



# Pushing the Energy Efficiency Envelope through Appliance Standards Around the World

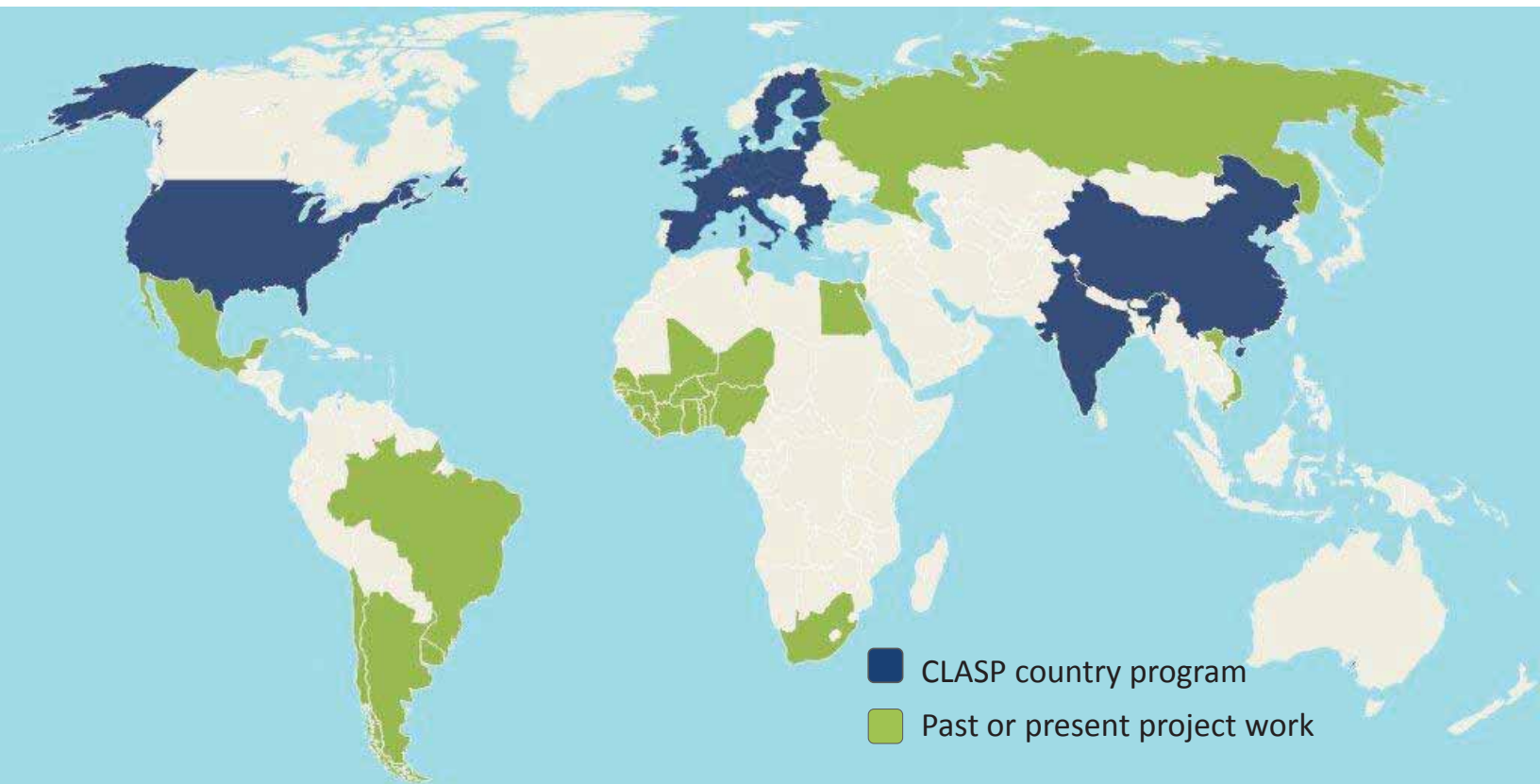
Nicole Kearney  
Senior Associate, Global Best Practices  
March 31, 2015  
Cape Town, South Africa





## CLASP: Who We Are

CLASP is a non-profit organization that provides technical assistance to local policymakers and facilitates knowledge exchange among S&L practitioners around the world.





# Global Standards & Labeling Programs



*More than 75 countries have energy efficiency standards and labeling programs in place*



## Standards

Energy efficiency standards are regulations that specify the minimum allowable energy performance for appliances, lighting, and equipment.

By establishing a maximum allowable energy consumption level, it removes the highest energy using, lowest efficiency products from the market.

## Labels

Energy efficiency labeling programs aim to shift markets for energy-using products toward improved energy efficiency.

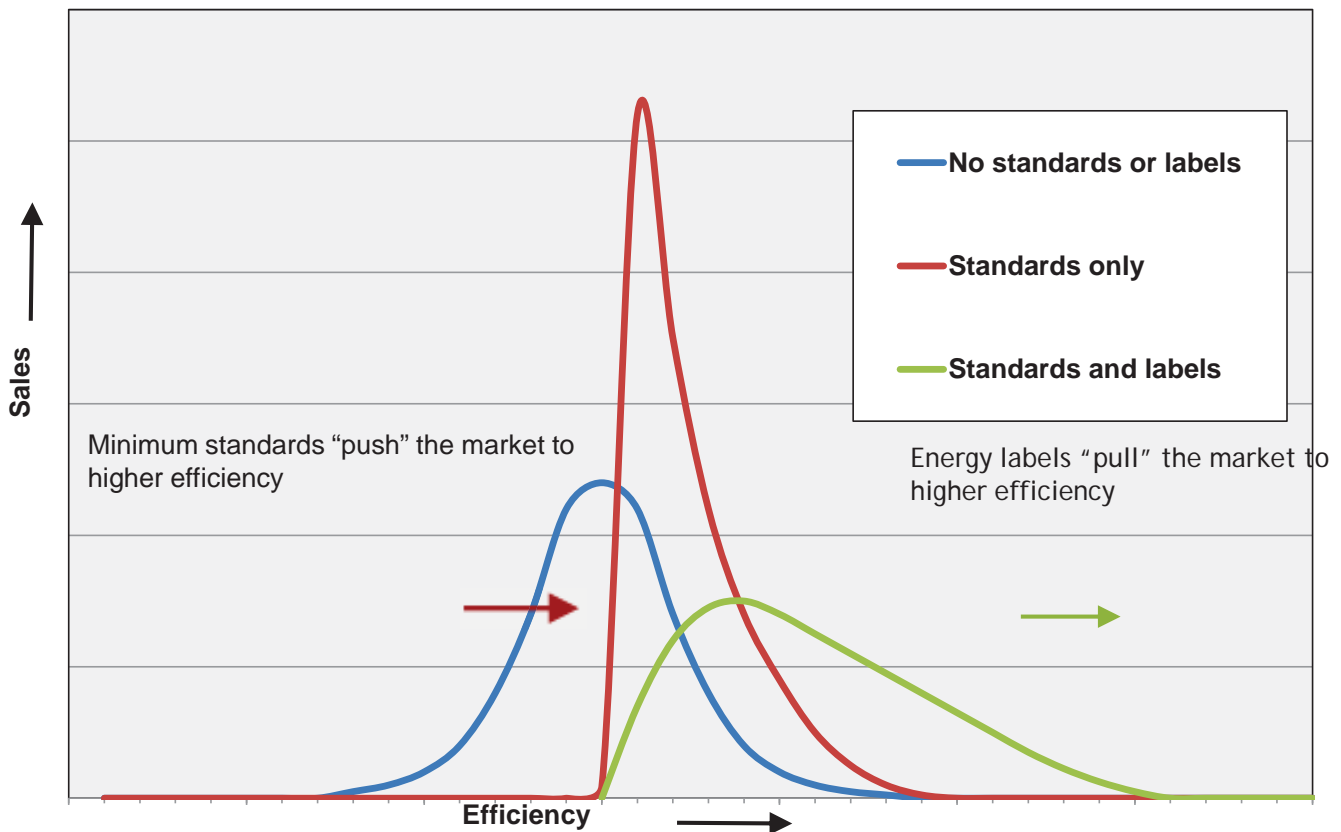
Well-designed energy labels are powerful tools that provide information about product efficiency to consumers at the point of purchase.

Labels also give manufacturers of high efficiency products a competitive edge when it comes to attracting energy savvy consumers



# Energy Efficiency Standards and Labels

Standards and labels work together to “push” and “pull” the market toward greater energy efficiency.





Reducing the energy consumption of a product...

on aggregate, reduces overall energy use.



This reduces power demand...

which reduces electricity and fuel consumption in existing power plants...



and reduces the need to build new power plants to produce more electricity.



## Benefits of S&L

Resulting benefits include:

Reduced capital investment in energy supply infrastructure;

Improved national economic efficiency by reducing energy bills;

Enhanced consumer welfare;

Increased energy independence;

Strengthened competitive markets;

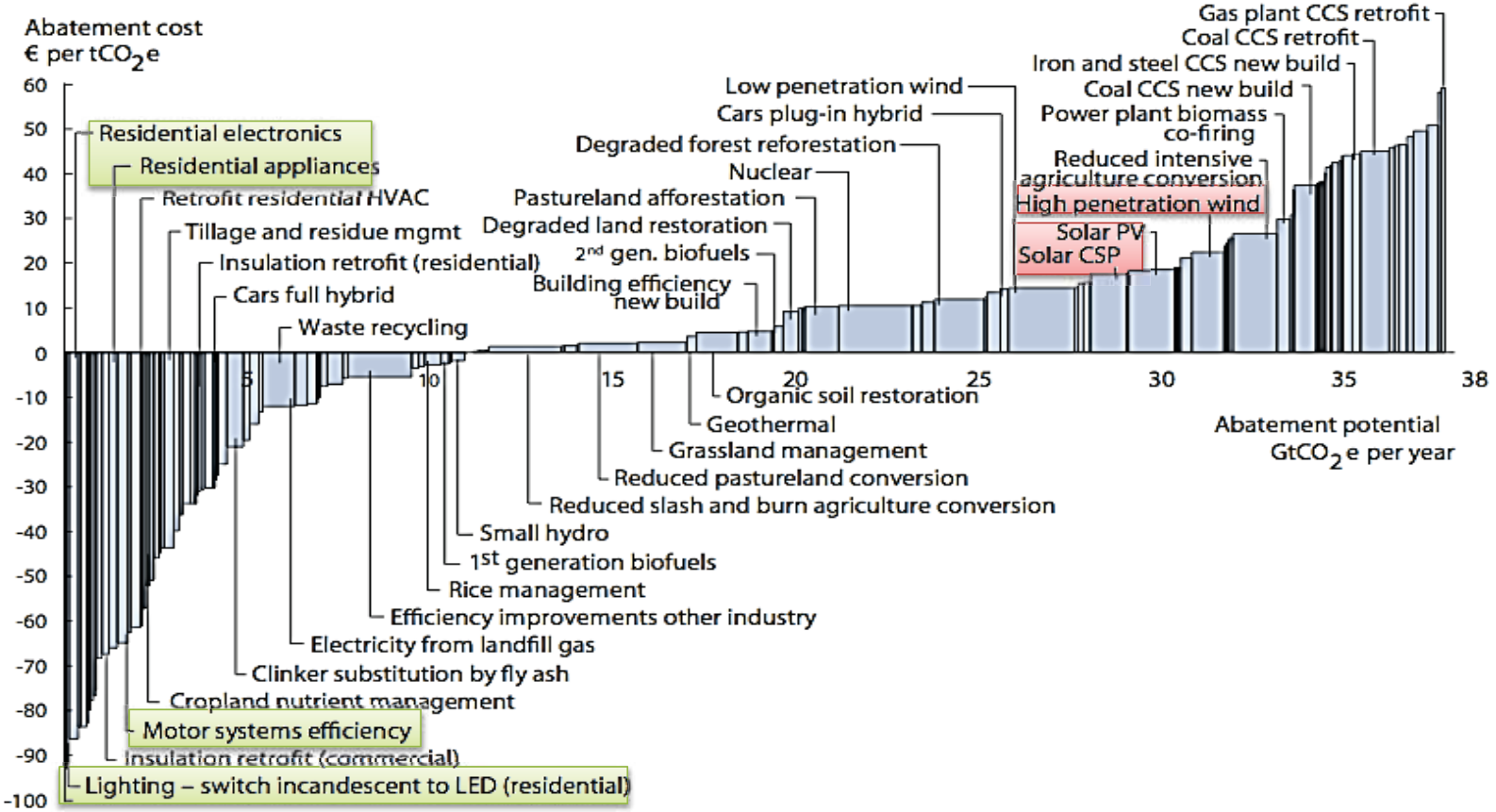
Reduced emissions to meet climate change goals;

Averted urban/regional pollution.

Source: S&L Guidebook, CLASP



## Global GHG abatement cost curve beyond business-as-usual - 2030



Source: McKinsey & Company, Pathways to a Low-Carbon Economy, Version 2 of the Global Greenhouse Gas Abatement Cost Curve, 2009

Note: The curve presents an estimate of the maximum potential of all technical GHG abatement measures below €60 per tCO<sub>2</sub> emissions of each never was pursued aggressively. It is not a forecast of what role different abatement measures and technologies will play.



# Energy Efficiency Standards

Energy efficiency standards “PUSH” the market towards greater energy efficiency by removing inefficient products from the market.

- **Minimum Energy Performance Standards (MEPS)** – require that a manufacturer achieve in each and every product a minimum efficiency (or maximum energy consumption); but does not require a specific technology or design.
- **Prescriptive Standards** – require that a particular feature or device be installed in all new products.
- **Class-average Standards** – specifies the average efficiency of a manufactured product, allowing each manufacturer to select the level of efficiency for each model so that the overall average is achieved.
- Different economies use different terms to describe standards.
  - Normas (Latin America), Minimum Energy Performance Requirements (Europe)
- Regular revision of standards necessary to ensure ongoing impact on the market







# Minimum Energy Performance Standards

1. The government sets a limit on the total amount of energy a product can use annually
  - $\leq 400$  kWh/a
2. The manufacturer designs the product to use less energy than the limit
3. The manufacturer tests the product using a designated test procedure to certify it uses less energy than the limit
4. The manufacturer then submits these results to the government or self-certifies them.
5. The product can be sold on the market

Marzo 24 de abril de 2001      DIARIO OFICIAL      (Primera Sección) 1

**SECRETARIA DE ENERGIA**  
NORMA Oficial Mexicana NOM-021-ENER/SCFI/ECOL-2000,  
Eficiencia energética, requisitos de seguridad al usuario y  
eliminación de clorofluorocarbonos (CFC's) en acondicionadores  
de aire tipo cuarto. Límites, métodos de prueba y etiquetado.

TABLA 1.- Valores de la Relación de Eficiencia Energética

Clase	REE
1	2,84
2	2,84
3	2,87
4	2,84
5	2,49
6	2,64
7	2,64
8	2,49
9	2,49
10	2,49





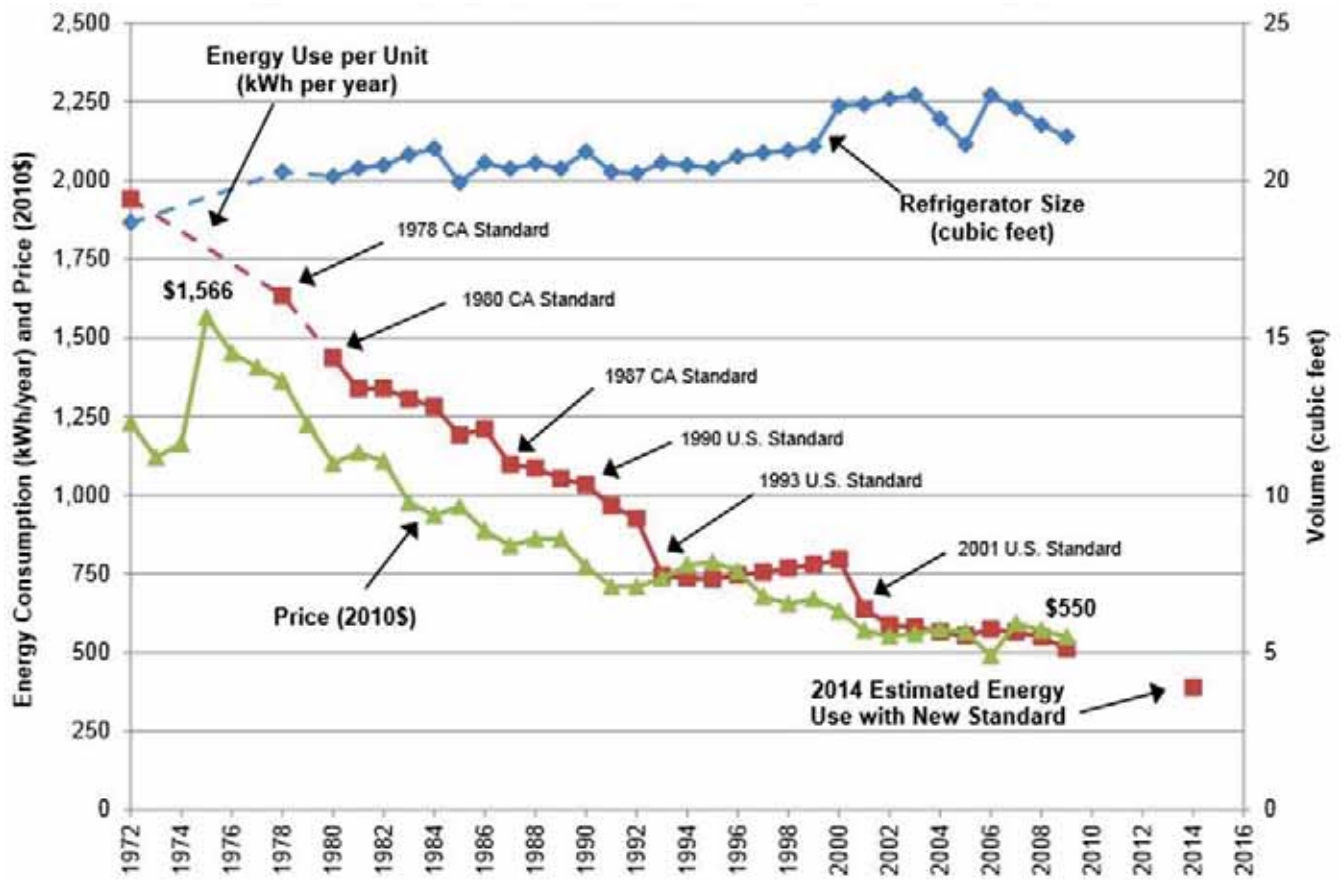
# Minimum Energy Performance Standards

- Advantages of MEPS
  - Provides predictable effects of eliminating low-efficiency products
  - Easy to ratchet levels periodically
  - Can be designed to maximize consumer benefits
  - Very low per unit transaction costs
  - Technology costs borne by consumer who also receives savings benefit
- Disadvantages of MEPS
  - Usually a mandatory program – requires consensus/cooperation among multiple stakeholders
  - Can incur some up-front costs for consumers
  - Requires good enforcement policy
- Savings Potential
  - Determined by available technology and cost-effectiveness
- Major Stakeholders
  - Manufacturers, environmental groups, consumer groups





# Impact of Refrigerator Standards in US

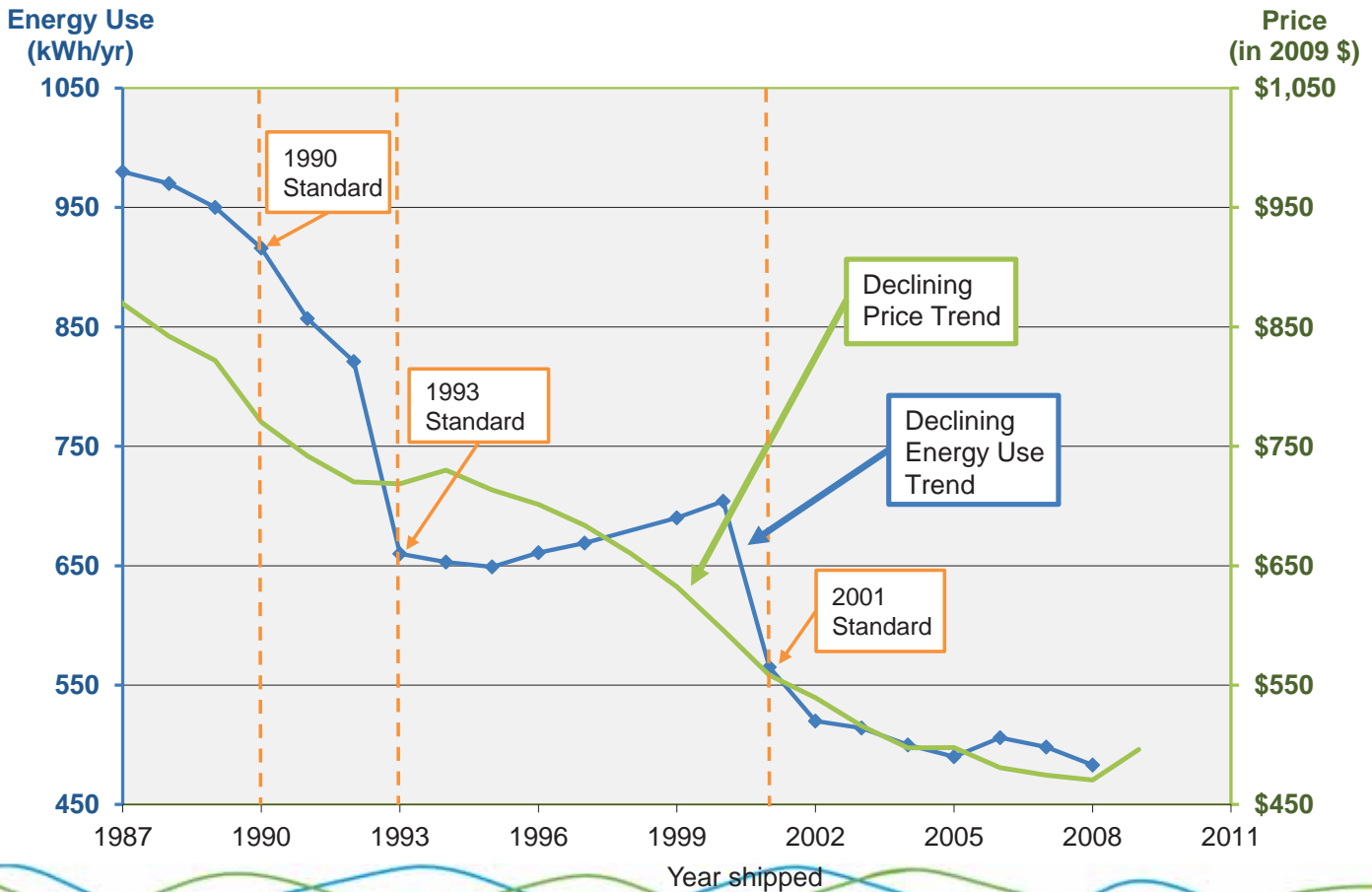


Source: Appliance Standards Awareness Project (ASAP)



# US Energy Efficiency Standards for Refrigerators Reduce Costs & Energy Consumption

Annual Energy Use and Real Price of New Refrigerators in the U.S.



Sources: AHAM Factbooks, Rosenfeld 1999 and Bureau of Labor Statistics

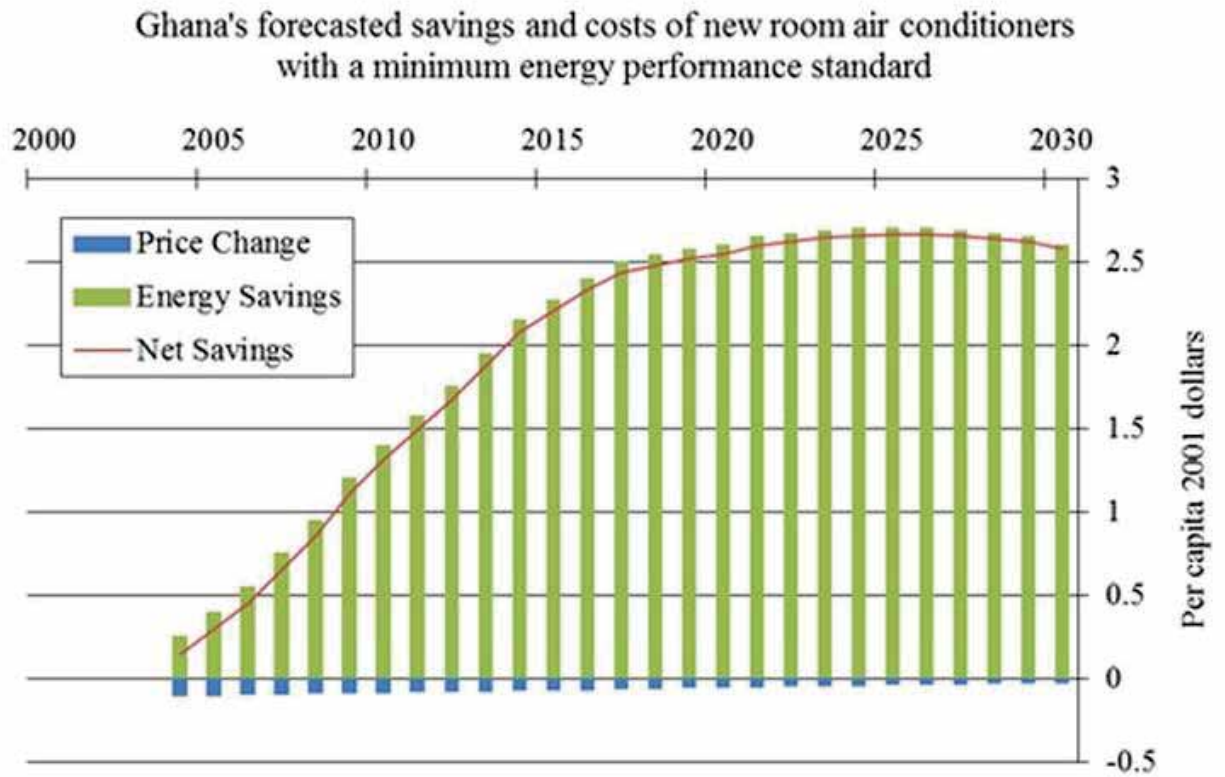


# Air Conditioner Standards Achieve Cost and Energy Savings in Ghana

CLASP worked with the Ghana Energy Foundation from 2000-2002 to assist the Ghana Standards Board (GSB) and Ministry of Mines and Energy to develop a standards for room air conditioners.

**\$64 M**  
annual  
electricity  
bill

**2.8**  
Million  
tons of CO<sub>2</sub>

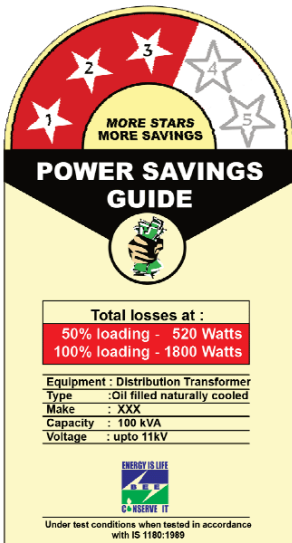




# Energy Labeling: Comparative

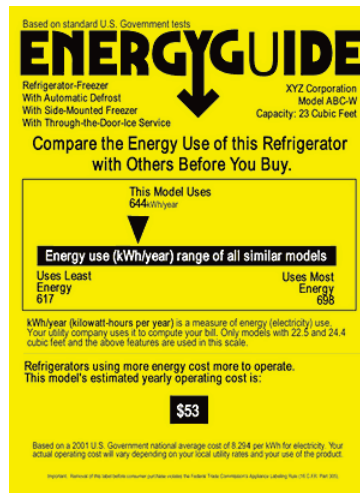
Comparative energy labels allow consumers to compare the energy efficiency of products while making a purchasing decision, thus motivating manufactures to build products that that are more efficient then their competitors.

**Categorical Label  
(Dial)**



India

**Continuous Label**



United States  
(Federal Trade Commission)


**Categorical Label  
(Bars)**



European Union

1. The government sets discreet categories based on specific ranges of energy use allowing comparison between products

Category:	Energy Range:
A	<400 kWh/a
B	400 – 499 kWh/a

2. The manufacture builds the product and test its energy use using a designated testing procedure in order to determine the proper category
  3. The manufacture submits the results to the government or self certifies
  4. The manufacturer labels their product with the correct category
- 



# Comparative Labels

## Advantages:

- Efficiency less compulsory - gives manufacturers the option of a wide range of efficiencies
- Provides strong market incentive for efficiency
- Market evolves over time at accelerated pace
- Low per unit transaction costs
- Technology costs borne by consumer who also receives savings benefit

## Disadvantages:

- Impact of program less predictable
- May be difficult to change labeling scheme
- May or may not maximize consumer benefits

## Savings Potential:

- Determined by market demand for higher efficiency products







## Energy Labeling: Endorsement

Endorsement labels identify highly efficient products for consumers, providing an incentive (market advantage) for manufacturers to build highly efficient product. They are “stamps of approval”



United States  
(Environmental Protection  
Agency)



European Union



Korea





# Endorsement Labels

## Advantages:

- Usually voluntary - manufacturers can opt in or out
- Provides market association between efficiency and quality
- Can have large impact if endorsement level becomes de facto standard
- Low per unit transaction costs
- Technology costs borne by consumer who also receives savings benefit

## Disadvantages:

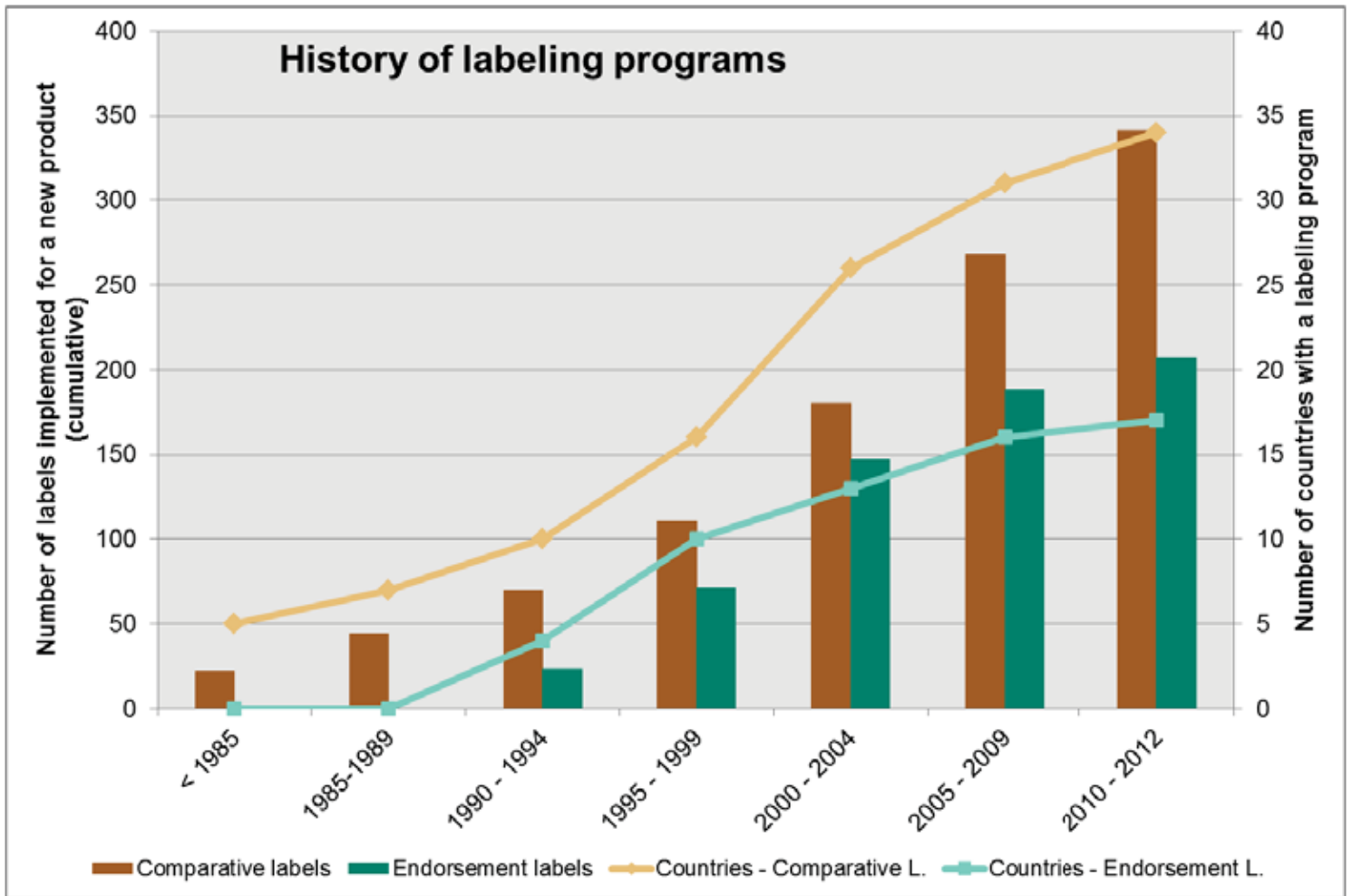
- Impact of program difficult to predict
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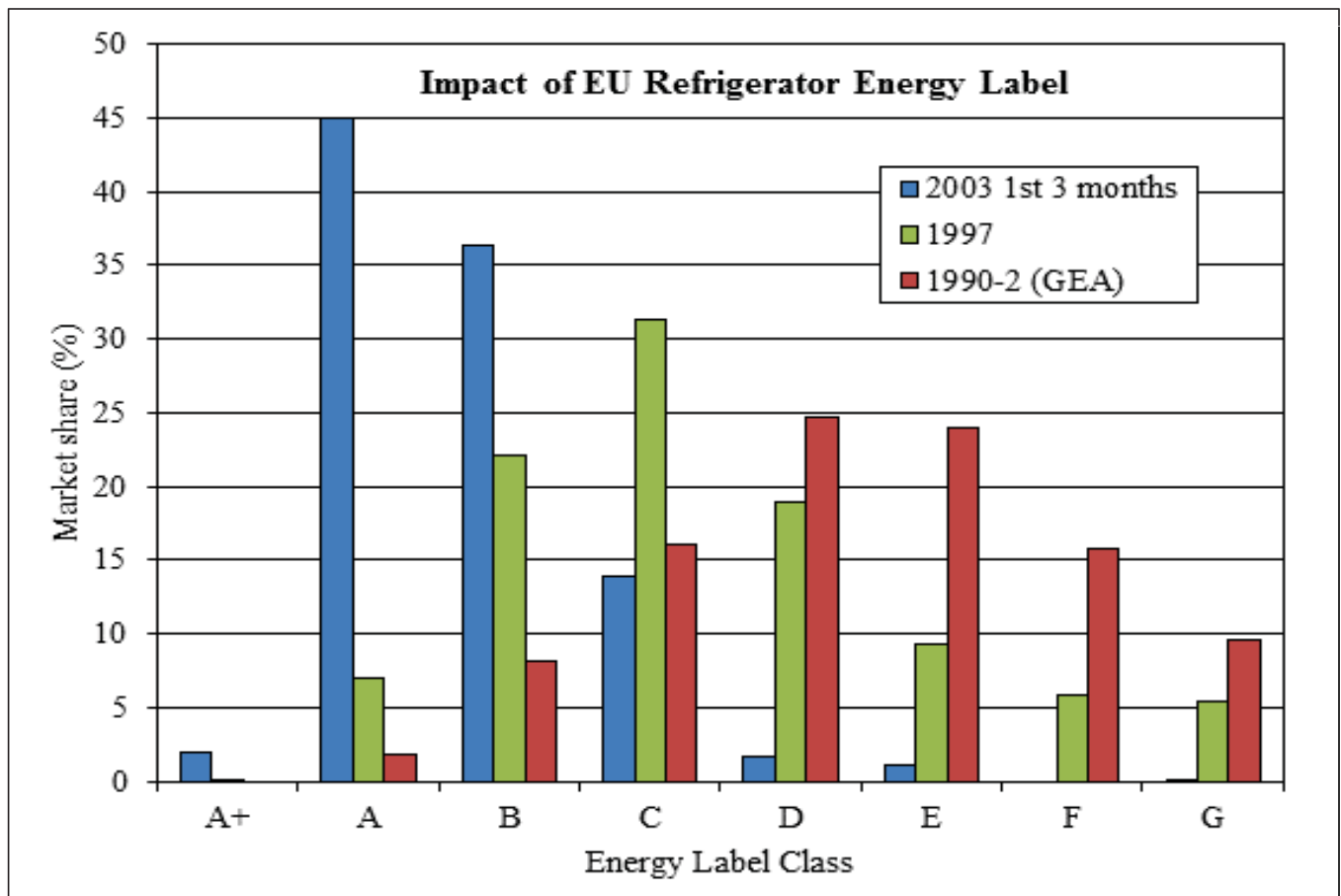


# Energy Labeling Over Time



Source: CLASP's S&L Database

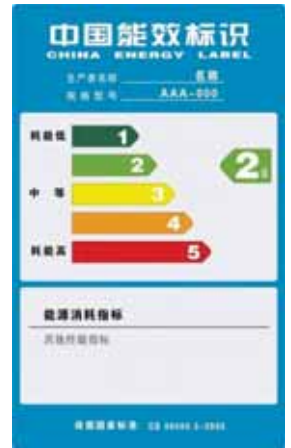
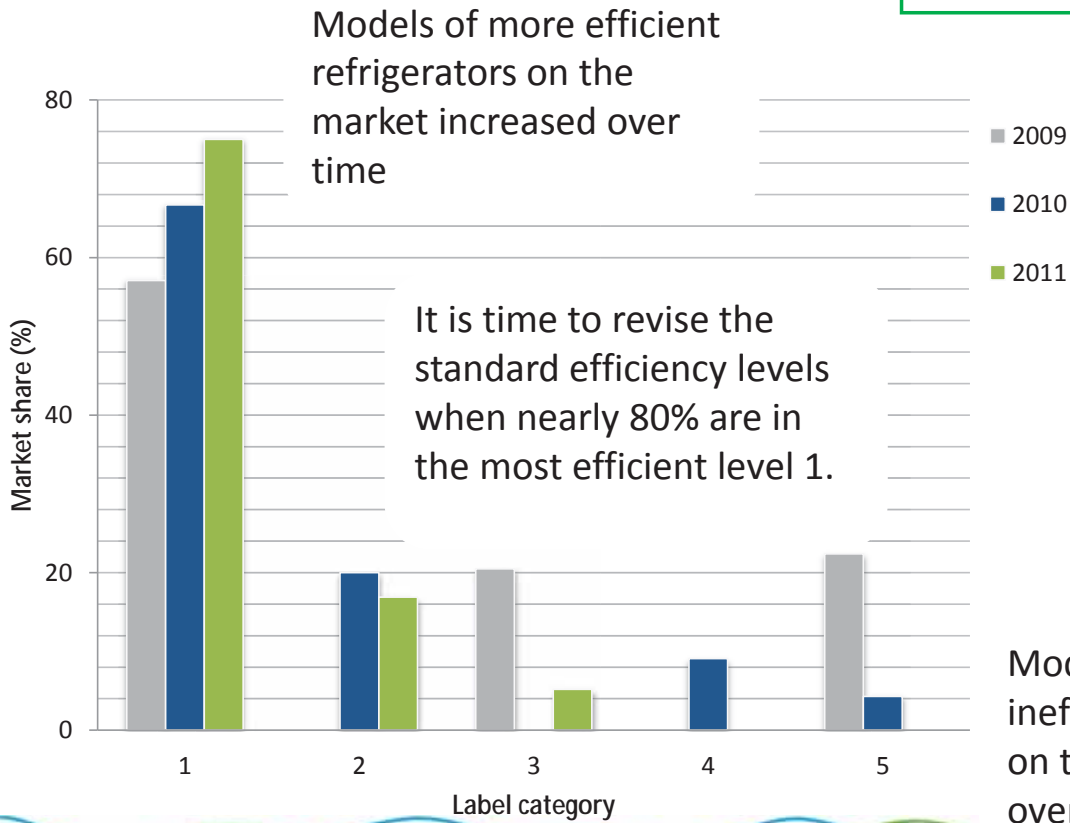
# Energy Labels Transform Markets



# Revising Energy Labels Over Time

China Refrigerators Energy Efficiency Level Distribution by Model Type

Efficiency levels should be ratcheted up after a cycle to keep up with market trends



Models of more inefficient refrigerators on the market decreased over time



# Test Procedures & Facilities

Reliable energy performance test procedures and test facilities are the foundation of successful standards-setting and labeling initiatives.

Test procedures need to:

- Reflect typical usage;
- Yield repeatable and accurate results;
- Be relatively inexpensive to perform;
- Test procedures can be developed either in country or adopted from an international body;
- Testing should be conducted in an accredited laboratory to ensure that tests are being conducted properly.



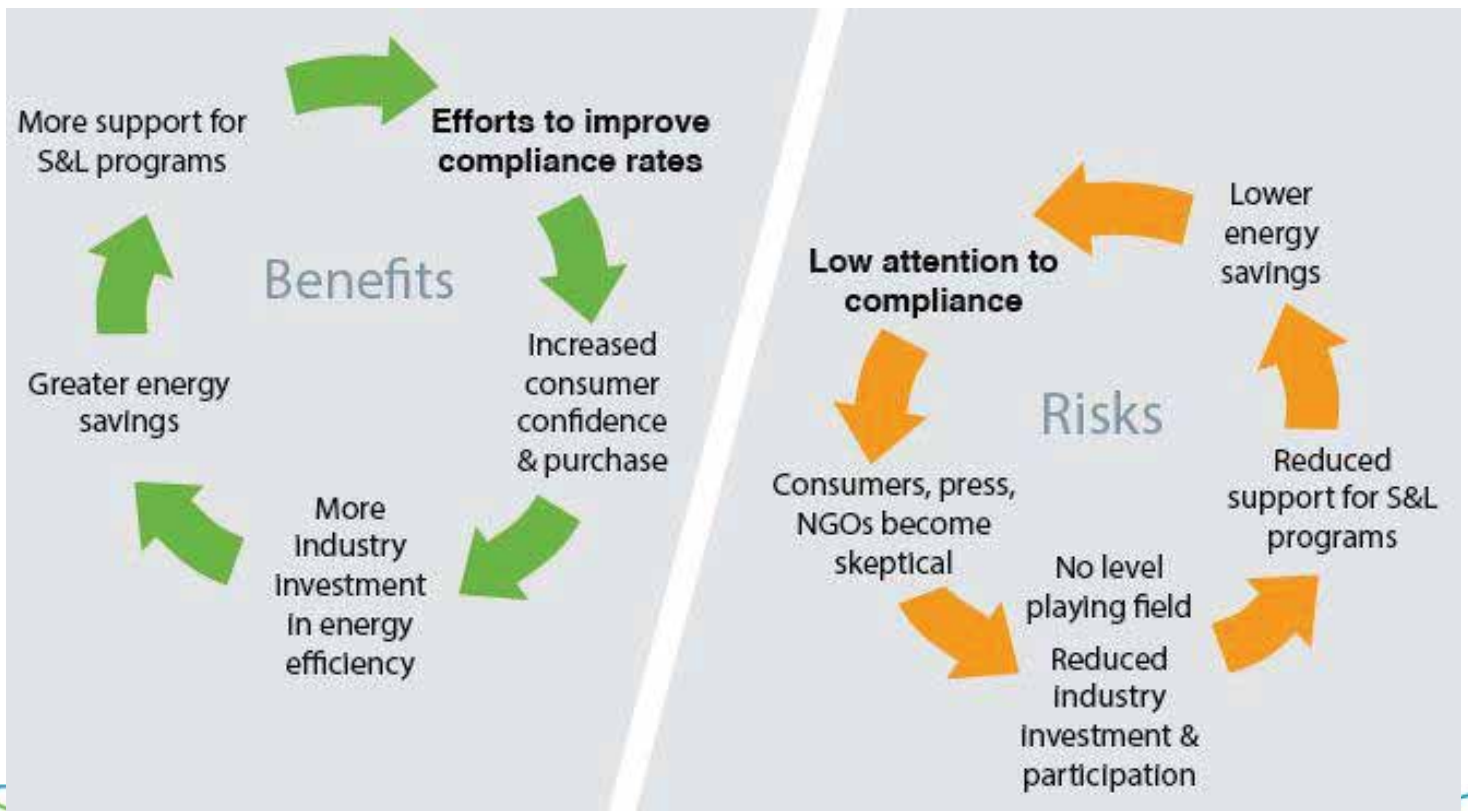
Chinese Air Conditioner  
Testing Facility





# Monitoring, Verification & Enforcement

Monitoring, verification, and enforcement (MV&E) policies safeguard the energy savings of S&L programs by ensuring products meet S&L policy requirements and live up to their energy efficiency claims.





- **Monitoring (Market Surveillance)**  
Market surveillance ensures that products in the marketplace comply with established S&L requirements.
- **Performance Verification**  
S&L programs rely on accurate measurement and declaration of appliance energy consumption and efficiency. Testing is the means to measure whether products perform as claimed.
- **Enforcement**  
Enforcement responses of varying toughness can be implemented based on the severity of non-compliance.

## MV&E Framework



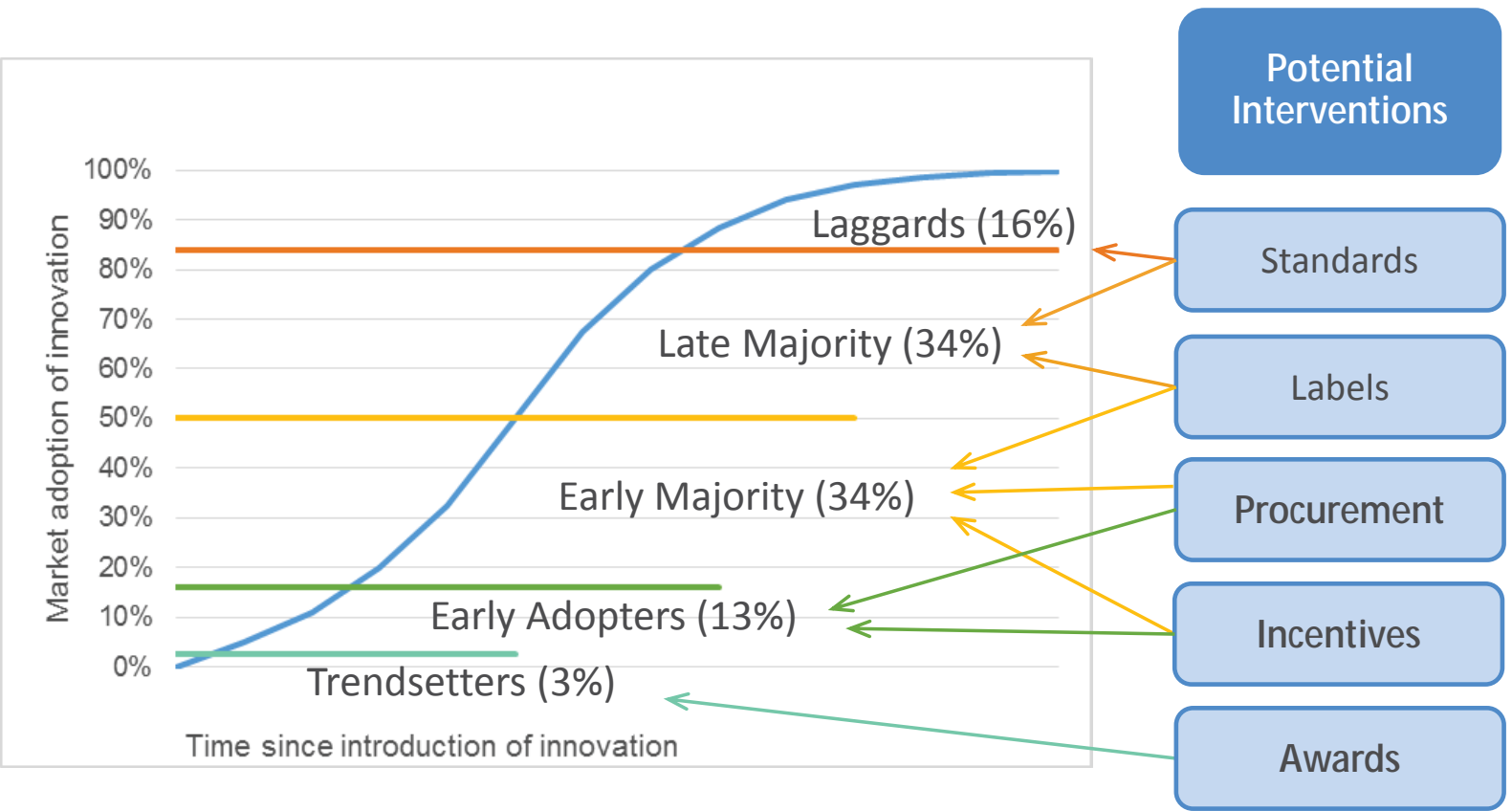
Enforcement Pyramid







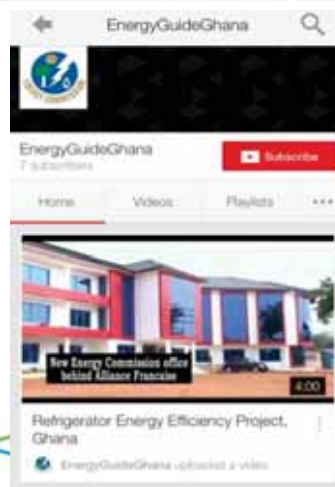
# Potential Interventions for Market Transformation





# Awareness Raising

Effective information campaigns are essential towards successful implementation of an S&L programme, targeting all stakeholders through all stages of the process.





# Nine Steps in Holistic S&L Development

**Step 1:**  
Decide whether and how to implement energy labels and standards

**Step 2:**  
Determine need for and develop testing capabilities

**Step 3:**  
Design and implement a labelling programme

**Step 4:**  
Analyse and set standards

**Step 5:**  
Establish & implement MVE framework

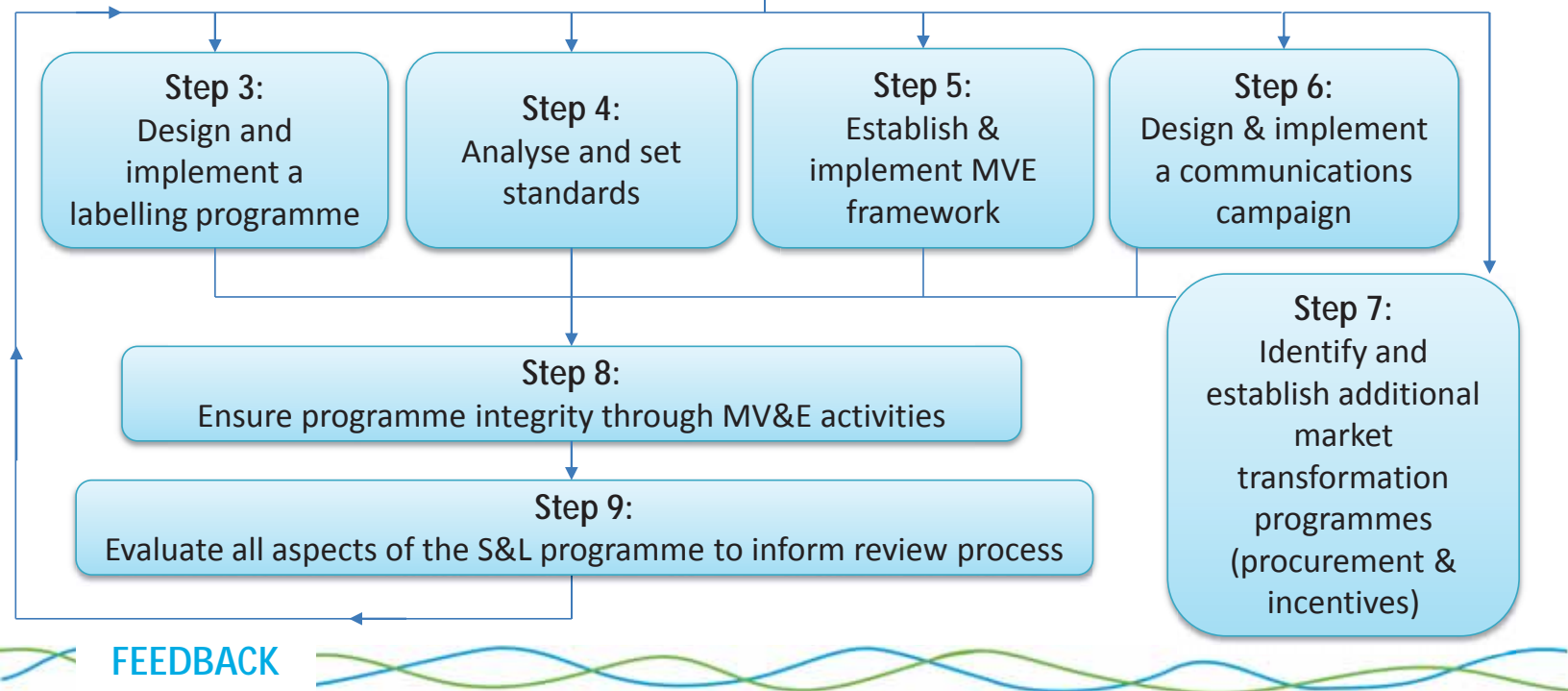
**Step 6:**  
Design & implement a communications campaign

**Step 7:**  
Identify and establish additional market transformation programmes (procurement & incentives)

**Step 8:**  
Ensure programme integrity through MV&E activities

**Step 9:**  
Evaluate all aspects of the S&L programme to inform review process

**FEEDBACK**





## Challenges to Implementation

There are many!

**Funding**

**Knowledge**

**Data**

**Capacity**

**Resources**

**Institutional**





## Learning through International Collaboration

- Joining international initiatives
  - South Africa is a member of the SEAD initiative
  - SEAD has contributed to the S&L programme through:
    - Technical analysis and building technical capacity on MEPS for Geysers
    - Bringing together international experts on MV&E and incentives to learn from existing best practice and experiences
    - Technical insights and contributions on incentives project
- Sharing best practices and learning from others
- Regional collaboration
  - Share resources
  - Share market knowledge





# S&L Resources & Tools

*Need more information?*

CLASP is committed to developing and sharing the best resources and online tools available for S&L practitioners globally.

<a href="#">Who We Are</a>	<a href="#">What We Do</a>	<a href="#">Where We Work</a>	<a href="#">Resources</a>	<a href="#">Tools</a>	<a href="#">RFPs &amp; Partnerships</a>
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## Search CLASP's Global S&L Database

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CLASP's Global S&L Database is an online resource that allows policy makers and S&L practitioners to compare policies and regulations across countries and by product; to explore specific information about those policies; and to view and understand the legislative framework and history of S&L by country and economic region.

**TOOLS**

- [Search Global Standards & Label Information](#)
- [Economy Finder](#)
- [Policy Analysis Modeling System](#)
- [Tools for Getting Started](#)

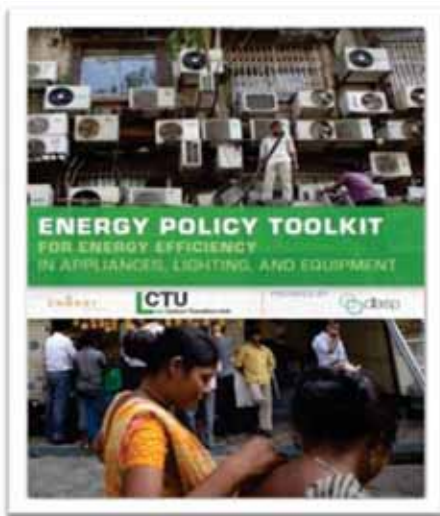
[By Product Group](#) [By Economy](#)

- All Products
- Computers & ICT
- Lighting
- Building Materials
- Power Supply & Power Conversion
- Compressors
- Standby
- Water Heating
- Pumps
- Refrigeration
- Ventilation, Fans & Blowers
- Motors
- Office Equipment
- Miscellaneous
- Cooking & Heating & Air
- Televisions, Displays



# Free Resources & Tools for Policy Makers

[www.clasponline.org](http://www.clasponline.org)



Energy Efficiency Policy Toolkit



Standards & Labelling Guidebook



Monitoring Verification & Enforcement Guidebook

**MVE Economy Profiles**

**CLASP Global S&L Database**

**APEC-ESIS Secretariat**





# Thank you!

Nicole Kearney  
[nkearney@clasponline.org](mailto:nkearney@clasponline.org)

