Regional Harmonization of Energy Efficiency Standards for Appliances

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The International Copper Association

- The International Copper Association (ICA) leads the world’s copper industry on the issues critical to securing copper’s future growth
  - No other organization is focused on protecting long-term copper demand
- ICA’s 42 members:
  - Represent a majority of global copper production
  - Include globally focused fabricators
- Active in 60+ countries
- Partnerships with 500+ organizations
- Credible expert in energy efficiency, climate change mitigation, electrical safety, public health, others
- Annual budget +/- $50M; 50% towards EE and conductive applications
Copper’s Role in the Low-Carbon Energy Transition

- Copper is the best (non-precious) conductor of heat and electricity
- The products that contain copper tend to operate more efficiently
  - Over their life cycles, these products will consume less energy, save money and reduce CO$_2$ emissions
- Decisions to use inferior conductors equates to:
  - Decreased efficiency
  - Higher operating costs
  - Increased GHG emissions
- Energy-efficient appliances/industrial equipment, renewable energy and e-mobility all rely on copper’s superior conductivity
United for Efficiency (U4E): Global Partnership
United for Efficiency (U4E)
Public Private Partnership

- Public Private Partnership founded by UNEP, UNDP, CLASP, NRDC and ICA
- Supports UN Sustainable Energy For All (SE4ALL) initiative goal of “doubling the rate of improvement in energy efficiency”
  - Energy efficiency provides at least half of the actions needed to meet the Paris agreement
## United for Efficiency (U4E)

### Project Partners

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United for Efficiency (U4E)
Six Appliance Groups use >50% Electricity

Global Electricity Consumption in 2030 – Business as Usual

- Heating
- Motors >375kW
- Electrolysis
- Air-conditioners
- Lighting
- Motors
- Information technology
- Refrigerators
- Transformers

Total: 31,000 TWh
United for Efficiency (U4E)
Potential Savings from Efficient Appliances

- Reduce global electricity use by over 2,500 TWh, more than 10% of global use of today.
- Reduce global CO₂ emissions by 1.25 billion tons/year.
- Save electricity equivalent to 600 large power plants.
- Save on electricity bills equivalent to 350 billion US$.
- Save investments in power generation equivalent to 500 billion US$.
United for Efficiency (U4E) Integrated Policy Approach
United for Efficiency (U4E) Support to Policymakers

Level 1
- 150 Country Assessments
- 6 Policy Guides
- 30 Lighting documents
- Other tools & resources
  www.united4efficiency.org

Level 2
- Regional Market Assessment
- Regional Policy Roadmap
- Regional Harmonisation
- Regional Training for Policymaker; Practitioner

Level 3
- National Action Plan
- Help develop funding proposal
- Technical assistance with implementation

Images Source: Google Maps
United for Efficiency (U4E)
Country-Specific Assessments Example

India

Energy efficiency benefits from lighting, residential refrigerators, room air conditioners, distribution transformers and industrial electric motors with the implementation of globally benchmarked minimum energy performance standards

ANNUAL SAVINGS IN 2030:

- Reduce electricity use
  - by over 150.2 TWh
  - 7.3% of future national electricity use
- Save electricity worth 10 billion USD equivalent to 69 Power Plants [500MW]
- Reduce CO₂ emissions by 170 million tonnes equivalent to 90 million Passenger Cars

PERCENTAGE OF EACH PRODUCT’S SAVINGS TO THE COUNTRY’S TOTAL SAVINGS IN 2030:

- Lighting: 31%
- Residential Refrigerators: 13%
- Room Air Conditioners: 38%
- Distribution Transformer: 2%
- Industrial Electric Motor: 16%

EVEN GREATER SAVINGS POSSIBLE WITH BAT MEPs

THE PATHWAY TO ENERGY EFFICIENCY

ANNUAL SAVINGS IN 2025 and 2030

- Electricity (TWh):
  - 2025: 81.5, 2030: 47.4
  - Residential Refrigerators:
    - 2025: 1.4, 2030: 0.2
  - Room Air Conditioners:
    - 2025: 2.6, 2030: 1.4
  - Distribution Transformers:
    - 2025: 5.7, 2030: 1.6
  - Industrial Electric Motors:
    - 2025: 4.9, 2030: 1.4

- Electricity Bills (billion USD):
  - 2025: 2.5, 2030: 0.9

- CO₂ Emissions (million tonnes):
  - 2025: 48.5, 2030: 11.2

CUMULATIVE SAVINGS (2020 - 2030)

- Electricity (TWh):
  - 2025: 43.0, 2030: 19.3
  - Residential Refrigerators:
    - 2025: 4.6, 2030: 1.1
  - Room Air Conditioners:
    - 2025: 8.8, 2030: 1.2
  - Distribution Transformers:
    - 2025: 16.5, 2030: 1.4
  - Industrial Electric Motors:
    - 2025: 24.2, 2030: 3.3

- Electricity Bills (billion USD):
  - 2025: 2.7, 2030: 0.1

- CO₂ Emissions (million tonnes):
  - 2025: 52.3, 2030: 2.6

OTHER BENEFITS IN 2030:

- Direct GHG emissions reduced by → 50.8 million tonnes
- Increased grid connection to → 75.1 million households
- Reduced electricity subsidies by → 1 billion USD
- Reduced emissions by → SO₂: 665.2 thousand tonnes, NOₓ: 365.2 thousand tonnes

EEDAL September 2017

Regional Harmonization:
ASEAN SHINE Program
Regional Harmonization of Standards: Benefits

- Program development effort, resources, costs shared among participating countries
  - Developing countries with relatively small markets benefit the most
- Trade barriers reduced
  - Pre-existing special trade relationships enable co-operation
- Need for fewer compliant products reduces unit prices for consumers
  - Increased volumes lower unit costs for suppliers
- Coordinated monitoring, verification & enforcement (MV&E)
  - Participating countries share costs of common registration and verification processes, regional testing centers
- Accelerates widespread adoption of MEPS, Labels
ASEAN-SHINE
Introduction

- PPP led by ICA and UNEP
- Established 2010
- Funded by APEC and the EU
- Initial focus: air conditioners; expanding to lighting and other U4E products
**ASEAN-SHINE Objectives: Air Conditioners**

- Support market transformation in ASEAN in favor of higher efficiency air conditioners

- Assuming all ASEAN countries adopt MEPS at 3.2 (China level):
  - 5,373 GWh saving/year
  - 2.7 million tCO₂ emission reduction/year
  - 716.4 million USD savings for households on electricity bills
ASEAN-SHINE Approach: Air Conditioners

**Market Pull Mechanism**
- Develop regional policy roadmap
- Develop national policy roadmaps
- Consumer awareness campaigns
- Increased demand for higher efficient ACs

**Market Push Mechanism**
- Harmonize standards for testing methods
- Build capacity of testing labs
- Build capacity of AC manufacturers
- Increase supply of higher efficient ACs on the market

Market transformation
ASEAN-SHINE Outcomes: Air Conditioners – Regional Policy Roadmap

Regional Policy Roadmap endorsed by 10 ASEAN member states (Ministers of Energy Meeting, AMEM) ASEAN Member states have agreed to increase MEPS for ACs over time.
ASEAN-SHINE Outcomes: Air Conditioners – Consumer Awareness

- Mobile App
- Video clip
- Promotional materials (leaflets, brochures, banners, etc.) in each country (except LCM):
  - Partnerships with retail chains and AC manufacturers already finalized
  - Active program to train at least 500 sales persons in each country
ASEAN-SHINE Outcomes: Air Conditioners – Testing Harmonization

All ASEAN member states to use ISO 5151:2010 for the testing method for air conditioners by 2017; Adoption of ISO 16358 by 2020

Standards Harmonization Technical Working Group meetings, 2013
EU-APEC-METI

APEC-ASEAN Harmonization of Energy Efficiency Standards for Air Conditioners: Phase 1 (Project no. EWG 12/2012A) Final Project Report

Dr. Chin, Wal Meng
Technical Consultant
October 2013

Standards harmonization technical report, October 2013
ASEAN-SHINE Outcomes: Air Conditioners – Capacity Building (1)

Training for testing laboratories from Thailand, Malaysia, Indonesia, Philippines, Vietnam Increased capacity to perform testing according to ISO5151:2010 and implement ISO 17025

Participants from Labs in 5 ASEAN countries including representative from ACE attended ISO 17025 training workshop, 17-19 August 2015, in Bangkok
ASEAN-SHINE Outcomes: Air Conditioners – Capacity Building (2)

Training on advanced technology to increase energy performance of ACs

Conference on Trend and Micro Groove Technology for Air con industry on May 22nd, 2015

28 July 2016: training of small-diameter copper tubes for heat exchanger

HXSim v2.1 and RACSIM v1.0
Two software were developed to assist AC manufacturers with design of higher efficiency air conditioners.
Request a copy by sending an email to: Kerry.song@copperalliance.asia

Follow our YouTube Channel: ASEANSHINE
Harmonization of Standards: Further Regions

- LA SHINE kick-off meeting being held today (Mexico City)
  - Initial focus on Mexico, Chile, Peru, Colombia
  - Support from CONUEE (Mexico energy efficiency commission) and regional manufacturers (led by Mabe)
  - Leverage experiences of ASEAN
  - Seeking funds from Global Environment Facility (GEF) and Green Climate Fund (GCF)

- Other priority regions include:
  - Southern Africa Development Community (SADC); two workshops to date
  - Pacific Island States (GCF proposal)
  - Middle East and North Africa (MENA)
  - Economic Community of West African States (ECOWAS)
Thank you

For more information please contact
Steve.Kukoda@copperalliance.org or Ajit.Advani@copperalliance.org
U4E Key Component:
Early Replacement of Inefficient Appliances
U4E Key Component: Early Replacement

- MEPS are critical, but not enough
- Less than 30% of energy-consuming products globally have MEPS
- Less than 10% of motors in installed-based have MEPS
  - Case study in Chile mining sector showed average replacement time for motors at more than 35 years!
- Appliances, motors and other equipment in-use for years or decades before replacement; it takes a long time for the market to catch up to the standard
- Early replacement of inefficient products is critical if climate change goals are to be met
- Barriers include information and capacity, consumer practices, market barriers, and above all finance.
Finance for Early Replacement (1/2)

- U4E and Danish EE Hub leading efforts to create financing mechanisms to accelerate early replacement
- Outside of GEF, lack of investment in necessary capacity-building that leads to projects on the ground
- Residential EE is still expensive – significant barrier in non-OECD
  - Creative financing solutions need to be part of the package offered to countries/municipalities
  - Potential exists for the sale of one billion air conditioners and refrigerators without efficiency standards!
  - Question: how do we leverage appropriate financing to overcome the first-cost barrier on EE?
Finance for Early Replacement (2/2)

- Industrial EE is expensive and disruptive
  - Industrial: motors and the systems that drive them consume 40% of electricity globally and up to 70% in industrialized nations
    - Case study Chile mining industry: motors repaired (re-wound) every 8 years and not replaced for 37 years (distribution transformers have similar or longer service lives)
  - Less than 10% of motors in the installed base have MEPS!
  - EE value proposition is strong; why not being scaled-up more quickly?
    - 3-month horizon (quarterly financial statement)
    - CAPEX limited to maintenance
    - “If it’s not broken, why fix it?”
- Question: how do we leverage appropriate financing to facilitate early replacement of functional industrial equipment?
United for Efficiency (U4E)

Global stock of room air conditioners

OECD

Non-OECD

Global MEPS Status

Minimum Energy Performance Standards
Refrigerators
Air Conditioners
ASEAN-SHINE Structure

Country Chapters (in each country)
(composed of key national stakeholders including manufacturers, industry associations, standard making bodies, testing laboratories, professional institutes)