

**THE COLLABORATIVE LABELING AND
APPLIANCE STANDARDS PROGRAM (CLASP)
AND
THE CENTRAL AMERICAN ENERGY FOUNDATION
(BUN-CA)**



Reference Document for Energy Efficiency Standards & Labeling in Central America

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The authors of this Reference Document relied extensively on CLASP's *Energy-Efficiency Labels and Standards: A Guidebook for Appliances, Equipment and Lighting*. This Guidebook, published in 2005, is the world's leading document of its kind and addresses, in great detail, all the components found in this document. It is recommended that the reader refer to the Guidebook for further discussion of standards and labeling (S&L) topics. The Guidebook is available online at www.CLASPOnline.org.

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Terms and Definitions

Accreditation Body – Public or private sector organization responsible for inspection of laboratory facilities to verify that they are equipped and staffed properly to perform a specific set of test procedures.

ANDEAN Community – Trade association of countries of northern South America, including Bolivia, Colombia, Ecuador, Perú and Venezuela.

ASEAN – Association of Southeast Asian Nations – Trade association including Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam.

BUN-CA – A regional non-governmental organization working in Central America on the promotion of energy efficiency and renewable energy.

Certification Agency – Government agency responsible for authorizing the sale of products, the display of an endorsement label, or the efficiency rating displayed on a comparative label. Sometimes referred to as Implementing Agency.

Comparative Label – An informative label which provides the consumer with a comparison of energy efficiency between models, either by a rating system (e.g. numbers, letters or stars), or on a continuous scale. These can be voluntary or mandatory.

CLASP – Collaborative Labeling and Appliance Standards Program – An international non-governmental organization whose mission is to promote efficiency standards and labels in developing and transitional countries.

EER – Energy-efficiency ratio, a measure of energy efficiency applied to air-conditioners where a higher value is typically more energy-efficient

EES&L – Energy Efficiency Standards and Labeling – Typically, a regulatory program designed to improve the average energy efficiency of products sold, either through mandated minimum efficiency requirements (standards) or by providing efficiency information to consumers (labels).

Endorsement Label – A ‘seal of approval’ indicating that the product meets or exceeds a particularly high efficiency level that is typically implemented on a voluntary basis

Enforcement – Mechanism to identify violations of efficiency regulations and a set of sanctions which can be threatened or imposed in order to guarantee future compliance.

GEF – Global Environment Facility – An independent financial organization that provides grants to developing countries for projects which benefit the global environment and promote sustainable livelihoods in local communities. The United Nations Development Program (UNDP) is one of the implementing agencies of the GEF.

GHG – Greenhouse gas

kWh - Kilowatt hour

MEPS – Minimum Efficiency Performance Standards . MEPS specify the lower limit of efficiency allowable for sale on the market and are generally mandatory.

Mutual Recognition Agreements (MRAs) - An international agreement recognizing the equivalencies of the accreditation systems for technical specifications.

NAEWG – North American Energy Working Group – Committee of experts and government officials from Canada, Mexico and the United States dedicated to the harmonization of energy policies between the three countries.

Negotiated Agreements – Agreements between manufacturers and governments to voluntarily increase the energy efficiency of products sold, usually in place of efficiency regulations.

PEER - Central American Program for Energy Efficiency (Programa en Eficiencia Energética para Centroamérica) A UNDP/GEF Regional Project to support the development of markets for energy efficient products in Central America, executed by BUN-CA.

SARI/Energy – South Asia Regional Initiative for Energy – Development initiative sponsored by the U.S. Agency for International Development (USAID) to promote the cooperation and improvement of energy policy and infrastructure in Bangladesh, Bhutan, India, Nepal, Sri Lanka and Maldives.

Test Facility – Laboratory installation, including equipment and trained staff capable to perform specific energy efficiency test procedures.

Test Procedure – A well-defined set of instructions to determine energy consumption or efficiency in a precise and consistent way.

UNDP – United Nations Development Program

PART I

Key Issues in the Development of Standards and Labeling Programs in Central America

1. Introduction

Governments find themselves at a critical time with regard to energy policy. The oil crisis of the 1970s showed that energy supplies are not unlimited, and that supply constraints could have serious damaging effects on the world's economies. This period also showed, however, that economies could become more energy efficient, either in response to high prices, or through targeted government policies. Today, governments around the world face a new sense of urgency. Challenges faced today include:

- The future supply of fossil fuels, especially petroleum, is uncertain;
- Energy prices are high, and may remain high for the long term;
- Growth in demand is outpacing supply, especially with electricity, leading to frequent service interruptions (blackouts);
- Local pollution problems have reached a critical stage in many areas, and energy consumption is related to growing health problems; and
- Concern about global climate change is growing, and reduction of greenhouse gas emissions is an increasing priority for all governments.

Some of the key policies to emerge during the oil crisis of the 1970s were policies to encourage the use of efficient equipment or forbid the sale of the most inefficient products. These policies, called Energy Efficiency Standards and Labeling (EES&L) Programs began in a few countries and targeted only a few main end uses. By 2004, 51 countries had enacted regulations for 40 separate product classes. The past 10 -15 years has seen an emergence of programs on the regional scale, including in the European Union, South America (ANDEAN), Southeast Asia (ASEAN) and South Asia (SARI/Energy) along with North America (NAEWG). These efforts seek to take advantages of trade linkages to lower barriers to development of effective regulations, and to avoid the barriers to trade that can accompany unilateral regulations.

In 2005, the United Nations Development Program (UNDP) and Global Environment Facility (GEF) approved a project to promote energy efficiency throughout Central America, including the development of S&L programs. In support of that program, and with additional support from the Renewable Energy and Energy Efficiency Partnership (REEEP), BUN-CA and CLASP have collaborated to create this *Reference Document* for the benefit of Central American governments and stakeholders . Part I consists of a series of articles covering general issues related to the development of EES&L programs. The goal is to provide an overview of important concepts and highlight some of the most important issues in an easy-to-read format. Furthermore, this document is tailored to the particular challenges and opportunities that policymakers in Central America are likely to encounter in going forward towards S&L policies as a region. For more details regarding all aspects of the development of S&L programs, the reader is referred to *Energy Efficiency Labels and Standards: A Guidebook for Appliances, Equipment and Lighting*, available for download at www.clasponline.org.

Part II presents S&L program development in Argentina and Colombia. This section gives details of those countries' experiences, particularly in the area of institutional roles, legislative frameworks, and key stakeholders. Part II is based on research carried

out by Adviesbureau voor Energiestrategie - Estrategias Energéticas para un Desarrollo Sustentable, an implementing partner of CLASP (www.energy-strategies.org).

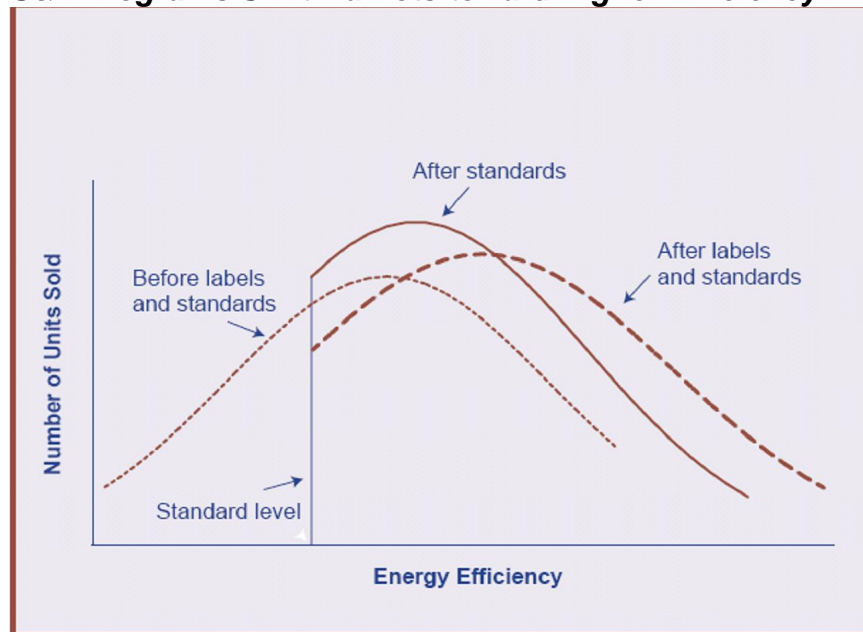
2. Reasons to Implement a Standards and Labeling Program

Benefits An energy efficiency standards and labeling (S&L) program for household and office equipment is one of the most effective policies that a government can employ to reduce energy consumption and meet climate change mitigation goals. Reducing electricity consumption results in reduced fuel combustion at power plants and, when done cost-effectively, the following benefits can be realized:

- Reduction of capital investment in energy supply infrastructure which becomes available to help meet other development goals;
- Enhanced national economic efficiency through reduced energy bills;
- Position regional economies in a more competitive condition in international markets;
- Enhanced consumer welfare;
- Meeting of climate change goals; and
- Averting of urban/regional pollution.

A well-designed, well-implemented S&L program will result in the removal of cost-ineffective, energy-wasting products. As seen below, standards shift the distribution of energy-efficient models of products sold in the market upward by eliminating inefficient models and establishing a baseline for programs that provide incentives for "beating the standard." Labels shift the distribution of energy-efficient models upward by providing information that allows consumers to make rational decisions and stimulating manufacturers to design products that achieve higher ratings than the minimum standard. The end result is potentially very large energy savings, limited energy growth without sacrificing economic growth.

S&L Programs Shift Markets toward Higher Efficiency



Source: CLASP 2005

Challenges No government can afford to waste energy because of negative impacts on their own population and the global community as a whole. Developing countries have an additional motivation to minimize energy consumption - the already high and increasing capital costs of energy infrastructure and fossil fuels which are often imported.

These specific concerns apply strongly to the countries of the Central American region, which have small but growing economies with rapidly expanding energy demand and very little fossil fuel resources of their own. The main challenges for Central American countries are to:

Cost-effectiveness of S&L Programs – U.S. Minimum Efficiency Standards

- Program in place for 19 years
 - Standards in place for 39 residential and commercial products
 - Total program costs to date = \$2 per household
 - Total savings to consumers = \$600 per household
- Source: Lawrence Berkeley National Laboratory

- 1) Contain a growing demand for power, driven by both increasing populations and increasing electricity consumption per capita;
- 2) Gain energy independence by decreasing the imports of hydrocarbons for power production; and
- 3) Respond quickly to the growth in the commercial and industrial sectors, integrating cost-effective energy efficiency measures in the end-use of electricity, while decreasing greenhouse gas (GHG) emissions.

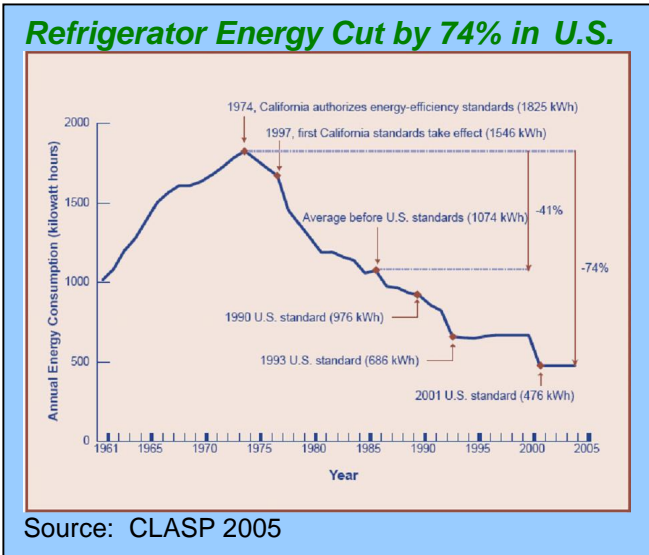
In order to prosper, and avoid negative environmental impacts, these countries need to make all practical efforts to optimize their energy consumption. An important element of energy policy needs also to encourage the growth of a market for high-efficiency equipment through incentives or through regulation.

UNDP/GEF Regional Project – Programa en Eficiencia Energética para Centroamérica (PEER) In 2005, the Global Environment Facility (GEF) approved a full sized project (FSP) to promote energy efficiency throughout Central America in the commercial and industrial sectors, including the development of S&L programs. The governments of Central America are in a particularly good position to benefit from regional coordination of such policies, because:

- There are currently no such programs in effect in any country. Therefore, governments can participate on an equal footing, without having to choose between existing policies and practices;
- Most energy-consuming equipment is imported. As a result, governments can avoid negotiating the needs of multiple national industries. Furthermore, product classes and prevailing technologies are similar across countries, as are the major trading partners; and
- Central America is emerging as a trade bloc through its Regional Customs Agreement, which enables individual countries having the legal framework to coordinate actions for imports of goods, based on harmonized regulations. Regional institutions can form the mechanism by which inter-governmental agencies devoted to regional efficiency may emerge.

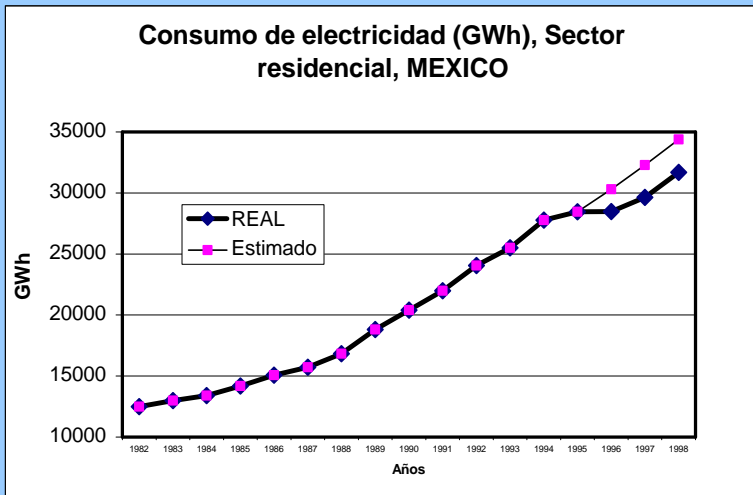
3. Standards and Labeling Can Have Dramatic Impacts

The first Minimum Efficiency Performance Standards (MEPS) for refrigerators in the United States were authorized in California in 1974. These were followed in 1990, 1993 and 2001 by successively more stringent U.S. federal standards. As a direct result, the consumption of the average U.S. refrigerator dropped by 74% between 1974 and 2004, from 1825 kWh to 476 kWh. By now, U.S. standards and labeling programs cover the great majority of energy consumption in buildings, and many products used in industrial installations. The U.S. Federal standards program alone covers 83% of residential energy consumption and 61% of commercial sector energy consumption. The total expected impact of these standards by 2025 is a reduction in U.S. residential energy consumption by 9% in 2025.



In developing countries, the impacts of EE S&L programs can be even larger in percentage terms. This is because sales of consumer durables like refrigerators and washing machines are growing rapidly with overall economic growth. This means that

Mexican Standards More Effective than Expected



Source: CONAE

programs implemented now will affect the great majority of products that will be in use in 10 to 15 years.

This is true in Mexico. The Mexican standards program was implemented in 1995 starting with only four main products – refrigerators, air conditioners, washing machines and electric motors. By 2005, standards for just these four products resulted in a 9.6% decrease in national electricity demand, and reduced the need for generating capacity

by 6.4%. The rapid success of the Mexican program depended on a clear legislative authority to set standards and strong enforcement. Mexican manufacturers exceeded the requirements of the standards, partially from a desire to become more competitive in international markets.

4. Program Approach: Labels and/or Standards? Mandatory or Voluntary?

Standards and labeling (S&L) programs can be either mandatory or voluntary. Labels also may vary in type between endorsement and comparative. Deciding which of these tools to use and which to start with is a function of political, social, economic and technical factors. In general, it may be easier to start with a labeling program rather than minimum efficiency standards as labels can help move the market toward higher efficiency products without the required phase-out of the lowest efficiency products that a standards program requires.

Labels Energy-efficiency labels are affixed to products in order to give consumers some level of information about the energy performance of that product, leading to a more informed purchase. An endorsement label acts as a “seal of approval” that the product has met the specific criteria level set by that label. Certain types of products such as consumer electronics (computers, printers, etc) and CFL lamps tend towards endorsement labels. Endorsement labeling programs are inherently voluntary.

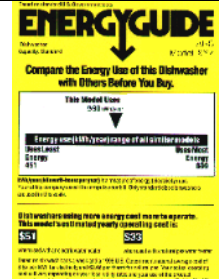


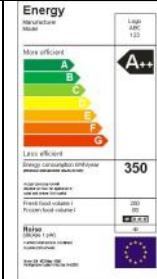
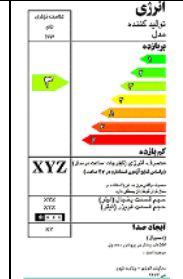

Endorsement Labels

					
U.S.	Ireland	China	Korea	Mexico	ELI

Source: CLASP 2005

Comparative labels provide information (categorically or on a continuous scale) that allows consumers to compare the energy performance of similar products. A program including comparison labels might begin as voluntary and evolve to mandatory at a later time. Labeling programs can either stand alone or act in conjunction with energy standards and can be very effective, depending on how the information is presented to the consumer, the way it is disseminated in an information campaign, and whether financial incentives exist.

Comparative Labels

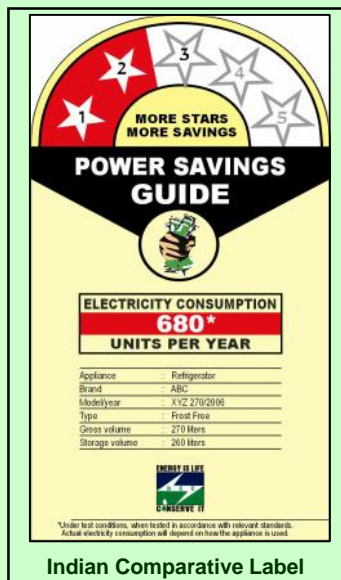
					
U.S. (Continuous)	Thailand (Categorical)	Australia's (Categorical)	EU (Categorical)	Iran (Categorical)	Philippines (Information)

Source: CLASP 2005

Standards Mandatory energy-efficiency standards are regulations that dictate the energy performance of products included in the program. Performance standards (MEPS) require manufacturers to meet a certain minimum efficiency level. This type of program will often result in less-efficient products no longer being eligible for sale.

Successful S&L programs reach their goals by motivating not only consumers, but also manufacturers, salespeople and importers, to move toward more efficient products. This can be done through either voluntary or mandatory programs. Assessments of institutional and regulatory capacity as well testing infrastructure and data availability are among the first considerations. Each society will have to determine the right combination of legal, economic, and social procedures and incentives that will most enable success. In the case of Japan, the S&L program is voluntary, with manufacturers routinely meeting targets without any enforcement or penalty mechanisms. Culturally, the threat of public disclosure of non-compliance is so strong that it is a sufficient deterrent, making a voluntary program effectively mandatory.

Combining MEPS and Labels in India

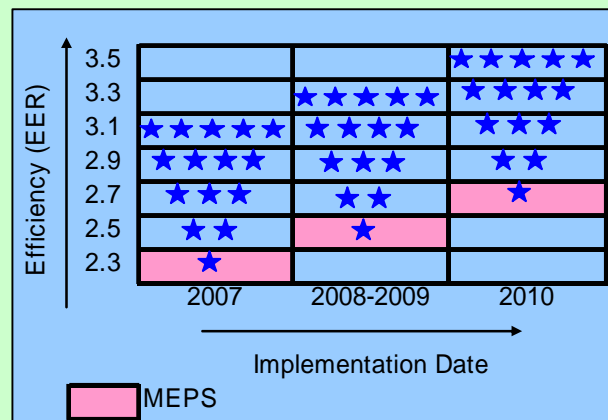


The Indian Bureau of Energy Efficiency's Standards and Labeling Program for Refrigerators and Air Conditioners combines comparative labels with Minimum Efficiency Performance Standards (MEPS). In this program products which barely pass the minimum requirements are awarded one star. Those that exceed the minimum by some margin are given two stars, etc. up to five stars. The Indian program also includes a strategy of *ratcheting*, that is, increasing the stringency of both standard and labels every few years. In each step, MEPS and label levels are raised one star level. This strategy was designed in order to quickly launch the program with relatively lax standards, but define regular intervals for improvement, after which efficiency requirements will be quite stringent.

Indian Standards and Labels Scheme for Room Air Conditioners 2007-2010

The figure on the right displays the standards and labeling scheme, for Room Air Conditioners in India. The first standard to take effect in 2007 is 2.3 EER. Products with efficiency between 2.3 and 2.5 will merit one star, between 2.5 and 2.7 will be two stars, etc. By 2008, the standard will be raised to 2.5. By 2010, the minimum will be 2.7, equivalent to the 3-star level in 2007.

Source: Tathagat 2007



5. Considering Regional Harmonization

Harmonization, or *alignment* as it is sometimes called, is the process of making regulations equivalent across national borders, or avoiding unnecessary differences in technical standards. A useful description of what is meant by harmonization is given by the following:

Harmonization "does not require standards to be identical, but differences will generally be due to requirements based on logic or real need, not on habit or prejudice - For example, difference of voltage or frequency, climate, seismic activity or legislative practices" (Cogan 2001).

The concept of harmonization of regulations is not new, and it has been applied to Energy Efficiency Standards and Labeling in many areas throughout the world.

Why harmonize? – The reason most often cited for the desire or necessity of harmonizing technical aspects of the program is *in order to avoid barriers to trade*. For this reason, it is often multilateral trade agreements which provide the impulse towards harmonization. For example, the European Commission requires that *all* technical regulations of all member states be harmonized. Technical regulations can form a barrier to trade because they impose a cost to manufacturers wishing to import products. This includes not only the cost of producing a product which conforms to the standards of each country, but also the cost of product testing, certification and labeling. These costs can be greatly reduced if fulfilling the export requirements of one country also fulfils the requirements of others.

Harmonization in North America

With the signing of NAFTA, the United States, Mexico and Canada continued a long process of harmonization of technical regulations. Mexican Minimum Efficiency Performance Standards (MEPS) were first applied in 1995 with the goal of harmonizing with those of the other two countries. By 2002, nearly all test procedures and MEPS had been harmonized. Mexican appliance manufacturers report to have benefited greatly from the harmonization of standards, which they recognized as a necessary condition of entrance into the wider North American appliance market.

Source: NAEWG 2004

In addition to trade considerations, harmonization may also lower the cost of program development, since it avoids repeating the time consuming and expensive process of developing basic technical procedures or standards. Instead of developing separate technical specifications, countries may review standards used internationally, and modify them as necessary for the particular situation. Harmonization may permit and encourage the sharing of resources, such as test facilities, between governments.

Who should harmonize? Whether or not a government should harmonize EES&L regulations depends on its domestic appliance market, imports and exports. Appliance markets have traditionally been domestic industries, especially in large countries (both industrialized and developing). In this case, national manufacturers do not have a great incentive towards harmonization, because they do not depend largely on export

markets. In fact, they may fear competition from imports, and therefore enjoy a benefit from technical trade barriers. This situation is disappearing however, as appliance markets are rapidly becoming more global. *Countries with little domestic manufacturing would likely benefit from harmonization unless their markets consist of products which are unique, or for which technical regulations do not exist internationally.*

What to Harmonize? There are several program elements that may be considered for harmonization. It is recommended that programs not be copied wholesale from other countries, but that each element be considered separately, since they have different advantages and disadvantages.

Test Procedures – Test procedures are the most important element of a program to consider for harmonization. Harmonization of test procedures can make a program much less expensive to implement, and also more effective. Energy test procedures are expensive to develop, a process that can be avoided by a doption of international procedures. Possibly more importantly, however, the use of different test procedures incurs significant costs to manufacturers, since testing each model can cost hundreds of dollars. This cost may be passed on to consumers, and may result in non-participation. Finally, since test procedures are the technical foundations of S&L programs, their alignment is necessary in order to harmonize other elements, such as efficiency levels.

Efficiency Levels – Once test procedures are aligned, efficiency levels may also be harmonized¹. As mentioned before, groups of countries, such as the EU, or NAFTA have used the same minimum efficiency level and efficiency categories for all or most appliances. As another example, Australia and New Zealand have an explicit policy adopting standards equivalent to the most stringent of those *anywhere else in the world*. Efficiency levels should be harmonized with care, because the baseline efficiency of the market may be dramatically different. In the case where most products are imported, it may make sense to harmonize with the efficiency levels of the major trade partners. This would be unlikely to restrict the availability of products on the market, and may prohibit exporting countries from ‘dumping’ low-quality products that are not allowed for sale in their own national market.

Label Design – Harmonization of label design is also an option. For example, several countries use a design for comparative labels that is similar to those used in the European Union. Countries should be very careful when considering harmonization of label design, however, because the reaction of consumers to a certain design is highly culturally specific. In addition, the need for different label designs presents a relatively small additional cost to manufacturers, in comparison with the burden of differing test procedures.

¹ In principle, it is possible to harmonize efficiency levels from countries using different test procedures. Conversions between test procedure results are generally difficult, however.

6. Legislative Framework

Establishment of political legitimacy for an S&L program is a critical first step on which the success of further steps depends. Ensuring political legitimacy typically requires the enactment of a framework law or the issuing of a decree that provides the authority to set standards and/or labels for certain products to a particular agency or agencies. Framework legislation should be generic and comprehensive rather than piecemeal, creating a legal basis and authority for regulation without specifying technical details related to specific products.

In occasional cases, for example where there is a solid but possibly fleeting political consensus in support of standards, it may be advisable to act quickly and outline only the very basic framework of the program in the law itself, leaving all the technical details to a capable regulatory body. This approach was used in Mexico in 1991 and more recently in China and India.

Generally, the preferable strategy is to develop a generic framework that empowers a capable agency to develop the technical details. By empowering an implementing agency to develop product-specific regulations at a later date, framework legislation avoids the need to return to the legislative assembly to seek approval for each new regulation. This approach passes responsibility for developing product-specific legislation to a body

with technical competence and removes a potentially significant cause of delays that could greatly reduce program effectiveness. Framework legislation should identify the main stakeholders and define their roles, responsibilities, and obligations related to the law. It should also designate a government agency as the “implementing agency” and give this agency the authority to issue product-specific standards and / or labels.

Examples of Framework Legislation

E.U.: Energy Labeling Framework Directive (92/75/EEC) of 1992

The E.U. Directive gives authority to the European Commission to issue product-specific energy labels following approval from a committee of nationally appointed civil servants. It is the responsibility of each Member State to translate directives into law

U.S.: National Appliance Energy Conservation Act (NAECA) of 1987, updated in 1988.

The NAECA legislation empowers and obligates U.S. Department of Energy to issue minimum energy-efficiency standards for energy-intensive tradable equipment when a specific set of criteria is met.

Mexico: Ley Federal Sobre Metrologia y Normalizacion of 1992

This law defines two types of standards: voluntary Normas Mexicanas, NMX (Mexican Standards) and mandatory Normas Oficiales Mexicanas, NOM – Energy efficiency NOM are enacted by the Energy Secretariat via the Comision Nacional para el Ahorro de Energia (CONAE).

Canada: Energy Efficiency Act of 1992

This law provides for the making and enforcement of regulations concerning MEPS for energy-using products. Most provinces have their own energy efficiency regulations, which may differ from the Federal Regulations or may apply to other classes of equipment. The Federal Regulations, administered by Natural Resources Canada –NRCan-do not take precedence over provincial regulations for locally-made and sold products.

Source: NAEWG 2004, CLASP 2005

7. Institutional Roles

Establishing an effective S&L program requires not only political will and a legal basis for the program (see Legislative Framework) but also the assignment of an *implementing agency*, the institution that will have primary responsibility for each element of an S&L program. An initial assessment of the existing institutional capacity for developing, implementing and maintaining an S&L program will determine if those existing institutions are capable of shouldering the identified responsibilities or if new institutions need to be established.

Assessing Existing Institutional Capabilities

A thorough assessment examines:



Financial resources (*Could an annual government allocation be secured?*)



Personnel (*Does qualified staff exist to perform testing, technical analysis, administration, monitoring, enforcement, evaluation and information campaigns? Are there resources to dedicate this staff to support the S&L program?*)



Facilities (*Is there a place to house central offices? Are there field facilities for monitoring/enforcement and/or laboratories to conduct testing?*)

Developing countries may rely on donor funding, at least initially, to launch an S&L program. But, over the mid- to long-term, countries must develop a self-sustaining alternative to ensure program continuity. The matter of training and sustaining dedicated personnel as well establishing and running facilities such as testing labs may be unattainable for smaller countries which have limited financial, technical and human resources. In these cases, consideration should be given to regional approaches or to relying on programs in other geographical areas that affect the local appliance market

It is important that the implementing agency be given the resources and authority to create effective S&L programs. This single agency need not carry all of the responsibilities of the program, however. Other agencies that are commonly part of the process include:

Testing – In most governments, an agency exists which is responsible for the testing of products sold on the national market. These agencies are responsible for testing a

Enacting Standards and Labels in Mexico

The Comité Consultivo Nacional de Normalización para la Preservación y Uso Racional de los Recursos Energéticos (CCNNPURRE) is responsible for reviewing all MEPS proposals. The Comisión Nacional de Ahorro de Energía (CONAE) presides over and defines membership in CCNNPURRE, which includes representatives from the Secretariats of Economy, Environment, Energy, and Treasury; research institutions and the National University; trade associations; and national associations of professionals (e.g., engineers and architects).

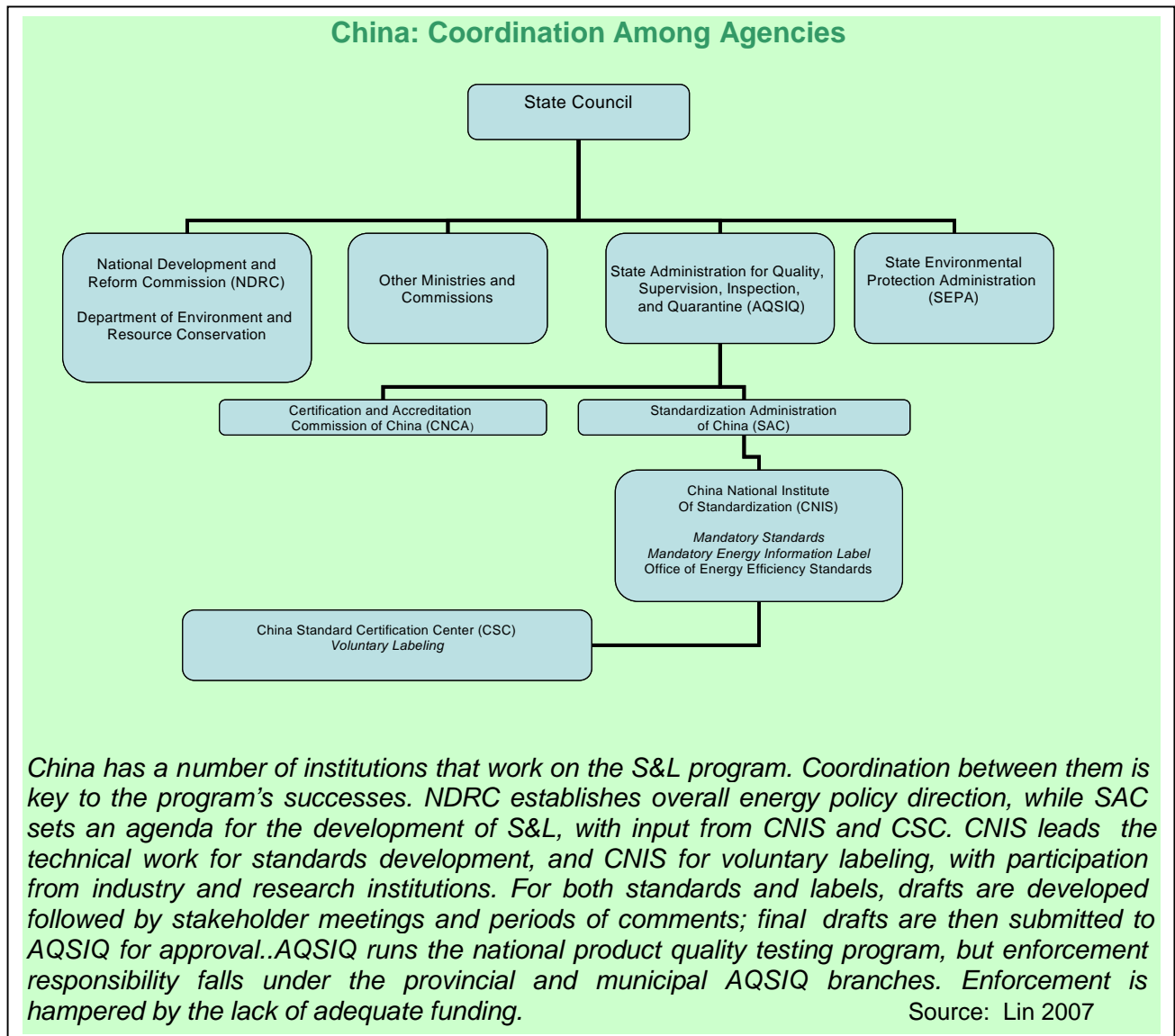
A MEPS proposal is presented to the CCNNPURRE which has 75 days to provide comments. The CCNNPURRE comments are incorporated within the next 30 days and the proposal is then published in the Diario Oficial de la Federación (DOF). A period of 60 days for public comment is followed by another 45 days of consultation within CCNNPURRE to incorporate the public comments and approve the final MEPS and/or label and its publication in the DOF. CONAE is in charge of verifying compliance.

Source: NAEWG 2004

large variety of products, often for safety or quality. Existing testing agencies are therefore often given this responsibility of developing procedures for energy efficiency. In addition, in some cases, the testing agency is given the responsibility for testing all products to be labeled, or to which a MEPS is applied.

Accreditation – In the case that certification testing is permitted by non-government laboratories, an accreditation agency is responsible for ensuring that these laboratories are suitably equipped and staffed to perform the necessary procedures as defined by the testing agency. Accreditation agencies are usually national, but there also exist international accrediting bodies.

Enforcement – Finally, it may be useful to enlist the help of another agency in the area of enforcement. For example, the Customs Agency may check products coming across the border for proper labeling, or the Finance/Commerce ministry may have the authority to impose sanctions against commercial firms, and will therefore be involved in enforcement.



8. Stakeholder Involvement

Once the legislative framework is in place to mandate standards, and a lead agency is created or identified with the authority to create equipment efficiency regulations, one of that agency's first and primary tasks is to identify and consult with those who have an interest in the decisions made. This responsibility not only provides citizens with a voice in the policy decisions, it can largely determine the success or failure of the program. Consultation with stakeholders creates informed decision making, since the stakeholders are often those with the greatest insight into product markets, as well as the technical aspects of efficient design. By fully consulting with stakeholders, the government avoids surprising interested parties with the publication of regulations, which could lead to legal challenges. Finally, a process of stakeholder consultation affords the possibility that decisions may be reached with wide agreement, or even consensus, which can accelerate implementation and greatly improve the chances of compliance. Stakeholder consultation is critical in making decisions on: Label Design, Implementation Dates, Test Procedures, Enforcement Policies, Certification Requirements and Efficiency Levels. Stakeholders include:

Manufacturers and Importers – Manufacturers and importers are perhaps the most directly impacted by efficiency regulations. Manufacturers and industry experts have valuable information about production costs and market structures. While efficiency regulations necessarily impose some burden on manufacturers and importers, these are usually perceived as acceptable as long as they impact all companies equally. Therefore, it is important to seek input from both domestic and international firms, and major, as well as, smaller industry players.

Environmental Advocates and Consumer Groups – Non-Governmental Organizations (NGOs) advocating for responsible energy policies may provide political support for the development of regulations, and provide a balancing viewpoint to manufacturers with regard to the stringency of standards. Consumer groups may have a related interest if they perceive that consumers are unnecessarily burdened by high energy costs. They may also ensure that regulations do not result in overly expensive or less functional products.

Retailers – Equipment retailers can provide important input to the process : characterizing the market and consumer response to efficiency and price.

Energy Providers – Energy utilities often have an incentive to encourage efficiency so as to lower capital costs for demand infrastructure. Regulated or state-owned utilities may have additional incentives. Utilities often have the best information regarding consumer demand patterns.

Negotiated Agreements

Close cooperation with stakeholders can lead to efficiency improvements *without regulations*, such as in the case of negotiated agreements in Europe. According to a 2002 report,

“Recently the European Commission negotiated agreements with manufacturers of televisions and video cassette recorders, as well as with washing machine manufacturers, with the aim of improving the energy efficiency of these appliances (CCE, 2000). Reflecting the position of certain member states and a large majority of manufacturers, the Commission is showing a growing interest in such negotiated agreements, which are increasingly seen as an alternative to what are felt to be overly restrictive regulations.”

Source: – Menanteau 2002

9. Which Products to Regulate?

Currently, worldwide, there are over 60 products regulated by standards and/or labels for energy efficiency. Together, these products are responsible for nearly all of the energy consumed in homes and businesses, and much of the energy used in industrial facilities. Programs vary in how many products they cover. Each additional product increases costs to the program in terms of testing facilities, technical staff, enforcement and administration. For this reason, no government covers all possible products. The most practical approach is to focus efforts on a few important products.

The most attractive products to target for efficiency standards are those which: (1) use a large amount of energy; (2) have the largest potential for efficiency improvement; or (3) have both of these characteristics. In Central America, the majority of electricity use is consumed by the following five products:

Lighting Equipment Lighting is one of the top uses of electricity in every home, business, and industrial facility. S&L can apply to lamps (incandescent, fluorescent or high-intensity discharge) and/or lamp ballasts (fluorescent and high-intensity discharge).

Refrigerators and Freezers Refrigerators and Freezers account for a large fraction of the energy consumption in homes and small businesses—especially in developing countries where households may not use many other large appliances. In addition, the energy consumption of these products can be reduced by up to 50% through increased insulation and more efficient compressors.

Room Air Conditioners In warm and humid climates, air conditioning use constitutes a very high fraction of electricity consumption in commercial businesses. Air conditioner ownership is still uncommon in Central American households, but is likely to grow rapidly in the next decades, dramatically increasing electricity bills, and further stressing peak supply capabilities.

Electric Motors Electric motors consume up to half of all of the electricity in the industrial sector, and have well defined specifications for efficiency. They can be an attractive target for S&L programs.

Clothes Washers A clothes washer is usually the second major appliance purchased by a household. After lighting, air conditioning and refrigeration, it may be the most energy intensive product in the home.

Most Often Regulated Products Worldwide

Product	No. of Countries
• Refrigerators	(32)
• Freezers	(23)
• Room Air Conditioners	(23)
• Lamps	(23)
• Clothes Washers	(21)
• Dishwashers	(18)
• Ballasts	(14)
• Dryers	(14)
• Ranges/Ovens	(13)
• Water heaters	(13)
• Electric Motors	(12)
• Boilers	(9)

Source: CLASP 2005

10. Defining Test Procedures

Test procedures that determine the energy consumption and/or efficiency rating for appliances, lighting and other equipment form the technical foundation of efficiency regulations. In order to suit the needs of an efficiency program, a test procedure must:

- Give consistent results with repeat testing, and in different facilities;
- Be relatively easy to perform;
- Have well-defined tolerances; and
- Be aligned with test procedures of trade partners as much as possible.

There is generally a trade-off between ease of performance and accuracy of test procedures. The most accurate test procedures may require more sophisticated (and expensive) equipment to perform, or require highly trained staff. If an agency will be responsible for testing products, its capacity to perform certain specific procedures must be considered seriously when determining test procedures. It may be that a less sophisticated procedure is determined to be sufficiently accurate to distinguish between products.

Test Facilities – The construction, staffing and continued operation of energy efficiency test facilities is an expensive proposition, especially for developing country governments. In some cases, funds for the construction of test laboratories may be provided by outside agencies, but governments should expect to bear a large part of the expense of testing.

As an alternative to constructing test facilities, governments may consider a certification regime which is largely based on testing in manufacturer test labs or in private third-party laboratories that operate for profit. Generally, however, there should be some means of checking test results through a public sector laboratory.

Mexican and International Test Procedures for Common Appliances *		
Product	Mexico*	International**
Refrigerator/Freezer	NOM-015-ENER-2002	ISO 5155, 7371, 8187 and 8561
Room Air Conditioner	NOM-021-ENER/SCFI/ECOL-2000	ISO 5151-94
Electric Motor (3-phase)	NOM-016-ENER-2002	IEC60034-2A
Washing Machine	NOM-005-ENER-2000	IEC60379

Source: CLASP/CONAE 2005

*Mexican test procedures are largely aligned with those used in the U.S. and Canada.
 **The European Union uses international (ISO/IEC) test procedures exclusively

Here, the possibility exists for sharing resources. For example, a system of laboratories might be established at a regional level, with certification and/or verification of results from laboratories in one country recognized by other countries in the same region through the mechanism of Mutual Recognition Agreements (MRAs), which state that results from one organization are recognized as technically equivalent by another.

11. Setting Appropriate Efficiency Levels

Once a set of test procedures have been agreed upon, providing the technical foundation for efficiency regulations, the next step is to choose efficiency levels, either for a minimum standard, or for labeling thresholds. In the most general sense, a standards and labeling program gives preference to some technologies over others. The preferred technology is described by an *efficiency level* in terms of energy consumption in a certain time (kWh per month, for refrigerators) or by use of power (Watts per lumens, for lamps) or by a specialized rating system (Energy Efficiency Ratio, or EER, for air conditioners). S&L programs either prohibit products with a low efficiency level from entering the market, or they encourage products with high efficiency levels by awarding them a 'seal of approval' (endorsement label) or rating them higher on a relative scale (A instead of C or D, as seen on a comparison label).

Factors to Consider When Defining Efficiency Levels

Energy Savings - The goal of efficiency programs are to reduce energy consumption. Higher efficiency level targets will reduce consumption levels, more quickly.

Equipment Cost – High efficiency equipment is generally more costly to produce than standard efficiency equipment. Increased equipment costs represent a consumer investment in lower energy bills, which can be highly cost-effective, but excessive equipment costs may price lower-income consumers out of the market.

Current Level of the Market - The current efficiency of models on the market can serve as a guide to where to set standards and labels. If, for example, most of the products already receive the best ratings, the efficiency is unlikely to improve. On the other hand, if standard levels are too stringent, much of the variety in the market could disappear, leaving consumers with few options.

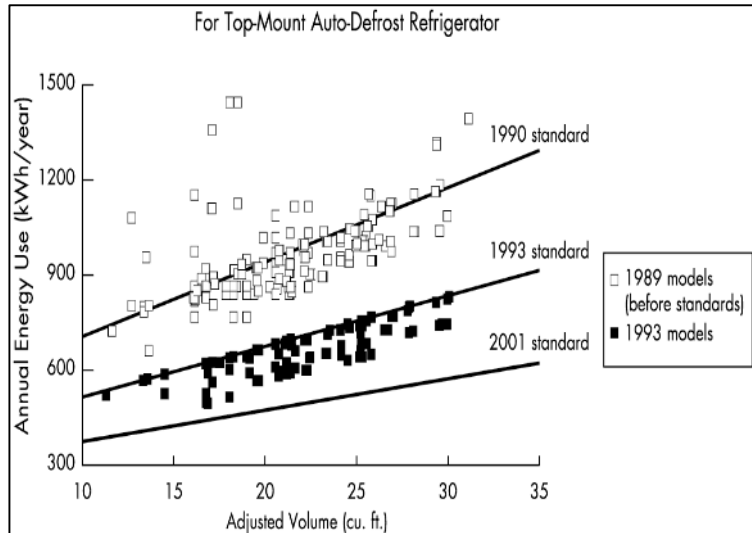
Capability of Local Manufacturers – Finally, an overly stringent efficiency level could be unattainable by local or smaller manufacturers. This could put local firms out of business, or at least put them at a comparative disadvantage relative to large multinationals, thus leading to an unacceptable risk of job losses.

Involving Stakeholders in the Process of Standards Setting It is highly advantageous to involve the important interested parties into the process of technical determination of efficiency levels from the very beginning of the process, including: manufacturers, distributors, consumer groups and environmental advocates. There are two important reasons for this:

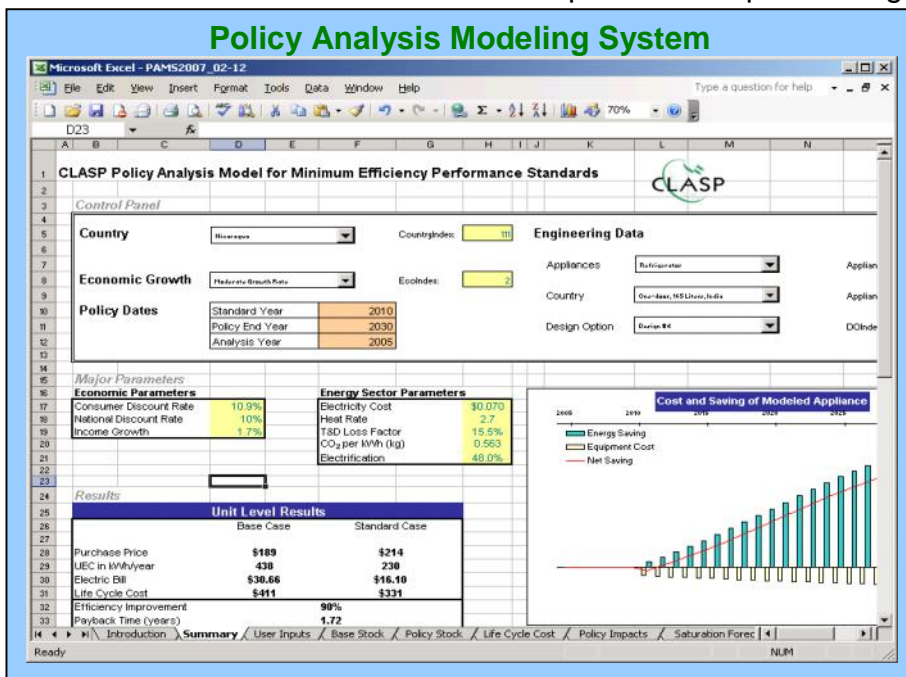
- Consultation and Consensus – Manufacturers and retailers are likely to be less resistant to regulations if they are engaged as part of the process of government actions through a cooperative process.
- Knowledge Transfer - Recommendations about a particular product are often best provided by a Technical Committee, which includes representation by all stakeholders, especially manufacturers and retailers. These stakeholders are often in the best position to provide critical engineering and market data.

Product Classes A first step in determining appropriate efficiency levels is the definition of *product classes* which are treated differently. Examples of important product classes are window vs. split systems for air conditioners, manual vs. automatic defrost for refrigerators, etc. Product classes vary between countries ; therefore a market study that provides product configurations and market shares should be performed as a first step.

Statistical Analysis This method can accurately define the percentage of the market that will be impacted by a standard, and the percentage of models that will carry each label category. This method demands less engineering data than a techno-economic analysis. However, it relies on a complete sample of models in the market to be tested according to well-established test procedures *before* program implementation.



Techno-Economic Analysis – This method uses engineering parameters in combination with energy prices in order to evaluate the cost effectiveness of different efficiency options. It is particularly useful in setting MEPS in order to set the standard at the *most cost effective* level for consumers. In addition, techno-economic analysis provides decision makers with an evaluation of net financial benefits of the policy, at the level of the household or at the national level. In this way, it gives the politicians and the public a truer evaluation of the benefits of the program. CLASP has developed the Policy Analysis Modeling System software tool to provide local experts with a customizable analysis of cost-effectiveness and national energy impacts of MEPS. PAMS can be downloaded at <http://www.clasponline.org/policy.php>



Techno-economic analysis is relatively data intensive. Data to be collected include:

- Product Class Market Shares
- Efficiency Market Shares
- Baseline Engineering Parameters
- Manufacturer Cost of Efficiency Improvement
- Energy Prices
- Product Ownership and Sales

For more on market data, see CLASP/BUN-CA 2006.

12. Enforcement

In order to realize the benefits of S&L programs, the correct institutions must be in place to ensure the integrity of the program(s). The approach to compliance must be coordinated with the resources made available to those institutions. The certification of products should be based on fair, consistent and practical criteria. Either industry or the public sector (or both) will have to be equipped with the capacity to test products.

Once the enforcement framework is in place, sufficient penalties must be established to pose a credible threat to violators. Programs should be monitored on a regular basis for non-compliance and when non-compliance is found it should be reported and addressed with a response that could include: private warning, public notification, ordering of changes and finally, penalty.

A variety of program compliance schemes are used worldwide.

Tunisia: Government-Certification In the Tunisian refrigerator certification program, every model of refrigerator to be sold on the market has to be tested by the state-operated lab. If the manufacturer accepts the results, this information is included on the energy label. The label is then printed by the government and supplied to the manufacturer. If the manufacturer does not accept the test results, the manufacturer can pay for and witness additional tests of other samples of the same model.

Australia: Government Check Testing Australia uses the check-testing method. State governments of Australia use a national testing program in which appliances are purchased from retail outlets and tested in accredited independent laboratories to verify the claims on the energy label and compliance with MEPS. Appliances that fail check testing in Australia are subject to a range of sanctions under state laws.

E.U.: Self-Certification Within a Regional Policy Framework In Europe, the product supplier is responsible for the accuracy of the information it provides on the energy label. Product suppliers must provide proof of testing (energy test reports) upon request of the E.U. member state where the product is sold. Enforcement of the labeling scheme is the responsibility of each E.U. member state, not the European Commission.

Customs Agency: Its Potential Role in Central American S&L Enforcement

Central American governments face an urgency to rationalize energy consumption; however, there exists limited knowledge of how to integrate the role of different public agencies in order to sustain energy efficiency markets. Policy makers in the ministries of energy supporting S&L programs should work closely with customs agencies and certification entities. At the regional level, the existence of the Central American Customs Agreement to facilitate imports and trade amongst countries, it is an avenue to enforce S&L in a region which is a net importer of electrical equipment.

Source: BUN-CA

U.S.: Government Reliance on Private Certification The U.S. essentially operates a system of self-certification for product energy performance; however, labeling and standards are enforced through a mixture of industry-sponsored third-party certification schemes and challenge testing, depending on the product.

References

CLASP 2005 - *Energy Efficiency Labels and Standards: A Guidebook for Appliances, Equipment and Lighting* – Collaborative Labeling and Appliance Standards Program, 2005. Available at: www.clasponline.org

CLASP/BUN-CA 2006 - *Market Evaluation for High Electricity Consuming Products in Central America: Industrial Motors and Room Air Conditioners in Costa Rica, El Salvador, Nicaragua and Panamá*. 2006. Available at <http://www.clasponline.org/listnews.php?no=473>

COGAN 2001 - *Harmonization of Standards – The Australian and New Zealand Experience*. David Cogan. CLASP Symposium – Lessons Learned in Asia: Regional Symposium on Energy Efficiency Standards and Labeling 2001

LEBOT 2001 – Benoit Lebot, Paul Waide and John Newman – *The European Appliance Labelling Programme* Asia Regional Symposium on Standards and Labeling, United Nations Conference Centre (UNCC), Bangkok, Thailand, May 2001

Lin 2007 – Jiang Lin, David Fridley - *Accelerating the Adoption of Second-Tier Reach Standards for Applicable Appliance Products in China* - Collaborative Labeling and Appliance Standards Program. March 2007.

Menanteau 2002 - Philippe Menanteau - *Can negotiated agreements replace efficiency standards as an instrument for transforming the electrical appliance market ?* Institut d'Economie et de Politique de l'Energie, March 2002

NAEWG 2004, *North American Energy Efficiency Standards and Labeling*, produced by the North American Energy Working Group (NAEWG) Energy Efficiency Expert Group. Released in 2002 and updated in 2004. Available at http://www.eere.energy.gov/buildings/appliance_standards/pdfs/naewg_report.pdf

Tathagat 2007 – Tanmay Tathagat - *India Labeling Program Impacts* – Collaborative Labeling and Appliance Standards Program. March 2007. Available at: <http://www.clasponline.org/disdodc.php?no=486>