Advancing Standards and Labelling Globally by Leveraging Analysis of Consumer Products and Commercial Equipment

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A Global Expert on Standards & Labeling

- The **Collaborative Labeling and Appliance Standards Program's** (CLASP) primary objective is to identify and respond to the technical analysis and assistance needs of energy efficiency standards and labelling (S&L) practitioners in targeted countries and regions while making the highest quality technical information on S&L best practice available globally
- CLASP's efforts are centred around getting more ambitious S&L requirements for **appliances, lighting, and equipment** in the residential, commercial and industrial sectors
- Established in 1999, CLASP joined the Climate Works Foundation network (www.climateworks.org) as a Global **S&L Best Practice Network (BPN)** in March 2009
- Before becoming a BPN, CLASP worked only in developing and emerging economies
- As a BPN, CLASP has been able to expand its operations globally and now has a presence in **China, Europe, India, Latin America and the US**

Activities undertaken by CLASP

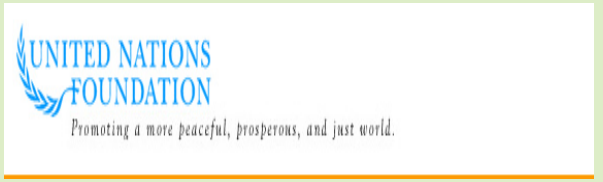
S&L policies are among the cheapest and most cost effective means of abating CO_2 and saving energy. CLASP works to ensure more stringent S&L requirements by:

- Providing technical assistance and expertise to governments and other stakeholders, including:
  - Product Specific Technical Analysis on S&L
  - Benchmarking Studies
  - Studies on Policy and Program Development, Implementation and Evaluation
- Aggregates technical resources drawing on extensive international network of experts
- Assembles project teams from diverse and highly-qualified organisations
- Disseminates best practice information and develops tools and training:
  - Guidebooks on best practice S&L
  - Workshop and guidebook on compliance
  - Global study on harmonization of S&L; test methods and benchmarking (MEPS, BAT, etc.)
  - Regulatory agenda tracking to facilitate international cooperation &harmonization of test methods & MEPS
  - OLADE (online training course for government officials in Latin America)

CLASP Europe's Ongoing Activities

- Product Specific Technical Analysis:
  - Power and Distribution Transformers
  - Cooling appliances (comfort cooling/air conditioning in buildings, residential and commercial) - expected publication 3rd quarter of 2011
  - Networked standby losses
  - Machine tools
  - Planning to launch several new studies in 2nd half of 2011
- Study on Monitoring, Verification & Enforcement of S&L in Member States - expected publication 3rd quarter of 2011
- Study Assessing Comprehension of new/revised EU Energy Label – expected publication 4th quarter of 2011
- Contribution to Global and Cross Cutting Activities:
  - Operating Agent Super-efficient Appliance Deployment (SEAD)
  - Country pages providing an overview of existing EU S&L
  - Timelines for ongoing rulemaking (where such information is publicly available)

Funders – Past and Present



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Paper Objectives

- Minimum energy performance standards (MEPS) and test methods are being implemented globally for a range of products and equipment
- Considerable analytical effort is required to develop these requirements and optimise them to reflect the best policy options
- Effort can be saved and outcomes improved through reviewing and utilising information from published studies in other economies, when relevant to the local context
- Harmonization of test methods can reduce costs and develop consistency on performance measurement

- We discuss four examples in our paper: transformers, televisions, electric motors and external power supplies
- We also identify barriers to leveraging these analyses and make recommendations on accelerating global adoption of test methods and energy-efficiency requirements

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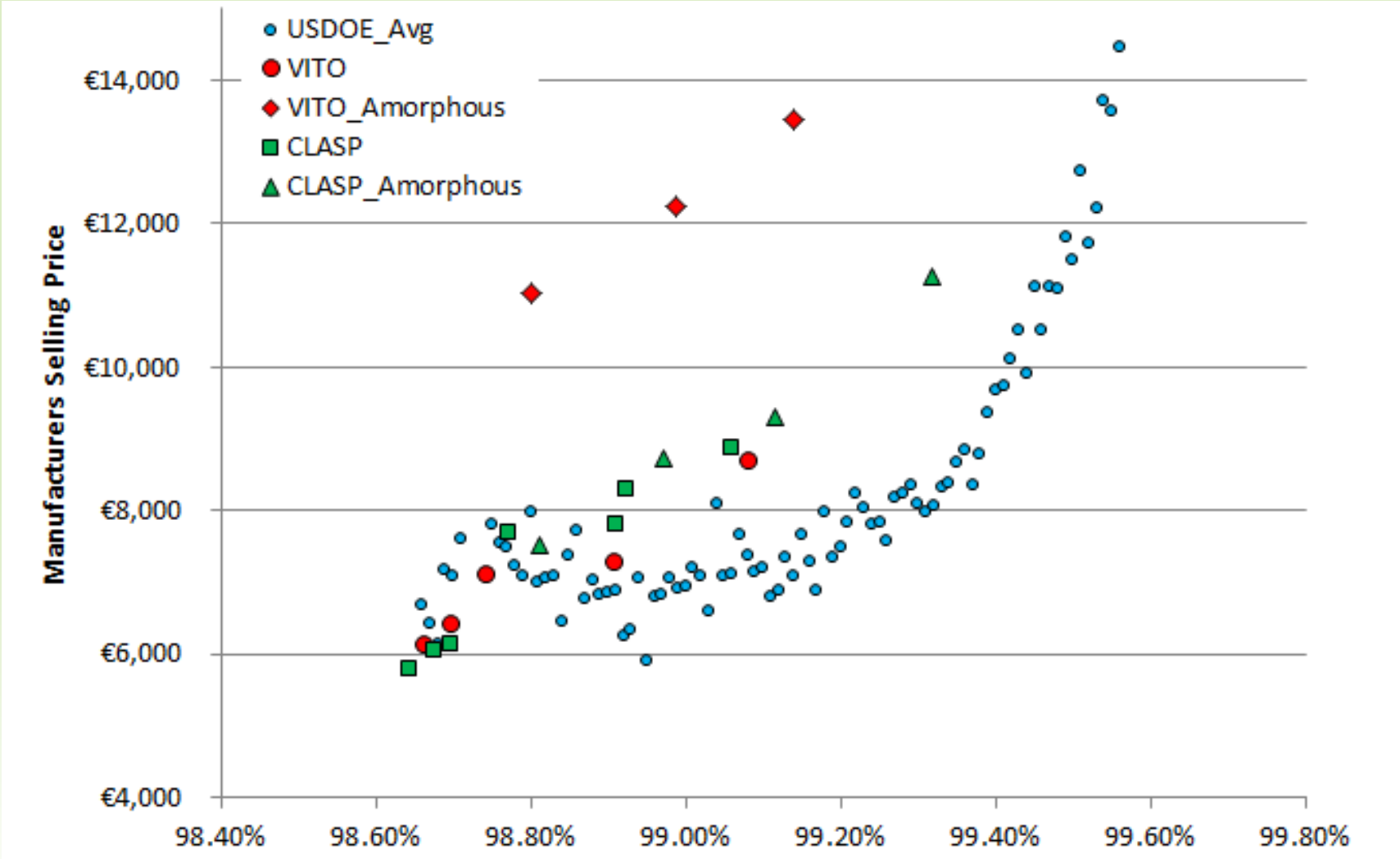
Case Study: Transformers

The Commission is studying Power & Distribution Transformers under the Ecodesign Directive:

- CLASP reviewed and commented on Preparatory Study drafts
- For the cost-efficiency curves, CLASP drew upon the transformer analysis published by US DOE (2007) and compared it to the draft European analysis
  - The analysis had to be adapted to the specific circumstances applying in Europe (test method, kVA rating, frequency)
- The comparison found that the draft Preparatory Study:
  - Had not considered all the viable options to increase transformer efficiency; and
  - Treatment of the most efficient designs (those using amorphous material) was inconsistent with DOE's analysis.

Example Comparison, 400 kVA 3ϕ

Scatter Plot of Draft EU and US Transformer Designs, Price vs. Efficiency



Notes: VITO Amorph vs. DOE Amorph & CLASP; Max efficiency levels reached & MSPs

Case Study: Televisions

TVs recently experienced a technology change which required updating the IEC test method.

- Product testing conducted initially in California on new types of TVs contributed to an update of IEC 62087 Ed.2:
- In 2005, Ecos Consulting conducted testing of TVs on behalf of the California Energy Commission using IEC 62087:2002
- This work was followed by a larger, more in-depth project conducted on behalf of the US EPA's ENERGY STAR, the New York State Energy Research and Development Authority (NYSERDA) and Natural Resources Canada (NRCan)
- As part of that project, Ecos Consulting purchased and tested TVs, monitors and projectors and studied power consumption, screen luminance and other performance measurements.
- This work led to a variety of refinements and improvements on IEC 62087:2002 that were incorporated into the ENERGY STAR test method.

Case Study: Televisions

The EPA communicated these refinements to the IEC Technical Committee, and the IEC adopted them into their 2008 revision.

- These recommendations percolated up to the IEC Committee responsible for IEC 62087, who took them into consideration.
- In 2008, a revised version of IEC 62087 was issued, incorporating those test method refinements.
- The new IEC test method has methods to measure power consumption of TVs including CRT, LCD, PDP and projection technologies.
- Edition 2 addresses the energy consumption of the new and emerging display technologies that now dominate the TV market.

Case Study: Electric Motors

Electric motors are a great example of getting it right…

- The largest single electrical end-use, consuming between 43 and 46% of global electricity
- Potential savings in motor-driven systems and the motors themselves
- Global harmonisation effort:
  - At EEDAL 2006, established the Standards for Energy Efficiency of Electric Motors Systems (SEEEM)
  - Merged into the IEA's 4E programme in November 2008
  - Work continues within IEA's 4E Motor Systems Annex
- This work supported development of a broadly accepted international test method (IEC 60034-2-1) adopted in 2007, and now used in most of the major economies
- IEC also went one step further and established target efficiency levels (IEC 60034-30 and -31), which are shown on the next two slides.
- Overall, electric motors are a good example of the successful application of international harmonisation on test methods and MEPS; and shows its possible to develop harmonised requirements for widely traded products.

Case Study: Electric Motors

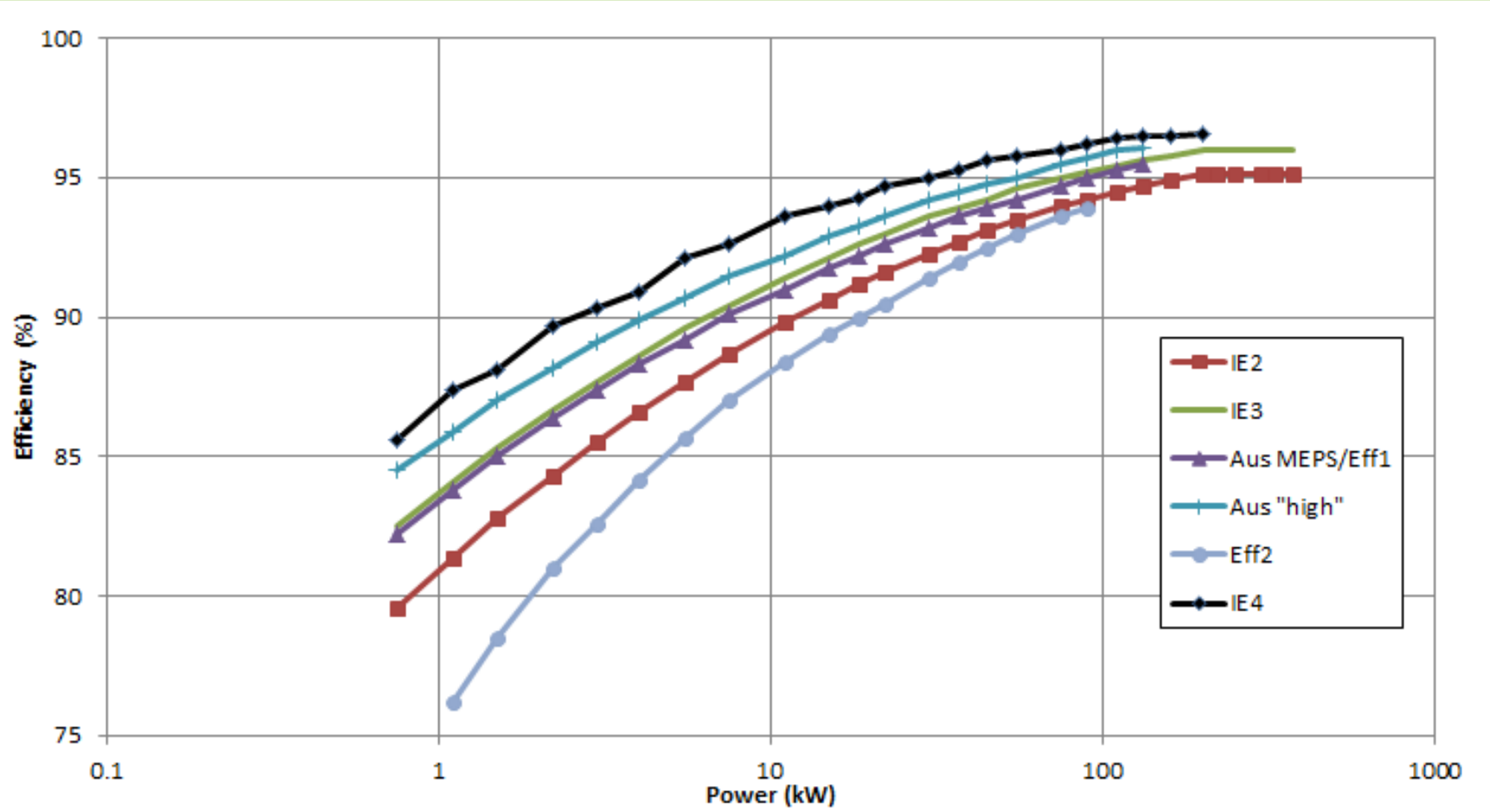
IEC Efficiency Classes and the Corresponding Levels from Different Countries

Motor Efficiency Class	International	USA	EU	China	India
Super Premium	IE4 (IEC 60034-31:2009)	-	-	-	-
Premium	IE3 (IEC 60034-30:2008)	NEMA Premium	IE3	-	-
High	IE2 (IEC 60034-30:2008)	EPAct	IE2 for motors with VSDs. Formerly Eff1	Grade 1	Eff1 (top label class)
Method	IE1 (IEC 60034-30:2008)	-	Eff2	Grade 2 (new MEPS from 1 July 2011)	Eff2 (lower label class)
Below method		-	Eff3	Grade 3 (current minimum)	-

Notes: India is voluntary, others are mandatory. Levels aligned to IEC; China moving to Grade 2 in less than a month.

Case Study: Electric Motors

Comparison of Electric Motor Regulations, Efficiency vs. Power (kW) Rating



Notes: Efficiency naturally increases with power, IE4 is highest in world; US NEMA Premium (IE3) level very similar to Australia.

Case Study: External Power Supplies

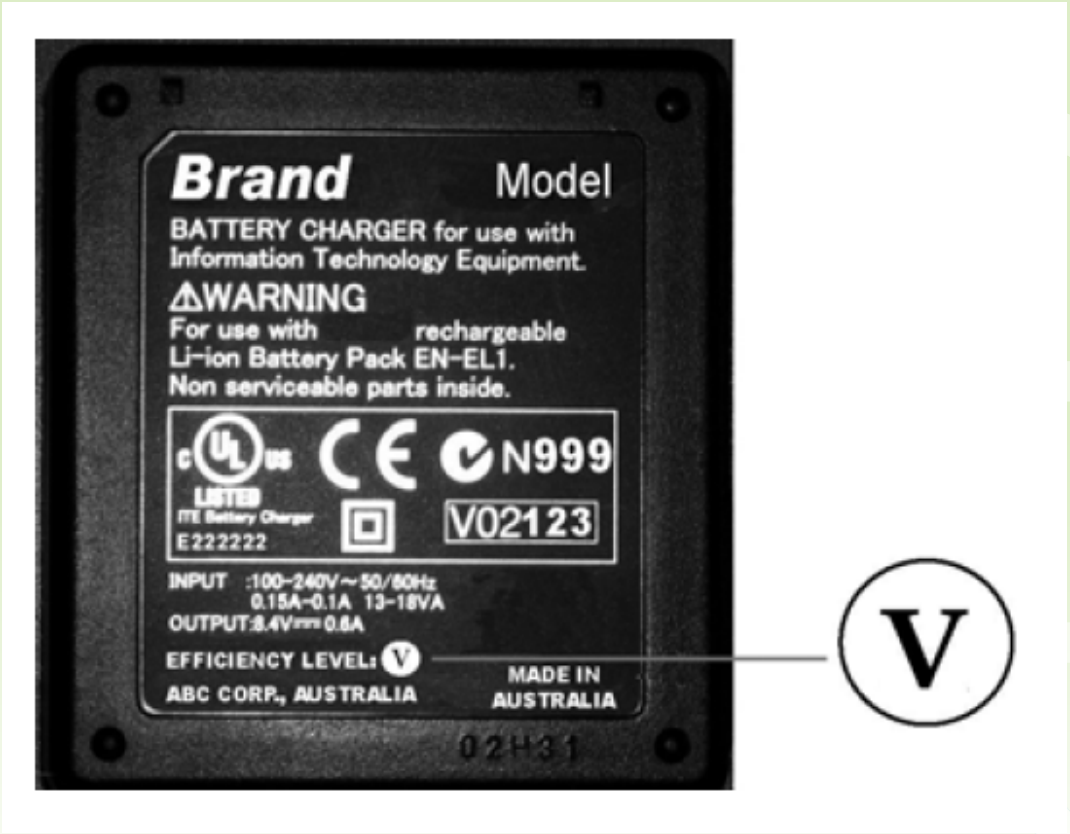
EPS success story of a harmonized test method and label.

- External power supplies (EPSs) are used to operate most small electronic devices, converting AC to low voltage DC for electronic products including MP3 players, mobile phones, laptops, etc.
- The EPS test method was originally developed by Ecos Consulting for the California Energy Commission in 2004.
- It measured no-load mode and active mode power consumption at 25%, 50%, 75% and 100% of rated output power.
- This EPS test method became the US national test standard.
- Starting in 2005, an international collaborative project between Australia, California, China, the EU and ENERGY STAR International resulted in this test method being adopted as the international test method for EPS.
- Now, the test method in these and other jurisdictions is the same as the one developed originally for California.

Case Study: External Power Supplies

Building on the success of the test method, the world has adopted a voluntary labelling system associated with efficiency.

Roman numeral: I, II, III, IV, V, VI, or VII.



Case Study: External Power Supplies

Mark	Performance Requirements				
	Nameplate Power Output (P_{no})[1]	No- Load Power[2]	Nameplate Power Output (P_{no})	Average Active Efficiency[3]	Power Factor
I	Used if none of the other criteria are met.				
II	0 to ≤ 10 watts	≤ 0.75	0 to < 1 watt	≥ 0.39 x P_{no}	Not applicable
	> 10 to 250 watts	≤ 1.0	1 to < 49 watts	≥ 0.107 x Ln(P_{no}) + 0.39	
			> 49 watts	≥ 0.82	
III	0 to < 10 watts	≤ 0.5	0 to 1 watt	≥ 0.49 x P_{no}	Not applicable
	10 to 250 watts	≤ 0.75	> 1 to 49 watts	≥ 0.09 x Ln(P_{no})+0.49	
			> 49 to 250 watts	≥ 0.84	
IV	0 to 250 watts	≤ 0.5	0 to < 1 watt	≥ 0.5 x P_{no}	Not applicable
			1 to 51 watts	≥ 0.09 x Ln(P_{no})+0.5	
			> 51 to 250 watts	≥ 0.85	
V	0 to < 50 watts	≤ 0.5 for ac-ac; ≤ 0.3 for ac-dc	0 to ≤ 1 watt	Standard: ≥ 0.480 * P_{no} + 0.140 Low Voltage[4]: ≥ 0.497 * P_{no} + 0.067	Power supplies with greater than or equal to 100 watts **input** power must have a true power factor of 0.9 or greater at 100% of rated load when tested at 115 volts @ 60Hz.
	≥ 50 to ≤ 250 watts	≤ 0.5	> 1 to ≤ 49 watts	Standard: ≥ [0.0626 * Ln (P_{no})] + 0.622 Low Voltage: ≥ [0.0750 * Ln (P_{no})] + 0.561	
			> 49 to 250 watts	Standard: ≥ 0.870 Low Voltage: ≥ 0.860	
VI and higher	Reserved for future use.				

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Leveraging Analysis

What are the lessons that can be derived from reviewing/applying the analysis from another jurisdiction?

- A sanity-check on findings under review – could be used as a comparative reference when reviewing product performance levels, manufacturing costs, lifecycle payback periods and other metrics.
- A parallel analysis/comparative benchmark – if sufficiently detailed, the analysis could be adapted or scaled for use as a validation tool or benchmark, to calibrate the new analysis, enabling a higher degree of precision in the findings.
- The analysis itself – for certain products and with sufficient detail, it may be possible to adapt the analysis to serve as the primary analytical basis for the new market, taking into account voltage, usage profile, model design and any key features.

Barriers to Leveraging

There were three critical barriers identified:

- Awareness of Programmes in Other Economies - regulators may not be aware of details associated with other regulatory programmes, such as coverage, test methods, efficiency metrics, the type and use of equipment and the stringency of the regulations adopted.

- Disconnections in the regulatory processes - equipment energy efficiency regulatory processes are complex and demanding and most regulators are fully occupied fulfiling the requirements of their respective domestic processes. Regulatory schedules are set independently and are thus rarely informed by those in other economies.

- Disconnections in the standardisation processes and their applicability - a disconnection occurs when test methods developed and adopted at the international level are not adopted for use in domestic MEPS and locally specific test methods are mandated instead.

Lessons Learned

The leveraged analysis can be used to support the development of:

- MEPS, energy metrics and product classifications
- Updating testing methods
- Potential pathway to harmonisation
- Enforcement of MEPS across markets

Lessons Learned

MEPS, energy metrics and product classifications

- Energy-efficiency metrics and product classes used should be informed by those used elsewhere in the world
- If test methods are harmonised, there is much greater probability these metrics and product classes will be too

Updating testing methods

- It can be difficult for international test methods to keep pace with product innovations
- When drafting a test method, it is important that technical experts involved in the process ensure the method is flexible and able to accommodate newer versions of existing products
- When adopting international test methods, regulators may need to deviate from the test method. These deviations should be reported back to the technical committee (as EPA did for TV's and IEC 62087)

Lessons Learned

Potential pathways to harmonisation

- Products not previously regulated are potentially easier to harmonise
- CLASP has found that the key to enhancing harmonisation is to support dialogue so greater information exchange and harmonisation occurs
  - International Partnership for Energy Efficiency Cooperation (IPEEC)
  - Super-efficient Equipment and Appliances Deployment (SEAD) Initiative (under IPEEC, CLASP is an operating agent)
  - IEA's Efficient Electrical End-use Equipment (4E) Implementing Agreement
  - EU-US High Level Regulatory Forum

Enforcement of MEPS across markets

- Manufacturers may have one particular model that is sold across several markets, and sometimes under different brand names
- If an enforcement agency finds a particular model to be in violation, this information should be shared with other enforcement agencies
- In Europe, the sharing of data on market surveillance is a function of the Administrative Cooperation (ADCO) Working Group.
  - Because regulations are set at the EU level and enforced locally, ADCO can serve as a clearing house for sharing monitoring, verification and enforcement test results, lowering costs for the MS.

Thank you for your attention!

For more information on CLASP, please go to

www.clasponline.org