APEC Capacity Building Workshop on Energy Efficiency and Conservation Policy

Members' Journey with MEPS

APEC Energy Working Group

March 2026

Asia-Pacific Economic Cooperation

Asia-Pacific
Economic Cooperation

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Foreword

In the global effort toward energy transition and decarbonization, APEC plays an important role in shaping global energy demand, as the region includes some of the world's largest energy-consuming economies. There is no single pathway toward energy transition; each economy must determine the most suitable approach based on its unique economic circumstances and energy landscape. This makes strong energy policy development capacity essential—particularly in the diverse APEC region, where member economies are at different stages of development and have varying levels of resources and infrastructure.

Since 2009, APERC has conducted the APEC Peer Reviews on Energy Efficiency (PREE) under the auspices of the Japanese government. Findings from these reviews highlight that for energy transition efforts to succeed, APEC economies must substantially strengthen their policy capacities. In response, the Capacity Building Workshop on Energy Efficiency and Conservation Policy (CBWS/EECP) was launched as the successor to PREE. Designed as a capacity-building initiative, the workshop allows a broader range of APEC members to participate and benefit from shared expertise. The project aims to:

- Identify common challenges related to energy efficiency among member economies;
- Share best practices through selected case studies; and
- Propose new ideas to improve energy efficiency across the region.

For the kick-off workshop, themed *"Members' Journey with MEPS"*, we sought to uncover the most prevalent challenges and opportunities in implementing Minimum Energy Performance Standards (MEPS) policies. The workshop produced a set of recommendations that can guide members in developing robust MEPS frameworks moving forward.

We would like to thank the APEC Expert Group on Energy Efficiency and Conservation (APEC EGEEC) for supporting the project and the host economy, the Republic of Korea, for its hospitality and preparations for the event.

We also extend our gratitude to all members and participants for contributing to the success of this workshop. We look forward to continuing to deliver meaningful capacity-building activities on energy efficiency and conservation. We welcome suggestions for future workshop topics that would further support the region's policy development efforts.

Kazutomo IRIE
Chairman and President
Asia Pacific Energy Research Centre

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Acronyms

AI	Artificial Intelligence
APEC	Asia-Pacific Economic Cooperation
APERC	Asia Pacific Energy Research Centre
ASEAN	Association of Southeast Asian Nations
CONUEE	Comisión Nacional Para El Uso Eficiente de La Energia (The National Commission for the Efficient Use of Energy)
COP	Conference of the Parties
EGEEC	Expert Group on Energy Efficiency and Conservation
	IEA International Energy Agency
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
KETEP	Korea Institute of Energy Technology Evaluation and Planning
MEPP	Minimum Energy Performance for Products
MEPS	Minimum Energy Performance Standards
MVE	Monitoring Verification and Enforcement
NDCs	Nationally Determined Contributions
PREE	Peer Review on Energy Efficiency
PELP	Philippine Energy Labelling Program
SAVE	Sustainability Achieved Via Energy Efficiency
UNEP	United Nations Environment Programme

Acknowledgments

The workshop was made possible through the collaboration of the Asia Pacific Energy Research Centre (APERC) with APEC EGEEC and its members, APEC EWG members, and the host economy, the Republic of Korea.

The report was made possible through the discussion and collaboration of the people named below:

Project members:

Mr Mitsuhito Takada, Ms Elvira Torres Gelindon, and Ms Yasmin Fouladi

The Consultant Team (Ribos):

Ms Andrea Arenas Fuentes, Ms Alison Pridmore, Ms Emily McQualter, and Mr Charles Michaelis

Disclaimers

The information and statements in this report reflect the outcomes of the workshop and may change in the future depending on unexpected external events or changes in the energy conservation and efficiency policy agendas of particular economies.

Summary

The *Capacity Building Workshop on Energy Efficiency and Conservation Policy: "Members' Journey with MEPS"* was held on 18 November 2025 at the Oakwood Premier COEX Center in Seoul, Korea. Organized by the Asia Pacific Energy Research Centre (APERC) under the auspices of the Japanese government, with support from the Asia-Pacific Economic Cooperation (APEC) Expert Group on Energy Efficiency and Conservation (EGEEC). The workshop gathered policymakers, technical experts, and representatives from APEC member economies to exchange knowledge, share experiences, and strengthen capacity on Minimum Energy Performance Standards (MEPS).

The workshop recognized MEPS as one of the most effective and scalable policy tools for promoting energy efficiency, reducing greenhouse gas emissions, and advancing APEC's shared goals of sustainable and inclusive economic growth. As energy demand continues to increase across the region, MEPS play a vital role in improving energy productivity, enhancing energy security, and supporting the transition toward net-zero economies.

Anchored by the theme "Members' Journey with MEPS", the workshop provided a platform for member economies to reflect on their implementation experiences, identify common challenges, and explore opportunities for collaboration. Through expert presentations, host economy case studies, and interactive breakout sessions, participants examined strategies for MEPS design, implementation, and evaluation—particularly for key product categories such as lighting and air conditioners.

Participants reaffirmed that strong policy coordination, technical capacity, and industry engagement are central to effective MEPS implementation. The workshop also emphasized the importance of aligning Member Economy MEPS with international standards, improving data and evaluation systems, and leveraging regional cooperation to accelerate progress.

Detailed information on key outcomes and recommendations is provided at the end of the report and summarized below.

Key Outcomes

- **MEPS reaffirmed as a core driver of system-level efficiency gains**
  Participants reaffirmed MEPS as one of the most impactful and scalable policy instruments available to governments. MEPS were recognized not only for delivering immediate and measurable energy savings, but also for their structural role in raising minimum performance baselines and transforming markets over time.
- **MEPS recognized as part of a broader policy ecosystem**
  Discussions emphasized that the full benefits of MEPS are realized when they are embedded within a coherent and durable policy ecosystem. Participants highlighted the importance of strong governance arrangements, predictable regulatory cycles, and clearly defined mandates across institutions to ensure effectiveness, credibility, and longevity.
- **Growing momentum toward evidence-based standard setting and market analysis**
  The workshop revealed increasing commitment to grounding MEPS design and revision in rigorous, transparent analysis. Economies underscored the need for improved data on product performance, sales volumes, stock turnover, and consumer behavior. Data was increasingly viewed not only as a technical requirement, but as a strategic asset for demonstrating impact, informing long-term planning, and strengthening policy narratives.

- **Broad support for regional alignment and shared technical resources** Participants recognized that greater regional alignment can significantly reduce administrative and compliance burdens for governments and industry. There was strong interest in shared regional tools, including product databases, test reports, harmonized metrics, and collaborative approaches to cooling efficiency—an area of rapidly rising demand. APEC was widely acknowledged as a well-placed platform to facilitate this cooperation.
- **Deeper appreciation of the role of industry, retail, and consumers** The workshop highlighted the critical influence of supply-chain actors—manufacturers, distributors, retailers, and online marketplaces—in shaping MEPS outcomes. Participants also emphasized the importance of consumer engagement in driving demand for efficient products and reinforcing the credibility and effectiveness of energy labelling and MEPS.
- **Strong demand for peer learning, technical exchange, and practical tools** Economies expressed clear interest in continued peer-to-peer learning and hands-on technical exchange. Priority areas included monitoring, verification, and enforcement (MVE) systems; adoption of test methods; digital compliance tools; and practical pathways for improving cooling efficiency across diverse market contexts.

Key Recommendations

APEC economies are at different stages of MEPS development, but share common priorities for strengthening policy design, implementation, and impact. The workshop highlighted that progress can be accelerated through targeted capacity building, evidence-based policy design, and enhanced regional collaboration, enabling economies to advance MEPS more efficiently and effectively regardless of their level of maturity.

1. **Foundational priorities for economies developing initial MEPS programs**

    - Use existing international regulations and test methods as a starting point to reduce complexity, shorten timelines, and align with global best practice.
    - Establish clear institutional roles and coordination mechanisms among MEPS authorities, standards bodies, laboratories, customs, and enforcement agencies before implementation.
    - Invest early in testing infrastructure and laboratory accreditation, including regional or shared testing arrangements where domestic capacity is limited.
    - Introduce MEPS and comparative energy labelling as integrated policies to support consumer understanding and market transformation.
    - Build monitoring, compliance, and evaluation systems from the outset, including product registration, data collection, and scheduled review cycles.

2. **Priorities for economies scaling up existing MEPS programs**

    - Implement predictable MEPS revision cycles supported by technology roadmaps and market analysis to maintain ambition while providing industry certainty.
    - Strengthen market surveillance, check testing, import controls, and enforcement to ensure compliance and maintain policy credibility.
    - Quantify and clearly communicate the wider co-benefits of MEPS, including affordability, health, resilience, and decarbonization, to build sustained policy support.

- Pursue regional alignment on test methods, performance metrics, and data systems to reduce compliance costs and support industry and technology transfer.

3. Cross-cutting priorities for all APEC economies

- Prioritize residential cooling products as a high-impact opportunity, given rapidly rising demand and pressures on energy systems and household budgets.
- Leverage international technical assistance to support regulatory design, cost-benefit analysis, test method adoption, and compliance system development.
- Strengthen data and digital systems for product registration, market monitoring, enforcement, and evidence-based MEPS revisions.
- Incorporate equity and distributional considerations through inclusive consultation, clear communication of social benefits, and integration of MEPS within broader policy packages.

4. Future workshop and cooperation priorities

- Continue structured regional technical exchanges to support practical MEPS design and implementation.
- Focus future workshops on high-impact themes such as cooling efficiency, digital compliance for online markets, advanced evaluation methods, and links to decarbonization strategies.
- Expand hands-on training, peer learning, and sustained engagement between workshops through shared tools, templates, and regional resources.

5. Policy ecosystem insights

- Treat MEPS as part of an integrated and evolving policy ecosystem rather than as standalone regulations.
- Strengthen governance, regulatory predictability, conformity assessment, data systems, and ongoing engagement with industry and consumers.
- Build on workshop momentum to deepen regional alignment, scale ambition, and maximize MEPS contributions to energy savings, affordability, resilience, and long-term decarbonization.

Introduction

The Capacity Building Workshop on Energy Efficiency and Conservation Policy: "Members' Journey with MEPS" was held on 18 November 2025 at the Oakwood Premier COEX Center in Seoul, Korea, organized by the Asia Pacific Energy Research Centre (APERC) under the auspices of Japanese government with support from the Asia-Pacific Economic Cooperation (APEC) and APEC Expert Group on Energy Efficiency and Conservation (APEC EGEEC). The workshop brought together policymakers, technical experts, and representatives from APEC member economies to exchange experiences, share lessons learned, and strengthen institutional capacity related to the design and implementation of Minimum Energy Performance Standards (MEPS).

Participating Economies, APEC Fora and Organizations

Participating economies (12 in total): Canada; People's Republic of China; Hong Kong, China; Japan; Republic of Korea; Malaysia; Mexico; The Philippines; The Russian Federation; Chinese Taipei; Thailand; and Viet Nam

Participating APEC fora: APEC Secretariat, EWG Lead Shepherd, EWG Secretariat; APEC EGEEC; APEC EGNRET, APERC

Participating Organizations: *Consultants*: Ribos. *Experts*: CLASP, Technology Collaboration Programme on Energy Efficient End-Use Equipment (4E TCP), Light Naturally, Energy Expert from Mexico, UNEP-Copenhagen

Background

The APEC region plays a pivotal role in the global energy transition and efforts to achieve decarbonization. Home to some of the world's largest and fastest-growing energy-consuming economies, the region accounts for approximately 56% of global energy demand, 58% of global energy supply, and 68% of electricity generation, while contributing around 60% of global CO_2 emissions (APERC, 2022). While APEC economies have achieved an average annual energy intensity improvement of 1.9% since 2005, absolute energy consumption continues to rise—driven by sustained economic growth, demographic shifts, and urbanization pressures. These trends highlight the urgent need for coherent, forward-looking energy policies that can balance economic development with environmental sustainability.

Given the diversity within APEC—from advanced industrial economies to fast-growing emerging markets—there is no single pathway to achieving energy efficiency improvements. Instead, economies require flexible policy approaches aligned with member economy priorities, sectoral conditions, and technological readiness. At the same time, stronger regional cooperation on standards, testing, and compliance can reduce administrative burdens, minimize technical barriers to trade, and accelerate the deployment of efficient products across the region.

Minimum Energy Performance Standards (MEPS) have emerged as one of the most effective and scalable policy tools available to APEC economies. As mandatory thresholds for the energy performance of appliances, equipment, and industrial products, MEPS ensure that the least efficient products are progressively removed from the market. By raising baseline performance, MEPS can generate measurable economic and social benefits: reducing energy

bills for households and businesses, improving energy security, deferring costly infrastructure investments, and driving industrial innovation and competitiveness.

Aligning MEPS with international test procedures and performance metrics further strengthens their impact. Harmonization improves policy coherence, enables manufacturers to access larger regional markets, reduces compliance costs, and supports the competitiveness of local industries. For economies seeking to meet Nationally Determined Contributions (NDCs), net-zero commitments, and other long-term policy goals, MEPS are therefore a foundational instrument capable of delivering long-term energy and emissions savings.

Against this backdrop, the APEC Capacity Building Workshop on Energy Efficiency and Conservation Policy—*Members' Journey with MEPS*—was convened to deepen institutional and technical capacity across the region. The workshop responded directly to member economies' calls for practical guidance on MEPS design, implementation, and evaluation, and for a platform to exchange lessons learned, identify common challenges, and explore pathways for enhanced regional cooperation.

Workshop Objectives

The workshop was designed to strengthen institutional and technical capacity among APEC economies to develop, implement, and refine effective Minimum Energy Performance Standards (MEPS). Building on participant feedback and emerging regional priorities, the 2025 workshop—"Members' Journey with MEPS"—focused on practical approaches to MEPS design, implementation, market surveillance, and impact evaluation, with particular attention to key product categories such as lighting and air conditioners.

The workshop aimed to:

1. Identify common challenges and contextual constraints in MEPS policy implementation across APEC economies.

Participants examined the technical, institutional, and market factors shaping MEPS adoption and enforcement, with a focus on understanding diverse member economy contexts and the practical barriers that affect policy effectiveness.

2. Facilitate peer learning through structured exchanges of experiences, lessons learned, and best practices.

The workshop provided a platform for member economies to share their MEPS journeys—including successes, implementation models, innovative approaches, and areas requiring additional support—to promote collaborative problem-solving and regional knowledge exchange.

3. Generate actionable recommendations for strengthening the design, adoption, and enforcement of MEPS policies.

Through expert presentations, panel discussions, and breakout sessions, participants contributed to a set of practical recommendations intended to guide future capacity-building activities, support regional alignment efforts, and inform the next phase of APEC energy efficiency work.

MEPS in APEC Economies

Overview

Across the Asia-Pacific Economic Cooperation (APEC) region, Minimum Energy Performance Standards (MEPS) are widely recognized as one of the most effective policy instruments for improving energy efficiency. Energy efficiency policies—particularly standards and labelling frameworks—play a central role in advancing APEC's shared objectives related to energy security, sustainable growth, emissions reduction, and technological competitiveness. Nearly all APEC economies now operate MEPS or related regulatory systems, though the scope, coverage, and institutional arrangements vary significantly. These differences reflect the diverse market conditions, policy priorities, and technical capacities across the region.

As energy demand continues to grow across the region, strengthened cooperation on test methods, compliance frameworks, and data sharing can help economies reduce administrative burdens, support harmonization efforts, and enhance the effectiveness of member economy MEPS programs. This collaborative approach aligns with APEC's commitment to capacity building, voluntary alignment, and improved energy productivity.

Regional Landscape and Trends

APEC's energy footprint underscores the importance of strong energy efficiency policies. According to APERC's *Energy Demand and Supply Outlook 8th Edition,* (APERC, 2022), APEC economies account for 56% of global energy demand, 58% of supply, 68% of electricity generation, and around 60% of global CO_2 emissions. With fossil fuels still comprising 86% of the region's primary energy supply, efficiency improvements remain one of the most cost-effective pathways for managing rising demand and supporting decarbonization goals.

Across the region, MEPS and standards-and-labelling frameworks are now widely recognized as scalable, high-impact tools for improving energy performance. While implementation levels vary and differences reflect diverse market conditions, policy priorities, and technical capacity, several clear and common trends are emerging:

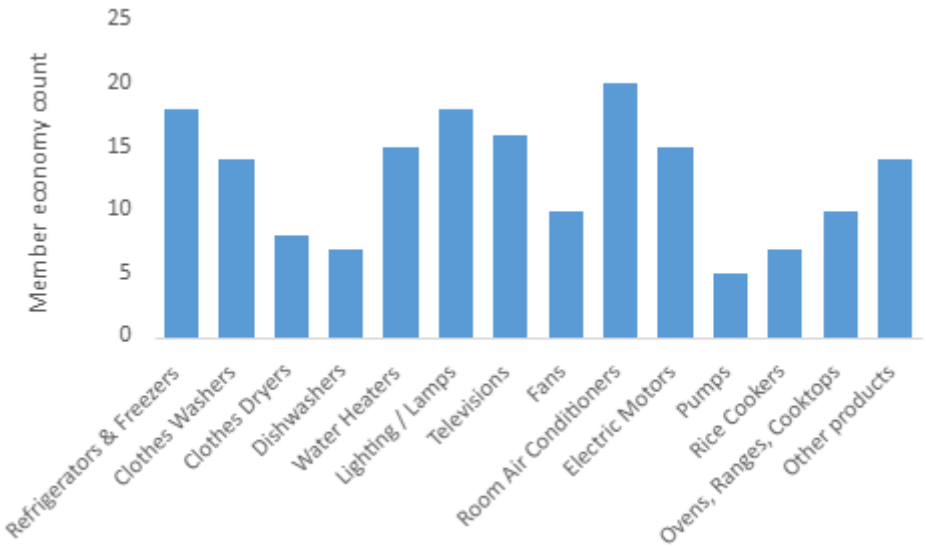
1. **Expansion of MEPS coverage.** Economies are broadening the range of regulated products beyond traditional household appliances. Many have introduced or are developing MEPS for motors, pumps, transformers, commercial equipment, and building components—reflecting growing recognition of the large energy savings potential across sectors.
2. **Integration of MEPS with energy labelling programs.** Most APEC economies now pair MEPS with mandatory or voluntary labelling schemes. Comparative labels help guide consumer decisions, while endorsement or tiered labels promote industry competition and accelerate the shift toward higher-efficiency models.
3. **Movement toward international alignment**. Several economies have adopted or adapted test procedures and performance metrics from the International Electrotechnical Commission (IEC), the International Organization for Standardization (ISO), or major trading partners. This alignment helps reduce technical barriers to trade, lowers compliance costs for manufacturers, and facilitates opportunities for future standards harmonization or mutual recognition agreements.
4. **Increasing use of data-driven policy development**. Economies are strengthening market surveillance, product registration databases, and evaluation systems. These tools

support transparent policy development, enable periodic review and revision of MEPS, and help quantify impacts on energy use, emissions, and consumer savings.

5. **Use of complementary policy levers to reinforce MEPS**. Green public procurement requirements, awareness campaigns, and financial incentives (such as rebates or tax benefits) are increasingly used to accelerate market uptake of high-efficiency products. These measures amplify the impact of MEPS and help shift broader market norms.

As economies face rising electricity demand—particularly from cooling, industry, and household appliances—regional cooperation on test methods, compliance frameworks, and data sharing offers a major opportunity. Collaborative efforts can reduce administrative burdens, strengthen member economy implementation, and support voluntary alignment efforts in line with APEC's broader goals for energy efficiency, sustainable growth, and energy security.

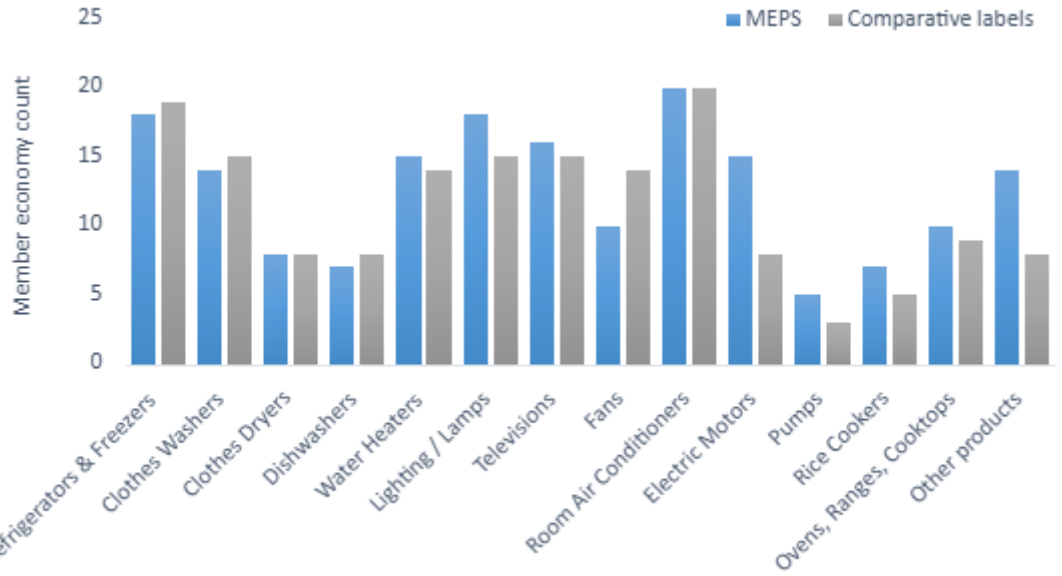
Figure 1: MEPS Coverage Across APEC Economies



Number of APEC member economies with Minimum Energy Performance Standards (MEPS) in place across major appliance and equipment categories. Results are based on the APEC workshop survey, policy information shared by the International Energy Agency (IEA) and CLASP and an internet search.

A review of MEPS coverage across APEC economies shows strong and growing attention to high-impact product categories. As illustrated in Figure 1, refrigerators, lighting, and air conditioners are among the most widely regulated products, reflecting their significant contribution to household and commercial electricity demand. Coverage is also expanding in areas such as motors, pumps, and televisions, demonstrating a regional trend toward broader and more comprehensive efficiency policy frameworks. While the extent of MEPS varies by economy, the overall pattern reflects a shared focus on reducing energy consumption from appliances and equipment with the highest potential for savings.

Figure 2: MEPS and Comparative Labels Across APEC Economies



Number of APEC member economies that have implemented Minimum Energy Performance Standards (MEPS) and comparative energy labelling schemes for major appliance categories. Results are based on the APEC workshop survey, policy information shared by the International Energy Agency (IEA) and CLASP and an internet search and show strong alignment between MEPS and labelling programs, particularly for high-energy-use products such as air conditioners, refrigerators, lighting, and motors.

Integration of MEPS with comparative labelling schemes is increasingly common across APEC economies. As shown in Figure 2, labelling programs often parallel MEPS coverage, supporting consumer awareness and enabling market differentiation for higher-efficiency products. This alignment reinforces the overall effectiveness of MEPS by encouraging informed purchasing decisions and stimulating competition among manufacturers. The similarities in coverage patterns across product categories also reflect a shared regional focus on appliances with the largest impact on household and commercial electricity demand.

Workshop Summary and Key Discussion Highlights

The event provided a platform for participants to share experiences, discuss challenges, and explore practical approaches to strengthening the design, implementation, and evaluation of Minimum Energy Performance Standards (MEPS) across the region.

Opening Session

The workshop opened with welcoming remarks by **Mr Youngsun You**, Director General of the Korea Energy Agency, who emphasized the importance of strengthening energy efficiency and conservation measures as APEC economies work to meet rising energy demand and long-term decarbonization commitments. This was followed by opening remarks from **Mr Mitsuhito Takada,** Vice President of APERC, who highlighted the role of the APEC Expert Group on Energy Efficiency and Conservation (EGEEC) in supporting member economies through collaborative initiatives, knowledge exchange, and capacity-building programs. After

the group photo, the program transitioned to introductory presentations that set the context for the day's discussions.

Photo: Participants at the workshop

Ms Elvira Torres Gelindon (APERC) provided an overview of the workshop's objectives, structure, and expected outputs. She explained that the capacity-building workshop series was developed in response to member economies' growing demand for practical policy support in the design and implementation of appliance and equipment efficiency standards. Building on insights from the Peer Review on Energy Efficiency (PREE) and associated follow-up reviews, she noted that economies continue to express strong interest in strengthening MEPS frameworks and learning from the experiences of their peers. Ms Gelindon outlined the workshop's methodology—including the pre-workshop survey, expert presentations, host economy case study, member sharing, and an interactive breakout session—and confirmed that the workshop summary report would consolidate the key findings, lessons learned, and recommendations emerging from the event.

This was followed by a presentation from **Ms Yasmin Fouladi** (APERC), who introduced regional trends in energy intensity and their implications for the role of MEPS in APEC economies. She reviewed the APEC-wide goal of reducing aggregate energy intensity by 45% by 2035 relative to 2005 levels, and presented recent data showing that, while meaningful progress has been made, the rate of improvement has begun to slow, and annual reductions in final energy intensity have varied significantly across the 2006–2023 period, with more modest declines in recent years.

Ms Fouladi highlighted that MEPS are one of the most effective instruments available to reduce economy-wide energy intensity. By removing inefficient products from the market and promoting the adoption of high-performance technologies, MEPS delivers sustained reductions in energy demand. She emphasized that MEPS deliver greater impact when

combined with complementary measures such as comparative labelling schemes and regular updates to test procedures. Drawing on international evidence, she noted that long-standing energy standards and labelling programs have contributed to reductions of around 15% in domestic electricity consumption in some APEC economies and decreases of approximately 30% on appliance energy use where MEPS and labelling programs are implemented together.

Together, the welcoming remarks and introductory presentations framed the workshop's focus on strengthening MEPS across the region. They reaffirmed the importance of expanding and updating MEPS programs as a practical, high-impact pathway for improving energy efficiency, reducing energy intensity, and supporting broader economic and environmental objectives across APEC economies.

Session 1: Setting the Context – The Role of MEPS in Advancing Energy Efficiency

Session 1a. Global and Regional Context for MEPS

The first technical session, led by **Ms Emily McQualter** (International Copper Association and Ribos), provided an overview of the global and regional landscape for MEPS implementation and highlighted the growing need for strengthened policy action across APEC. Drawing on insights from the pre-workshop survey, she noted that economies are seeking targeted support in areas such as MEPS design, enforcement, financing mechanisms, regional cooperation, and consumer engagement. These priorities underscored the importance of building practical capacity to help economies advance their MEPS frameworks in line with their energy and climate objectives.

Ms McQualter emphasized that energy efficiency remains one of the most cost-effective strategies for reducing energy demand and greenhouse gas emissions. While APEC economies have made meaningful progress, global improvements in primary energy intensity have slowed in recent years, pointing to the need for more ambitious policy measures. In this context, MEPS are a proven and scalable mechanism for reducing electricity consumption in high-use product categories such as lighting, refrigeration, and air conditioning.

Her presentation highlighted the multiple benefits of appliance efficiency, including lower energy bills, improved comfort and health, reduced emissions, strengthened energy security, and enhanced economic competitiveness. She noted that these benefits are amplified when MEPS are integrated within broader policy packages that include comparative labelling schemes, consumer awareness programs, financial incentives, and periodic updates to test procedures.

Ms McQualter also discussed examples from international MEPS programs that demonstrate the long-term impact of consistent standard strengthening, strong compliance frameworks, and effective stakeholder engagement. These examples illustrated the scale of potential efficiency gains achievable across APEC economies as MEPS programs evolve and expand.

Session 1b. Host Economy Case Study: Korea's Experience with MEPS Implementation

The contextual session continued with a case study from **Mr Bongjoo Shin,** Program Director at the Korea Institute of Energy Technology Evaluation and Planning (KETEP), who presented Korea's long-standing experience with appliance and equipment efficiency programs. He emphasized that energy efficiency is central to Korea's energy strategy, with the appliance and equipment sector contributing significantly to potential CO_2 reduction opportunities.

Korea's approach to appliance efficiency is built on three complementary pillars: the mandatory Energy Efficiency Labelling and Standard Program, the voluntary High-Efficiency Appliance Certification Program, and the e-Standby Power Reduction Program, which combines mandatory and voluntary elements. Together, these programs cover a broad range of products, from household appliances and lighting to industrial equipment and standby-power technologies.

Mr Shin highlighted that Korea's MEPS program, established in the early 1990s, now regulates dozens of product categories and prohibits the manufacture and sale of products that do not meet specified minimum energy performance levels. Korea's energy labelling system enables consumers to make informed purchasing decisions, while the high-efficiency certification scheme supports the uptake of premium-efficiency models through financial incentives and certification marks.

He also noted that energy consumption in the appliance and equipment sector has grown steadily due to increasing product diversity and rising demand, reinforcing the need for continuous improvement in standards and supporting programs. Korea's performance data shows significant energy savings and emissions reductions from its efficiency initiatives, demonstrating the cumulative impact of long-term policy consistency.

The case study concluded with an overview of Korea's strategic framework for energy efficiency management, which maps how products progress through market creation, transformation, maturity, and saturation phases. This structured approach illustrates the importance of clear regulatory cycles, robust compliance mechanisms, and sustained stakeholder engagement in achieving market transformation.

Question and Answer Session

The Question and Answer session following Session 1 focused on emerging policy challenges, the evolving scope of energy efficiency, and the role of MEPS within broader member economy and international energy strategies.

Participants raised questions about the rapid growth of artificial intelligence (AI) and digital technologies and their implications for future energy demand. In response, it was noted that while AI and digitalization are expected to increase electricity consumption in absolute terms, they also offer significant opportunities to improve productivity, optimize systems and reduce energy use in other sectors. From a policy perspective, this reinforces the importance of ensuring that efficiency improvements—including through MEPS—keep pace with technological change so that growing demand is met as efficiently as possible.

Several questions addressed Korea's experience with MEPS implementation, particularly the scale of program participation and the social dimensions of energy efficiency policy. Korean representatives highlighted that energy efficiency programs in Korea are increasingly linked to social policy objectives. Examples discussed included targeted initiatives designed to support low-income households, with one program aiming to reach one million such families, as well as efforts to develop monitoring systems that help small and medium-sized enterprises improve energy performance. These interventions were presented as part of a broader effort to ensure that the benefits of energy efficiency are widely shared.

The discussion also touched on international climate processes and future policy directions, including questions related to upcoming Conference of the Parties (COP) discussions and the role of energy efficiency within member economy climate commitments. Korean representatives emphasized that energy efficiency remains a top priority and that work is ongoing to integrate multiple end-use components—such as heating, cooling, gas, and

water—into more holistic approaches centered on end users. They also noted ongoing participation in international collaboration with other economies to develop roadmaps aimed at accelerating energy efficiency improvements globally.

Overall, the session reinforced the relevance of MEPS in addressing both near-term efficiency gains and longer-term structural challenges, particularly as economies navigate technological change, rising energy demand, and evolving climate commitments.

Key takeaways from Session 1

Session 1 reinforced the role of MEPS as a foundational policy tool for managing rising energy demand and supporting long-term market transformation. Discussions highlighted that the effectiveness of MEPS increases when they are embedded within stable regulatory frameworks, supported by complementary measures such as labelling and incentives, and updated regularly in response to market and technology developments. The global and host economy perspectives demonstrated that sustained policy commitment, strong compliance systems, and structured revision cycles are critical to achieving cumulative energy savings over time. Participants also noted the growing importance of ensuring that MEPS evolve alongside emerging technologies and are aligned with broader social and climate objectives.

Session 2: Overcoming Challenges and Leveraging Success Factors in MEPS Implementation

Session 2 focused on the practical challenges that economies face when implementing MEPS and the key factors that enable successful delivery. Through expert perspectives and member economy experiences, the session explored common implementation risks and the institutional, technical, and political conditions needed to overcome them.

Discussions highlighted that while MEPS can deliver substantial energy, economic, and social benefits, these outcomes are not automatic. Speakers emphasized the importance of sustained political commitment, clearly defined institutional responsibilities, effective coordination across agencies, and sufficient technical and testing capacity. Transparent compliance and enforcement arrangements were also identified as critical to maintaining credibility and market confidence.

Member economy presentations from Malaysia; the Philippines; and Chinese Taipei provided concrete examples of how these challenges arise in practice and how targeted solutions—such as phased implementation, stakeholder engagement, and capacity-building efforts—can support effective MEPS delivery. Overall, the session reinforced that addressing foundational implementation challenges is essential for ensuring MEPS function as intended and can be strengthened over time.

The panel was moderated by **Ms Emily McQualter**. Panelists included:

Expert speakers:

1. Dr Kevin Lane, Programme Manager, 4E Technology Collaboration Programme
2. Mr Leonardo Beltrán Rodriguez, Government Advisor, former Deputy Secretary for Energy Planning and Transition, Secretariat of Energy, Mexico
3. Mr Steven Coyne, International Lighting Expert and Managing Director of Light Naturally, Australia

Member sharing presentations:

1. Malaysia – Mr Norazrin Rupadi
2. The Philippines – Ms Dorella Maye Perlas
3. Chinese Taipei – Mr Ting-Jui Sun

Expert Perspectives

Dr Kevin Lane : **Best Practice Policies for Energy-Efficient Appliances**

Dr Kevin Lane highlighted that MEPS are among the most cost-effective tools for reducing energy demand but require well-established legal and administrative structures to function effectively. Economies implementing MEPS for the first time were encouraged to begin with simple, achievable requirements aligned with international standards and supported by realistic compliance expectations. He stressed the value of leveraging regional or neighboring testing infrastructure to overcome high initial costs and noted that early alignment with trading partners can reduce compliance burdens for manufacturers.

Mr Leonardo Beltrán : **Mexico's Appliance Energy Efficiency Programme**

Mr Leonardo Beltrán shared Mexico's multi-decade experience building a comprehensive MEPS and labelling framework. Mexico's institutional architecture—featuring clear roles for policy development, technical standard-setting, enforcement, and consumer protection—has enabled sustained progress. Achievements such as significant reductions in electricity consumption, major appliance replacement programs, and strong North American alignment demonstrate what can be achieved through consistent policy cycles. At the same time, he highlighted recurring challenges, including limited early testing infrastructure, industry concerns about compliance timelines, market surveillance gaps, and the need to control informal appliance markets. Success factors identified included early and continuous stakeholder engagement, clear communication of compliance pathways, culturally relevant public education campaigns, and structured review cycles that ensure standards evolve with market conditions.

Mr Steve Coyne : Overcoming Challenges and Leveraging Success Factors in MEPS Implementation

Mr Steve Coyne presented experiences from the Pacific and Association of Southeast Asian Nation (ASEAN) regions, illustrating how regional harmonization can dramatically reduce costs and accelerate MEPS adoption. Harmonized test methods, shared product databases, interlaboratory comparisons, and mutual recognition agreements were shown to reduce administrative burdens and support compliance across smaller markets. He emphasized the importance of understanding domestic market conditions, including local manufacturing capacity and existing product performance, before setting or revising MEPS. Ensuring continued confidence in laboratory capabilities—particularly for economies reliant on external facilities—was identified as essential for credible enforcement.

Member Economy Sharing

Member speakers complemented these perspectives with practical insights from their respective economy programs.

Malaysia outlined its transition from voluntary to mandatory MEPS and its recent expansion into thermal and commercial products under the Energy Efficiency and Conservation Act of 2024. Malaysia faced challenges such as limited testing facilities and the need for close

collaboration with manufacturers to build reliable data for standard-setting. Key success drivers included the establishment of a clear legal framework, investment in testing infrastructure, rebate programs such as Sustainability Achieved via Energy Efficiency (SAVE) to stimulate market uptake, and strong alignment with its broader energy and climate strategies. These interventions contributed to significant energy savings, improved market readiness, and growing consumer recognition of efficient products.

The Philippines presented its Minimum Energy Performance for Products (MEPP) and the Philippine Energy Labelling Program (PELP), supported by a robust regulatory foundation under the Energy Efficiency and Conservation Act. The Philippines shared its experience expanding product coverage, improving its online registration system, and strengthening engagement with retailers, manufacturers, and distributors through public consultations and information campaigns. These activities helped improve compliance, streamline processes for industry, and enhance consumer awareness of energy-efficient products.

Chinese Taipei described its mature and well-integrated policy ecosystem comprising MEPS, energy efficiency rating labels, voluntary conservation labels, and multiple incentive programs. The presenter highlighted the introduction of a new AI-assisted online surveillance system that has significantly increased the scale and efficiency of compliance checks—an important response to the growing volume of retail online. Current challenges include balancing industry competitiveness with more ambitious MEPS, improving harmonization of test methods, addressing consumer behavior barriers, and strengthening data-sharing arrangements. Future directions include continuous updates to MEPS and labels and expanded public education to support behavioral change.

Cross-Cutting Challenges and Lessons

Across economies, several common challenges emerged:

- **Limited resources for testing and market surveillance**, including shortages of accredited laboratories and staff capacity.
- **Fragmented institutional responsibilities**, with MEPS design, enforcement, and consumer protection often spread across multiple ministries and agencies.
- **Gaps in data availability and technical knowledge**, which constrain standard-setting and enforcement.
- **Balancing ambition with market readiness**, particularly where domestic manufacturers face cost pressures or where informal markets are prevalent.
- **Ensuring political continuity**, as MEPS require long-term policy cycles and consistent implementation.

Speakers also identified a shared set of success factors:

- **Early and continuous stakeholder consultation** to build trust, transparency, and credible compliance pathways.
- **Pilot programs and phased implementation**, which help economies test approaches, identify bottlenecks, and adjust timelines.
- **Clear communication and public education**, essential for achieving industry buy-in and consumer support.
- **Incentives and complementary measures**, which ease the transition to higher-efficiency technologies.
- **Regional collaboration**, including shared testing infrastructure, harmonized standards, and product databases, which can significantly reduce costs and accelerate MEPS adoption.

Participants agreed that while MEPS pathways vary across APEC, the underlying principles of sound governance, transparency, robust technical infrastructure, and sustained collaboration are universally applicable and critical to long-term success.

Question and Answer Session

The open questions to the panel in Session 2 provided an opportunity for deeper reflection on the role of MEPS within broader policy frameworks, with particular attention to ambition, data availability, and stakeholder engagement.

Panelists discussed the idea that MEPS should be understood as a policy floor rather than a ceiling. It was noted that while MEPS play a critical role in removing the least efficient products from the market, additional actors—such as real estate developers and large commercial players—can and should be encouraged or required to meet higher performance standards, particularly for energy-intensive end uses such as cooling.

Data availability and monitoring emerged as a central theme in the discussion. Panelists emphasized that credible data systems are essential for understanding market evolution, evaluating policy impacts, and informing MEPS updates. The discussion also explored innovative approaches to market data collection, particularly in contexts with limited public data. Examples included the use of consumer-facing applications that crowdsource price and product information, as well as automated tools that scrape online retail platforms where pricing transparency requirements exist. Panelists cautioned, however, that data collection methods must be adapted to local market conditions, as approaches that work well in some economies may be less effective in others. Across all approaches, the importance of using consistent, comparable metrics—to enable robust comparisons—was emphasized.

Questions also addressed how MEPS can be designed to better serve low-income households. Panelists noted that efficiency improvements do not necessarily imply higher costs, as market competition and technological progress often make more efficient products available at little or no additional upfront cost. This reinforces the potential for MEPS, when well designed, to improve affordability over time by reducing operating costs without increasing purchase prices.

Finally, the panel highlighted the importance of high-level political commitment and broad stakeholder engagement. Drawing on experience, speakers noted that successful MEPS programs often benefit from strong political backing supported by clear, accessible messaging that resonates with the public. Catchy, inclusive campaign narratives—combined with engagement across technical, legal, behavioral, and social disciplines—were described as effective tools for building durable support. Panelists emphasized that implementing MEPS at scale requires not only technical expertise, but also an ecosystem of skills and institutions capable of engaging industry, consumers, and policymakers alike.

Overall, the Question and Answer session reinforced the view that MEPS effectiveness depends on ambition, credible data, inclusive engagement, and adaptability to market conditions—key considerations for economies seeking to strengthen or expand their programs.

Key takeaways from Session 2

Session 2 highlighted that while MEPS are widely recognized as a powerful policy tool, their effectiveness depends on strong institutional foundations, adequate technical capacity, and

sustained political support. Presentations and discussions showed that challenges such as limited testing infrastructure, data gaps, and fragmented responsibilities are common across economies, but can be addressed through phased implementation, early stakeholder engagement, and targeted investment in compliance systems.

Member economy experiences demonstrated the value of integrating MEPS with complementary measures, including labelling, incentives, and digital monitoring tools. The session also reinforced the importance of regional cooperation—through harmonized test methods, shared technical resources, and collaborative data approaches—as a practical way to reduce costs and strengthen implementation. Overall, Session 2 underscored that successful MEPS programs balance ambition with market readiness while relying on credible enforcement and collaboration across institutions and economies.

Session 3: Advancing MEPS Implementation – Strategies, Impact, and Evaluation

Session 3 focused on how APEC economies can advance MEPS implementation to deliver measurable impacts and support continuous improvement. Building on earlier sessions, discussions examined practical strategies for MEPS design and delivery, alongside the systems required to evaluate effectiveness and inform policy refinement.

Expert presentations and member economy case studies highlighted the importance of strong institutional and legal foundations, internationally aligned test methods, and robust compliance and enforcement frameworks. Evaluation and data were emphasized as core components of effective MEPS implementation, enabling economies to assess impacts, guide regular revision cycles, and strengthen policy credibility.

Case studies from CLASP; UNEP; China; Japan; and Mexico demonstrated that while MEPS approaches vary, successful programs share common features: clear governance, transparent regulatory processes, reliable data systems, and sustained engagement with industry and consumers. Overall, the session reinforced that advancing MEPS requires integrating implementation strategies, impact assessment, and evaluation within a coherent and evolving policy ecosystem.

The panel was moderated by **Ms Andrea Arenas.** Panelists included:

Expert speakers

1. Dr Steven Zeng, China Program Director, CLASP
2. Dr Zhuolun Chen, United Nations Environment Programme (UNEP)

Member sharing presentations

1. Mexico – Ms Diana López Mendoza
2. China – Dr Dongyuan Cao
3. Japan – Dr Seonghee Kim

Expert Perspectives

Dr Steven Zeng : Technical Foundations for MEPS Development

Dr Steven Zeng opened the session with a detailed overview of the technical building blocks required for effective MEPS design and implementation. He highlighted that MEPS programs

operate at the intersection of engineering, market analysis, regulatory design, and consumer behavior and therefore require an integrated approach.

Dr Zeng outlined several essential components of a well-functioning MEPS program:

1. **Clear legislative authority and institutional mandates.** Successful MEPS depend on legal frameworks that define roles for policy development, technical standard setting, market surveillance, laboratory accreditation, and import control. Without this clarity, responsibilities become fragmented and enforcement weakens.
2. **Adoption of robust and internationally aligned test methods.** Accurate, comparable measurements are the foundation of credible MEPS. Economies were encouraged to adopt recognized international metrics—such as ISO 16358 for testing and calculating methods for seasonal performance factors for air conditioning—a strategy that reduces testing costs, facilitates global alignment, and supports manufacturers operating across borders.
3. **Product registration systems.** Dr Zeng highlighted the value of mandatory online product databases that record model information, performance ratings, and test reports. These systems support compliance monitoring, reduce administrative burden, and provide policymakers with real-time market data.
4. **Transparent compliance frameworks.** A robust compliance regime should include random check testing, penalties for non-compliance, and clear corrective pathways. A well-managed compliance system not only protects consumers but also ensures a fair market for manufacturers investing in efficient technologies.

Throughout the presentation, Dr Zeng stressed that economies should avoid “copy-paste” MEPS and instead adapt international best practices to local market conditions. Economies beginning their MEPS journey can start with simpler standards while building capacity in testing, data management, and enforcement over time.

Dr Zhuolun Chen : A Roadmap for Scaling MEPS Ambition

Dr Zhuolun Chen (UNEP) provided a structured roadmap for how APEC economies can introduce, strengthen, and align MEPS programs over time, tailored to different levels of maturity in the MEPS journey. His presentation emphasized a phased approach, beginning with foundational actions and progressing toward full market transformation and continuous improvement.

Phase 1: Foundation building. Economies were encouraged to start with market data collection, baseline assessments, and the establishment of interagency coordination mechanisms. Engagement with industry from the outset was highlighted as essential for building trust and understanding compliance realities.

Phase 2: Standard development and capacity building. This stage focuses on adopting and adapting international test methods, building or upgrading laboratory capacity, and developing draft MEPS through consultative processes. Pilot testing helps verify feasibility before standards are formalized.

Phase 3: Implementation and market transformation. Once MEPS are adopted, economies must launch complementary programs—such as energy labelling and public awareness campaigns—while simultaneously initiating compliance monitoring and enforcement actions.

Phase 4: Monitoring, evaluation, and revision. Dr Chen emphasized the importance of establishing mechanisms to periodically review MEPS based on technological progress,

market readiness, and policy objectives. Regular revision cycles keep standards relevant and maintain pressure for innovation.

Dr Chen also highlighted the importance of regional alignment and cooperation, citing ASEAN's harmonization of air conditioner standards as a model. Harmonized test methods and minimum thresholds reduce costs for manufacturers and simplify enforcement across borders.

The presentation concluded with a strong message: Given the rapid growth of cooling demand in the Asia-Pacific region, residential cooling represents both the largest challenge and biggest opportunity for MEPS, with enormous potential for energy and emissions reductions.

Member Economy Sharing

Mexico shared its experience developing a mature and highly structured MEPS framework built over several decades. The economy highlighted how early legal foundations and clearly defined institutional roles—now led by Comisión Nacional Para El Uso Eficiente de La Energia (CONUEE) (The National Commission for the Efficient Use of Energy)—have enabled the steady expansion of MEPS coverage and supported consistent policy evolution. Mexico's approach is deeply integrated: MEPS operate alongside comparative labels, incentive programs, and large-scale appliance replacement schemes that have accelerated the retirement of inefficient stock. These combined efforts have delivered significant energy savings and driven long-term technology transitions, exemplified by the substantial improvement in refrigerator efficiency over successive MEPS updates. Mexico's experience underscored the value of stable governance, predictable policy cycles, and strong coordination between regulators, testing bodies, and industry.

China presented a comprehensive regulatory ecosystem that spans buildings, appliances, and industrial equipment, supported by an extensive legal and institutional framework. The economy described how its MEPS system draws authority from multiple laws and is implemented through coordinated responsibilities across several ministries and regulatory agencies. This multi-layered structure has enabled China to scale MEPS rapidly across sectors and align them with broader priorities related to energy security, consumer protection, and industrial development. China's experience demonstrated how legal clarity, mature conformity assessment systems, and predictable regulatory processes establish a stable foundation for industry compliance and long-term policy effectiveness.

Japan offered insights into its well-known Top Runner Program, which takes a market-driven approach to improving product efficiency. Rather than setting a fixed minimum threshold, Japan requires manufacturers to meet a target performance level based on the best technology available in the market, encouraging continuous innovation and portfolio-wide improvement. The program currently covers a wide range of appliances, equipment, and building materials, supported by transparent evaluation procedures and meaningful enforcement mechanisms. Japan's experience highlighted how forward-looking regulatory design can stimulate competition, reward innovators, and deliver substantial efficiency gains over time.

Together, these member economy perspectives reinforced that there is no single MEPS pathway; instead, successful programs are those built on clear institutional foundations, transparent regulatory processes, strong compliance systems, and close engagement with industry and consumers.

Question and Answer Session

The Question and Answer session for Session 3 focused primarily on evaluation frameworks, data requirements, and how evidence can be used to improve MEPS design and long-term policy effectiveness.

Panelists discussed the importance of tailoring evaluation and modelling approaches to local market conditions. In response to questions on data priorities for strengthening MEPS analysis, it was noted that economies should focus on collecting data most relevant to their specific appliance markets, including product lifetimes, sales volumes, usage patterns, and grid emission factors. Speakers emphasized that there is no single approach to data collection; instead, economies may draw on a mix of market research, industry associations, import and customs data, and targeted surveys. Where data gaps remain, transparent assumptions and sound methodologies were identified as critical to maintaining credibility in policy analysis.

The discussion also addressed the equity and distributional impacts of MEPS, including gender considerations. Panelists highlighted that MEPS should not be designed in isolation, but rather as part of broader policy packages that include buildings, cooling strategies, and financial mechanisms. Gender-disaggregated data were recognized as an important tool for understanding how efficiency policies affect households differently, particularly in terms of affordability, comfort, and access to cooling. It was noted that inclusive consultation processes and clear communication of social benefits can strengthen both policy design and public support.

Some questions focused on how evaluation findings are used to inform policy revision. Panelists shared that in more mature programs, reporting requirements—such as mandatory sales and performance data—enable governments to track progress toward targets and assess compliance. Regular reporting cycles and review processes were described as important mechanisms for determining whether standards should be tightened, adjusted, or supported by additional measures.

Questions from participants also explored the use of sales data and verification mechanisms. It was noted that mandatory reporting requirements can be an effective way to collect sales information, even where third-party verification is limited. The discussion further touched on the growing relevance of environmental, social, and governance (ESG) considerations, with panelists noting that MEPS increasingly intersect with corporate sustainability strategies and procurement decisions, creating new incentives for industry engagement.

Overall, the Question and Answer session reinforced the view that robust evaluation systems, context-specific data strategies, and attention to social impacts are essential for strengthening MEPS over time and ensuring that policy adjustments are informed, inclusive, and effective.

Key Takeaways from Session 3

The session demonstrated that even when APEC economies might be at different stages of MEPS development, the underlying principles of success are similar: strong institutions, robust data, transparent processes, engaged stakeholders, and a commitment to continuous improvement. The tools and approaches shared in this session provide concrete pathways for economies to expand, modernize, and harmonize their MEPS programs in ways that deliver energy savings, economic benefits, and social and environmental gains.

Cross-Cutting Themes

Across all expert presentations, several cross-cutting themes emerged about what makes MEPS effective:

1. **Strong governance and institutional coordination.** MEPS require clear mandates, interagency coordination, and well-organized technical and administrative processes.
2. **Investment in technical capacity.** Accredited laboratories, trained personnel, and reliable testing infrastructure are critical for credible and enforceable standards.
3. **Integration with complementary policies.** MEPS are most effective when paired with comparative labels, consumer awareness campaigns, and targeted financial incentives.
4. **Regular evaluation and iterative revision.** Continuous improvement keeps standards aligned with technological advances and ensures sustained market transformation.
5. **Regional cooperation amplifies impact.** Shared test methods, harmonized thresholds, and information exchange can significantly reduce costs and strengthen enforcement.

Across the expert and member economy presentations, several cross-cutting themes emerged that are particularly relevant to **advancing and strengthening MEPS over time**:

1. **From institutional setup to system performance**
   Rather than focusing solely on establishing mandates and coordination, discussions emphasized how mature governance arrangements enable consistent implementation, policy credibility, and long-term market transformation.

2. **Technical capacity as a platform for scaling ambition**
   Testing infrastructure, accredited laboratories, and skilled personnel were framed not only as compliance necessities, but as enablers of more ambitious standards, shorter revision cycles, and alignment with international best practice.

3. **Integration to amplify market and consumer impact**
   Presentations highlighted how aligning MEPS with energy labelling, incentives, and awareness campaigns strengthens market signals, accelerates technology uptake, and increases the visibility of policy impacts for consumers and policymakers.

4. **Evaluation as a driver of continuous improvement**
   Regular monitoring, data collection, and evaluation were identified as central to maintaining MEPS relevance. Evidence-based review processes support timely revisions, inform complementary measures, and ensure standards keep pace with technological change.

5. **Regional cooperation to support impact and efficiency at scale**
   Cooperation on test methods, metrics, and data systems was discussed as a way to reduce costs, improve comparability of results, and enhance the effectiveness of MEPS in high-growth markets such as residential cooling.

Breakout Session: Identifying Barriers and Developing Solutions

The breakout session, moderated by **Ms Emily McQualter**, invited participants to work in facilitated groups to identify common barriers to effective MEPS and Standards & Labelling implementation, propose actionable solutions, and outline targeted areas where regional cooperation or capacity building could provide additional support. Each group was guided by one of the expert speakers as a facilitator. The discussions were highly interactive and yielded a wide range of insights reflecting the diverse contexts of APEC economies.

Photo: Examples of breakout group activity

Barriers Identified by Participants

Across the boards, groups consistently identified barriers falling into four broad categories: governance and institutional coordination, market and industry readiness, capacity and data constraints, and consumer awareness.

a. Governance and Institutional Coordination Barriers

- Fragmented institutional responsibilities and poor coordination between ministries (e.g., energy, commerce, industry).
- Challenges in rule-of-law enforcement, including insufficient legal backing for compliance or weak enforcement mechanisms.
- Prolonged approval processes or lack of long-term policy planning, affecting MEPS updates and implementation timelines.

b. Market and Industry Barriers

- Resistance or hesitation from manufacturers due to perceived cost impacts or uncertainty about market readiness.
- High upfront costs for consumers and producers, especially in price-sensitive markets.
- Economic distortions, such as cheap electricity or subsidies for inefficient products, which dampen incentives for high-efficiency purchases.
- Limited access to efficient technologies in smaller or remote markets.

c. Capacity, Testing, and Data Barriers

- Insufficient testing infrastructure, including lack of accredited labs and limited MVE (monitoring, verification, and enforcement) capacity.
- Lack of baseline data and difficulty collecting market information for standard setting.
- Resource constraints, especially for smaller agencies and developing economies.

d. Consumer Awareness and Behavioral Barriers

- Low consumer awareness of efficiency labels and MEPS.
- Difficulty communicating long-term savings, especially in markets with low energy tariffs.
- Lack of trust or understanding of labels among consumers and retailers.

Actionable Recommendations Proposed by Groups

Each group developed practical strategies to address their priority barriers. Several consistent solution pathways emerged. Below the key ones are summarized.

a. Strengthening Policy Design and Institutional Coordination

Participants recommended:

- Earlier and more systematic stakeholder engagement, especially industry consultation during MEPS development.

- Clearer definition of institutional roles and improved coordination mechanisms across ministries and agencies.
- Setting standards at “appropriate levels” to balance ambition with market readiness.

b. Enhancing Testing, Compliance, and MVE Capacity.

Groups suggested:

- Third-party certification systems and use of external labs where domestic capacity is limited.
- Capacity-building for MVE officials, including training, workshops, and peer-based learning.
- Adoption of AI-enabled or digital compliance tools, especially to track online marketplaces.

c. Improving Consumer Awareness and Market Communication.

Proposed approaches included:

- Targeted education campaigns for consumers and retailers.
- Public-facing toolkits, simple labelling explanations, and social media outreach.
- Campaigns demonstrating cost savings and linking efficiency to comfort and safety.

d. Supporting Industry Transition and Reducing Market Friction.

Groups recommended:

- Incentive programs for high-efficiency products (rebates, tax incentives, procurement).
- Harmonization of standards across economies to reduce compliance burden and expand markets.
- Phased implementation or pilot programs to test and refine MEPS requirements.

Targeted Support Needs for APEC Economies

Participants identified several areas where regional cooperation or external support could meaningfully accelerate MEPS implementation.

a. Regional Platforms and Knowledge Exchange. Several groups recommended expanding the use of:

- APEC platforms for sharing best practices, case studies, and technical guidance.
- Regional mechanisms for testing infrastructure, such as shared labs or mutual recognition of test results.
- Inter-economy expert networks, enabling technical mentorship and cooperation.

b. Tools and Technical Resources. Requests included:

- Offline toolkits for smaller economies with limited connectivity.
- Model regulations, templates, and step-by-step guidance for MEPS development.
- Access to international standards (International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC)) and support in adapting them to local conditions.

c. Financial and Capacity-Building Support. Participants stressed the need for:

- Funding for testing labs, MVE activities, and data collection.
- Training for policymakers, inspectors, and testing staff.
- Support to analyze economic impacts of MEPS and communicate results to stakeholders.

Closing Session

The workshop concluded with closing reflections from **Ms Andrea Arenas**, who underscored the strong engagement and shared momentum among APEC economies in strengthening MEPS and energy efficiency policies. She noted that the day's discussions demonstrated not only the diversity of member economy contexts, but also a clear convergence around the need for practical tools, better data, and sustained collaboration to improve appliance and equipment performance across the region.

Ms Arenas highlighted several emerging trends that will shape the future of MEPS, including the increasing use of climate-relevant metrics—especially for cooling—greater interest in eco-design approaches, and the growing role of digital solutions such as product registries and AI-assisted compliance checks. Strengthening monitoring and evaluation practices was identified as an area of rising importance, as economies look for more robust ways to track product performance, assess policy impacts, and guide future MEPS updates.

She also reflected on the breakout discussions, noting that participants identified many actionable steps that economies can take in the near term, from improving testing capacity to enhancing consumer engagement and prioritizing high-impact product categories. Regional cooperation emerged as a recurring theme, with economies recognizing the benefits of shared resources, harmonized approaches, and continued peer learning.

In closing, Ms Arenas thanked all participants for their contributions and reaffirmed APERC's commitment to supporting economies in advancing their MEPS programs. She emphasized that the insights gathered could inform future capacity-building efforts and help sustain the collaborative spirit demonstrated throughout the workshop.

In her closing remarks, **Ms Elvira Torres Gelindon** outlined the next steps following the workshop and emphasized the importance of sustaining the momentum generated during the day's discussions. She encouraged participants to continue reflecting on the best practices and policy insights that could be brought back to domestic institutions. Looking ahead to Phase 2 of the capacity-building program, she invited economies to propose potential themes for future workshops, noting that member-driven priorities would guide the design of upcoming activities. Ms Gelindon also highlighted the role of the Workshop Summary Report—to be published on the APEC and APERC websites. She reaffirmed that continued exchange of experiences, challenges, and opportunities among economies will be essential for strengthening MEPS implementation across the region.

Dr Meng Liu, Chair of the APEC EGEEC, closed the session by acknowledging the strong participation of member economies and the valuable contributions of experts throughout the workshop. He emphasized that advancing MEPS requires not only sound technical design, but also deeper collaboration across agencies, sectors, and economies. Dr Liu noted that the workshop demonstrated the APEC community's shared commitment to improving energy efficiency and its willingness to learn from one another's experiences. He reiterated EGEEC's support for ongoing capacity-building initiatives and encouraged economies to continue engaging actively as the region moves toward more ambitious, coordinated, and future-ready efficiency policies. He thanked APERC, the expert presenters, and all participants for their engagement, expressing confidence that the relationships and insights formed during the workshop would support meaningful progress in the years ahead.

Key Outcomes and Recommendations

Key Outcomes

The Capacity Building Workshop on Energy Efficiency and Conservation Policy: "Members' Journey with MEPS" provided APEC economies with an opportunity to take stock of their MEPS programs, share diverse implementation approaches, and explore the institutional, technical, and market foundations that support effective standards. Across discussions, participants emphasized that MEPS are not just regulatory instruments, but central components of broader strategies to improve energy performance, support innovation, and contribute to long-term decarbonization. Key outcomes from the workshop include:

MEPS as a core driver of system-level efficiency gains

Participants highlighted MEPS as one of the most scalable policy tools for governments. They noted the ability of well-designed MEPS to deliver measurable energy savings, encourage innovation, accelerate the turnover of inefficient stock, and reduce system-wide energy demand—particularly in high-growth sectors such as residential cooling. MEPS were recognized as contributing to energy security, affordability, and climate mitigation.

MEPS as part of a broader policy ecosystem

Discussions emphasized that MEPS are most effective when integrated within a coherent policy ecosystem. Participants stressed the importance of clear governance structures, predictable revision cycles, and well-defined roles across agencies, supported by legal clarity, robust conformity assessment systems, and alignment with complementary instruments such as labelling and incentives.

1. **Evidence-based standard setting and market analysis**
   Participants identified data-driven approaches as essential for designing effective MEPS. Presentations and discussions highlighted the value of product performance data, sales volumes, stock turnover, and consumer behavior in informing policy decisions. Cost-benefit analyses, modelling, and evaluations were recognized as tools that enhance the credibility and strategic relevance of MEPS.

2. **Regional alignment and shared technical resources**
   Economies acknowledged the potential benefits of harmonizing test methods, performance metrics, and technical resources where appropriate. Shared product databases, test reports, and information exchange were recognized as mechanisms to reduce administrative and compliance burdens while supporting effective implementation in rapidly expanding markets. A modular approach to alignment was seen as a way to accommodate diverse markets while enabling interoperability.

3. **Role of industry, retail, and consumer interfaces**
   Participants noted the critical influence of manufacturers, distributors, retailers, online marketplaces, and consumers on MEPS effectiveness. Discussions highlighted approaches for more active engagement, including voluntary partnerships, co-design of compliance pathways, industry data-sharing, and targeted awareness campaigns.

4. **Interest in peer learning, technical exchange, and practical tools**
   Economies expressed strong interest in continued peer-to-peer engagement on topics such as Monitoring, Verification, and Enforcement (MVE) systems, adoption of test methods, digital compliance tools, and strategies for cooling efficiency. Participants

emphasized the value of sharing experiences across economies at different stages of MEPS maturity to support capacity development and avoid common implementation challenges.

Recommendations

APEC economies are at different stages of MEPS development, but the workshop identified clear, actionable priorities for strengthening MEPS implementation across the region. The recommendations below provide key guidance tailored to economies at varying levels of MEPS maturity and highlight cross-cutting areas where collaboration, capacity building, and evidence-based policy design can accelerate progress.

Recommendations for Economies Developing Initial MEPS Programs

Economies in the early stages of MEPS face specific challenges—limited data, constrained institutional capacity, and early-stage engagement with industry and testing systems. The workshop highlighted foundational actions to support a stable launch of new MEPS frameworks:

- **Use existing regulations and international test methods as a starting point**
  Adopt established regulations for lighting, refrigerators, and air conditioners, and align with internationally recognized test methods. This reduces design complexity, shortens timelines, and supports early alignment with global best practices.
- **Establish institutional coordination mechanisms before implementation**
  Define clear mandates for MEPS authorities, standards bodies, laboratories, customs agencies, and enforcement units. Create interagency working groups with regular technical exchanges and shared data protocols.
- **Prioritize testing infrastructure and laboratory capacity**
  Invest in testing facilities, pursue accreditation for priority methods, and explore shared or regional testing options where domestic capacity is limited.
- **Introduce MEPS and labelling as integrated policies**
  Implement MEPS alongside comparative labels to help consumers understand efficiency and drive market uptake of high-performance products. Plan for label updates to maintain relevance as technologies evolve.
- **Plan evaluation before implementation begins**
  Establish product registration, sales data collection, compliance tracking, and scheduled review cycles from the outset to support transparency and informed decision-making.

Recommendations for Economies Scaling Up Existing MEPS Programs

Economies with established MEPS face challenges in maintaining ambition, ensuring compliance, and integrating MEPS into broader energy and climate strategies:

- **Develop technology roadmaps and structured MEPS revision cycles**
  Use regular, predictable revision cycles supported by market analysis and technology projections. Roadmaps help sequence MEPS updates strategically and anticipate emerging technologies.
- **Strengthen market surveillance, check testing, and enforcement**
  Allocate sustained resources to risk-based inspections, random check testing, import surveillance, and transparent corrective actions to maintain policy credibility.
- **Quantify and communicate co-benefits to build policy support**
  MEPS contribute to affordability, health, resilience, and decarbonization. Develop

frameworks to quantify and communicate these benefits to policymakers, industry, and the public.

- **Pursue regional alignment to reduce costs and support industry** Harmonize key elements of MEPS—such as test methods or performance metrics—where feasible. Engage in bilateral or subregional alignment and explore shared information platforms and product databases.
- **Incorporate equity and distributional considerations** Include inclusive consultation and clear communication of social benefits to strengthen policy design and public support. Ensure MEPS are part of broader policy packages.

Cross-Cutting Priorities for All APEC Economies

Regardless of MEPS maturity, all economies share priorities that can accelerate progress:

- **Prioritize residential cooling as a high-impact product category** Strengthening MEPS for air conditioners, fans, and refrigerators addresses rising cooling demand, improving efficiency and reducing emissions.
- **Leverage external technical support** Tap into international expertise on regulatory design, cost-benefit analysis, test method adoption, and compliance system development.
- **Invest in data and digital systems** Strengthen model registration databases, market monitoring tools, and digital compliance solutions to enable evidence-based policymaking, targeted enforcement, and credible revision cycles.

Recommendations for the Development of Future Workshops

The workshop demonstrated the value of structured, technical exchange across APEC economies:

- Shared tools, aligned methodologies, and learning from institutional experiences were highlighted as highly beneficial.
- Future workshops could focus on high-impact areas such as cooling efficiency, digital compliance tools, advanced evaluation methods, and integrating MEPS into decarbonization strategies.
- Hands-on exercises, peer mentoring, and targeted capacity-building modules for laboratories, market surveillance authorities, and policy evaluation teams could enhance practical skill development.
- Economies expressed interest in sustained engagement between workshops through technical clinics, virtual training, and shared regional resources such as model regulations, data templates, and MVE toolkits.

Policy Ecosystem Insights

Across all MEPS maturity levels, the workshop emphasized that MEPS are most effective when integrated into a coherent, evolving policy ecosystem, including:

- Strong governance
- Transparent and predictable regulatory processes
- Robust data systems
- Credible conformity assessment
- Sustained engagement with industry and consumers

Strengthening this ecosystem through targeted investments, strategic planning, and regional cooperation is key to maximizing energy savings, affordability, resilience, and long-term decarbonization. Building on the workshop momentum, economies are positioned to refine frameworks, pursue deeper regional alignment, and scale up ambition in response to technological opportunities and growing energy demands.

Conclusions

The *"Members' Journey with MEPS"* workshop provided an important opportunity for APEC economies to reflect on progress, share concrete experiences, and collaboratively identify the next steps needed to strengthen MEPS programs across the region. Discussions throughout the day revealed both the diversity of member economy pathways and the clear convergence around common priorities: improving institutional readiness, strengthening data and compliance systems, engaging industry more effectively, and deepening regional cooperation on standards and testing. The workshop underscored that MEPS continue to play a pivotal role in enabling energy efficiency, enhancing energy security, and supporting long-term climate objectives.

As economies work to refine and expand their MEPS frameworks, the insights generated through this workshop will directly contribute to more coherent, credible, and ambitious efficiency policies. The collective expertise shared by participants reflects the strength of the APEC community and its commitment to practical, evidence-based solutions. Continued collaboration—through follow-up workshops, peer learning activities, and joint initiatives—will be essential to advancing MEPS implementation and ensuring that the region is well equipped to meet rising energy demands and evolving technological opportunities.

References

APERC, 2022. *APEC Energy Demand and Supply Outlook 8th Edition*, 2022, APERC, Japan. https://aperc.or.jp/reports/outlook.php.

Appendices

Appendix I: Workshop Agenda

Agenda

Time	Agenda Item/Speakers	Comments/ Session Leader
8:00 – 9:00	Registration and informal networking	
9:00 – 9:30	**Opening Session**	Moderator: APEC
9:00 – 9:05	**Welcoming Remarks** Mr Youngsun You, Director General Korea Energy Agency	
9:05 – 9:10	**Opening Remarks** Mr Mitsuhito Takada, Vice President, APERC	
9:10 – 9:15	**Group photo**	
9:15 – 9:30	**Workshop Overview and Introduction** *Workshop objective and overview* (5 mins) Ms Elvira Torres Gelindon, Research Fellow, APERC *Introduction to energy intensity in the APEC Region* Ms Yasmin Fouladi, Researcher, APERC	
9:30 – 10:45	**Sessions 1a and 1b**	Moderator: Ms Andrea Arenas, Consultant, Ribos
9:30 – 10:00	**Session 1a: Setting the Context** *The Role of MEPS in Advancing Energy Efficiency in APEC Economies* Ms Emily McQualter, Consultant, International Copper Association/Ribos	
10:00 – 10:20	**Session 1b: Host Economy Case Study** *Best Practices and Lessons learned from implementing MEPS in Korea* Mr Bongjoo Shin, Program Director, Korea Energy Economics Institute	
10:20 – 10:30	**Q&A and reflections**	
10:30 – 10:45	**Coffee Break**	
10:45 – 12:30	**Session 2: Overcoming Challenges and Leveraging Success Factors in MEPS Implementation – Presentations and Interactive discussion**	Moderator: Ms Emily McQualter, Consultant, International Copper Association/ Ribos
	In this session, expert speakers will explore common challenges economies face in implementing MEPS, along with the key factors that support successful adoption and	

	enforcement. Presentations will highlight practical experiences and lessons learned, followed by an interactive discussion. Expert speakers and panellists: 1) Dr Kevin Lane, Programme Manager, 4E Technology Collaboration Programme 2) Mr Leonardo Beltrán Rodriguez, Government Advisor, former Deputy Secretary for Energy Planning and Transition, Secretariat of Energy, Mexico 3) Dr Steven Coyne, International Lighting Expert and Managing Director of LightNaturally, Australia Member sharing presentations: 1. Malaysia – Mr Norazrin Rupadi 2. the Philippines – Ms Dorella Maye Perlas 3. Chinese Taipei – Mr Ting-Jui Sun	
12:30– 13:30	**Networking lunch**	
13:30 – 15:00	**Session 3: Advancing MEPS Implementation: Strategies, Impact, and Evaluation**	Moderator: Ms Andrea Arenas, Consultant, Ribos
	This session will explore strategies to advance MEPS implementation, including pathways for programme development, approaches to measuring impact, and evaluation frameworks. Speakers will share lessons learned and highlight priorities for effective MEPS design and assessment. The session will begin with presentations followed by an interactive discussion. Expert speakers and panellists: 1) Dr Steven Zeng, China Program Director, CLASP 2) Dr Zhuolun Chen, UNEP Member sharing presentations: 1. Mexico – Ms Diana López Mendoza 2. China – Dr Dongyuan Cao 3. Japan – Dr Seonghee Kim	

15:00 – 15:15	**Coffee Break**	
15:15 – 16:45	**Breakout Session**	Moderator: Ms Emily McQualter, Consultant, International Copper Association/ Ribos
	This interactive session will guide participants to identify the key barriers to MEPS implementation in their economies and collaboratively develop practical solutions. Facilitators will help groups move from problem identification to actionable recommendations, ensuring discussions are concrete and documented for the workshop summary. Outputs will include a ranked list of top barriers, practical strategies to overcome them, and suggestions for targeted support, including potential tools, partnerships, and "quick wins".	Facilitated by session experts
16:45 -17:00	**Closing Session**	Moderator Ms Yasmin Fouladi, Researcher, APERC
16:45 – 16:55	**Reflections and Next Steps** *Reflections* Ms Andrea Arenas, Consultant, Ribos *Next steps* Ms Elvira Torres Gelindon, Research Fellow APERC	
16:55 – 17:00	**Closing Remarks** Dr Meng Liu, EGEEC Chair	

Appendix II: Speaker Biographies

	**Mr Youngsun You** brings more than 30 years of professional experience to his current position as Director General of the International Cooperation Division at Korea Energy Agency (KEA). He previously served as Director General of the Solar Power Business Division and has held various leadership roles since joining KEA in 1994, including renewable energy supply, ODA-based international cooperation, local government engagement, and public communication. Mr You holds a B.A. in Journalism and Communication from Korea University in Seoul, Republic of Korea.
	**Mr Mitsuhito Takada** was appointed Vice President of APERC in 2025. Prior to this, he spent about 10 years working in several energy-related companies. He started in 1984 and served for about 30 years at the Ministry of Economy, Trade and Industry (METI) in Japan. At METI, he was involved in a wide range of policy areas, including energy, SMEs, regional development, and information security. He contributed to the establishment of APERC in the mid-1990s. He was posted to Myanmar, Germany, and Viet Nam during his tenure. He holds a bachelor's degree in economics from the University of Tokyo.
	**Ms Elvira Torres Gelindon** is a Research Fellow, APERC's resident researcher assigned to the Energy Statistics and Training Office (ESTO) and the focal person for the *Capability Workshop on Energy Efficiency and Conservation Policy* project. She participates in major APERC projects, such as the annual APEC Energy Overview and APEC cooperative projects that would assist members in achieving APEC energy intensity reduction goals. She is in charge of collecting energy efficiency indicators, analysing the APEC energy intensity goal, and takes part in the APEC Energy Statistics publication. She also serves as one of the lecturers/ trainers of energy statistics and energy modelling training that ESTO regularly conducts. Prior to APERC, she was in the government for 27 years, 20 of which were as a Science Research Specialist in the Philippines' Department of Energy. She holds a bachelor's degree in Mathematics from Pamantasan ng Lungsod ng Maynila.
	**Ms Yasmin Fouladi** is a researcher at the Asia Pacific Energy Research Centre (APERC). At APERC, she works on research projects to assist Asia-Pacific Economic Cooperation (APEC) members achieve their energy and climate goals. Prior to joining APERC, Ms Fouladi worked for the U.S. Department of Energy (DOE) in various roles, such as a Senior Asia Researcher and as a DOE Attaché abroad. Before DOE, Ms Fouladi gained experience in U.S.-Asia relations at various organizations, such as The Asia Group (TAG), the U.S. Department of State, the Carnegie-

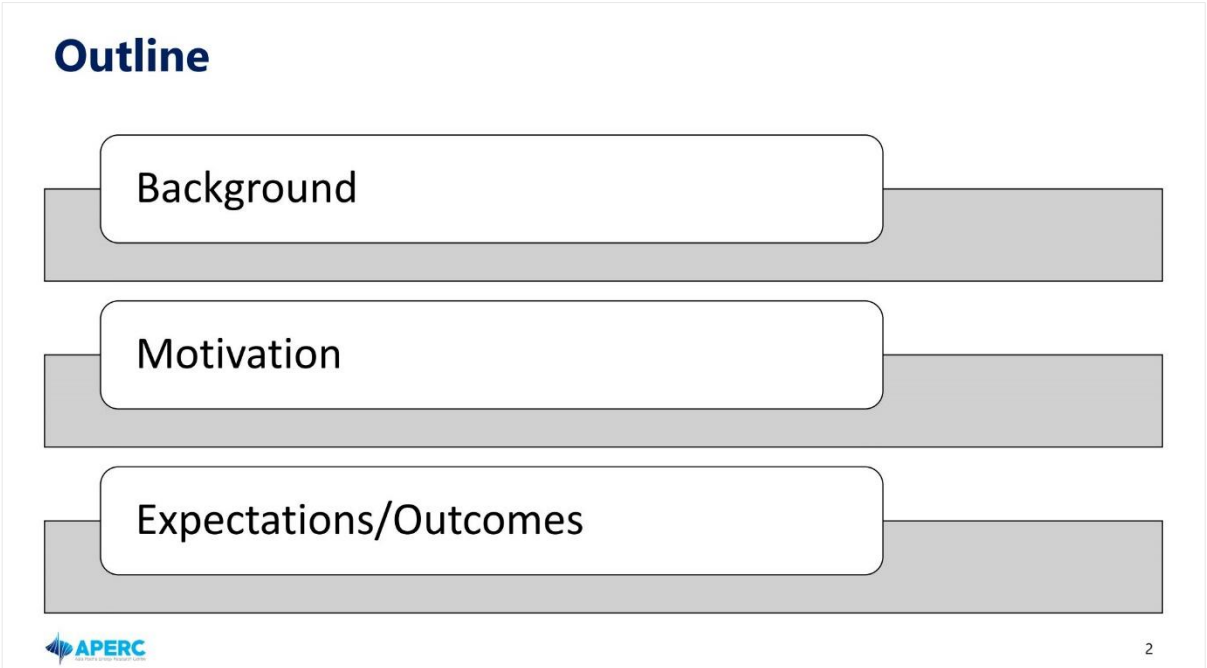
	Tsinghua Center for Global Policy, the National Committee on United States-China Relations (NCUSCR), and the US-Asia Institute (USAI). Ms Fouladi has a Bachelor's degree from Cornell University and a Master's degree from Georgetown University's School of Foreign Service.
	**Ms Emily McQualter** has over 10 years of international experience in technical and managerial roles in energy efficiency, with a focus on appliances, lighting and equipment. She currently leads the International Copper Association's energy efficiency portfolio, overseeing projects across Latin America and Africa. Previously, Emily worked with the International Energy Agency's Energy Efficiency in Emerging Economies (E4) programme, managing initiatives in Southeast Asia. She has also worked in Thailand and across Southeast Asia with the United Nations Environment Programme, Regional Office for Asia and the Pacific, supporting energy efficiency programmes. Emily holds a BSc and a Master's in Natural Resource Management from the University of Melbourne.
	**Mr Bongjoo Shin** is currently a Program Director at the Korea Institute of Energy Technology Evaluation and Planning. He conducted energy audits for the energy-intensive industrial sector and managed demand-side management (DSM) for over 10 years during his tenure at the Korea Energy Agency. He later transitioned from KEA to KETEP. Over the past 15 years, he has planned, evaluated, and managed various energy R&D projects, including heat pumps, energy storage systems (ESS), oil and gas exploration and production (E&P), resource recycling, and carbon capture, utilization, and storage (CCUS). Additionally, he is the Korean delegate to the heat pump technology collaboration program within the International Energy Agency (IEA). He also serves as a technical advisor to the Korea Institute for Advancement of Technology's ODA program and is a member of the rechargeable battery safety committee at the Ministry of Trade, Industry, and Energy. Mr. Shin holds a Master's degree in Renewable Energy Engineering and a Bachelor's degree in Chemical Engineering from Hanyang University in Seoul, Korea. He also possesses a government certification in heating, ventilation, and air-conditioning (HVAC), focusing on building systems.

	**Dr Kevin Lane** has over 30 years' international experience in energy policy, especially related to energy efficiency and clean energy technologies. His experience includes management of government programmes, research, project and policy appraisal and evaluation. He has supported the development of efficient appliance policy in multiple economies (including Australia; China; EU; the United Kingdom; the United States; and Viet Nam). He has been an academic at Oxford University, a programme manager for the UK government, a senior programme manager at the International Energy Agency, and is the head of Secretariat of the IEA Technology Collaboration Programme on Energy Efficient End-Use Equipment (4E).
	**Mr Leonardo Beltrán** is an energy expert with over 20 years of experience in energy policy, sustainability, and international development. He chairs the Advisory Group of the Climate Investment Funds' Evaluation and Learning Initiative and serves on several boards and advisory bodies, including the Por México Foundation, the World Bank's ESMAP, and the World Economic Forum's Energy Transition and Clean Hydrogen initiatives. He is a non-resident senior fellow with the Inter-American Dialogue, Columbia University's Center on Global Energy Policy, and the Institute of the Americas. He also holds fellowships with the University of Calgary and COMEXI, and contributes to organizations such as OLADE and IPS News. From 2005 to 2018, Mr. Beltrán held senior roles in Mexico's Ministry of Energy, including Deputy Secretary for Planning and Energy Transition. He has advised institutions such as SEforALL, the World Bank, OECD, UNIDO, and the IDB, and previously consulted for BBVA Bancomer. He holds a Master in Public Administration in International Development from Harvard Kennedy School, a B.Sc. in Economics from ITAM, and studied Law at UNAM.
	**Dr Steve Coyne** is a physicist who has specialized in photometry, lighting, and daylighting. For 20 years as Director of Light Naturally, he has continued to provide independent expert advice to the Law Courts and the private sector as well as supporting Governments, United Nations, and other NGOs in the development and implementation of energy efficient lighting regulations and harmonisation initiatives in over 60 economies. He has been Australia's representative expert on the Smart Sustainability in Lighting and Controls Platform in the Energy Efficient End-use Equipment program within the International Energy Agency (IEA 4E SSLC) since 2009. Steve is involved in working groups drafting standards related to lighting for IEC and CIE. Previously, during an 18-year academic career, Steve also established and lectured in post graduate lighting courses in Australia and Hong Kong, China. He has been Chair of the Australian Council of Built Environment Design Professions, President of IES ANZ and is currently President of CIE Australia.

	**Dr Steven Zeng** is the director of the China program for CLASP. CLASP is an international environmental NGO dedicated to improving the energy and environmental performance of the appliances & equipment we use every day, accelerating our transition to a more sustainable world. Dr. Zeng manages CLASP's China program and collaborates with CLASP team members and a wide network of international partners and program stakeholders on the design and implementation of impactful energy efficiency initiatives for appliances and industrial equipment, both in China and globally. In the past 5 years, Dr. Zeng and his team have conducted policy and technical research in support of energy efficiency standards improvements for over 15 energy-consuming products covering cooling, heating, lighting, kitchen appliances, and industry equipment. Dr. Zeng has engaged in energy efficiency and climate-related work for over 20 years. Dr. Zeng holds a Ph.D. in energy and environment engineering and an MSc degree from Lund University in Sweden.
	**Dr Zhuolun Chen** is a climate scientist and urban sustainability expert with over 20+ years of international experiences in climate change mitigation and adaptation, urban resilience, and sustainable cooling solutions. He holds a Ph.D. in Building Science and Architectural Engineering and has conducted extensive research on urban climate, extreme heat risk assessment, and energy efficiency in the built environment. He has published over 30 peer-reviewed journal papers, over 40 peer-reviewed conference papers, 2 academic research books. He is now working as senior advisor in building and district energy systems and green finance, in UNEP Copenhagen Climate Center. He is a LEED Accredited Professional (LEED AP) certified by the U.S. Green Building Council, a Certified Measurement & Verification Professional (CMVP) in energy systems by EVO, and a Chartered Financial Analyst (CFA) with additional chartered specializing in Environmental, Social, and Governance (ESG) investments. Dr. Chen has been selected and appointed as a technical expert on the Global Goal on Adaptation under the UAE-Belem Work Program and nominated as a technical expert for Biennial Transparency Reports (BTR) and Article 6 transparency reports under the UNFCCC's Roster of Experts. His work has been instrumental in bridging scientific research, policy recommendations, and implementation strategies for sustainable urban development.

	**Dr Meng Liu, Ph.D**., is an associate professor. He joined the China National Institute of Standardization in 2008 and has over 15 years of experience in energy conservation and renewable energy policies and standards. He is the APEC EGEEC chair, IEA 4E (Energy Efficient End-use Equipment) Executive Council member, the committee manager of the ISO Subcommittee on Solar Energy System Performance (ISO/TC180/SC4) organizing the development of ISO standards on solar energy, the Chair Advisory Group member of the ISO technical committee on Energy Management and Energy Savings (ISO/TC301) , the convenor of ISO/TC301/WG19 on Integrated District Energy System, and he also worked as the convenor in leading the development of international standard of ISO 17741:2016 General technical rules for measurement, calculation and verification of energy savings of projects. He led the development of over 30 Chinese energy efficiency standards, energy management system, energy system optimization, district energy, solar energy, energy savings evaluation, etc. He is the co-author of the Annual White Paper for Energy Efficiency of Appliances and Equipment in China.

Opening session



Background

- A project funded by the APEC Support Fund.. It's a one-day in-person workshop intended to be held annually in the margins of an EGEEC meeting. Each workshop will have a different theme and different objectives
- Developed to address the increasing need of the members to enhance their capacity in policy formulation, especially in addressing energy efficiency and conservation issues. Generally, the project aims to:
  - Identifying common challenges to energy efficiency of the member economies;
  - Sharing best practices of the selected case, or theme and;
  - Proposing new ideas to improve the energy efficiency of the member economies.

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Motivation

"In their Darwin Declaration of 29 May 2007, APEC Energy Ministers recognised the importance of pursuing policies and technologies to promote the development of cleaner energy and the improvement of energy efficiency and conservation."

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- PREE was endorsed in 2008 at EWG35
  - CEEDS in 2010-2013
  - EEP Workshop in 2016-2024
- There were 18 peer reviews on energy efficiency since 2009
  - 11 PREEs
  - 7 Follow-up PREEs
- APERC completed **13 Phases** of the project (2009-2024)

- ❖ *Increasing race to energy transition: various pathways, choose the best pathways towards decarbonization;*
- ❖ *Policy capacities of the APEC members must be significantly improved, given each economy's different economic and energy situations.*
- ❖ *PREE has already achieved its objectives. Going forward, needs a project that will benefit a wider number of members.*
  - *Peer reviews indicated a strong need for policy capacity building*

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Expectations/Outcomes

❖ **Workshop (MEPS) objectives**

- Enhanced participants' capacity in developing sound EE&C (MEPS) policies.
- Member participants are expected to be highly involved in conceptualizing MEPS policies that are appropriate to their respective economies.
- Member participants would be able to identify MEPS policy gaps in their respective economies.

❖ **Methodology**

- *Pre-workshop survey*
- *Host presentation* – provides MEPS experience
- *Experts* – assess the members' journey on MEPS recommendations
- *Members' sharing* – share experiences, challenges, opportunities
- *Break-out session* - guide participants to identify the key barriers to MEPS implementation in their economies and collaboratively develop practical solutions.

❖ **Workshop Summary Report**

- Serves as a reference in developing EE&C (MEPS) policies.
- Compiles all the MEPS best practices, challenges and opportunities shared by the member participants [that can be implemented in the medium (5 to 10 years) to long-term (10years above).]

5

Asia-Pacific Economic Cooperation

Thank you.

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Asia-Pacific Economic Cooperation

APERC

Introduction to Energy Intensity in the APEC Region

Capacity Building Workshop for Energy Efficiency and Conservation Policy
18 November 2025 – Seoul, Korea

Yasmin Fouladi, Researcher, APERC

Outline

APEC's energy intensity goal

Progress towards goal

Impact of MEPS on energy intensity

APEC's energy intensity goal

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APEC's Energy Intensity Goal

To reduce APEC's aggregate energy intensity by 45 percent by 2035 compared to 2005 levels

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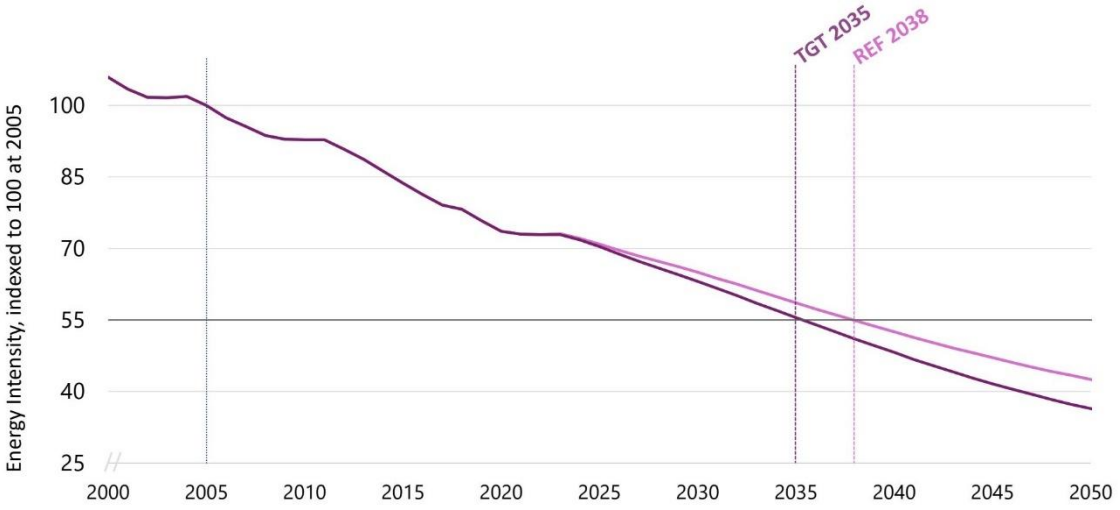
Progress towards goal

Declines in APEC's final energy intensity appear to be slowing

Annual change in APEC final energy intensity, 2006-2023

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2005-22
Change in Final Energy Consumption (FEC)	2.5%	3.5%	0.8%	-1.0%	5.6%	4.2%	1.9%	1.4%	0.8%	0.6%	0.5%	1.2%	2.8%	0.2%	-4.2%	4.6%	2.3%	2.6%	**36.1%**
Change in GDP (PPP, constant 2021 US dollars)	5.3%	5.5%	3.0%	-0.3%	5.7%	4.2%	4.2%	3.9%	3.8%	3.7%	3.4%	4.0%	4.1%	3.4%	-1.3%	6.2%	2.5%	3.8%	**92.0%**
Change in final energy consumption intensity	-2.7%	-1.9%	-2.1%	-0.7%	-0.1%	0.0%	-2.2%	-2.4%	-2.9%	-2.9%	-2.8%	-2.8%	-1.3%	-3.1%	-3.0%	-1.5%	-0.2%	-1.2%	**-29.2%**

In 9th edition of the Outlook, APEC is projected to reach the goal in TGT, but not in REF



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Impact of MEPS on energy intensity

APERC

8

Impacts of introducing MEPS

- The relationship between **Minimum Energy Performance Standards (MEPS)** and **energy intensity** is strong and direct — MEPS are one of the key policy tools that reduce energy intensity across sectors.
- MEPS are designed to remove inefficient equipment from the market.
- MEPS are not static regulations, and regular updates allow them to keep pace with technological advancements and evolving market conditions.
- In economies where MEPS are implemented alongside energy labeling programs, appliance energy consumption has typically decreased by approximately 30%.
- Energy efficiency standards and labelling (EES&L) programs for appliances and equipment now operate in more than 120 economies globally.
- Implementing EES&L has delivered an approximately 15% reduction in domestic electricity consumption in APEC economies with long-standing programs.

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Source: IEA 9

APEC
Asia-Pacific
Economic Cooperation

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Thank you for your kind attention.

https://aperc.or.jp

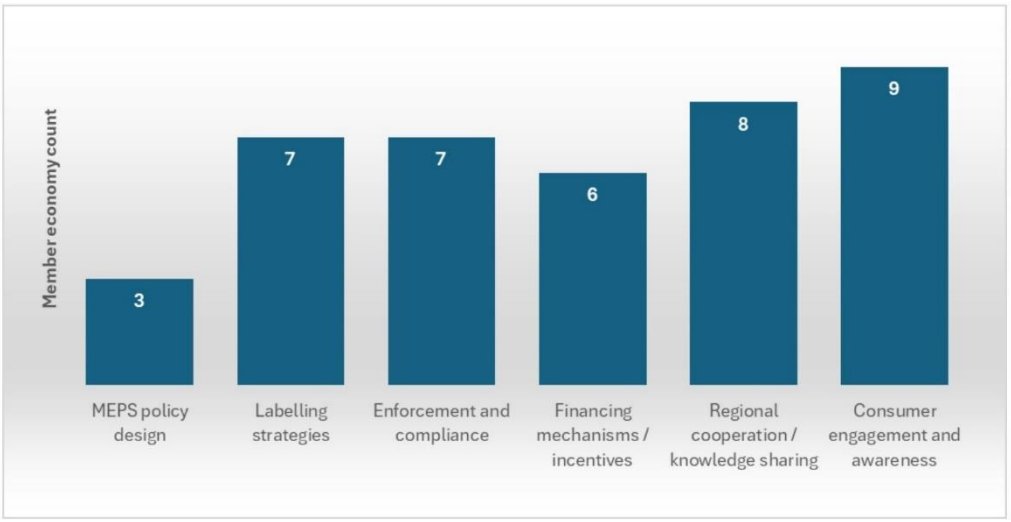
Session 1

The Role of Policy in Advancing Energy Efficiency in APEC Economies

Emily McQualter

RIBOS

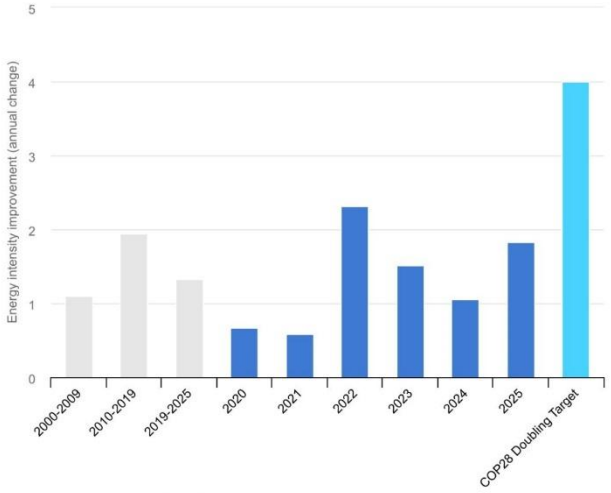
What topics do participants want to see discussed at the workshop



Source: APEC workshop survey results

Global Energy efficiency progress needs to double to meet Net Zero

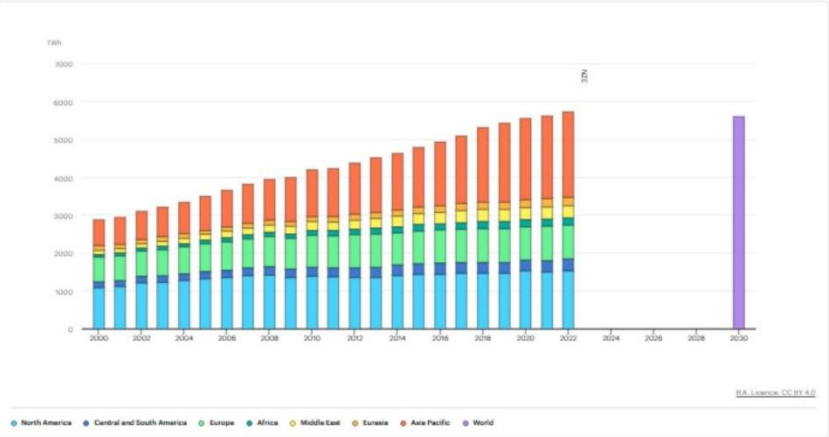
Global annual improvement in primary energy intensity, 2010-2025e, and COP28 global doubling target



IEA (2025), Global annual improvement in primary energy intensity, 2010-2025e, and COP28 global doubling target, IEA, Paris https://www.iea.org/data-and-statistics/charts/global-annual-improvement-in-primary-energy-intensity-2010-2025e-and-cop28-global-doubling-target, Licence: CC BY 4.0

Importance of appliances and equipment in meeting target

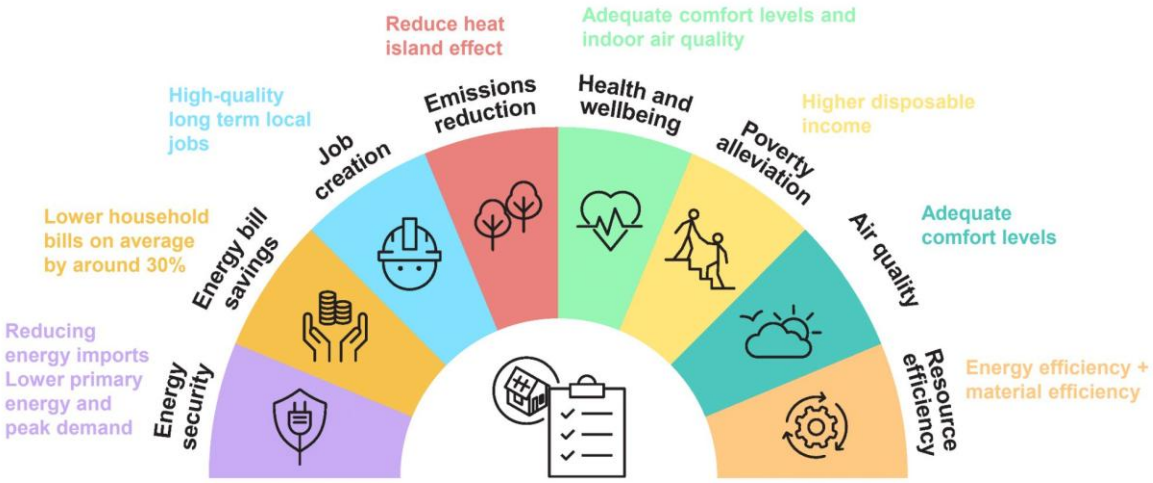
Electricity Consumption from Appliances and Equipment 2000-2021 and in the IEA's Net Zero Scenario

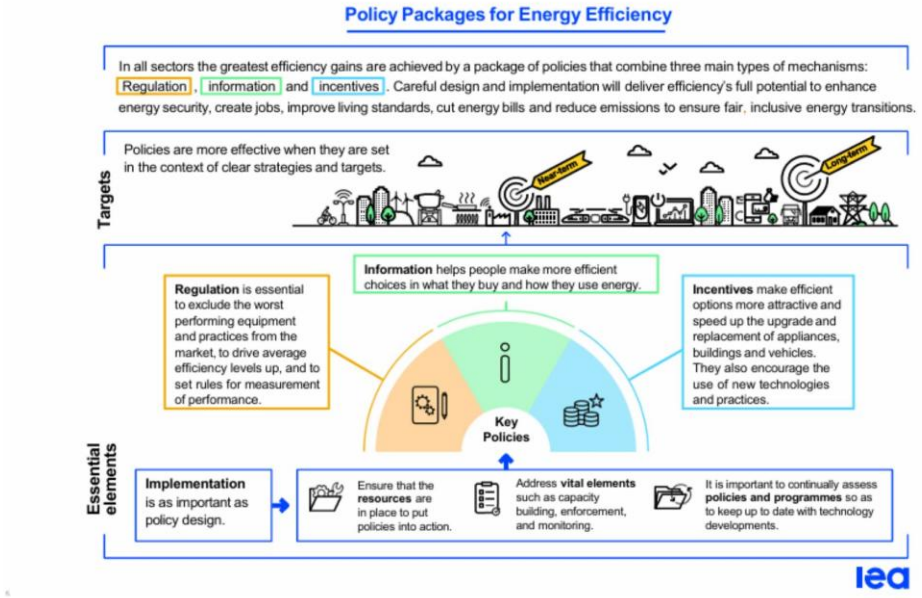


IEA (2023), Electricity consumption by appliances and equipment in the Net Zero Scenario, 2000-2030, IEA, Paris https://www.iea.org/data-and-statistics/charts/electricity-consumption-by-appliances-and-equipment-in-the-net-zero-scenario-2000-2030-2, Licence: CC BY 4.0

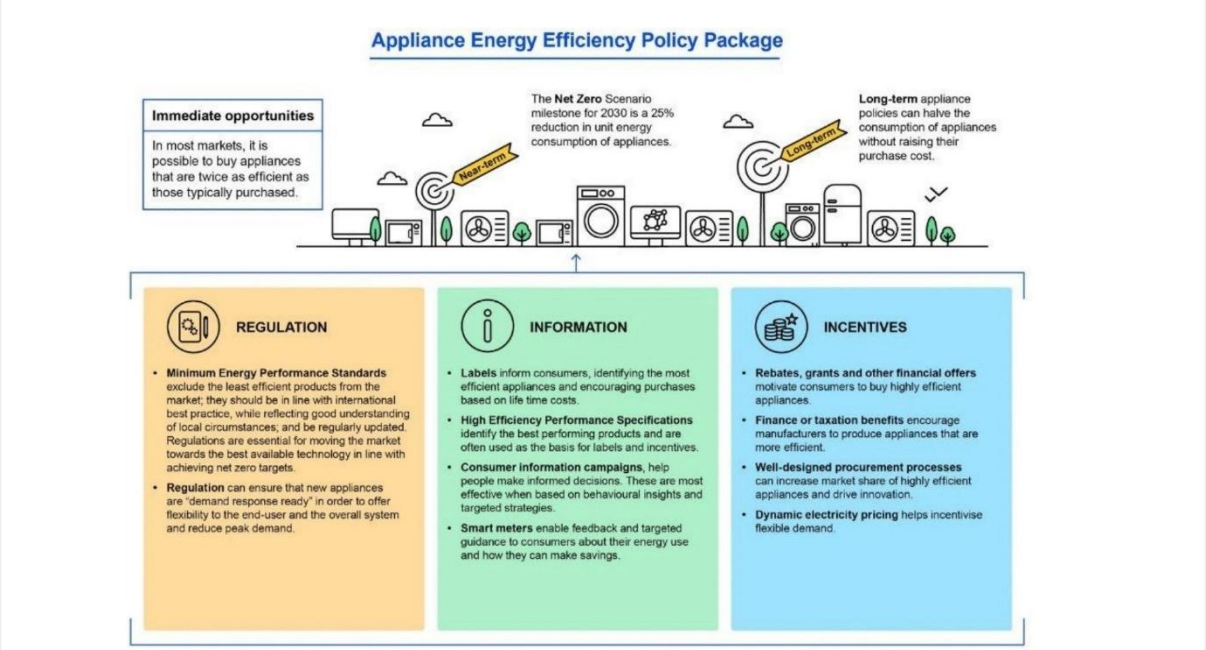
Multiple Benefits of Energy Efficiency

Appliance energy efficiency offers numerous economic, social and environmental benefits





Source: The Energy Efficiency Policy Package – Energy Efficiency Policy Toolkit 2025 – Analysis - IEA



Source: https://www.iea.org/reports/energy-efficiency-policy-toolkit-2025/appliance

Appliance Efficiency Policy Package - Regulation

Regulation

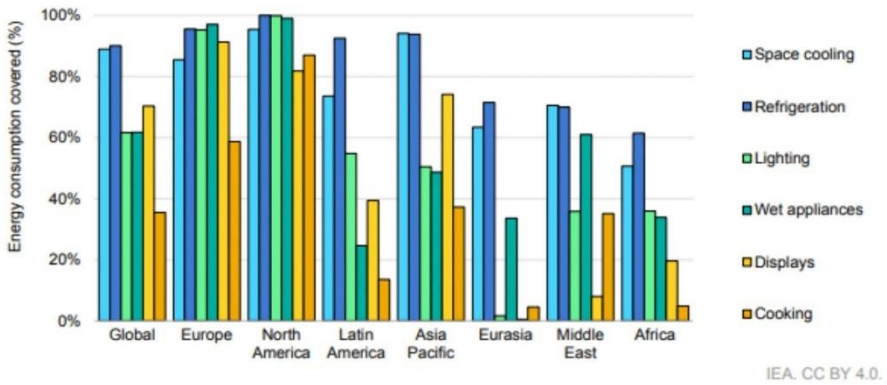
- **Minimum Energy Performance Standards** exclude the least efficient products from the market. They should be in line with international best practices, while reflecting local circumstances; and be regularly updated. Regulations are essential for moving the market towards the best available technology in line with achieving net zero targets.
- **Regulation** can ensure that new appliances are demand response ready in order to offer flexibility to the end-user and the overall system, and reduce peak demand.
- **Regulating the import and performance of used appliances** appliances can help avoid inefficient appliances entering the market.

- A **Minimum Energy Performance Standard (MEPS)** is a specification, containing a number of performance requirements for an energy-using device, that effectively limits the maximum amount of energy that may be consumed by a product in performing a specified task.
- Minimum Energy Performance Standards (MEPS) are a **highly cost-effective** way to improve equipment efficiency.
- Standards should be accompanied by **mandatory labelling,** and targeted **incentives** to make, sell and install the most efficient appliances.
- They suppose that energy consumption **measurement protocols** exist and are used by various stakeholders.

Source: https://www.iea.org/reports/energy-efficiency-policy-toolkit-2025/appliance

Globally policy coverage varies widely across regions

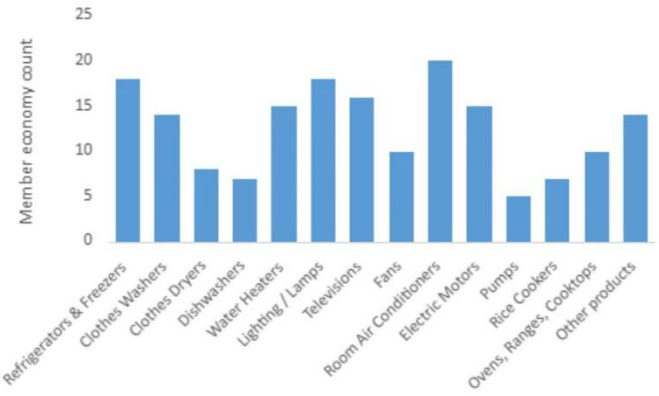
Energy use coverage of minimum energy performance standards for appliances by region, 2024



Sources: IEA analysis based on the IEA policies and measures (PAMS) database, and CLASP Policy Resource Center in IEA (2024), Energy Efficiency 2024, IEA, Paris https://www.iea.org/reports/energy-efficiency-2024, Licence: CC BY 4.0

APEC adoption of MEPs

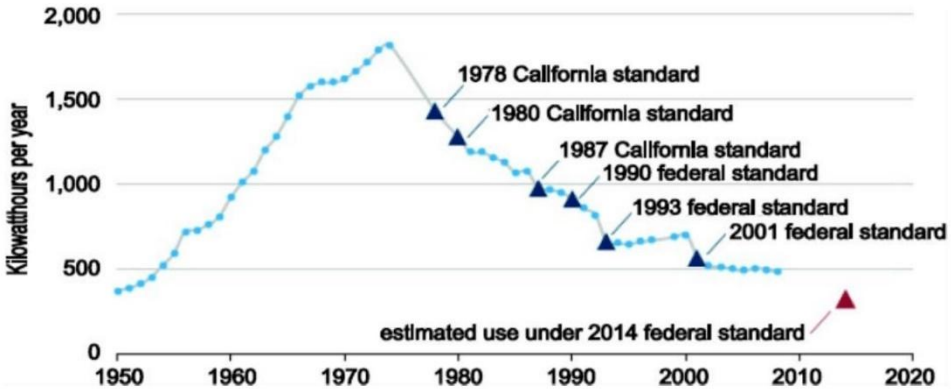
APEC Member economy MEPS count by appliance category



Appliances with the highest energy use are a focus of coverage

Source: *Results are based on the APEC workshop survey, policy information shared by the International Energy Agency (IEA) and CLASP and an internet search.*

US: Efficiency regulation of refrigerators energy efficiency

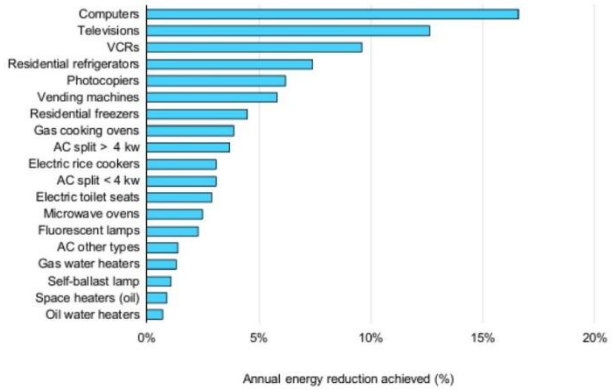


Ratcheting MEPS has reduced energy consumption of new US refrigerators by 75%

Source: ACEEE, 2017.

Impacts of Japanese Top Runner Programme

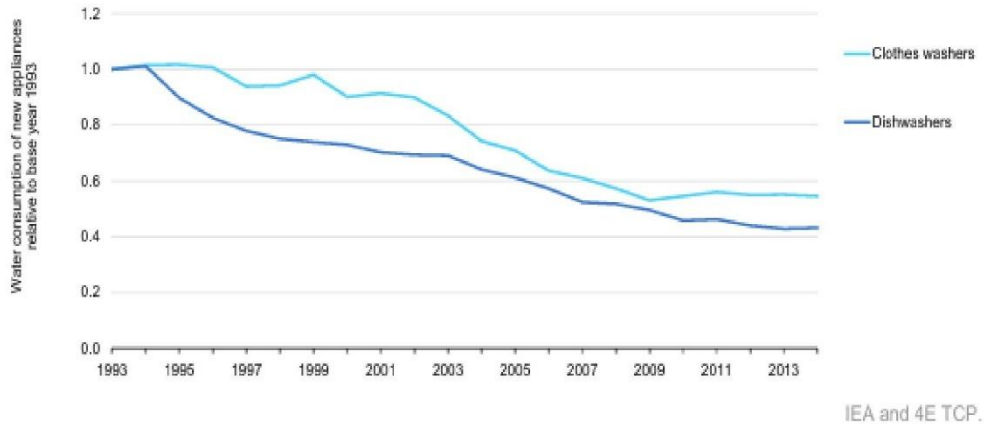
Annual energy improvement delivered by the Japanese Top Runner Programme



IEA and 4E TCP.

Multiple benefits – resource efficiency

Changes in water consumption of new clothes washers and dishwashers in Australia, 1993-2014



Information – a focus on labels

INFORMATION

- **Labels** inform consumers, identifying the most efficient appliances and encouraging purchases based on life time costs.
- **High Efficiency Performance Specifications** identify the best performing products and are often used as the basis for labels and incentives.
- **Consumer information campaigns**, help people make informed decisions. These are most effective when based on behavioural insights and targeted strategies.
- **Smart meters** enable feedback and targeted guidance to consumers about their energy use and how they can make savings.

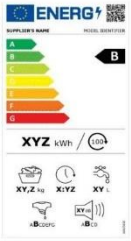
- **Comparative labels** show the energy performance of an appliance relative to others on the market. *Categorical* comparative labels use a discrete ranking system to classify appliances based on their energy performance. *Continuous* comparative labels display the performance of an appliance along a spectrum of comparative performance levels.
- **Endorsement labels** express that an appliance meets a certain energy performance levels. They are often used for appliances (e.g., computers) which are difficult to include in comparative labelling programs due to their shorter lifetimes and design cycles, as well as the relatively narrow ranges of energy consumption across models. Endorsement labels are typically voluntary and can be used to indicate high energy efficiency models.

Source: https://elearning.iea.org/courses/course-v1:IEA+EE1+2022/about

Comparative labels - Categorical

Dial

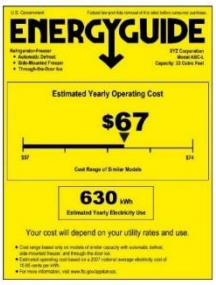
Bar

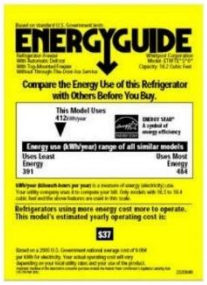


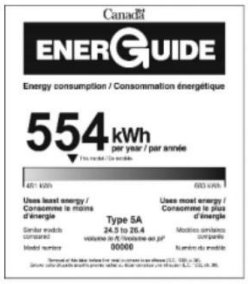
Source: IEA (2025) Energy Efficiency Policy Training Week – Appliance Course

Comparative Label - Continuous

Continuous



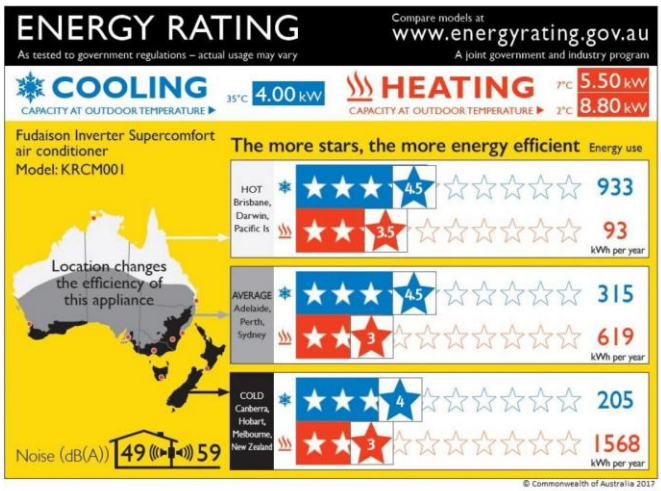




Source: IEA (2025) Energy Efficiency Policy Training Week – Appliance Course

Information

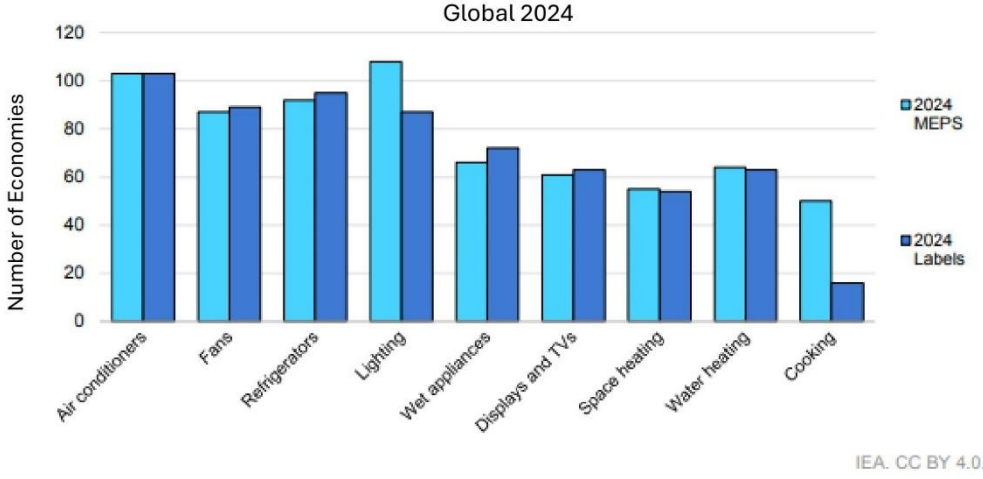
- **Comparative labels** help consumers, to identify the most efficient appliances and encourage purchases based on lifetime costs. Ensuring labels are appropriately displayed is also key.
- **High Efficiency Performance Specifications** identify the best performing products and are often used as the basis for labels and incentives.
- **Education and capacity building** encourage industry and retailers to produce and supply more efficient products.
- **Consumer information campaigns** help people make informed decisions. These are most effective when based on behavioural insights and targeted strategies.



Source: IEA (2025) Energy Efficiency Policy Training Week – Appliance Course/ Government of Australia

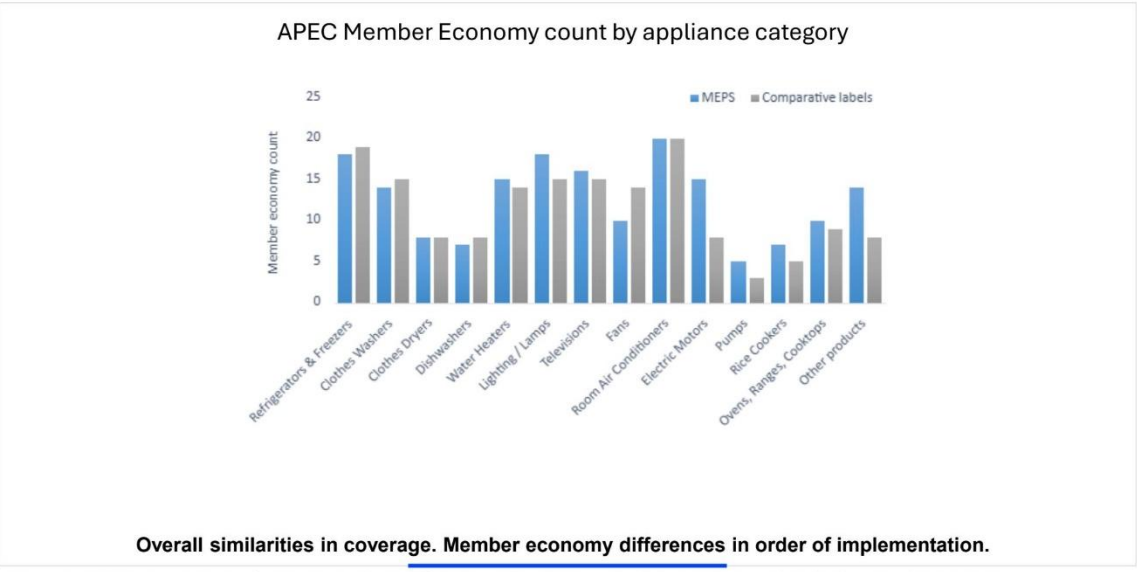
MEPS and Labels adoption globally

Number of Economies with Minimum Energy Performance Standards and Labels for Appliances, Global 2024



Source: IEA (2024), Energy Efficiency 2024, IEA, Paris https://www.iea.org/reports/energy-efficiency-2024, Licence: CC BY 4.0. Note modified title and axis label

APEC adoption of MEPs and comparative labels



Overall similarities in coverage. Member economy differences in order of implementation.

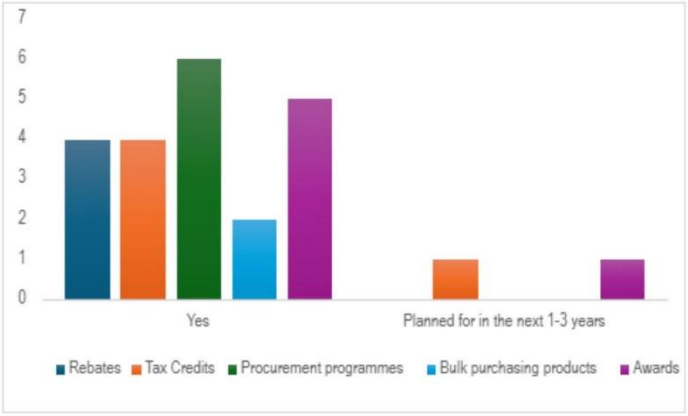
Source: *Results are based on the APEC workshop survey, policy information shared by the International Energy Agency (IEA) and CLASP and an internet search.*

Incentives - an APEC Workshop survey snapshot

Are there financial or non-financial incentives to promote efficient appliances/equipment?

Incentives

- **Rebates, grants and other financial offers** motivate consumers to buy highly efficient appliances. These could come directly from governments or schemes such as energy efficiency obligations.
- **Finance or taxation measures** on sales and imports can encourage manufacturers to produce appliances that are more efficient.
- **Dynamic electricity pricing** helps incentivise flexible demand.
- **Product lists** help companies and households identify efficient products which are eligible for loans, tax reductions, or other financial incentives.
- **Awards** promote the most efficient appliances and equipment.



Source: APEC workshop survey results

Energy Efficiency Management in the Appliance & Equipment Sector

Bongjoo, Shin
Program Director, KETEP
shinskie@ketep.re.kr

18 NOV 2025

1-1 Role of Energy Efficiency

» The biggest energy source from '74~'15 among IEA member economies was 'energy efficiency'

» Major economies are focusing on enhancing domestic energy efficiency by establishing mid - to long-term goals

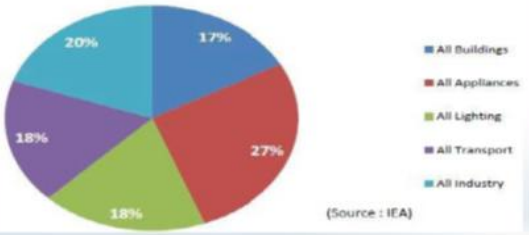
- (EU) Reduce 40% of GHG by '30, use 27% of total energy in renewables, increase energy efficiency by 27%

Share of appliances & equipment sector in energy saving

Share in potential CO_2 reduction: 45%

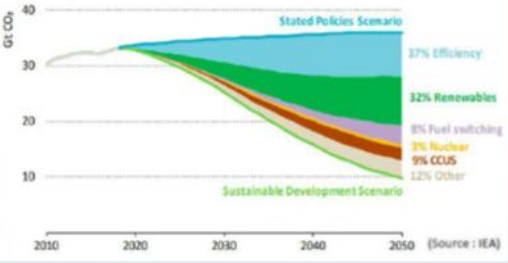
- The International Energy Agency (IEA) analyzes that 45% of total potential CO2 emissions reduction by 2030 will be the appliances & equipment sector (including lighting, based on OECD+EU)

Reductions in CO_2 emissions by 2030



2050 CO2 emissions reductions contribution

- Energy efficiency is the primary "fuel" of choice in most regions, because of its cost-effectiveness
- No decarbonization pathway is achievable without rapid and significant deployment of energy efficiency measures



1-2 What are the Energy Efficiency Programs (EEP) in the Appliance & Equipment Sector?

1. Energy Efficiency Labeling & Standard Program

- ☑ Mandatory 5 rating Label with MEPS
- ☑ Failing to meet MEPS restricts on Production and Sales
- ☑ 40 Items: Refrigerator, Washing Machine, 3 Phase Induction Motor, etc.

2. High-Efficiency Appliance Certification Program

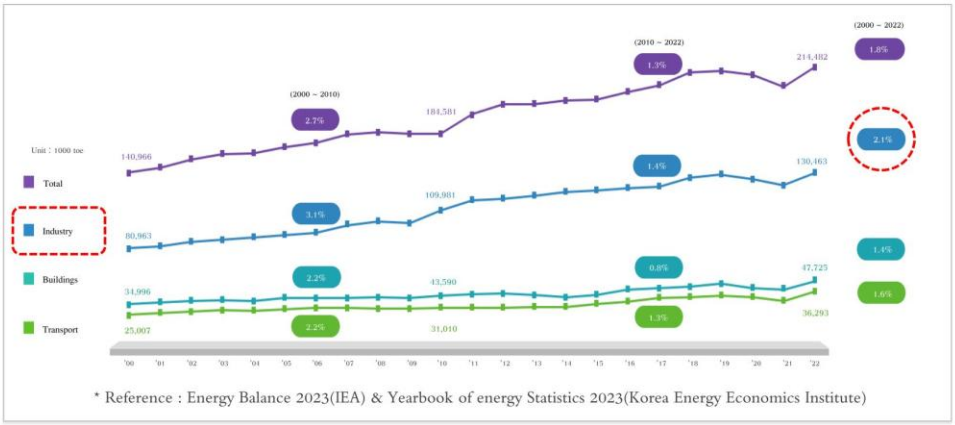
- ☑ Voluntary Certification
- ☑ 23 Items: Lighting, Pump, etc.
- ☑ Certificate and Incentives for high-efficient products

3. e-Standby Power Reduction Program

- ☑ Mandatory + Voluntary system
- ☑ 18 Items: Printer, Audio, etc.
- ☑ Automatic shift to low standby power mode
  - Meet Standard: Energy-saving Mark
  - Below Standard: Warning label required

1-3 Energy Consumption Status in Korea

» Energy Consumption in Industry, Buildings and Transport Sectors has steadily increased.
Particularly, Industry sector is higher than other sectors due to diversity of technologies & devices



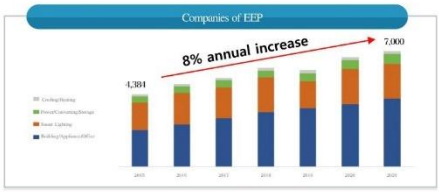
* Reference : Energy Balance 2023(IEA) & Yearbook of energy Statistics 2023(Korea Energy Economics Institute)

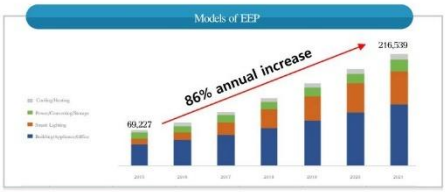
1-4 Appliance & Equipment Sector's Energy Consumption Status

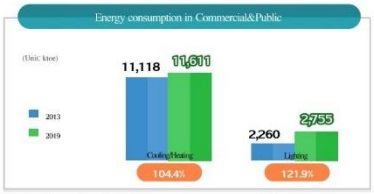
Appliance — **Energy consumption has steadily increased due to diversity of appliance & equipment**

» Energy consumption in the appliance & equipment sector has increased

➡ Energy consumption management is required by expanding items and models of EEP







* Reference: EEP Total Status(Korea Energy Agency), Energy Consumption Survey in 2020(Korea Energy Economics Institute)

1-5 Energy Efficiency Labeling & Standard Program

1 Labeling — **Consumers can easily purchase high efficient products**

» Manufacturers and importers are required to label products from production and import stage (Mandatory)

➡ Mandatory 1 – 5 rate labeling program

1 – 5 Rate Labeling

☑ Label based on product energy efficiency (Rate 1 = most efficient)

➡ Prohibition of production and sale of products that do not meet **MEPS**

Program Overview

☑ Legal Basis: Energy Use Rationalization Act

➡ 1-5 rating energy grading system (mandatory)

☑ Started in 1992, Currently Total 40 Items

Rating-labeled (23 Items)	MEPS only (17 Items)
Refrigerators, Kimchi-fridges, Washers, Water dispensers, LED lamps, Dryers, etc.	Fans, Incandescent bulbs, Fluorescent lamps, Motors, Transformers, Set-top boxes, etc.

What is Minimum Energy Performance Standards (MEPS) ?

A mandatory energy efficiency standard that aims for fundamental national energy conservation by prohibiting the manufacturing and sales of low-efficiency products that do not meet specific energy efficiency criteria

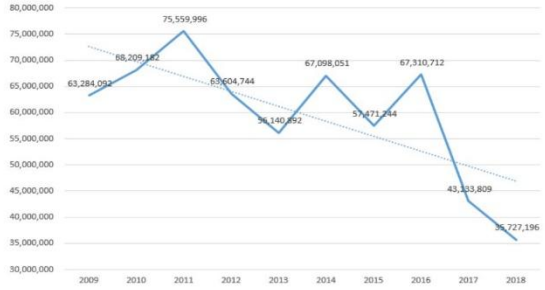
1-5 Energy Efficiency Labeling & Standard Program

1 Labeling — Consumers can easily purchase high efficient products

Market Status of fluorescent lamps

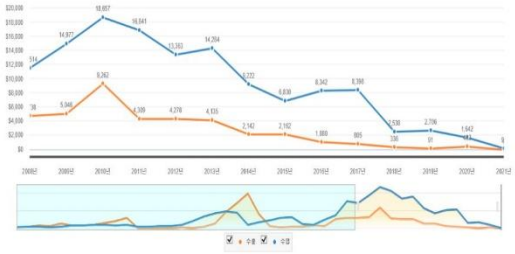
Domestic sales volume of fluorescent lamps has been continuously decreasing since 2000
after LED light installation was made mandatory in public organizations and the smart lighting industry developed

Yearly sales volume of fluorescent lamps



*Source: KEA Sales report of 2018, 'efficiency management equipment'

Import and export analysis of fluorescent lamps



* Source: 2021 KITA K-stat analysis

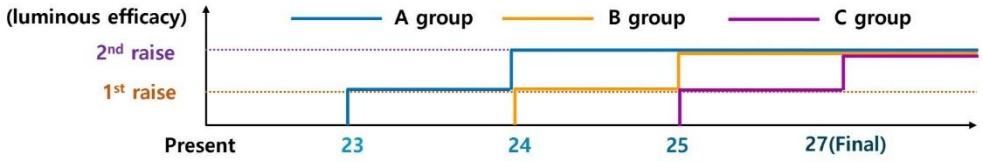
22 MM(2021)

1-5 Energy Efficiency Labeling & Standard Program

1 Labeling — Consumers can easily purchase high efficient products

Schemes to strengthen the standards for fluorescent lamps

Divided the models into three groups from highest sales volume to lowest and raised the minimum efficiency standards for each group across two occasions (-'27)



Cat.	Sales	Eligible products
A	Low	FPL 27W compact type / 32W round type / 40W round type
B	Medium	FPX 13W compact / 20W straight / FDX 26W compact / 28W straight / FPL 45W compact
C	high	32W straight / 40W straight / FPL 32W compact / FPL 55W compact / FPL 36W compact

- Revised the operation regulations of efficiency management (Aug. 21, 2023)
- Effective Dec. 31, 2023

1-6 High-Efficiency Appliance Certification Program

2 Certification — Excellent SME Product Guarantee, Quality Improvement Incentives

» Certify products meeting high-efficiency standards (Voluntary)

➡ Products meeting a certain EE standard are certified, issued a certificate, and marked

Target Items (23)

- Lightings (5) LED lamps, Fixtures, Smart lighting, etc.
- Power (8) UPS, Inverters, ESS, EV chargers, etc.
- Cooling/Heating (7) Boilers, Chillers, GHP, Heat/Humidity control, etc.
- Insulation(3) High-seal doors, etc.

Program Overview

- Legal Basis: Energy Use Rationalization Act
  - ➡ High efficiency certification system (Voluntary)
- Started in 1996 with Motors & Lamps
- Current 23 items
  + New items (incl. Cold chain, Heat pumps) (TBD)

Reporting & Performance

- Registered items by year

Year	2022	2023	2024
Items	23	23	23
Companies	1,483	1,537	1,624
Models	58,082	64,714	73,732

- Energy saved: 602 kTOE
  GHG reduced: 1,262 $ktCO_2$ (as of 2023)

1-7 e-Standby Power Reduction Program

3 e-Standby — Promotes Excellent e-Standby Power Reduction Products

» Promotes sleep mode and standby power reduction when not in use (Mandatory + Voluntary)

➡ Mark attached to low standby power products, Mandatory warning for non-compliant items

e-Standby Power Reduction Program

- Mandatory (13) PC, Printer, Copier, Microwave, Modem, Bidet, etc.
- Voluntary (5) Router, Digital converter, Hand dryer, etc.

Program Overview

- Legal Basis: Energy Use Rationalization Act
- Started as voluntary in 1999,
  Warnings mandatory since 2008
- Total 18 items
- To be integrated with
  EE Labeling & Standard by 2027

Reporting & Performance

- Registered items by year

Year	2022	2023	2024
Items	21	20	20
Companies	1,027	899	925
Excellent Models	65,977	59,007	56,915
Warning Models	708	495	535

- Energy saved: 98 kTOE
  GHG reduced: 204 $ktCO_2$ (as of 2023)

1-8 Registration Status of Efficiency Management Programs

Energy Efficiency Labeling & Standard Program

Category	2015	2017	2019	2020	2021	2022	2023	2024
No. of Items	28	27	32	33	33	33	34	34
No. of Declared Businesses	2,223	2,738	3,448	3,707	4,166	4,390	4,888	5,145
No. of Models	39,820	52,148	69,349	82,383	93,680	106,975	130,567	141,301

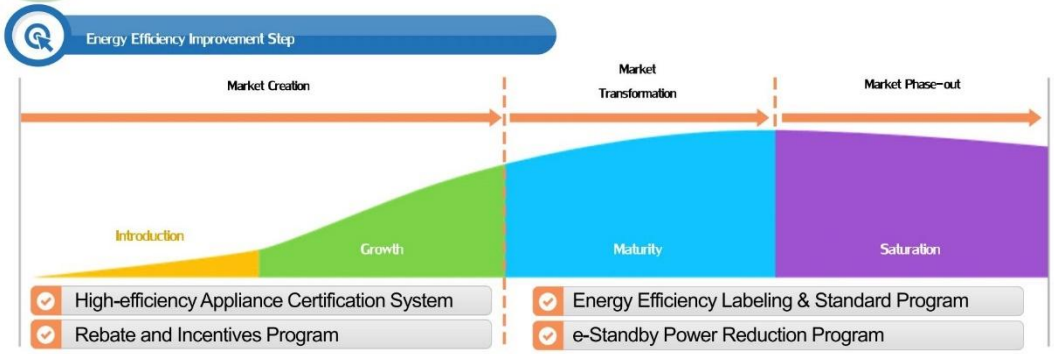
High - Efficiency Appliance Certification Program

Category	2015	2017	2019	2020	2021	2022	2023	2024
No. of Items	47	37	22	22	23	23	23	23
No. of Declared Businesses	2,340	1,616	1,376	1,463	1,440	1,483	1,537	1,624
No. of Models	15,860	24,318	39,373	47,100	51,732	58,082	64,714	73,732

e-Standby Power Reduction Program

Category	2015	2017	2019	2020	2021	2022	2023	2024
No. of Items	21	21	21	21	21	21	20	20
No. of Declared Businesses	564	728	826	854	960	1,027	899	925
No. of Models	20,589	29,495	43,690	52,777	57,115	66,685	59,502	57,450

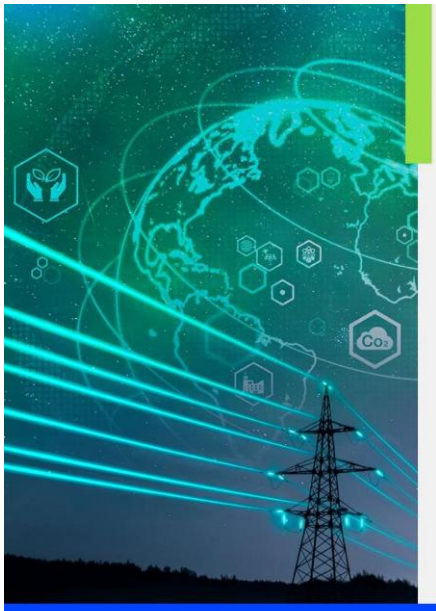
1-9 Strategy of Energy Efficiency management Programs



01 Market Creation	High-efficiency Appliance Certification	○ The Korean government certifies high-efficiency appliance & equipment that meet standard - 4 Sectors with 23 items: Lightings, Power, Cooling/Heating, Insulation
02 Market Transformation & Phase-out	Energy Efficiency Labeling & Standard	○ Mandatory energy efficiency rating for 40 items that need energy consumption management - Energy efficiency rating: 23 items, Only MEPS: 17 items
	e-Standby Power Reduction	○ Power reduction and warning mark for promoting excellent standby power reduction home & office appliance


Thank You!
Save Energy Save Earth

Session 2



Energy Efficient End-Use Equipment
International Energy Agency

APEC workshop

Best Practice Policies for energy-efficient appliances

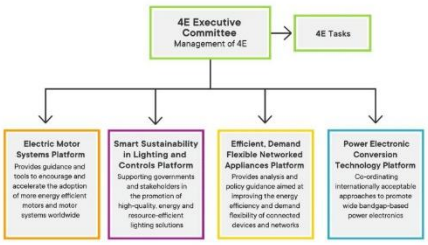
Kevin Lane, 4E TCP Programme Manager

Seoul, 18 November 2025

Technology Collaboration Programme
by iea

4E TCP overview

- An international platform for governments to collaborate on policy measures for energy efficient end-use equipment
- 15 members actively participate, including seven APEC members.



- Most 4E Members are represented by government agencies responsible for product policy.
- Strategic collaboration and partnerships:
  - IEA, other TCPs, coordination groups
  - Energy Efficiency Hub, DWG, SEAD, EnR

Energy Efficient End-Use Equipment
International Energy Agency

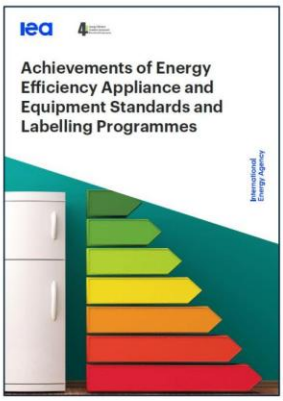
Governments - MEPS, labels and other measures

- Key Government-related policy
  - **MEPS** – Mandatory minimum energy efficiency performance standards, barring the most inefficient from the market
  - **Mandatory labels**. Regulated labels so consumers have information on the efficiency of appliances
  - **Endorsement labels**, voluntary, and sometimes paid for (such as Energy Star)
  - **Incentives** – such as rebates to purchase more efficient appliances. Include social dimension
- Supporting measuring performance. Underlying testing procedures required
  - Standards, usually based on international one (e.g. IEC, ISO)
- Monitoring and verification - compliance with regulations

What are the benefits of MEPS and labelling

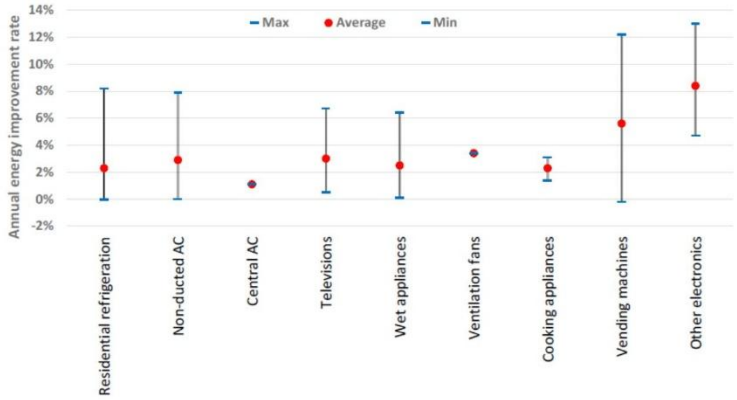
From review of ex-post evaluations by 4E:

- Over 120 economies use these policies
- Benefit of programmes exceed their costs by ratio of 4 to 1
- Generating employment, over 1 million direct jobs per year in the EU, 300 000 in the USA due to spend on more efficient appliances
- Appliance prices falling, 2-3% pa, during period of increased efficiency
- Longest running programmes with economy savings of 15% of electricity consumption

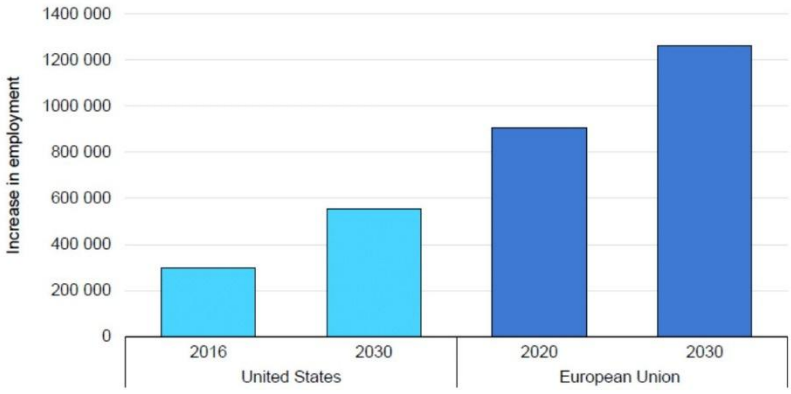


Ex-post analysis highlights saving opportunities

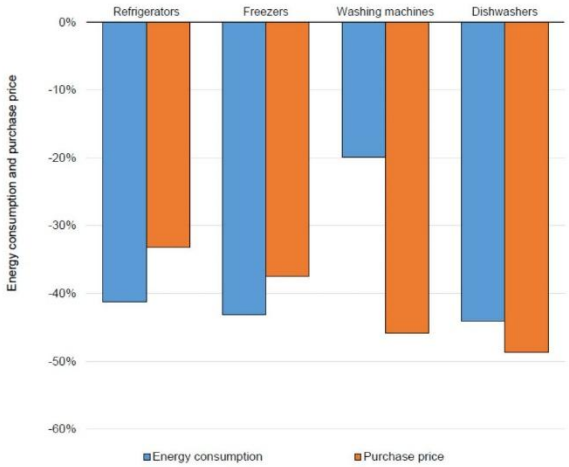
Annual energy reduction in new-product energy consumption from EES&L programes



Direct employment effects of standards and labelling programs



Changes in residential appliance prices and energy performance in Australia, 1993-2014

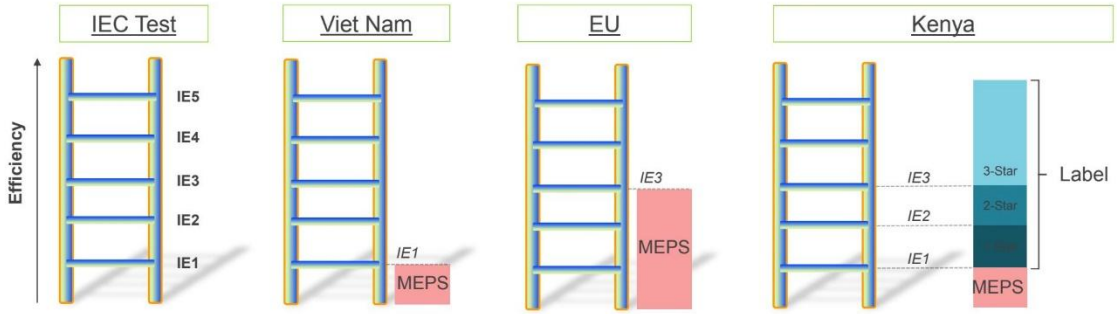


Appliance prices have fallen, whilst increased in energy efficiency and reduced energy consumption

Success factors – overcoming challenges

- Signposting
  - provides time and clarity for stakeholders
- Engagement with stakeholders and consumers
- The role of data in MEPs setting
- Peer technical exchanges
- Compliance
  - Monitoring, verification and enforcement
- Harmonization
  - Lowers cost for all
  - Simpler to implement and comply

Example: Motors – All economies employ the same ladder



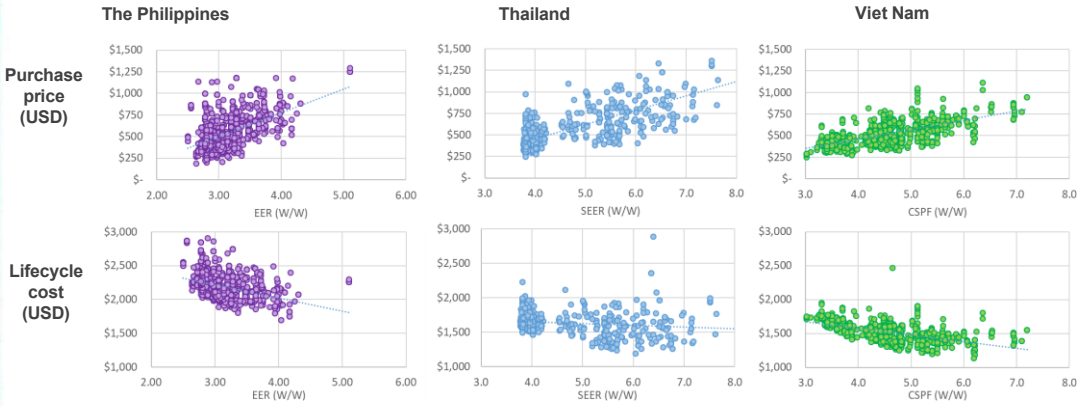
All economies can use the same ladder for their policy thresholds.

Viet Nam (IE1) and the EU (IE3) use different levels for Minimum Energy Performance Standards (MEPS).

Whilst, Kenya currently uses (IE) tiers for its 3-star energy labelling of new electric motors.

Residential ACs – Cost vs

- Purchase price and lifecycle cost vs. efficiency in selected ASEAN markets in 2019



Notes: ACs normalised to electricity consumption of 1,000 kWh/year and cooling capacity of 12,000 BTU/hr. Source: Based on IEA (2019). The Future of cooling in Southeast Asia.

- Despite higher purchase prices, more efficiency ACs can have lower lifecycle costs
- thanks to lower energy running costs

Electric Motor Systems Platform - EMSA

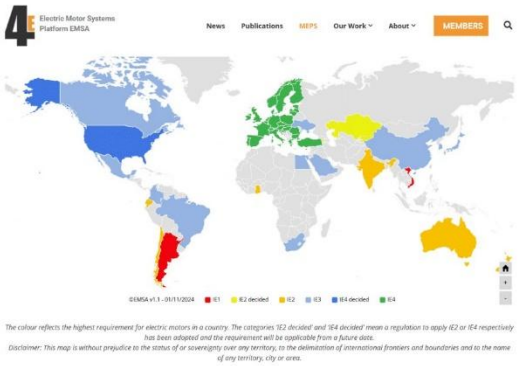
Electric motors consume over half the world's electricity

Potential to reduce demand by 20-30% with good policy.

Recent work include:

- Demand Flexibility and Digitalisation
- Testing standards, international standards
- Motor systems tool
- Mapping policy developments (especially MEPS)
- Outreach, policy research

Special collaboration area for 4E members

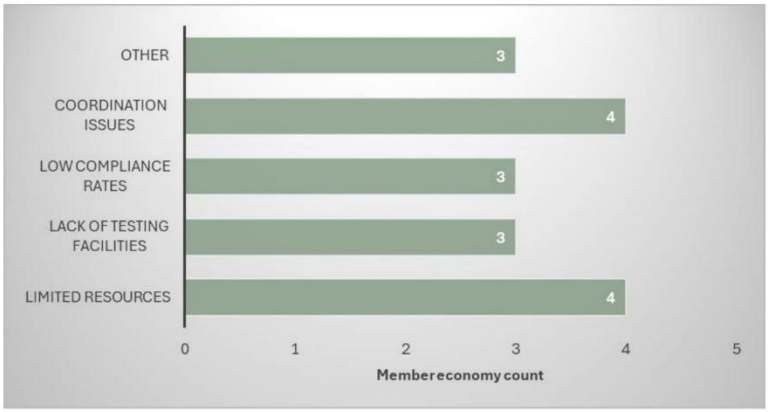


Sustainability in Lighting and Controls Platform (SSLC)

- New lighting technologies, including controls, offer to reduce global electricity use of lighting by 50%
- Convening governments, industry experts, and academia.
- Analysis to transform markets, improving efficiency and quality
- Recent work includes:
  - Product performance
  - Testing, laboratory comparison
  - Overview of health effects
  - Policy developments

Compliance challenges

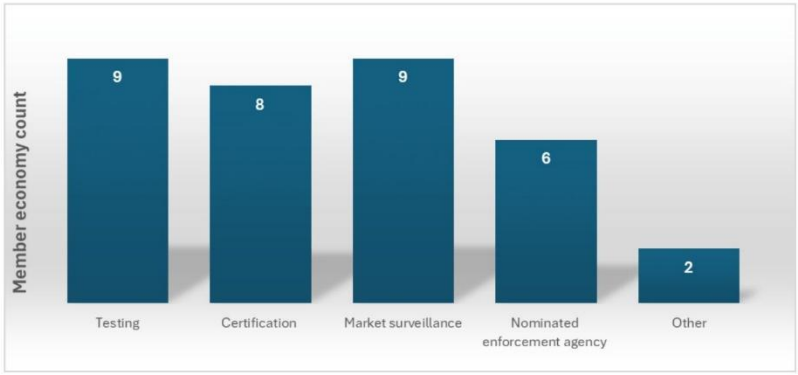
APEC Workshop Survey – What are the Key Enforcement Challenges for MEPs?



Source: APEC workshop survey results

Compliance processes

APEC Workshop Survey – What Processes Exist to Ensure Compliance with MEPs?



Source: APEC workshop survey results

Harmonization

- This includes several aspects
  - Testing procedures (support and reference IEC, etc.)
  - Performance levels (ideally similar thresholds)
- Other presentations today on this topic

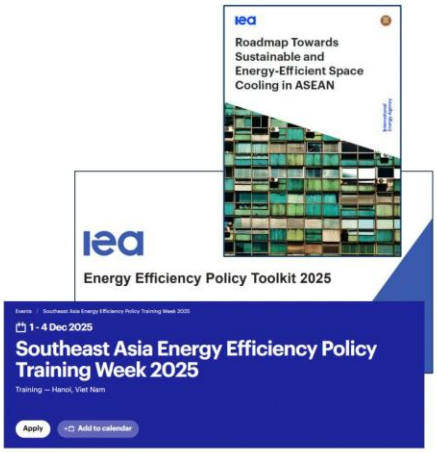
International Energy Agency

IEA

- Word energy outlook, 2025
- Southeast Asia Energy Outlook 2024
- Policy database: Policy database – Data & Statistics
- Policy reviews. Data and statistics

Office of Energy Efficiency and Inclusive Transitions

- Energy Efficiency Policy Toolkit: Case studies – Energy Efficiency Policy Toolkit 2025
- Multiple Benefits of Energy Efficiency
- Appliance – Energy Efficiency Policy Toolkit 2025
- Energy Efficiency Policy Training Week 2025
- On-line training course: Appliance Energy Efficiency Policy



Resources United for Efficiency, CLASP

- UNEP, United for Efficiency (U4E)
  - Model regulations,
    - **Ceiling fans**, air conditioners, refrigerators, commercial refrigerators, industrial motors
  - Economy savings assessments
  - Registration systems
- CLASP
  - Policy database, best MEPS
  - MEPSY, off grid
- Energy Efficiency Hub, SEAD
  - Training, performance ladders
  - Double efficiency, COP 30

Contact and further 4E TCP information

- Website
  - https://www.iea-4e.org/
- Outputs
  - https://www.iea-4e.org/publications/
- Contact
  - Programme Manager: Kevin.Lane@iea-4e.org
  - Chair: Thore Stenfeldt (DEA)

Content

Mexico's MEPS Journey: Overview

01

- First MEPS in mid-1990s; >30 appliances now covered

02

- Led by a strong energy efficiency architecture

03

- Continuous cycle: design → consultation → testing → revision

04

- Alignment with North American supply-chain standards

Institutional Architecture

- SENER – policy direction
- CONUEE – technical authority
- Standards Bodies (NOMs) – mandatory standards
- PROFECO – consumer protection & enforcement
- Utilities & FIDE – incentive programmes

Key Achievements

• Major reductions in electricity consumption (5TWh/year)

• 'Cash-for-Coolers' replaced ~1.5M appliances

• 20–40% efficiency gains through MEPS updates

• Strong coordination with the US/Canada

Challenges in MEPS Design

• Limited early testing infrastructure

• Industry concerns about compliance timelines

• Need for harmonization with trading partners

• Balancing affordability with performance

Challenges in MEPS Implementation

- MARKET SURVEILLANCE GAPS

- INFORMAL APPLIANCE MARKET

- POLITICAL CONTINUITY CHALLENGES

- LABELLING COMPLIANCE OUTSIDE MAJOR RETAIL CHAINS

Success Factors

- Stakeholder engagement from the start
- Clear communication on compliance pathways
- Complementary incentives & financing
- Culturally relevant public education
- Data-driven revision cycles

Consumer Education Strategy

- Large telenovela-based campaigns
- Messages on savings, trust, product quality
- Strong impact on label recognition
- Demonstrates value of culturally aligned outreach

Lessons for APEC Member Economies

• GOVERNANCE + COMMUNICATION + INDUSTRY ALIGNMENT

• INCENTIVES TO SUPPORT AFFORDABILITY

• REGIONAL HARMONIZATION LOWERS COSTS

• INVESTMENT IN TESTING & CONFORMITY ASSESSMENT

• STRUCTURED MEPS REVIEW CYCLES

Conclusion

- MEPS deliver long-term cost savings & competitiveness
- Mexico experience offers transferable lessons
- Many elements applicable across APEC economies

Overcoming Challenges and Leveraging Success Factors in MEPS Implementation

Steve Coyne
Director
Light Naturally

Implementing MEPS

First Time for MEPS

- "Learn to walk before you run"
  - There are legal and administrative structures to establish
- Simple, achievable MEPS outcomes for first implementation
  - Should be manageable for the anticipated administration and compliance resources
- Don't create something novel, it's a global market.
  - This may limit market competition due to additional compliance burden
- Look to your trading partners for engagement and alignment
- Access to a neighbouring economy or regional registration system
- Availability of test laboratories – local or regional
- Plus…

Implementing MEPS

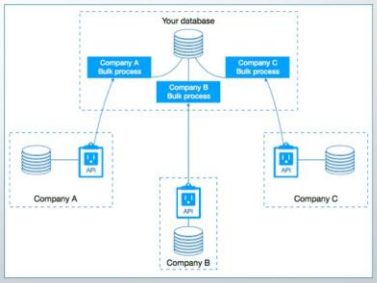
Reviewing Existing MEPS

- Know the market
  - Benchmarking product performance provides understanding of the current market and potential challenges especially for local manufacturers
  - Local market must be considered in relation to the global market
- Harmonization of test methods and MEPS requirements
  - Use international test standards
  - Opportunity to establish a regional MEPS
- Maintaining confidence in local and regional test laboratories
  - Interlaboratory comparisons

Pacific Community

Regional Harmonization

- Test Standards and MEPS aligned with Australia and New Zealand
- Pacific Appliance Database (PAD) linked to Australia/New Zealand Energy Rating database for a number of appliances



Reliant on third party economy for timely

- Revisions of existing MEPS
- Establishing new MEPS for product expansion (e.g. LED lighting)

Pacific Community – Pacific Appliance Database

Pacific Community
Communauté du Pacifique
Pacific Appliance Database

Home | Check Database

PAD Registrations

Record ID/Registration No | Brand | Model | Product Type | Jurisdiction

Search

- Product Type: - Any - / Air-conditioners / Refrigerators & Freezers / Televisions
- Jurisdiction: - Any - / Cook Islands / Fiji / Kiribati / Samoa / Solomon Islands / Tonga / Tuvalu / Vanuatu

Registration No.	Product Type	Brand	Model No.	Standard	Status	Country	ID
KIR-RF-000001	Refrigerators and freezers	Liebherr	ECN6156	AS/NZS 4474.1:2007/Amdt 2:2011	APPROVED	Kiribati	1920
KIR-RF-000002	Refrigerators and freezers	FISHER & PAYKEL	H160SL	AS/NZS 4474.1:2007/Amdt 2:2011	APPROVED	Kiribati	1940
SLB-RF-000002	Refrigerators and freezers	Haier	HRF220TW	AS/NZS 4474.1:2007/Amdt 2:2011	APPROVED	Solomon	0357
SLB-AC-000022	Air-conditioners	Haier	AS53TD1HRA / 1U53RA1ERA	AS/NZS 3823.1.1:2012	APPROVED	Solomon Islands	SLB-PR-000371
SLB-AC-000001	Air-conditioners	CHIGO	CS-25V3A-1CZ-W3/CS-25V3A- Y4Z	AS/NZS 3823.1.1:2012	APPROVED	Solomon Islands	SLB-PR-000401
SLB-RF-000001	Refrigerators and freezers	Haier	HRF340BS2	AS/NZS 4474.1:2007/Amdt 2:2011	APPROVED	Solomon Islands	SLB-PR-000473
SLB-RF-000003	Refrigerators and freezers	Haier	HCF264	AS/NZS 4474.1:2007/Amdt 2:2011	APPROVED	Solomon Islands	SLB-PR-000474
SLB-RF-000108	Refrigerators and freezers	MIDEA	HD-207FWEN	AS/NZS4474.2:2009	APPROVED	Solomon Islands	SLB-PR-000475
SLB-RF-000004	Refrigerators and freezers	Haier	HBM450HSA1	AS/NZS 4474.1:2007/Amdt 2:2011	APPROVED	Solomon Islands	SLB-PR-000476

ASEAN – A Regional Policy Roadmap

Harmonization of Energy Performance Standards for Lighting

Components

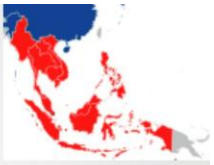
1 Harmonization of Test Methods

2 Product Scope and Evaluation Parameters

Non-directional lamps – LED

Linear lamps – LED & fluorescent

ASEAN – A Regional Policy Roadmap



Components

3 Harmonization of Minimum Energy Performance Standards

Harmonization of Minimum Energy Performance Standards: The ASEAN economies progress (possibly in a staged progress) towards agreed target reference MEPS of 80 lm/W by 2023, as mandatory MEPS for all non-directional LED lamps and linear LED and fluorescent lamps within the agreed scope. The MEPS would be periodically reviewed, revised and/or expanded at an interval of 5 years or less.

4 Testing Infrastructure: interlaboratory comparisons

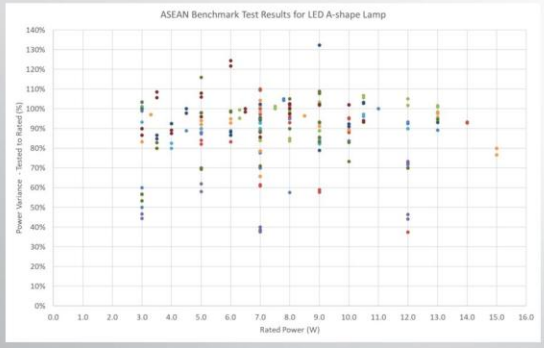
5 Mutual Recognition Agreements (MRA)

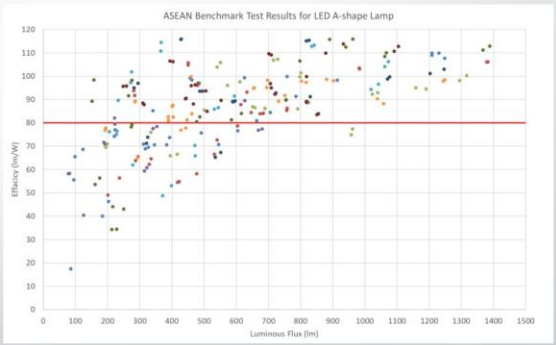
ilac-MRA

6 Reporting – establish regional product database

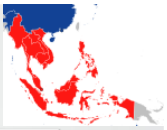
ASEAN – A Regional Policy Roadmap

Benchmarking performance - before





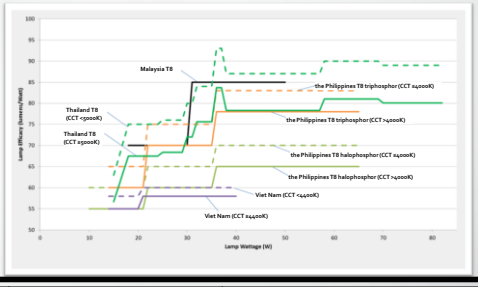
ASEAN – A Regional Policy Roadmap



Before

Economy	Incandescent Lamps	Compact Fluorescent Lamps	Linear Fluorescent Lamps	Light Emitting Diode Lamps	Ballasts	HID Lamps
Brunei						
Cambodia						
Indonesia		✓ (V) Under revision		*Planned*	*Planned*	
Lao PDR						
Malaysia	✓ (M)	✓ (M)	✓ (M)	✓ (M)	✓ (M)	
Myanmar						
the Philippines		✓ (M)	✓ (M)	*Planned*		
Singapore	✓ (M)	✓ (M)		✓ (M)		
Thailand		✓ (V)	✓ (V)	*(V) Under development*	✓ (M)	
Viet Nam	✓ (M)	✓ (M)	✓ (M)	*Planned*	✓ (M)	✓ (M)

(M) mandatory; (V) voluntary



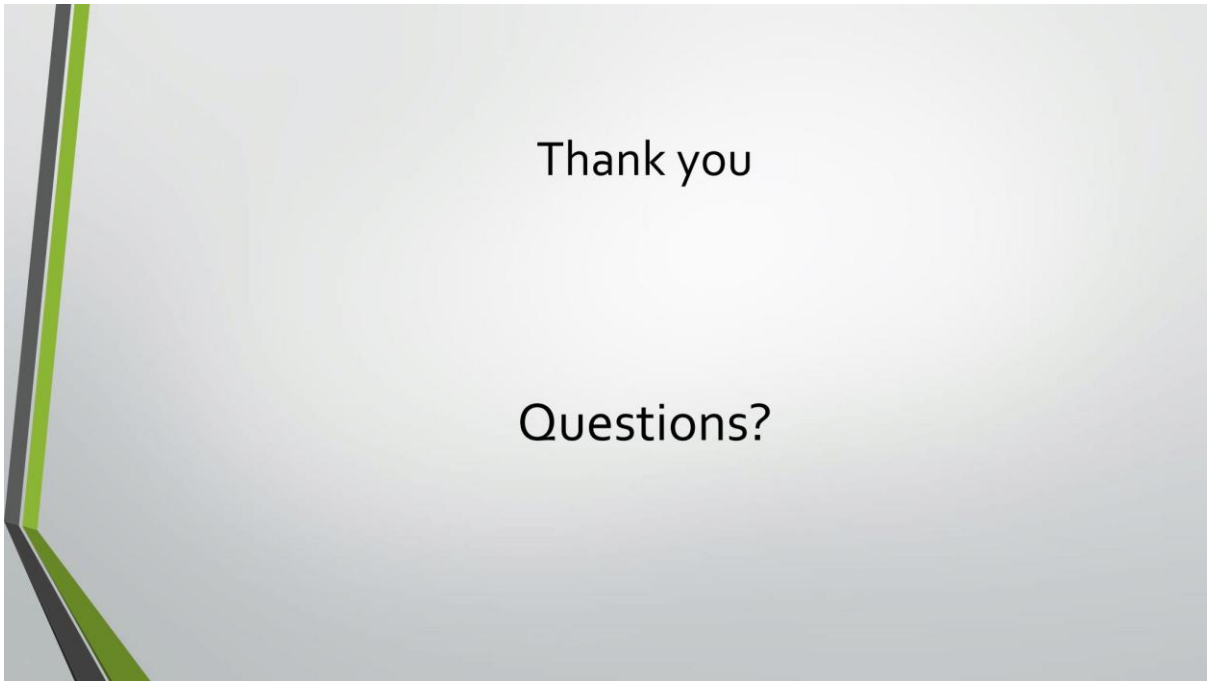
Now

Economy	Non-directional LED Lamps			Double-capped LED Lamps		Double-capped Linear Fluorescent Lamps		
	MEPS Level (lm/W)	CIE S025 Adoption	IEC 62612 Adoption	MEPS Level (lm/W)	CIE S025 Adoption	MEPS Level (lm/W)	CIE 084 Adoption	IEC 60081 Adoption
Brunei Darussalam	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cambodia	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Indonesia	80	YES	YES	100	YES	N/A	YES	YES
Lao PDR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Malaysia	60	N/A	YES	75	N/A	70/75	YES	YES
Myanmar	80	YES	YES	80	YES	80	YES	YES
the Philippines	90	YES	YES	100	YES	100	YES	YES
Singapore	100	YES	YES	100	YES	75	YES	YES
Thailand	90	YES	YES	120	YES	100	N/A	YES
Viet Nam	60	YES	YES	80	YES	55/60	N/A	YES

Africa

Harmonised MEPS and Test Methods

- East African Community (EAC)
  - EAS 1064-1:2022, Lighting Products – Minimum Energy Performance Standard (MEPS) – Part 1 – Lamps (1st Edition) covering energy efficiency and functional performance requirements, sampling and test methods for general service and tubular lamps.
  - EAS 1064-2:2022, Lighting Products – Minimum Energy Performance Standard – Part 2 – Luminaires (1st Edition) covering energy efficiency and functional performance requirements, sampling and test methods for ambient luminaires and outdoor/streetlight luminaires.
- Southern Africa Development Community (SADC)
  - SADC HT 109:2021 Minimum Energy Performance Standards (MEPS) for Lighting
- The Economic Community of West African States (ECOWAS)
  - Considering adopting Nigerian Standard as regional standard
  - NIS 1209 Minimum energy performance standard — Lighting products - Parts 1: Lamps & 2: Luminaires
- **There is strong consistency between EAC, SADC and Nigeria (ECOWAS) standards**


Thank you
Questions?

MEPS Implementation Malaysia Experience

Norazrin Rupadi,
Energy Commission of Malaysia

Introduction to MEPS

Minimum Energy Performance Standards (MEPS) play a crucial role in promoting **energy efficiency in Malaysia**. The economy's journey reflects significant collaboration among stakeholders to implement effective policies.

Challenges in MEPS Implementation & Timeline of Enforcement in Malaysia

VOLUNTARY PHASE

From 2009 to 2013, MEPS operated on a voluntary basis with incentives for manufacturers but lacked enforcement.

MANDATORY MEPS

In 2014, Malaysia established mandatory MEPS under the Electricity Supply Act, focusing on specific appliances for compliance.

EECA 2024 EXPANSION

The 2025 expansion under EECA 2024 includes thermal and commercial products, enhancing the scope of energy efficiency initiatives.

Challenges in MEPS Implementation

Implementing MEPS faced significant challenges, including **limited testing facilities** and the need for close collaboration with manufacturers to ensure accurate data gathering for compliance.

Success Factors in MEPS

LEGAL FRAMEWORK

Energy Efficiency and Conservation Act 2024
EECA 2024 institutionalizes the MEPS expansion enforcement not only on domestic electrical appliances, but also thermal and commercial product with mandates for registration, certification, and labelling. It offers a clear, enforceable legal foundation for market compliance.

INCENTIVE PROGRAMS

SAVE programme provided rebates for energy-efficient appliances, increasing market adoption and awareness. Over 6 million units distributed with measurable energy savings.

TECHNICAL CAPACITY

MEPS development is backed by investments in testing infrastructure and methodologies. Stakeholder collaboration ensured credible and verifiable energy efficiency standards.

Strategic Planning

Initiatives like the NETR aligned MEPS with Malaysia's broader energy efficiency and climate goals.

Success Factors in MEPS - Development Process

1. Market surveillance
   - Determine suitability of EUP selection based on the availability of testing standard, market penetration, annual energy consumption of the EUP
2. Establish the WG
   - Stakeholders' engagement from various expertise association and product representative to develop the testing standard & EE Criteria of the EUP
3. Product Sample Testing
   - Testing laboratory e.g. SIRIM will conduct the test based on the testing standard & EE Criteria. (No. of Sample: 30)
   - To determine the performance of each sample for the Rating Development Proses
4. EE Rating Development
   - Based on the data from the sample testing, a statistical model will be used to develop the rating table
5. Guideline amendment & Enforcement

Average Timeline Development 1 EUP: 2 Years

Current List of MEPS Appliances

Air Conditioner
- Type :Non-ducted Single Split Wall Mounted
- Capacity ≤ 25,000 btu/hr

Fan
- Ceiling Fan with diameter less than 60 inch
- Wall fan,desk fan,table fan with diameter less than 16inch

Refrigerator
- 1-door & 2-door only

Television
- Type :LCD,PLASMA,LED,CRT
- Screen size up to or equal to 70 inch

Lamp
- T5 & T8 Fluorescent Lamp
- Self ballasted single capped CFL
- Single Capped Fluorescent Lamp & Circular Fluorescent Lamp
- Self ballasted LED Lamp

Washing Machine
- Type :Top Loading and Front Loading
- Capacity ≤16kg

Current List of MEPS Appliances

Microwave Oven

- solo; combination; convection; any other microwave oven with similar function; and exclude any type of built-in microwave oven which its power supplied
- Size up to or equal to 32 Litre

Electric Rice Cooker

- Capacity: 1.0L ≤ Capacity ≤ 3.6L; and
- Rated Power: 400W ≤ P ≤ 1600W

Freezer

- Chest with Solid Door
- Size up to or equal to 320 L

Electric Oven

- conventional mode; convectional mode; conventional and convectional mode; and conventional, convectional and steam mode.

SAVE Programme Impact & Market Growth

RM164 million

Total budget allocated

The **total budget of RM164 million** for the SAVE Programme has facilitated nearly 800,000 rebates issued, and over 473 GWh energy saved with 396,000 tons CO_2 avoided annually.

Behavioral Impact

The implementation of the MEPS has significantly **boosted the sales** of 5-Star refrigerators, indicating a shift towards energy-efficient appliances while also **lowering price gaps** for consumers.

Lessons Learned

To achieve sustained MEPS success, **long-term policy commitment**, effective consumer incentives, robust testing infrastructures, and collaborative stakeholder engagement are essential for fostering compliance and trust.

Lessons Learned & Applicability to APEC Economies

Sustained Policy Commitment: The development of MEPS in Malaysia highlights the need for continuous policy efforts aligned with energy goals such as NETR.

Effectiveness of Consumer Incentives: Programs like SAVE 4.0 have greatly boosted the uptake of energy-efficient products and offer a model that could be applied across other APEC member economies.

Essential Testing Infrastructure: Investing early in product performance testing and laboratory capabilities is crucial to making MEPS enforceable and technically sound.

Inclusive Policy Development: Engaging a broad range of stakeholders during MEPS formulation fosters trust and enhances compliance among industry participants.

Thank you

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Suruhanjaya Tenaga
Energy Commission

Overview of Minimum Energy Performance Standards (MEPS) and Philippine Energy Labeling Program (PELP)

18 November 2025 | Capacity Building Workshop on Energy Efficiency and Conservation Policy

BAGONG PILIPINAS

DEPARTMENT OF ENERGY • PHILIPPINES •

ENERGY UTILIZATION MANAGEMENT BUREAU

PRESENTATION OUTLINE

- Republic Act No. 11285: Energy Efficiency and Conservation (EEC) Act
- Energy Performance Standards and Labelling Requirements
- Philippine Energy Labelling Program (PELP) Online Registration System
- Opportunities and Way Forward

Energy Efficiency and Conservation Act

Republic Act No. 11285
Energy Efficiency and Conservation (EEC) Act
Apr 12, 2019

The EEC Act institutionalizes energy efficiency and conservation, enhances the efficient use of energy, and grants incentives to energy efficiency and conservation projects.

Issued policies as of October 2025

67 POLICY ISSUANCES

- 32 Department Circulars
- 10 Department Orders
- 1 Memorandum Circular
- 11 IAEECC Resolutions
- 13 Implementing Guidelines

PUBLIC SECTOR

- Government Energy Management Program (GEMP)

PRIVATE SECTOR

- Designated Establishments
- Energy Service Companies
- Energy Efficiency Practitioners

KEY POLICIES & STRATEGIES

- **Minimum Energy Performance of Products (MEPP)**
- **Philippine Energy Labelling Program (PELP)**
- Energy Conserving Design of Buildings

ENERGY PERFORMANCE STANDARDS AND LABELING REQUIREMENTS

Minimum Energy Performance for Products (MEPP)

Department Circular no. DC 2024-05-0016 Prescribing Amendments to **Department Circular No. DC2020-06-0016** or the Minimum Energy Performance for Products (MEPP) Guidelines

Philippine Energy Labeling Program (PELP)

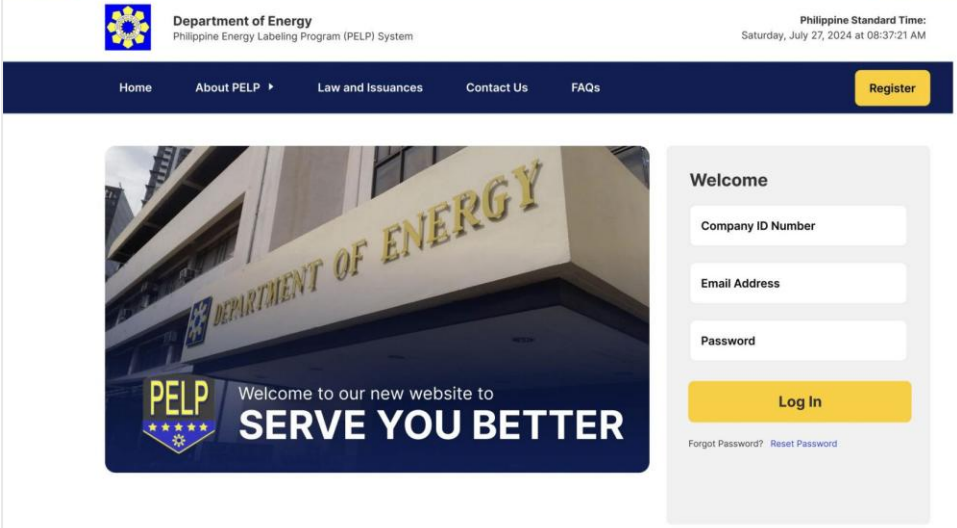
Department Circular no. DC 2024-05-0017 Prescribing Amendments to Department Circular No. DC2020-06-0015 or the Philippine Energy Labeling Program (PELP) Guidelines

Coverage

- Air Conditioners
- Lighting Products
- Refrigerating Appliances
- Television Sets
- Electric Fans
- Clothes Washing Machines
- Display Monitors
- Energy Saving Devices

SAMPLE ENERGY LABEL

PELP ONLINE REGISTRATION SYSTEM



Improved version of the PELP System to facilitate better online registration and data handling and other features to aid in implementation.

OPPORTUNITIES, AND WAY FORWARD

IEC CAMPAIGNS FOR RETAILERS

ONLINE WEBSITES, PUBLICATIONS, AND ADVISORIES

PUBLIC CONSULTATIONS AND STAKEHOLDER MEETINGS

ONLINE IEC CAMPAIGNS

thank you

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Asia-Pacific Economic Cooperation

Capacity Building Workshop on Energy Efficiency and Conservation Policy

Members' Journey with MEPS

Implementing MEPS in Chinese Taipei

Challenges, Solutions, and Future Directions

Regulatory Authority

經濟部能源署
Energy Administration, Ministry of Economic Affairs

Implementing Agency

ITRI
Industrial Technology Research Institute

November 18, 2025

Seoul, Korea

Outline

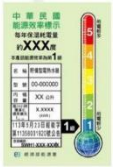
- Overview of CT equipment energy efficiency policy
- Incentives: Home appliance replacement subsidy
- Enforcement: AI-assisted online market surveillance
- Current challenges & future directions

Overview of CT Equipment Energy Efficiency Policy

Policy tools	Regulation	Information	Incentives
	Phase out inefficient equipment and set performance rules	**Guide consumers toward energy-efficient choices**	**Make efficiency attractive to speed up tech replacement**
Programs	• Minimum Energy Performance Standard (Energy Administration Act: Articles 14, 19-1, 21, 24)	• Energy Efficiency Ranking Labeling (Energy Administration Act: Articles 14, 19-1, 21, 24) • Energy Conservation Labeling **(Voluntary)**	• Home Appliance Replacement Subsidy • Equipment Replacement Subsidy for service sector • Motor, Pump & Fan Efficiency Subsidy • Energy Performance Contract Subsidy

Note: Policy framework refers to the 「**IEA Energy Efficiency Policy Toolkit**」

Current Status of Equipment EE Policy

Name	Minimum Energy Performance Standards (MEPS)	Energy Efficiency Rating Labeling	Energy Conservation Labeling
Nature	Compulsory	Compulsory	Voluntary
Launch Date	December 1981	July 2010	December 2001
Purpose	Ban the import or domestic sale of low-efficiency products.	Provide consumers with EE information to support saving choices.	Use simple labels to promote efficient products for consumers and manufacturers.
Number of items	**33 items**	**17 items**	**50 items**
Label			

Incentives: Home appliance replacement subsidy

Challenges

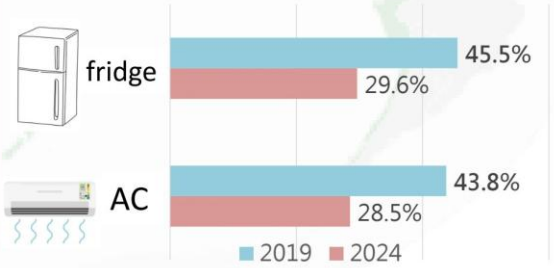
- Many appliances are over 10 years old (AC 43.8%, fridge 45.5%)
- Old units are often resold in the **second-hand market** instead of properly recycled

Measures

Home Appliance Replacement Subsidy

- **Eligibility:** Level 1 efficiency
- **Appliance:** AC and fridge
- **Amount**：NT$3,000 per unit
- **Verification:** "**Waste Appliance Recycling Form**" issued by the Ministry of Env.

Share of AC and fridge Over 10 Years Old



Source: Energy Administration, MOEA / ITRI, 2025 Household Electricity Consumption Survey (2025)

Enforcement: AI-assisted online market surveillance

Challenges

- Online platforms list many non-compliant products, misleading consumers.
- Manual online inspections are labor-intensive and costly.

Measures

Web-crawler inspections using **image & text recognition**

	Before	After
Resources	7 full-time staff conducting manual online inspections	Automated AI-assisted online inspection system+1~2 staff
Pages inspected	40,000 pages/year	500,000 pages/year

Current Challenges & Future Directions

Current Challenges

- **Industry–efficiency trade-off:** raising MEPS can improve energy savings, but domestic appliance manufacturers face cost and competitive pressures
- Harmonization of test methods & mutual recognition of test data
- **Difficulties in changing consumer behavior**： even when consumers purchase high-efficiency products, poor usage habits limit actual energy savings.

Future Directions

- Continuous review of MEPS and rating standards
- Strengthening **public education** & **behavior-oriented** policies

Thank You

Regulatory Authority

經濟部能源署
Energy Administration,
Ministry of Economic Affairs

Implementing Agency

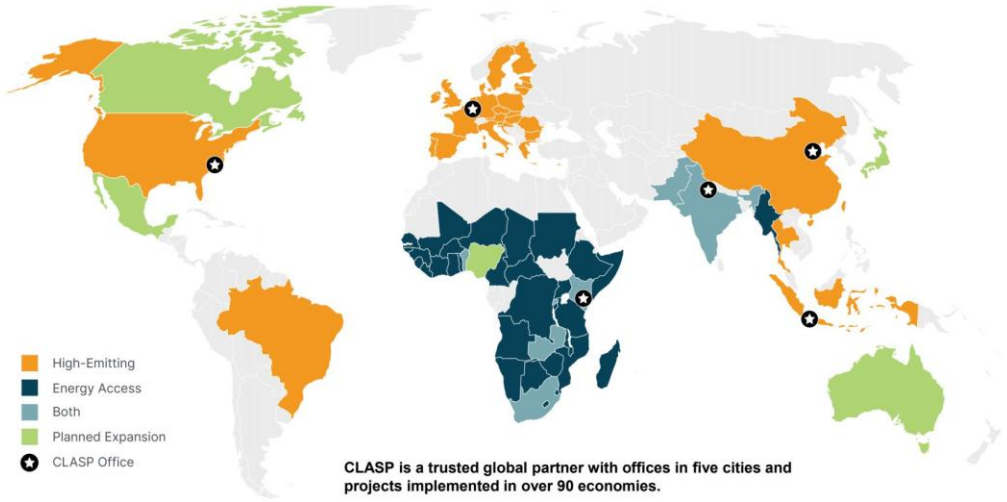
ITRI
Industrial Technology
Research Institute

Session 3


CLASP Tools for Global MEPS Analysis
Steven Zeng, Director of China Program, CLASP
Seoul, Nov 18, 2025
clasp
Efficient Appliances for People & the Planet


ABOUT CLASP
CLASP is the leading global authority on appliances' role in fighting climate change and promoting sustainable development.
CLASP provides sound recommendations, innovative tools, and groundbreaking research to advance appliance policy, technology, financing, and markets. It focuses on the appliances most critical to reducing emissions and improving lives and livelihoods.
Areas of Expertise
• Energy and quality standards
• Labeling and buyer education
• Awards and product recognition
• Compliance, testing, and quality assurance
Where We Work
• Global offices: China, Europe, Indonesia, India, Kenya, Brazil and the United States
• Projects implemented in over 90 economies

Where we work



CLASP is a trusted global partner with offices in five cities and projects implemented in over 90 economies.

3

Agenda

- Appliance policies globally
- Challenges during MEPS design or implementation
- Measuring impact: CLASP tools
- Q&A

4

Appliances have a major impact on our climate

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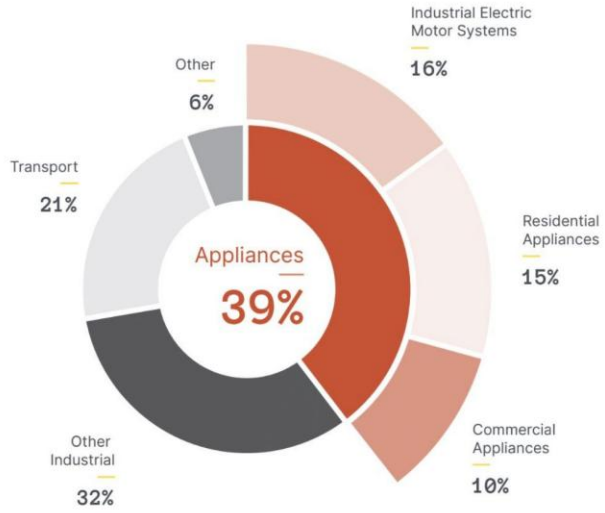

Appliances are responsible for 39.3% of energy-related CO_2 emissions.

These emissions are equal to roughly the total CO_2 emissions from China, Europe, and Brazil.

5

Appliance efficiency programs cut electricity consumption by ~15%

clasp

Appliance energy efficiency policies are one of the most cost-effective solutions to reduce emissions and should be a cornerstone in any climate mitigation strategy.

There are **86** economies with mandatory MEPS and labels for appliances, while over **120** economies employ appliance standards and labeling programs in some capacity.

China has 70+ appliance efficiency policies.

European Union efficiency policies cover 31 appliances.

India has efficiency policies for 34 appliances.

United States efficiency policies cover 60+ appliances.

CLASP. "Net Zero Heroes: Scaling Efficient Appliances for Climate Change Mitigation, Adaptation & Resilience." CLASP, 2023.

6

10 top emitting economies in the appliance sector

clasp

Table 1. Appliance Energy Efficiency Potential – Based on Business-as-usual CO_2 Emissions		
Priority	**Economies**	**Megatons (Mt) CO_2 2025-2040**
1	China	39,564
2	EU-27	29,265
3	India	26,754
4	USA	20,260
5	Japan	10,306
6	The Russian Federation	5,245
7	Indonesia	4,486
8	Canada	4,110
9	United Kingdom	4,101
10	Republic of Korea	3,668

7

Potent products

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- Several products dominate energy use, emissions, and other impacts
- Addressing them in one place can create spillovers elsewhere:
  - Global conventions and pledges
  - Targeting major manufacturers
  - Product recognition

Industrial motors: 69% of industrial electricity

Cooling: 5% of buildings energy but growing

Heating: 32% of buildings energy; electrification will reduce methane

Lighting: 6% of buildings energy; mercury reduction

Cooking: health benefits from indoor air quality

8

Challenges during MEPS design or implementation

Data gaps and technical capacity – Limited access to reliable market, performance, and cost data for appliances and equipment; insufficient local testing and analytical capacity to support standard setting.

Industry resistance and stakeholder alignment – Manufacturers may resist stricter standards due to perceived cost impacts or competitiveness concerns; balancing diverse interests takes time.

Institutional coordination – Fragmented responsibilities among ministries, standards bodies, and enforcement agencies can slow decision-making and weaken implementation.

Testing and compliance infrastructure – Inadequate accredited laboratories, inconsistent testing protocols, and limited market surveillance reduce policy credibility and impact.

Challenges during MEPS design or implementation

Timely updates and revision cycles – Standards often lag behind technology advances, missing opportunities for higher energy savings and locking in inefficiency.

Market enforcement and monitoring – Weak enforcement mechanisms and limited resources for inspections or product sampling undermine compliance.

Consumer awareness and labeling linkage – Low awareness of energy labels and limited use of MEPS in procurement or incentive programs reduce demand-side pull.

International harmonization and trade pressures – Differences in test methods and efficiency metrics create barriers for regional trade and complicate alignment with global best practices.

International comparison of efficiency levels for four appliances
Minimum Energy Performance Standards (MEPS) and Best Available Technology (BAT)

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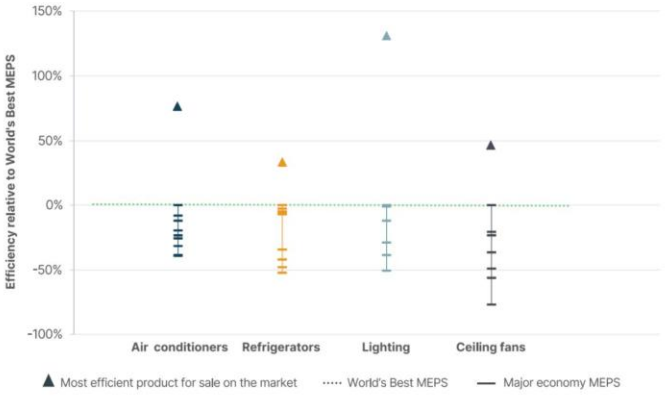


- Most economies MEPS fall short of the world's most stringent MEPS
- Even best-in-class MEPS remain well below the efficiency levels of the best available technologies
- This gap represents an opportunity to further reduce energy use and emissions

Source: CLASP *World's Best MEPS* study

11

clasp.ngo/tools

Net Zero Appliances NDC Toolkit
Incorporate climate-friendly targets for appliance efficiency into NDCs

World's Best MEPS
Comparison of world-leading appliance efficiency standards

Mepsy
Model the impacts of energy and carbon reduction policies

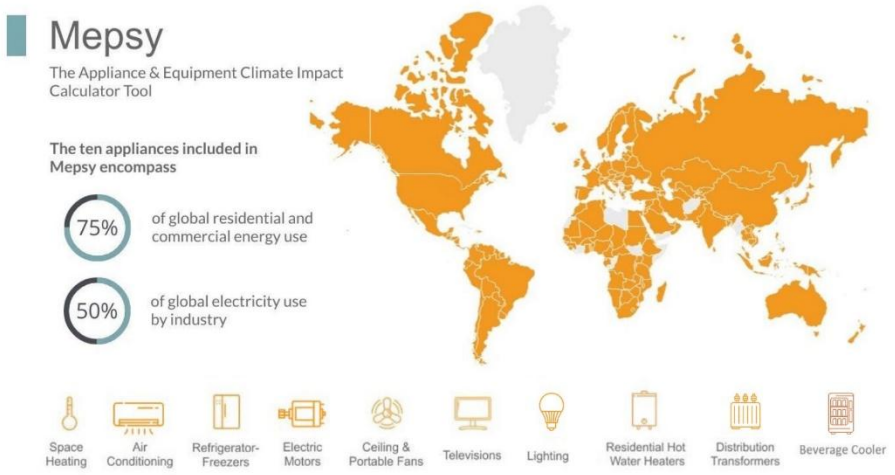
CPRC
Searchable database of 1500+ quality, water, and efficiency policies

VeraSol
Solar-powered and off-grid appliance database

Compliance Toolkit
Resources to help design effective compliance strategies

Computer Testing Tool
Measure the power and performance of a personal computer

What is Mepsy?



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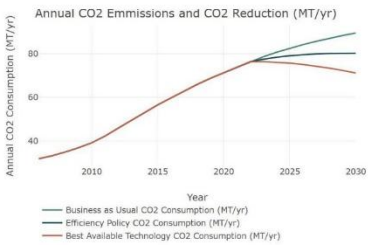
What makes Mepsy unique?

- Visuals intended to support policymaking
- Ability to create custom outputs by downloading data:

Download Model Results



- Prioritization of economies and appliances
- Analysis of different policy scenarios
- Presentation of cost- benefits, paybacks, and tons

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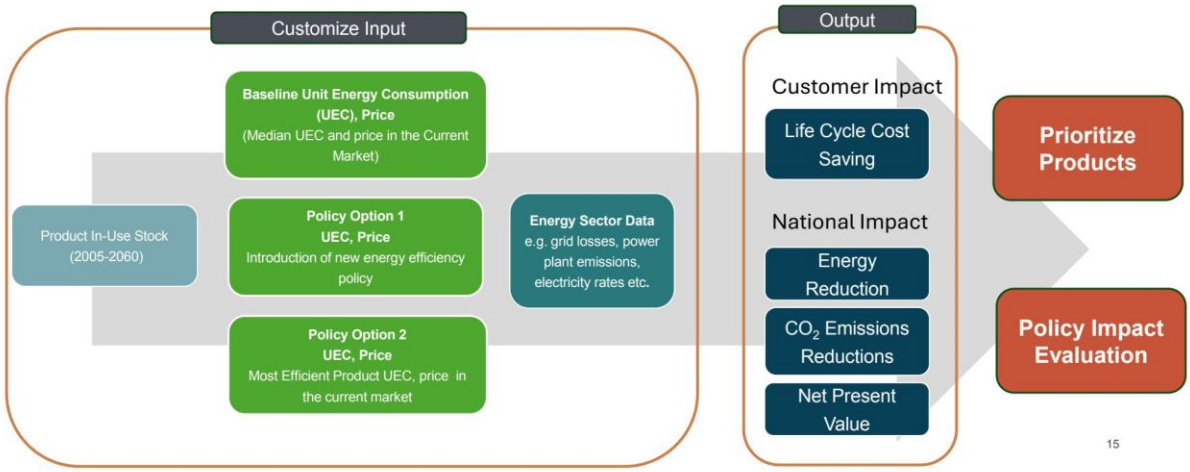
Methodology

clasp

- Bottom-up stock accounting model



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Mepsy Graphical User Interface (GUI)

clasp

1. Economies dropdown
2. Appliance selector
3. Impact metric selector
4. Policy scenario
5. Year
6. Economies detailed analysis button
7. Appliance comparison
8. Economies comparison
9. Download scenario data
10. Export PDF/PPT

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Thank you!
Any questions?

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clasp
Efficient Appliances for People & the Planet

clasp.ngo

MEPS for Appliances and Equipment: A Roadmap for APEC Economies

Dr. Zhuolun Chen
Senior Advisor on Energy Efficiency & Finance
LEED AP, CMVP, CFA & CFA-Sustainable Investment

2025.11.18. Capacity Building Workshop on Energy Efficiency and Conservation Policy

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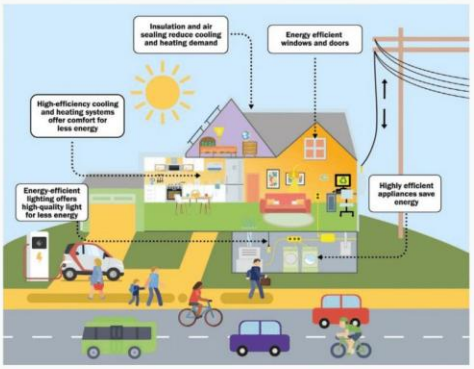
APEC's Energy Challenge Demands Urgent Action on Efficiency



56%
Global Energy Demand

60%
Global CO_2 Emissions

1.9% per year
Energy intensity improvement since 2005

THE CHALLENGE

Absolute energy consumption continues to rise despite efficiency gains due to economic growth, demographic shifts, and urbanization. This underscores the urgent need for **scalable, enforceable policy instruments** that can deliver immediate and lasting energy savings across the region.

MEPS Deliver Multiple Benefits Beyond Energy Savings

ECONOMIC

Consumer savings: Lower electricity bills

Deferred infrastructure: Avoided generation costs

Innovation: Market creation for efficient tech

ENVIRONMENTAL

Climate: Reduced CO_2 emissions

Air quality: Lower power plant emissions

Resources: Water conservation

SOCIAL

Affordability: Reduced energy poverty

Health: Improved air quality benefits

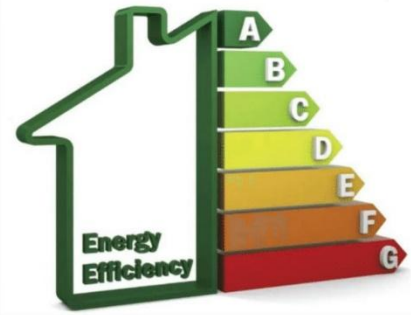
Security: Lower import dependence

TRADE

Harmonization: Reduced technical barriers

Markets: Expanded opportunities

Standards: Level playing field



MEPS represent one of the most cost-effective policy instruments available to governments, delivering immediate savings while incentivizing continuous innovation.

Case Study: SE4ALL- Sustainable Cooling and the Role of MEPS

Sustainable Energy for All's Cooling for All programme advocates for sustainable cooling solutions that are affordable, reliable, and use environment-friendly technologies. The programme addresses three critical cooling needs: human comfort and safety, food preservation and agriculture, and healthcare cold chains.

THE CHALLENGE

1.12 billion

people at high risk due to lack of cooling access

MEPS IMPACT

1.07 billion

appliances compatible with household electricity through MEPS

EFFICIENCY TARGET

4× lower

energy consumption with international best practice MEPS

SE4ALL KEY FINDINGS ON MEPS FOR COOLING

Refrigerators-Freezers: MEPS make an additional **133 million efficient units** viable, reaching 470 million total units compatible for 71% of households at medium and low risk. Market shift extends viability for **75 million additional poor households** in 40 economies.

Air Conditioners: Introduction of MEPS increases compatibility by an additional **15 million energy-efficient AC units** (+16% compared to business-as-usual), critical for households with limited electricity access.

Fans: Even with baseline efficiency, **490 million units** viable in 2030. MEPS aligned with international best practices reduce energy demand and free up household resources (electricity capacity and disposable income).

Equity Impact: MEPS expand cooling access for vulnerable populations by reducing appliance energy consumption, making cooling affordable for low-income households with limited electricity access.

SE4ALL'S THREE COOLING NEEDS FRAMEWORK

HUMAN COMFORT & SAFETY

Air conditioners and fans for thermal comfort, heat stress prevention, and climate adaptation

FOOD & AGRICULTURE

Refrigerators and cold chains for food preservation, reduced waste, farmer income, and nutrition

HEALTHCARE

Medical cold chains for vaccine storage, medicine preservation, and healthcare facility cooling

Pathways for Advancement: Scaling Up MEPS Ambition

PHASED IMPLEMENTATION APPROACH

PHASE 1 — Year 1
Foundation Building: Market data collection, baseline assessment, institutional coordination mechanisms, stakeholder engagement, define roles and responsibilities

PHASE 2 — Year 1-2
Standard Development & Capacity Building: Adopt international test methods (ISO 16358), establish accredited testing labs, develop draft standards, pilot testing

PHASE 3 — Year 2-3
Implementation & Market Transformation: Adopt and publish standards, implement energy labeling, launch awareness campaigns, begin market surveillance and enforcement

PHASE 4 — Year 3-5
Monitoring & Revision: Track market transformation, evaluate impacts, assess compliance rates, plan standard revisions based on technology advancement and market readiness

TECHNOLOGY ROADMAPS

Air Conditioner Efficiency Progression

Fixed-speed (EER 2.5-3.0) → Variable-speed inverter (CSPF 5.0-6.1) → Advanced optimization (CSPF 6.5+)

Key Technology Drivers

→ Variable-speed compressors: 25-60% energy savings
→ Low-GWP refrigerants (R-32): 10-15% efficiency gain + 68% GWP reduction
→ Enhanced heat exchangers, ECM fans, smart controls
→ Seasonal metrics (CSPF) capture real-world performance

REGIONAL ALIGNMENT STRATEGIES

ASEAN Harmonization Model

Common test method (ISO 16358) + minimum performance level (CSPF 5.0) + "floor not ceiling" approach allowing individual economies to adopt more stringent standards

Benefits of Regional Coordination

→ Reduced compliance costs for manufacturers
→ Economies of scale in testing and certification
→ Enhanced market surveillance through information sharing
→ Accelerated technology diffusion across markets

Residential Cooling Demand Presents Both Challenge and Opportunity

CHALLENGE
~1/3 of electricity growth
from cooling in Asia-Pacific

OPPORTUNITY
25-60% savings
variable-speed vs. fixed-speed ACs

SOLUTION
ISO 16358
Seasonal performance metric

ASEAN SUCCESS STORY: Estimated Savings by 2040

144 TWh	101M	$16B	66
Electricity saved	Tonnes CO_2 avoided	Consumer savings (USD)	500-MW power stations avoided

Metrics for Measuring MEPS Impact

ENERGY SAVINGS

Unit-level: Annual electricity consumption (kWh/year) per appliance, baseline vs. actual performance

Aggregate: Total demand reduction (TWh), peak load reduction (MW), stock turnover modeling

Climate-adjusted: Cooling degree days, usage patterns, real-world performance factors

EMISSIONS REDUCTIONS

GHG emissions: CO_2 reductions using grid emission factors (average or marginal), NDC contribution

Co-pollutants: SO_2, NOx, PM2.5 from reduced power generation, health impact assessment

Direct emissions: Low-GWP refrigerant adoption, HFC phasedown contribution

ECONOMIC BENEFITS

Consumer savings: Reduced electricity bills, life-cycle cost analysis, payback periods

Avoided infrastructure: Generation capacity ($/kW), transmission and distribution, fuel costs

Employment: Testing and certification services, manufacturing, efficiency program jobs

EQUITY IMPACTS

Access expansion: Number of households for whom efficient appliances become viable

Affordability: Percentage of households that can afford cooling services, freed-up resources

Vulnerable populations: High-risk individuals gaining cooling access (gender-disaggregated)

MEASUREMENT APPROACHES

Bottom-Up Engineering

Unit energy savings × number of compliant units. Uses technical reference manuals, product testing data, stock turnover models. Provides detailed product-specific estimates.

Top-Down Econometric

Time-series or panel data analysis of aggregate consumption. Controls for economic growth, weather, prices, other policies. Captures market transformation effects.

Hybrid Validation

Engineering calculations as primary method, econometric analysis for validation. Addresses uncertainty, bias (free ridership, rebound, spillover). DOE EM&V best practice.

Key Principle: Establish clear baselines and counterfactual scenarios that isolate MEPS impacts from other market trends. Include uncertainty ranges and address potential sources of bias transparently.

Evaluation Frameworks and Best Practices

EVALUATION PLANNING (DOE EM&V FRAMEWORK)

OBJECTIVES & METRICS

Define clear evaluation objectives aligned with program goals. Specify metrics for impact, process, and market effects evaluation. Address stakeholder information needs.

TIMING & FREQUENCY

Process evaluation: 6-12 months post-implementation. Impact evaluation: 2-3 years when sufficient data available. Periodic updates: every 3-5 years for standard revision.

STAKEHOLDER NEEDS

Policymakers: aggregate impacts. Administrators: compliance data. Industry: clear requirements. Public: transparent benefit reporting. Budget 3-5% for evaluation.

DATA COLLECTION AND MANAGEMENT SYSTEMS

PRODUCT REGISTRATION

Mandatory database of all models offered for sale. Includes technical specifications, energy performance ratings, test reports from accredited labs. Enables market surveillance and compliance tracking.

MARKET SALES DATA

Sales-weighted efficiency analysis tracks market transformation. Sources: manufacturer shipments, retailer point-of-sale, import/export statistics. Monitor units sold, revenue, market share by efficiency level.

ENERGY CONSUMPTION

Smart meter data for appliance-level consumption. Metering studies with sub-meters for detailed analysis. Surveys on usage patterns, maintenance, consumer satisfaction. Validate engineering estimates.

COMPLIANCE VERIFICATION

Check testing programs randomly purchase products from retail. Verify performance against declared ratings. Track non-compliance patterns by manufacturer/category. Penalties: recalls, fines 5-10% of annual sales.

EVALUATION BEST PRACTICES

Baseline Establishment

Use adjusted baselines that project pre-MEPS efficiency trends forward. Avoid historical baselines if efficiency was already improving. Consider comparison groups from non-MEPS markets.

Uncertainty Quantification

Include confidence intervals or uncertainty bands. Use Monte Carlo simulation or sensitivity analysis. Communicate precision of estimates to policymakers and stakeholders.

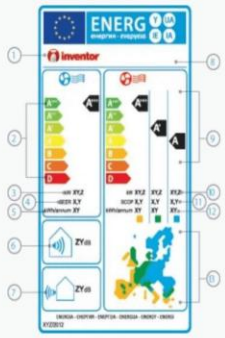
Addressing Bias

Account for free ridership, rebound effects, and spillover. Transparently discuss treatment of each factor. Use hybrid approaches combining engineering and econometric methods for validation.

Case Study: ASEAN Harmonization Shows Power of Regional Cooperation

ASEAN AC HARMONIZATION PROJECT

Regional harmonization of air conditioner efficiency standards based on ISO 16358 metric



Harmonized energy label example

KEY SUCCESS FACTORS

1. Regional harmonization reduces costs and complexity for manufacturers and regulators

2. ISO 16358 adoption aligns with international standards and best practices

3. Simplified testing protocols for both fixed-speed and variable-speed ACs lower compliance burden

4. Technical support from UNEP, Lawrence Berkeley Lab, and U4E provided expertise

5. Stakeholder engagement through Technical Working Group ensured buy-in

TRANSFERABLE LESSONS FOR APEC

→ Single set of temperature bin hours for entire region simplifies implementation

→ Combining fixed-speed and variable-speed under same metric enables consumer comparison

→ Phased implementation with capacity building supports gradual adoption

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Case Study: EU Energy Label Demonstrates Impact of Complementary Policies

79% of purchase decisions

EU energy label influences nearly 4 out of 5 appliance purchase choices, driving continuous market transformation

KEY SUCCESS FACTORS

→ MEPS and labeling as complementary policies

→ Mandatory display online and in stores

→ Comprehensive stakeholder consultation

→ Product registration database (EPREL)

→ Regular revisions for technology improvements

CASE OVERVIEW

Policy: EU Energy Label with A-G comparative scale, color coding (green to red), mandatory display in-store and online

Timeline: Implemented since 1995 alongside MEPS. 2021 rescaling returned to simple A-G from A+++ scale

Integration: MEPS eliminate worst products (D-G rated), labeling drives market pull toward high efficiency (A-B rated)

GOVERNANCE LESSONS

Coordinate policy development across energy ministries, standards bodies, market surveillance, and customs

Invest in consumer research to improve label design and effectiveness

Anticipate need for revisions from the start with clear triggers and procedures

Manage consultation to prevent industry capture and delays

2014 evaluation and 2020 Court of Auditors report confirmed contribution to EU energy efficiency and climate goals

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Institutional Coordination is Critical for Effective Implementation

GOVERNMENT DEPARTMENTS

Energy/Environment Ministry
Policy development, performance targets, program oversight

Standards/Standardization Body
Technical specifications, international alignment, revision cycles

Market Surveillance Authority
Compliance enforcement, verification testing, enforcement actions

Customs/Trade Authority
Import controls, conformity verification, border enforcement

Consumer Protection Agency
Consumer interests, complaint handling, labeling accuracy

EXTERNAL ORGANIZATIONS

Accreditation Bodies
Laboratory accreditation (ISO/IEC 17025), quality assurance

Testing Laboratories
Conformity assessment, verification testing, certification

Industry Associations
Stakeholder representation, consultation facilitation, capacity building

International Organizations
Model regulations (U4E), research (IEA), technical assistance (CLASP)

COORDINATION MECHANISMS

Establish inter-ministerial working groups with regular coordination meetings, clear information sharing protocols, and defined escalation procedures for enforcement issues.

Aligning with International Standards Reduces Barriers and Costs

BENEFITS OF ALIGNMENT

✓ Reduces technical barriers to trade
✓ Leverages existing supply chains
✓ Simplifies compliance for manufacturers
✓ Enables technology transfer

U4E MODEL REGULATION GUIDELINES - KEY TARGETS

LIGHTING	90 lm/W (LED transition), advanced target 120 lm/W
ELECTRIC MOTORS	IE3 efficiency class (IEC 60034-30-1)
AIR CONDITIONERS	CSPF 5.1 Wh/Wh (ISO 16358 standard)
REFRIGERATORS	279 kWh/year (400L unit), intermediate target 223 kWh/year
WATER HEATERS	≥90% efficiency (gas), ≥100% efficiency (electric storage)
SPACE HEATING	≥90% efficiency (fossil fuel), 100% efficiency (electric)

Most appliances are manufactured in or source components from major economies like China, making it feasible for APEC economies to adopt similar standards and leverage global supply chains.

Identifying and Communicating Co-Benefits Strengthens Policy Support

ECONOMIC

Consumer savings: Lower electricity bills, reduced total cost of ownership

Deferred infrastructure: Avoided power generation, transmission, distribution costs

Industrial competitiveness: Innovation stimulus, market creation

Job creation: Testing, certification, manufacturing, efficiency services

ENVIRONMENTAL

Climate mitigation: Direct CO_2 reduction, NDC contribution, net-zero support

Air quality: Reduced power plant emissions (SO_2, NOx, particulates)

Water conservation: Reduced cooling water for power plants

Resource conservation: Lower fuel consumption, reduced imports

SOCIAL

Energy affordability: Lower costs for low-income households, reduced energy poverty

Health benefits: Improved air quality, reduced respiratory disease

Energy security: Reduced import dependence, lower price volatility

Consumer protection: Minimum quality assurance, accurate information

BEST PRACTICES FOR CO-BENEFIT ASSESSMENT

- ✓ Use established methodologies (IEA Multiple Benefits framework)
- ✓ Conduct baseline and counterfactual analysis
- ✓ Engage multiple stakeholders in benefit identification
- ✓ Use conservative assumptions for credibility
- ✓ Monetize benefits where possible
- ✓ Update assessments as new data becomes available

Quantifying and communicating the full range of MEPS co-benefits is essential for building political support, securing sustained funding, and maintaining public acceptance beyond energy efficiency advocates.

Recommendations for APEC Member Economies

FOR ECONOMIES DEVELOPING INITIAL MEPS PROGRAMS

1. Adopt U4E Model Regulations: Use U4E guidelines for priority products (ACs, refrigerators, fans). Adopt ISO 16358 CSPF for air conditioners to capture seasonal performance and incentivize variable-speed technology.

2. Establish Institutional Coordination Early: Define clear roles across departments before launch. Create interagency working groups with written terms of reference. Learn from ASEAN's facilitated coordination model.

3. Invest in Testing Laboratory Capacity: Pursue ISO/IEC 17025 accreditation for relevant test methods. Consider regional cooperation through shared facilities or mutual recognition. Budget $500K-2M for comprehensive capability.

4. Implement MEPS and Labeling Together: Design as integrated policies from outset. Use comparative labels (A-G or star ratings) to drive consumer demand beyond regulatory minimums. Ensure online and in-store display.

FOR ECONOMIES SCALING UP EXISTING MEPS PROGRAMS

5. Develop Technology Roadmaps: Map pathways from current market performance to future efficiency potential. Establish triggers for standard updates: 25-30% high-efficiency market share, technology breakthroughs, or periodic reviews (3-5 years).

6. Strengthen Market Surveillance: Invest in check testing programs and non-compliance penalties. Allocate 10-15% of program resources to surveillance. Implement risk-based targeting of high-volume products and new entrants.

7. Quantify and Communicate Co-Benefits: Use IEA Multiple Benefits framework to assess economic, environmental, and social co-benefits beyond energy savings. Follow SE4ALL's model for equity-focused impact assessment.

8. Pursue Regional Alignment: Engage in APEC cooperation on test method harmonization, information sharing, and mutual recognition. Consider bilateral or plurilateral harmonization with neighbors or major trading partners.

CROSS-CUTTING PRIORITIES FOR ALL APEC ECONOMIES

Focus on Residential Cooling

Given SE4ALL findings that cooling drives 1/3 of electricity growth in Asia-Pacific and ASEAN's demonstrated impact (144 TWh savings, 101M tonnes CO_2 avoided, $16B consumer savings), prioritize residential cooling in MEPS programs.

Leverage External Organizations

Engage U4E for model regulations, CLASP for implementation assistance, IEA for research and best practices, SE4ALL for sustainable cooling frameworks. Participate in international networks and capacity building programs.

Invest in Data Systems

Establish product registration databases, market sales monitoring, energy consumption tracking, and compliance verification. Use DOE EM&V framework for evaluation planning. Budget 3-5% of implementation costs for evaluation.

Advancing MEPS Implementation: Key Takeaways

PATHWAYS FOR ADVANCEMENT

Systematic phased approach from foundation building through monitoring and revision. Technology roadmaps guide standard progression. Regional alignment (ASEAN model) delivers economies of scale and accelerates technology diffusion.

METRICS FOR IMPACT

Comprehensive measurement across energy savings, emissions reductions, economic benefits, and equity impacts. Bottom-up engineering calculations validated by top-down econometric analysis. SE4ALL framework for equity-focused assessment.

EVALUATION FRAMEWORKS

DOE EM&V framework provides comprehensive evaluation planning guidance. Robust data systems (product registration, market sales, consumption monitoring, compliance verification) enable evidence-based policy. Budget 3-5% for evaluation activities.

LESSONS FROM EXPERIENCE

ASEAN harmonization demonstrates value of international standards, facilitated coordination, and "floor not ceiling" approach. EU label evolution shows power of complementary policies and need for periodic rescaling. Both provide actionable guidance for APEC.

THE RESIDENTIAL COOLING OPPORTUNITY

Residential cooling presents both the greatest challenge and opportunity for APEC economies. SE4ALL's analysis demonstrates that MEPS aligned with international best practices could make **1.07 billion cooling appliances compatible** with household electricity services while reducing energy consumption by **4×**. ASEAN's harmonization projects **144 TWh of electricity savings, 101 million tonnes of CO_2 emissions avoided, and $16 billion in consumer savings** by 2040.

The time to act is now, as cooling demand continues its rapid growth trajectory and the window for cost-effective climate mitigation narrows. MEPS represent a proven, cost-effective policy instrument that APEC economies can deploy immediately to achieve energy security, economic, environmental, and equity objectives simultaneously.

Energía
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CONUEE
COMISIÓN NACIONAL PARA EL USO EFICIENTE DE LA ENERGÍA

Energy Efficiency Standards in Mexico

2025 Año de La Mujer Indígena

November 2025

Energía
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CONUEE

Energy Efficiency Standards in Mexico

1989: The National Commission for Energy Conservation (CONAE)

- Conae was established on September 28, 1989, by a presidential decree, as an Intersecretarial Commission.
- **One of its first mandates was standardization for energy efficiency.**

Its mission was to serve as a technical advisory body.

2025 Año de La Mujer Indígena

2008: Creation of CONUEE

- **In 2008, the Law for Sustainable Energy Use (LASE) created the Nacional Commission for the Efficient Use of Energy (CONUEE)**
- **Energy Transition Law (LTE):** Published in December 2015. Add planning functions to CONUEE *(Now Energy Transition and Planification Law [LTPE] published in April 2025).*
- CONUEE is currently the agency responsible for drafting mandatory technical regulations on energy efficiency (NOM-ENER).

Energía | CONUEE

Secretaría de Energía

Comisión Nacional para el Uso Eficiente de la Energía

In Mexico exists 33 active NOM-ENER

27 NOM-ENER for products

6 NOM-ENER for systems

The NOM-ENER establishes the minimum or maximum energy consumption of the products or systems.

The NOM-ENER are standard that lead to new products and systems becoming increasingly efficient

2025 Año de La Mujer Indígena

Conformity Assessment Bodies

Their function is to **assess the conformity of a product or system** according to a specific standard. In the case of NOM-ENER for products, Testing Laboratories (LP) carry out the tests and Product Certification Bodies (OCP) ensure compliance with the Conformity Assessment Procedure (PEC).

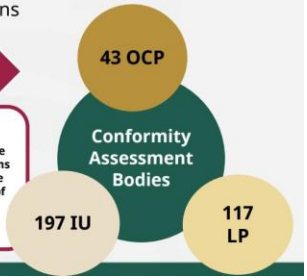
In case of NOM-ENER for systems, the Inspection Bodies (UI) evaluate the systems by in situ verifications

Accreditation Process → Approval Process → Conformity Assessment Body

Accreditation Compliance with the requirements of ISO 17020, 17025 or 17065. It is conducted by an accreditation body approved by the Economy Ministry

Approval Compliance with the requirements of Infrastructure Quality Law. **It is conducted by CONUEE.**

These are the only organisms to assess the conformity of NOM-ENER



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Comisión Nacional para el Uso Eficiente de la Energía

Program "Change your old one by new one" "Cambia tu viejo por uno nuevo" (2009-2010)

Criteria:
- ✓ Term 4 years with rate and fixed payments
- ✓ Bonus up to USD$150 and financing up to USD$725

Main results:
- ✓ In just 22 months, more than 939 thousand were replaced (375 million dollars).
- ✓ Support for the family economy: the credit is almost amortized with the savings on the electricity bill
- ✓ Reduction of subsidies in electricity rates
- ✓ Support for the commercial and productive sector

9 % window type air conditioner **(NOM-021-ENER/SCFI/ECOL-2008 y NOM-023-ENER-2010)** split air condition (on/off)

91% Refrigerators (NOM-015-ENER-2002)

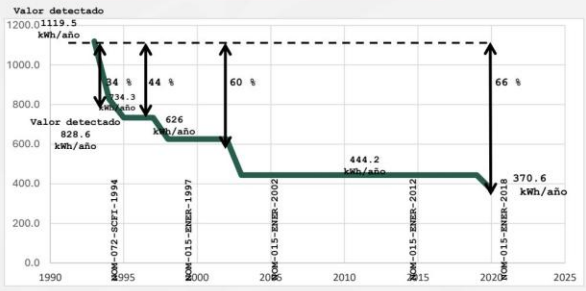
2025 Año de La Mujer Indígena

Estimated savings:
- ✓ 823.1 GWh
- ✓ Emissions avoided 549.3 Miles tCO2, 1.5 Million barrels of oil not consumed

Evolution of Energy Efficiency Standards for Refrigerators (NOM-015-ENER-2018)

25 years ago, a new medium-sized refrigerator consumed **1,200 kWh/year**

Today, an average household in a temperate climate consumes **1,000 kWh/year.**

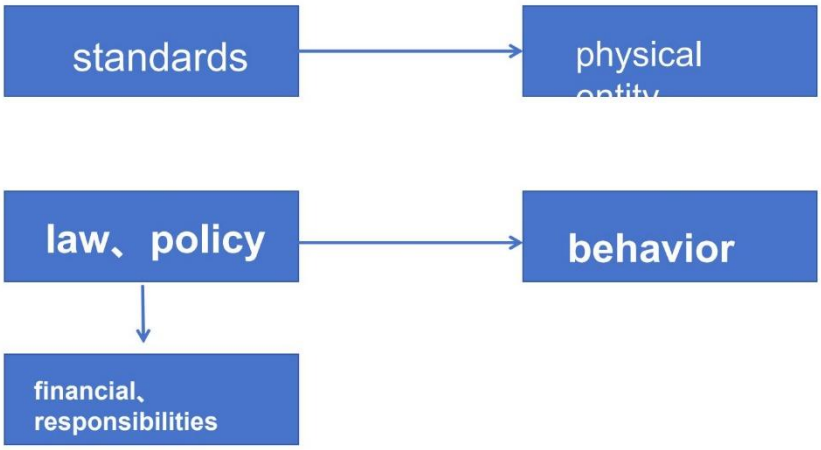


北京科技大学
University of Science and Technology Beijing

Key factor to promote executing MEPs

Dr.CAO Dongyuan

18 Nov.2025



MEPs mainly in:

1、construction industry for new and renovated residential and public buildings.

2、electrical appliances

3、industrial equipment

Law

《energy conservation law》《product quality law》《Consumer Protection Law》

Department regulation

1、Construction Department

《Energy Conservation Regulations for Civil Buildings 》

《Regulations on Energy Conservation in Buildings》

《General specification for building energy conservation and renewable energy utilization》

2、National Development and Reform Commission

《Energy Efficiency Labeling Management Measures》

3、TAX Department

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THANKS

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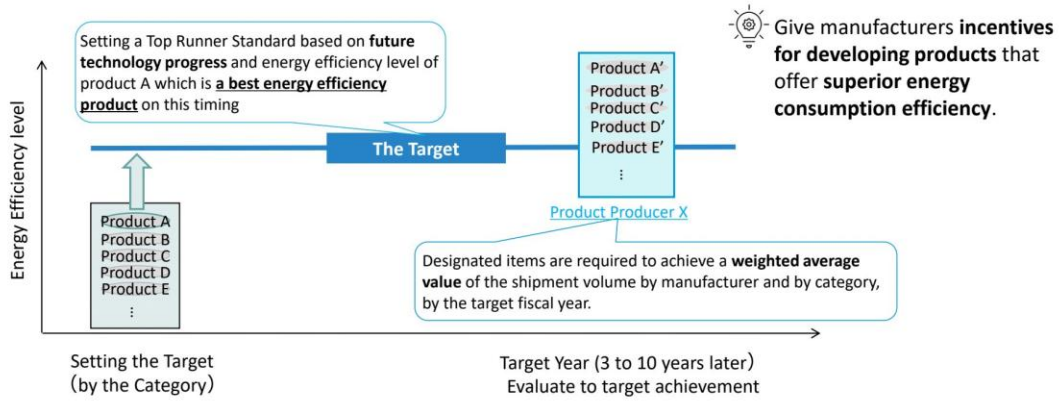
APERC Capacity-Building Workshops for Energy Efficiency and Conservation Policy,
November 18, 2025

Top Runner Approach for home appliances and equipment in Japan

INSTITUTE OF ENERGY ECONOMICS, JAPAN (IEEJ)
CLIMATE CHANGE AND ENERGY EFFICIENCY UNIT
KIM SEONGHEE, PH.D

Outline of Top Runner Approach

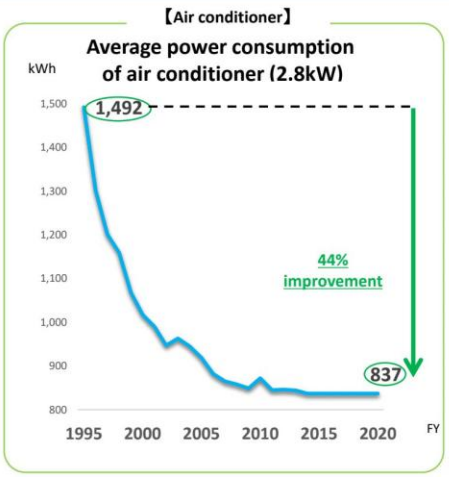
- **In 1998**, Government of Japan decided to introduced energy efficiency standard by **Top Runner Approach** for home appliances and Vehicle on the revised Energy conservation law.
- Now, this energy efficiency standard are expanding to **32 products** include building materials such as insulation, window which are designated to energy consumption equipment/appliance by the law.
- If the product producer doesn't meet the goal and needs to improve energy efficiency, the government can take action through **recommendations**, **announcements**, **orders**, and **penalties**. **(up to million JPY)**.



Give manufacturers **incentives for developing products** that offer **superior energy consumption efficiency**.

The effect of Top runner program in Japan

- Due to the efforts by manufacturers and others, each product category attained **efficiency improvement that exceeds initial expectations**.



	Energy efficiency improvement(result)	Energy efficiency improvements (initial expectation)
Passenger vehicles	48,8% (1995→2010)	22.8%
Air conditioners, Non-ducted/wall mounted, 4kW or less	16.3% (2005→2010)	22.4%
Refrigerators	43.0% (2005→2010)	21.0%
Electric rice cookers	16.7% (2003→2008)	11.1%
TV Sets	60.6% (2008→2012)	37.0%
Copying machines	72.5% (1997→2006)	30.9%
Gas cooking appliances	25.8% (2002→2008)	20.3%
Vending machines	48.8% (2005→2012)	33.9%
Routers	40.9% (2006→2010)	16.3%

Source : IEA,Tracking Clean Energy Progress, https://www.iea.org/reports/tracking-clean-energy-progress-2023
Agency for Natural Resource and Energy(2015), Top runner program, https://www.asiaeec-col.eccj.or.jp/wpdata/wp-content/uploads/toprunner2015.pdf

3

Breakout Session

Breakout Session

Objective

- To explore common barriers and success factors in implementing S&L Programs across APEC Economies

Discussion Focus

1. **Barrier Identification**
    1. Identify key barriers (2-3 per person)
    2. Prioritize and agree on a list
2. **Actionable Recommendations**
    1. For each priority barrier, outline practical strategies that could be implemented within a 1–5 year timeframe.
    2. Consider feasibility, responsible actors, and enabling conditions.
3. **Targeted Support Needs**
    1. Identify tools, partnerships, capacity-building measures, or other support that would strengthen MEPS implementation.

Expected Output

Each group will present:

- List of barriers
- Practical, recommendations for addressing them
- Suggested support mechanisms (tools, partnerships, resources)

Facilitators will support the groups in guiding the discussion and capturing outcomes

Reflections and Next Steps

Asia-Pacific Economic Cooperation

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Next Steps

Capacity Building Workshop on Energy Efficiency and Conservation Policy (EWG_205_2024A)
Theme: *"Members' Journey with MEPS"*

Oakwood Premier COEX CENTER SEOUL, Seoul, Korea
18 November 2025

Ms Elvira Torres Gelindon, Research Fellow

Outline

- At the workshop
- After the workshop
- Final thoughts

APERC

At the workshop

❖Post evaluation
- Complete the APEC Project Evaluation Survey

❖ Theme for Phase 2 and future workshops
- Any ideas for a theme?

❖ Leveraging member insights on best practices, challenges, and opportunities
- Have you thought of a best practice that you can share with your policy makers?

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After the workshop

Sustainability

❖ **Workshops and Surveys**
- Phase 2 - Next EGEEC (67) meeting
- Follow-up workshop (*What have you done after the Journey?)*
- Post evaluation survey
  - determine whether the recommendations will be adopted
  - Challenges to MEPS policy implementation were addressed

❖ **Workshop Summary Report**
- Published on the APEC and APERC websites
- Best practices sharing as a reference for addressing challenges and opportunities
- Reference for recommendations

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❖ *LTEAP (6 months after the project completion date)*

Final thoughts

- Continue collaboration with EGEEC and other APEC fora and expert groups.
- Effective policy implementation depends on robust cooperation across agencies.
- Member exchanges of best practices, challenges, and opportunities serve as a valuable starting point for shaping future policies.
- Finally, thanks to the experts who provided valuable insights and recommendations, to the consultants for ensuring a smooth workshop (who will also deliver a valuable report) and the active participation of all the participants.

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Thank you.

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