database, such as model number, technical details of the product, and country of production. The success of the programme in Australia can be measured by the fact that retailer websites use energy rating as a filter.

Under the Equipment Energy Efficiency Program, the Australian Department of Industry, Innovation and Science and New Zealand Energy Efficiency and Conservation Authority compliance teams work very closely together on compliance. The Department of Industry, Innovation and Science compliance team manages the overall compliance budget for compliance testing, which is jointly funded by the Australian federal, state and territory governments, as well as the government of New Zealand. The costs of labelling compliance and other compliance-related activities are borne by each jurisdiction.

The Department of Industry, Innovation and Science compliance team consults with the Energy Efficiency and Conservation Authority on the products to be tested, and products are chosen based on Equipment Energy Efficiency Program selection criteria. Test results are recorded on the Energy Rating website, but they are not publically available, and only compliance staff in both jurisdictions have access to all test results. Should a product fail the verification testing process, New Zealand registered products are followed up by the Energy Efficiency and Conservation Authority and Australian registered products are followed up by the Department of Industry, Innovation and Science. By sharing test data, Australia and New Zealand make sure they are not repeating work. For example, if a model fails in Australia, New Zealand may rely on the Australian test results, and the same product does not

need to be tested again. Labelling compliance is the responsibility of each jurisdiction; however, results are shared and compared.

The registration database contains various details including energy efficiency and star ratings for a range of electrical appliances that carry an energy label. It also lists residential, commercial and industrial products that have been registered for MEPS.

The Trans-Tasman Mutual Recognition Arrangement provides that products meeting New Zealand legal requirements may be sold in Australia without the need for a separate Australian registration, provided the product was imported into Australia from New Zealand, and vice versa. Joint training workshops have been held to train registration assessors.

Australia has also developed a mobile application for consumers across a variety of platforms. This facilitates informed purchase decision making for consumers as it allows models to be compared and provides running costs of the registered products. A snapshot of this application is provided in Figure 4.

In order to allow potential stakeholders to familiarise themselves with the Energy Rating product registration system and as a tool for policymakers considering the development of such as system, the Equipment Energy Efficiency Program has developed, and made available, a test site that mirrors the functionality of the live Energy Rating product registration system. Individuals interested in making use of this facility should email David Boughey at the Department of Industry, Innovation and Science (david.boughey@industry.gov.au) requesting access to the system.

🟣 **Figure 4**
Australian mobile application for consumers

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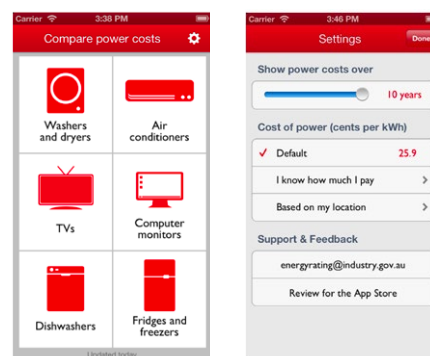
28 AS/NZS 4847.1:2010, *Self-ballasted lamps for general lighting services Part 1: Test methods – Energy performance*; AS/NZS 4847.2:2010/Amdt 1:2011, *Self ballasted lamps for general lighting services Part 2: Minimum Energy Performance Standards (MEPS) requirements* (Australian Government 2012)

6

6.2 ENERGY STAR

ENERGY STAR is a voluntary endorsement labelling programme established in 1992 by the United States Environmental Protection Agency and other federal agencies. It has one-time registration through a partnership agreement between the Environmental Protection Agency and product brand owners, who may also be the manufacturer. Partners are assigned an Environmental Protection Agency-generated organisation identification. Partners then select Environmental Protection Agency-recognised testing laboratories and certification bodies. Testing laboratories test the product and a certification body verifies that test results are from an Environmental Protection Agency–recognised laboratory. The certification body also certifies products that meet ENERGY STAR requirements and report information on these products to the Environmental Protection Agency. Certification bodies are also responsible for administering verification testing and challenge testing. The Environmental Protection Agency notifies partner countries (with which the Environmental Protection Agency has agreements) of any product that is disqualified based on a verification testing failure if that product is also sold in that partner country. ENERGY STAR has an agreement in Canada only for lighting products.

The Environmental Protection Agency collects a wide array of information, such as products type, subtype, product characteristics and features, photometric performance, electrical performance and test conditions in its database. The key elements of this database are shown in Table 7 and the ENERGY STAR database for lamps can be accessed by the following link:

http://www.energystar.gov/productfinder/product/certified-light-bulbs/results

■ **Table 7**
Key elements of the ENERGY STAR product registration system

Name of Registration System	ENERGY STAR database
Web address	http://www.energystar.gov/ http://www.energystar.gov/products?s=mega
Geographic coverage	United States, Australia, Canada, European Union, Japan, New Zealand, Switzerland and Taiwan
System administrator	United States Environmental Protection Agency
Programme types supported	Voluntary endorsement labels
Access to verification test results	No
Products included	Lamps, light fixtures, commercial light fixtures and other residential and commercial products under labelling
Primary input modes	Web form via user login
Primary output modes	Public web portal
Special features	- XML-based qualified product exchange (QPX) system for certification bodies to submit information - Advanced view-access to ENERGY STAR's open data cloud - Access to API - Mobile version of the product finder

The ENERGY STAR database demonstrates a number of special features that could provide a model for agencies wishing to provide enhanced tools for submission of, and access to, registration data.

⇨ **Qualified product exchange**. The Environmental Protection Agency has developed an XML[29]-based qualified product exchange (often referred to simply by the abbreviation, QPX) system for certification bodies to submit information via web services on products certified as ENERGY STAR. XML submissions allow certification bodies to send information on several certified products at a time and to make modifications to those certifications over time. The qualified product exchange requirements for all products can be accessed via www.energystar.gov/qpx

⇨ **Access to ENERGY STAR's data sets**. The ENERGY STAR Certified Products Data Catalog provides open access to product data sets to support the varied needs of ENERGY STAR partners, government agencies, application developers, and media outlets. This powerful interface allows users to generate a variety of reports based on real-time data, to create accounts so users may save and share their work, and to export and embed the data users have designed in innovative ways that support their goals and missions. These data sets represent a broad range of product categories and include detailed information by model number about product performance, including energy use and efficiency. They are available at data.energystar.gov and the detailed guide explaining how to use and access the data sets can be accessed via:

https://www.energystar.gov/productfinder/downloads/ EEPS_Guide_on_Advanced_View_Visuals.pdf?0544-2a1e

⇨ **Access to an API**. This allows stakeholders to develop their own tools and build applications by providing access to the ENERGY STAR APIs. The Environmental Protection Agency encourages energy efficiency programmes, retailers, and developers to use the APIs to pull current data on ENERGY STAR products and help promote products that have earned the ENERGY STAR label. See https://data.energystar.gov/developers.

⇨ **Mobile version of Product Finder tool**. The Environmental Protection Agency recently created a mobile version of the Product Finder tool to enable shoppers to look up products while out and about. The Product Finder tool provides consumers with access to energy efficiency information in 40 categories of ENERGY STAR products. Consumers can compare

product brands using energy efficiency data in order to make purchasing decisions. The tool also offers advanced features to support the more complex data analysis required by partners and third parties. Users are still able to access Excel-based lists. This is not a stand-alone application, but a customisation of the existing web tool for the mobile platform.

6.3 VIETNAM

Vietnam has an online registration system for the products under its labelling programme, but accepts registration applications through both online and paper-based systems. It does not require transfer of data from the paper-based application into the registration system, and online applications have helped Vietnam validate data automatically. The registration system is dual language, Vietnamese and English, allowing the user to switch between the two languages at will. The design and implementation of this registration system was supported by Australia, who provide resources to assist in processing applications. The key elements of the system are shown in Table 8.

In the online registration system, applicants can register by creating an account; and providing applicant's information, product details such as model number, size/capacity, other technical details of the product, and supporting documents such as test report, certification, etc.

The online registration system then reviews the application form and issues both 1) warnings to help the user, but doesn't require them be corrected to continue, and 2) errors which prohibit the user from proceeding to the next page of the form.

Initially, the application is assigned a 'draft' status, which is then reviewed by regulator. The status is then changed to 'returned' or 'approved'. Whenever the status of a product changes, applicants receive an email notifying them of the change in status.

A special feature of the Vietnamese system, which other agencies may wish to use as a model, is its ability to automatically combine data to generate aggregate energy saving figures, based on product characteristics, sales data, energy performance values and usage assumptions.

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29 Extensible Markup Language

■ **Table 8**
Key elements of the Vietnamese product registration system

Name of Registration System	Vietnam Energy Efficiency Standards and Labelling (VEESL) Programme
Web address	http://registration.nhannangluong.com/Publish
Geographic coverage	Vietnam
System administrator	Ministry of Industry and Trade
Programme types supported	Voluntary labelling
Access to verification test results	No
Products included	Ballast, compact florescent lamp, linear fluorescent lamp and other products under labelling
Primary input modes	Web form via user login and Excel workbooks
Primary output modes	-
Special features	• Energy saving figures • Dual language, Vietnamese and English

6.4 ECOPLIANT

Although not a product registration system per se, in that it does not provide the initial gateway for a model's participation in a voluntary or regulatory programme, the Ecopliant Database does provide a useful example of how governments can share model-specific compliance-related information with each other.

The Ecodesign Directive[30] in Europe sets mandatory requirements to improve the environmental performance of energy-related products. The process of creating these requirements for individual product groups is managed by the European Commission. The European Commission does not currently have a product registration database. However, as part of the Energy Union Strategy, it is proposing to develop a digital database for new, efficient products, allowing greater transparency and easier market surveillance for national authorities.[31] Currently, the European Commission has in place a European-wide platform for exchanging market surveillance information on products amongst Member States, known as the ICSMS Database.[32] This database enables market surveillance authorities to share information on products that have been withdrawn from the market for non-compliance with a whole range of product regulations.

However, as it covers multiple regulations, several market surveillance authorities determined that the database wasn't serving their exact needs and they chose to develop and pilot a different approach to collaborate on exchange of experiences and best practices. These market surveillance authorities designed (as part of the European Ecodesign Compliance Project - Ecopliant) the Ecopliant compliance database. The Ecopliant compliance database supports the coordinated testing of products and sharing of test results to ensure compliance and exchange of notification of non-compliant products. The Ecopliant database is intended to inform the future update or revision of the ICSMS Database. A summary of the key elements of the Ecopliant database is given in Table 9.

Ecopliant supports the economic and environmental benefits of the Ecodesign Directive by strengthening market surveillance and increasing levels of compliance across the single market. It achieved this by establishing a framework and supporting infrastructure for the cost-effective coordination of the monitoring, verification, and enforcement of the Ecodesign Directive that is suitable for use across the whole European Economic Area. The database also enhances the functioning of the European single market by ensuring that Ecodesign requirements are applied consistently and effectively across the European Economic Area.

30 Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products. Available at: http://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficient-products
31 European Commission 2015a and European Commission 2015b
32 Available at: https://webgate.ec.europa.eu/icsms/

Table 9

Key elements of the Ecopliant database

Name of Database	Ecopliant Database
Web address	http://www.ecopliant.eu/ https://db.ecopliant.eu/Login.aspx?ReturnUrl=%2f
Geographic coverage	European Economic Area, currently 18 market surveillance authorities
System administrator	Department of Communications, Energy and Natural Resources, Ireland
Programme types supported	MEPS and mandatory comparative labels
Access to verification test results	Yes
Products included	Lighting, special-purpose lamps, ballasts, luminaires, directional and non-directional lighting, and other products under labelling
Primary input modes	Web form via user login
Primary output modes	The data is shared only among participating governments
Special features	Sharing of verification testing results among governments

The project was supported by the European Commission's Intelligent Energy Europe programme and was completed on 20 April 2015. Ecopliant was delivered by a consortium of national government policy leads and market surveillance authorities from ten different countries (Denmark, Finland, Germany, Hungary, Ireland, Italy, Netherlands, Spain, Sweden, and the United Kingdom). Currently, there are 37 registered users of Ecopliant from 18 member states and it has approximately 200 registered products.

The database includes a range of product information, such as reason for testing, technical specifications, manufacturers/importer/supplier details, details of the laboratory where testing was conducted, product compliance with each of the Ecodesign criteria and final test result. The test results can be filtered by market surveillance authority, model number, product category, manufacturer, and/or the date the product was placed in the market.

Market surveillance authorities enter test results manually into the Ecopliant database for both compliant and non-compliant products. The database analyses the test results and determines whether the product meets requirements (is compliant). Test reports are also uploaded and stored for reference by other market surveillance authorities.

The Ecopliant database enables a market surveillance authority that is considering inspecting a given model to learn whether another country has inspected that model and whether it was found compliant. Thus it enhances effectiveness of market surveillance process and reduces the cost of re-testing the models that already have been tested by other authorities.

7 | RECOMMENDATIONS

Aproduct registration system is a key component of many programmatic efforts to achieve high levels of energy efficiency and phase out inefficient lamps. Product registration systems are essential to maintaining healthy energy markets and high levels of efficiency compliance, and may be used to promote collaboration across efficiency stakeholders. To maximise effectiveness and usefulness, the registration system must be: planned, developed and operated with careful attention to detail; communicated about regularly; and allocated sufficient funding. Taking advantage of international experience always yields more success. This chapter outlines the key recommendations for developing a product registration system.

START WITH A STRUCTURED APPROACH

It is strongly recommended that a structured approach is followed. The key steps for designing, planning for, building and launching the registration system are as follows:

1. **Determine objectives and infrastructure requirements:** Ensure leadership and institutional prerequisites; determine the purpose and scope of the registration system; perform situational analysis, including a review of policies and procedures; review existing registration systems; identify key users and engage stakeholders.
2. **Plan and specify:** Specify detailed technical and user requirements; identify resources, roles and responsibilities; draft terms of reference/ requirements; and select a contractor or contractors, as required.
3. **Design and build:** Develop user and machine interfaces; develop system architecture and security; and test the registration system.
4. **Launch:** Notify and train users; put the registration system into use.

MAINTAIN THE REGISTRATION SYSTEM, BUILD SUCCESS

Put appropriate processes in place to ensure the accuracy of data in the registration system, in particular that of product performance data. The single most important function of most registration systems is to serve as the authoritative source of information on the performance of products on the market.

Plan carefully to ensure the data servers that host the registration system have sufficient capacity to handle the amount of data and number of simultaneous users anticipated. A registration system that is frequently unavailable could erode confidence in the programme.

Update and upgrade the registration system as necessary to ensure its smooth functioning, guard against cyberattacks and accommodate changing programme requirements, such as the introduction of more stringent MEPS.

BUDGET FAIRLY AND CREATIVELY

Make a plan in advance of launch for how the registration system will be funded. Look to international experience to find out how different systems collect fees. Communicate to stakeholders clearly, and in advance, about fees and fee schedules, any planned changes, and, when appropriate, the rationale for those changes. Plan for both ongoing and occasional maintenance. When possible, and appropriate, leverage resources by collaborating with regional partners.

7

TAKE ADVANTAGE OF INTERNATIONAL EXPERIENCE AND OPPORTUNITIES FOR COLLABORATION

It is important for new registration systems to take into account the design of other systems around the world. While there is no universal solution, the administrators of existing registration systems have learned from experience and have much to offer.

Additionally, as many of the same (or similar) products are sold across a region, establishing a regionally harmonised registration system can help coordinate MVE planning and activities. It may also help facilitate regional evaluation programmes and energy efficiency policy harmonisation at the regional level. Compatible registration systems (and programme criteria) simplify the ability to share test results and other compliance verification information. Coordination of MVE efforts can reduce costs, avoid duplication of efforts, facilitate global trade, and improve product performance, thereby accelerating the transition to energy efficient lighting markets.

8 | RESOURCES

To support countries and regions in the development of efficient lighting activities and strategies, the UNEP-GEF en.lighten initiative, CLASP and other organisations offer a wide array of practical tools. The most relevant of these are described below.

⇒ UNEP-GEF EN.LIGHTEN INITIATIVE PUBLICATIONS

Achieving the Transition to Energy Efficient Lighting Toolkit – delivers best practice guidance for policy development and provides technical and practical tools for those directly involved in national phase-out activities. This toolkit is available online in five languages: Arabic, English, French, Russian and Spanish.

http://www.enlighten-initiative.org/ResourcesTools/EfficientLightingToolkit.aspx

Developing Minimum Energy Performance Standards for Lighting Products: Guidance Note for Policymakers - illustrates how to develop MEPS for lighting products. It is a practical resource for governments on the processes to follow when establishing MEPS in a national or regional market.

http://www.enlighten-initiative.org/ResourcesTools/Publications.aspx

Developing Lighting Product Registration Systems: Guidance note – provides practical guidance and examples to energy efficiency programme administrators on how to develop, operate and maintain a registration system for lighting products.

http://www.enlighten-initiative.org/ResourcesTools/Publications.aspx

Efficient Lighting Market Baselines and Assessment: Guidance note – provides practical guidance to policymakers and energy efficiency programme administrators on how to determine national baselines, use this data for market monitoring purposes, and how to monitor the market to continuously update the baselines.

http://www.enlighten-initiative.org/ResourcesTools/Publications.aspx

Enforcing Efficient Lighting Regulations: Guidance note – presents best practices for enforcing energy efficiency regulations for lighting products. It can be used as a practical resource by policymakers and enforcement bodies when developing or revising their enforcement regime.

http://www.enlighten-initiative.org/ResourcesTools/Publications.aspx

Good Practices for Photometric Laboratories: Guidance note – provides guidance on the operation of photometric laboratories to ensure that testing results are fully supported by evidence of the legitimacy of the measurement values obtained and to give confidence in the accuracy of these results and conformance with test procedures/conditions.

http://www.enlighten-initiative.org/ResourcesTools/Publications.aspx

Performance Testing of Lighting Products: Guidance note - outlines the process for carrying out energy efficiency performance testing for lamps, and how to interpret and use the data. It is a practical resource for energy efficiency policymakers and programme administrators.

http://www.enlighten-initiative.org/ResourcesTools/Publications.aspx

Product Selection and Procurement for Lamp Performance Testing: Guidance note – provides guidance on the steps required when selecting and procuring residential lamps to undergo performance testing, including defining the product scope, selection methodology, and the procurement and tracking protocol.

http://www.enlighten-initiative.org/ResourcesTools/Publications.aspx

Global Compact Fluorescent Lamp Check Test Results and Analysis Report – provides results and analysis of the safety, performance and mercury content of 47 models of CFLs tested at the Global Efficient Lighting Centre in 2013. The lamps were sampled in 10 countries (Azerbaijan, Chile, Costa Rica, Dominican Republic, Guinea-Bissau, Lebanon, Panama, Tonga, Tunisia and Uruguay) with the support of the UNEP en.lighten initiative.

http://www.enlighten-initiative.org/ResourcesTools/Publications.aspx

Inter-laboratory Comparison Testing of Light Emitting Diode (LED) Lamps - presents the results of an inter-laboratory comparison testing exercise undertaken by six laboratories in Southeast Asia in 2015 (in accordance with ISO/IEC 17043, *Conformity assessment - General requirements for proficiency testing*), with the Global Efficient Lighting Centre as the nucleus laboratory.

http://www.enlighten-initiative.org/ResourcesTools/Publications.aspx

Lamp Sampling in Cambodia, Indonesia, Lao PDR, the Philippines, Thailand and Viet Nam – presents a summary of a 2014 lamp sampling exercise coordinated by the International Institute for Energy Conservation to identify and sample compact fluorescent and LED lamps in six target countries. The objective of the exercise was to provide participating agencies with guidance on, and experience in, conducting a retailer survey, lamp purchasing and witnessing, and packing and shipping; and to sample lamps for subsequent testing undertaken by the Global Efficient Lighting Centre.

http://www.enlighten-initiative.org/ResourcesTools/Publications.aspx

Southeast Asia Compact Fluorescent Lamp Performance and Mercury Testing and Analysis Report – presents the results and analysis of testing undertaken by the Global Efficient Lighting Centre on CFLs purchased in six Southeast Asian countries (Cambodia, Indonesia, Lao PDR, Philippines, Thailand and Viet Nam in 2014.

http://www.enlighten-initiative.org/ResourcesTools/Publications.aspx

Southeast Asia Light Emitting Diode Lamp Performance Testing and Analysis Report – presents the results and analysis of testing undertaken by the Global Efficient Lighting Centre on LED lamps purchased in six Southeast Asian countries (Cambodia, Indonesia, Lao PDR, Philippines, Thailand and Viet Nam in 2014.

http://www.enlighten-initiative.org/ResourcesTools/Publications.aspx

⇨ **CLASP PUBLICATIONS**

Energy Efficiency Labels and Standards: A Guidebook for Appliances, Equipment and Lighting – provides guidance for government officials and others responsible for developing, implementing, enforcing, monitoring, and maintaining labelling and standards-setting programmes.

http://clasp.ngo/Resources/Resources/StandardsLabelsGuidebook

Compliance Counts: A Practitioner's Guidebook on Best Practice Monitoring, Verification, and Enforcement for Appliance Standards & Labeling - provides guidance on designing and implementing effective compliance frameworks, and directs the reader to references and other relevant resources.

http://clasp.ngo/Resources/MVEResources/MVEGuidebook

Assessment of Opportunities for Global Harmonization of Minimum Energy Performance Standards and Test Standards for Lighting Products - presents an assessment of test procedures and MEPS globally and identifies key gaps and similarities between them. It also examines the opportunities for the alignment of various economies to one global test procedure, and corresponding MEPS, for CFLs and LEDs and provides recommendations on possible steps to encourage and accelerate the global uptake of energy-efficient lighting technologies.

http://clasp.ngo/Resources/Resources/PublicationLibrary/2011/Global-Harmonization-Lighting-MEPS-TestStandards

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Assessment of Verification Testing Capacity in the APEC Region and Identification of Cost Effective Options for Collaboration- presents the results of a comprehensive survey of APEC countries to identify qualified testing facilities and analyse cost-effective policy options for conducting compliance testing.

http://clasp.ngo/Resources/MVEResources/ MVEPublicationLibrary/APEC-Assessment- of-Testing-Capacity-Facilitates-Compliance- Collaboration

⇨ **EXPERTISE AND COLLABORATIVE PROGRAMMES**

UNEP-GEF en.lighten initiative Centre of Excellence – comprised of a network of over 50 lighting experts representing over 30 countries – offers recommendations, technical guidance and efficient lighting expertise to assist countries in the shift to energy efficient lighting. The Centre is based in Paris, France.

http://www.enlighten-initiative.org/

UNEP-GEF en.lighten initiative online support centre, 'en.lightened learning' - provides targeted technical advice and contains forecasting tools, publications and guidance documents. It also includes a series of informational webinars that provide more detailed guidance on specific aspects of MVE including:

- *Best Practices for Enforcing Efficient Lighting Regulations;*
- *CIE Test Method Standard for LED Lamps;*
- *Communication of Lighting Product Performance Standards and Labelling Programmes to Supply Chain Providers;*
- *Developing a Legislative Framework to Support Successful Monitoring, Verification and Enforcement Activities for Energy Efficient Lighting;*
- *Evaluation Indicators for Energy Efficient Lighting MVE Policy;*
- *How to Create and Operate a Lighting Product Registration System;*
- *Lamp Product Performance Tests and Interpretation of Results;*
- *Lighting Product Benchmarking as an Energy Baseline for Change;*
- *Lighting Product Registration Systems: Design and Operation;*
- *Market Baselines and Surveillance for Efficient Lighting Products;*
- *Testing Lamp Efficacy, Lumen Maintenance, Rated Life and Uncertainties.*

http://learning.enlighten-initiative.org/

UNEP Collaborating Centre for Energy Efficient Lighting, China - GELC offers a wide range of technical services to developing countries including laboratory training and establishing systems for lamp quality control.

http://www.enlighten-initiative.org/About/ GlobalEfficientLightingCentre.aspx

lites.asia - is a network of lighting efficiency regulators and policy makers in the Asia region. Since its formation in 2009, membership of the lites.asia network has increased to over 700 participants from 30 economies, with delegates actively participating in IEC meetings, sharing knowledge on local standards and labelling electronically and in regional meetings, plus a number of other cooperative actions. The *lites.asia* website contains a range of resources on lighting efficiency and regulation including presentations from regular regional meetings and collaborative project and survey results, such as the regional labelling display survey.

http://www.lites.asia/

Australian and New Zealand Equipment Energy Efficiency (E3) Program - is a cooperative government programme that applies a combination of MEPS and energy rating labelling to a range of energy using products including lighting in order to inform consumers and increase the range of efficient products in the market. The Energy Rating website contains a range of reports on lighting related baseline data and analysis for the Australian and New Zealand markets, as well as a publically accessible database of registered lighting products.

http://www.energyrating.gov.au/

CLASP - Works to improve the environmental and energy performance of appliances and related systems, lessening their impacts on people and the world around us. CLASP develops and shares practical and transformative policy and market solutions in collaboration with global experts and local stakeholders. It is a non-profit international organisation promoting energy efficiency standards and labels for appliances, lighting, and equipment. Since 1999, CLASP has worked in over 50 countries on six continents pursuing every aspect of appliance energy efficiency, from helping to structure new policies to evaluating existing programmes.

http://www.clasponline.org/en

The Clean Energy Ministerial's Clean Energy Solutions Center - offers no-cost expert policy assistance, webinars and training forums, clean energy policy reports, data, and tools provided in partnership with more than 35 leading international and regional clean energy organisations.

https://cleanenergysolutions.org/

IEA - the International Energy Agency (IEA) is an autonomous organisation which works to ensure reliable, affordable and clean energy for its 28 member countries and beyond. The IEA's four main areas of focus are: energy security; economic development; environmental awareness; and engagement worldwide. Founded in response to the 1973/4 oil crisis, the IEA's initial role was to help countries coordinate a collective response to major disruptions in oil supply through the release of emergency oil stocks. It has a staff of 260 professionals (energy analysts, modellers, data managers/statisticians, technicians, secretaries and support staff) working together on global energy challenges.

http://www.iea.org/

IEA 4E Solid State Lighting Annex – the Solid State Lighting Annex was established in 2009 under the framework of the International Energy Agency's Efficient Electrical End-Use Equipment (4E) Implementing Agreement to provide advice to its ten member countries seeking to implement quality assurance programmes for solid state lighting. This international collaboration brings together the governments of Australia, China, Denmark, France, Japan, The Netherlands, Republic of Korea, Sweden, United Kingdom and United States. China works as an expert member of the Annex. The Annex website provides information on recommended performance specifications for LED lighting, as well as reports and advice on LED product testing, lighting and health and lifecycle analysis.

http://ssl.iea-4e.org/

LED Lighting Facts - LED Lighting Facts® is a programme of the United States Department of Energy that showcases LED products for general illumination from manufacturers who commit to testing products and reporting performance results according to industry standards. Their website contains information on their verification testing policy, a list of accredited laboratories in the United States and a list of products with their energy performance information. This is a useful web portal for policymakers and programme administrators to inform themselves about efficient lighting policies and testing.

http://www.lightingfacts.com/

SEAD Initiative - The Super-efficient Equipment and Appliance Deployment (SEAD) Initiative is a voluntary collaboration among governments working to promote the manufacture, purchase, and use of energy-efficient appliances, lighting, and equipment worldwide. SEAD is an initiative under the Clean Energy Ministerial and a task of the International Partnership for Energy Efficiency Cooperation.

www.superefficient.org

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EQUIPMENT ENERGY EFFICIENCY PROGRAM 2015a

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Making energy efficiency clearer: Commission proposes a single 'A to G' energy label and a digital database for products
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SEAD INITIATIVE 2013

Energy Efficiency Data Access Project: Final Report.
http://superefficient.org/dataaccess

SEAD INITIATIVE 2015	*Product Certification Databases* http://superefficient.org/en/Tools/Product-Certification-Databases.aspx	
UNITED STATES ACCESS BOARD 2000	*Section 508 Standards for Electronic and Information Technology, Federal Register Vol. 65 p. 80500, 21 December 2000.* http://www.access-board.gov/guidelines-and-standards/communications-and-it/about-the-section-508-standards/section-508-standards	
UNITED STATES DEPARTMENT OF ENERGY 2015	*Compliance Certification Management System [web page]* https://www.regulations.doe.gov/ccms	
UNITED STATES EPA 2015a	*ENERGY STAR API User Essentials* http://www.energystar.gov/products/spec/energy_star_api_user_essentials_pdf	
UNITED STATES EPA 2015b	*ENERGY STAR Certification Body Resources* http://www.energystar.gov/index.cfm?c=third_party_certification.tpc_cert_bodies	
UNITED STATES EPA 2015c	*ENERGY STAR Developer Resources Page [web page - BETA]* https://data.energystar.gov/developers	
UNITED STATES EPA 2015d	*ENERGY STAR International Partners [web page]* http://www.energystar.gov/index.cfm?c=partners.intl_implementation	
UNITED STATES EPA 2015e	*ENERGY STAR Product Finder [web page]* http://www.energystar.gov/productfinder/	
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WORLD WIDE WEB CONSORTIUM 2015	*Web Content Accessibility Guidelines (WCAG) Overview [web page]* http://www.w3.org/WAI/intro/wcag.php	

ANNEX A

LIST OF LIGHTING PRODUCT REGISTRATION SYSTEMS

The following is a complete list of the lighting product registration systems known to the authors, including those profiled in Chapter 6.

Australia and New Zealand	Energy Rating System	http://reg.energyrating.gov.au/comparator/product_types/
Brazil	Product Registration System	http://www.inmetro.gov.br/registrosobjetos/Default.aspx?pag=1
California	Appliance Efficiency Database	https://cacertappliances.energy.ca.gov/Pages/ApplianceSearch.aspx
Canada	Searchable Product Lists	http://oee.nrcan.gc.ca/pml-lmp/
China	Energy Label Product Database	http://www.energylabel.gov.cn/NewsMore.aspx?para=uncc_bagg More information: http://www.energylabel.gov.cn/
Chinese Taipei	Certified Products Database	https://ranking.energylabel.org.tw/_outweb/product/Approval/list.asp
DesignLights Consortium	Qualified Products List	https://www.designlights.org/qpl
European	Ecopliant Database[33]	http://www.ecopliant.eu/
Hong Kong	Labelled Products Database	http://www.energylabel.emsd.gov.hk/en/households/select.html
India	Star Label Product Database	http://220.156.189.29/Home/Searchcompare More information: http://www.beestarlabel.com/
Japan	Product Database	https://seihinjyoho.go.jp/
Philippines	Labelled And Certified Product Lists	https://www.doe.gov.ph/energy-efficiency/energy-labelling-efficiency-standards/

33 Although not a product registration system per se, in that it does not provide the initial gateway for a model's participation in a voluntary or regulatory programme, the Ecopliant Database does provide a useful example of how governments can share model-specific compliance-related information

Singapore	Database of Registered Goods	https://e-services.nea.gov.sg/els/Pages/Search/PublicSearchProduct.aspx?param=goods&type=p
Thailand	Label No. 5 Products Database	http://labelno5.egat.co.th/index.php?lang=th
United States Department of Energy	Compliance Certification Database	http://www.regulations.doe.gov/certification-data/
United States Department of Energy	LED Lighting Facts	http://www.lightingfacts.com/
United States EPA	ENERGY STAR Qualified Product Finder	http://www.energystar.gov/productfinder/
Vietnam	Product Registration System	http://registration.nhannangluong.com/Publish

ANNEX B

EXAMPLE TERMS OF REFERENCE FOR HIRING A CONTRACTOR

TERMS OF REFERENCE

Title: **Terms of Reference for Design, Operation and Maintenance of the [insert country/region] Energy Efficiency Programme Product Registration System**

1. INTRODUCTION:

[Include goals and objectives of the national energy efficiency programme with details on mandatory or voluntary requirements, along with some introductory information on how the product registration system will support the programme. This should include details of the products to be covered by the MEPS and labelling requirements and those that should be included in the registration system]

2. BACKGROUND:

[Include details of other product registration systems that will inform development of the national system.]

3. OBJECTIVE:

The Contractor will: develop an architecture for the product registration system; build a product registration system and the online platform where it will be hosted; and maintain (and update) the product registration system in a timeframe to be agreed with the Client.
[More details or clarification can be provided.]

4. DESCRIPTION OF THE PRODUCT REGISTRATION SYSTEM:

[Provide information on how the product registration system will be used, and information on any existing systems or processes for registering products. For example:

The product registration system should provide the following functions

- Manufacturers can register themselves with the programme after paying a registration fee.
- The registration fee can be paid by through the Online Payment Gateway.
- Manufacturers can register their models online for the national energy efficiency programme certification or accreditation.
- The software automatically calculates the energy efficiency rating depending on parameters entered by manufacturers
- The software enables communications between manufacturers and the programme administrator.
- The programme administrator can create and manage accounts for the manufacturers through the accounts portal of the product registration system.
- Laboratories that carry out check testing on products are also linked to the product registration system portal.
- Reports can be generated for analysis of energy savings.
- The application provides flexibility for addition of new products under the energy efficiency programme.]

5. SCOPE OF WORK:

The Contractor is responsible for executing the following tasks as part of the project, in close collaboration with [Name of project manager and relevant stakeholders].

Note to reader – The following tasks serve as examples and should be amended as appropriate for the given project.

TASK 1: Understand and review existing platforms for product registration and carry out needs assessment to inform methodology

Work together with the Client, through [include designated project manager], and other designated experts to carry out needs assessment of the product registration system, to help inform the methodology for designing, developing and maintaining the system.

a. Review materials provided by the Client to obtain sufficient understanding of the national energy efficiency programme to understand which products should be included in the system and assess existing platforms for product registration in the national programme. Assess objectives of the system to ensure all functionalities are included.
b. Review product registration systems in the region that may inform or be aligned with the national system, and consider the related operating environment through meetings with the Client.
c. Develop and submit methodology that will be used for developing the whole system and conducting the service / maintenance of the new system.
d. Develop detailed work plan along with time scheduling for undertaking the work.

Deliverables:
1.1 Detailed needs assessment report.
1.2 Detailed methodology report.
1.3 Detailed work plan with timelines.

TASK 2: Design and develop product registration system

Design and develop the various interfaces and architecture of the product registration system and review with the Client over regular meetings.

a. Develop user interfaces that address the needs of different stakeholders using the system. Consider different languages required as well as accessibility concerns to ensure the user interfaces meet government requirements and are easy to use and understand. Consider existing interfaces that may be adapted or linked to.
b. Develop machine interfaces through which users directly interact with the registration system. Consider different APIs that might support this function, and example best practice examples used in different regions.
c. Develop system architecture. Consider required functionalities of the system, the number of anticipated users, equipment available to users to access a system, simultaneous peak demand for the system, data storage requirements and any legacy systems used by the Client to understand if they can be shared or repurposed.
d. Incorporate system security, to ensure that both public and private data are stored securely. Incorporated standard user group-based permissions to protect data against unauthorised access and apply HTTPS to ensure communications on the system are encrypted. Identify privacy notices or warnings that should be presented to users.

Deliverables:
2.1 Prototype product registration system containing all interfaces and functionalities as agreed with the client in a location and format as agreed with the client.
2.2 An online platform on which to store the prototype system.

TASK 3: Test and refine the product registration system

Once the prototype system has been developed, the Contractor will test the system with selected experts and stakeholders, as agreed with the Client, to verify the system works as expected and meets all requirements and functionalities. Any recommendations or issues identified during the testing phase will be assessed and incorporated into the final system, as agreed with the Client.

a. Develop a test plan, to be agreed with the Client.
b. Test the prototype product registration system with the Client and selected experts to check that all regulatory and technical requirements have been met and that data validation rules are working correctly. Make any necessary changes as identified by the testers and as agreed with the Client.
c. Test the prototype product registration system with selected external stakeholders, as agreed with the Client, to check ease-of-use of the system. Identify and resolve any remaining problems identified during the testing phase.
d. Prepare final refined version of the product registration system.

Deliverables:

3.1 Detailed test plan.

3.2 Final version of product registration system.

TASK 4: Guidance and training tools to support use of product registration system

Prior to launching the system, the Contractor will develop a set of guidance materials and frequently asked questions that can be accessed online by users of the system. The Contractor will also provide training sessions and materials to the Client to facilitate use by the programme administrators.

a. Develop 'help' or 'frequently asked questions' materials for inclusion on the website to facilitate use of the system to external stakeholders.

b. Develop training materials for the programme administrators on how to run and manage the system.

c. Hold training sessions to support practical use of the system by programme administrators.

Deliverables:

4.1 Detailed help and frequently asked questions section for the online platform.

4.2 Training materials.

4.3 Training sessions for the Client.

TASK 5: Launch product registration system and provide ongoing technical maintenance support

Once the system is ready for public launch, the Contractor will host this on a server, as agreed with the Client, and provide ongoing technical maintenance support for the system.

a. Prepare detailed maintenance plan for the product registration system.

b. Make product registration system publically available on a server, in a location to be agreed with the Client.

c. Monitor the system for bugs or updates, and maintain as needed in agreement with the Client.

Deliverables:

5.1 Detailed maintenance plan.

5.2 Online product registration system.

5.3 Monthly maintenance reports.

6. PERIOD OF PERFORMANCE:

[Include agreed timeframe for performance of the project, in table or gantt chart format – as preferred by the project manager].

7. BUDGET:

[Include budget agreed with the Contractor, including payment structure. This can be per task, per deliverable, per month, etc.]

ABOUT THE UNEP DIVISION OF TECHNOLOGY, INDUSTRY AND ECONOMICS

Set up in 1975, three years after UNEP was created, the Division of Technology, Industry and Economics (DTIE) provides solutions to policy-makers and helps change the business environment by offering platforms for dialogue and co-operation, innovative policy options, pilot projects and creative market mechanisms.

DTIE plays a leading role in three of the seven UNEP strategic priorities: **climate change, chemicals and waste, resource efficiency.**

DTIE is also actively contributing to the **Green Economy Initiative** launched by UNEP in 2008. This aims to shift national and world economies on to a new path, in which jobs and output growth are driven by increased investment in green sectors, and by a switch of consumers' preferences towards environmentally friendly goods and services.

Moreover, DTIE is responsible for **fulfilling UNEP's mandate as an implementing agency for the Montreal Protocol Multilateral Fund** and plays an executing role for a number of UNEP projects financed by the Global Environment Facility.

The Office of the Director, located in Paris, coordinates activities through:

→ **The International Environmental Technology Centre** - IETC (Osaka), which promotes the collection and dissemination of knowledge on Environmentally Sound Technologies with a focus on waste management. The broad objective is to enhance the understanding of converting waste into a resource and thus reduce impacts on human health and the environment (land, water and air).

→ **Sustainable Lifestyles, Cities and Industry** (Paris), which delivers support to the shift to sustainable consumption and production patterns as a core contribution to sustainable development.

→ **Chemicals** (Geneva), which catalyses global actions to bring about the sound management of chemicals and the improvement of chemical safety worldwide.

→ **Energy** (Paris and Nairobi), which fosters energy and transport policies for sustainable development and encourages investment in renewable energy and energy efficiency.

→ **OzonAction** (Paris), which supports the phase-out of ozone depleting substances in developing countries and countries with economies in transition to ensure implementation of the Montreal Protocol.

→ **Economics and Trade** (Geneva), which helps countries to integrate environmental considerations into economic and trade policies, and works with the finance sector to incorporate sustainable development policies. This branch is also charged with producing green economy reports.

DTIE works with many partners (other UN agencies and programmes, international organizations, governments, non-governmental organizations, business, industry, the media and the public) to raise awareness, improve the transfer of knowledge and information, foster technological cooperation and implement international conventions and agreements.

For more information,
see **www.unep.fr**

This guidance note provides practical guidance for policymakers on how to design, establish, commission and maintain a robust and reliable registration system for lighting products. It is equally relevant for countries seeking to establish a product registration system for the first time, or for those upgrading a paper-based system to an online system or extending an existing online registration system to include more features. It describes the steps necessary to create a registration system and provides best practice guidance for maintaining the user records and information technology infrastructure. It also provides an overview of the typical registration process and the reviews undertaken by policymakers for the approval/rejection of applications.

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