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meetMED
Mitigation Enabling Energy Transition in the MEDiterranean region
Together We Switch to Clean Energy

REGIONAL MEPS HARMONIZATION AND CERTIFICATION

LESSONS LEARNED FROM INTERNATIONAL EXPERIENCES

MED ENER

RCREEE
Regional Center for Renewable Energy and Energy Efficiency
المركز الإقليمي للطاقة المتجددة وكفاءة الطاقة

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ABOUT THE PROJECT

The Mitigation Enabling Energy Transition in the Mediterranean region “meetMED” is an EU-funded project developed by the Mediterranean Association of the National Agencies for Energy Management (MEDENER) and the Regional Centre for Renewable Energy and Energy Efficiency (RCREEE).
With the objective of contributing to energy and climate transition Southern Mediterranean Neighbourhood through a multi-scale, multi-partner inclusive approach, meetMED II activities aim at developing a more stable, efficient, competitive, and climate-resilient socioeconomic environment in Southern Mediterranean countries, by fostering regional cooperation for Energy Efficiency measures and implementing demo actions.

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LIST OF ABBREVIATIONS

ASEAN	Association of Southeast Asian Nations
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization
EA	European Cooperation for Accreditation
EC	European Commission
EFTA	European Free Trade Association
EPREL	European Product Database for Energy Labeling
ETSI	European Telecommunications Standards Institute
EU	European Union
GPP	Green Public Procurement
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
MEETMED	Mitigation Enabling Energy Transition in the Mediterranean Region
MEPS	Minimum Energy Performance Standards
MLA	Multilateral Agreement
MRA	Mutual Recognition Agreement
NAB	National Accreditation Body
NGO	Non-Governmental Organization
NSB	National Standardization Body
RAC	Room Air Conditioner
SADC	Southern African Development Community
SCOP	Seasonal Coefficient of Performance
SEER	Seasonal Energy Efficiency Ratio

EXECUTIVE SUMMARY

With rising energy consumption driven by population growth, urbanization and modernization, improving energy efficiency has become vital for saving costs, mitigating climate change, and enhancing energy sustainability. As appliances are significant drivers of energy consumption, especially in the residential and commercial sectors, improving the energy efficiency of appliances, particularly those with intensive energy consumption, will have a considerable impact.

For a regional planning of wide adoption of efficient technologies in the Arab Mediterranean Countries, covered by the MEETMED Project, harmonizing Minimum Energy Efficiency Appliances (MEPS) of these countries will help to remove technical barriers to products movement among countries, facilitates trade, reduces testing costs, and results in substantial energy and cost savings, while protecting consumers and the environment.

The report draws lessons drawn from international programs and other regions such as European Union, East and Southern Africa (EAC and SADC), Southeast Asia (ASEAN-SHINE), and Australia-New Zealand, exploring their implementation frameworks, successes, and challenges. Key success factors include strong political commitment, inclusive stakeholder engagement, using aligned standards supported by mutual recognition, robust legal frameworks, capacity building, transparent product databases, and ongoing updates of standards reflecting technological progress. The experiences reveal that phased implementation, effective enforcement, and alignment with international standards accelerate the transition.

The findings emphasize that regional harmonization catalyzes energy-efficient appliance markets by consolidating efforts and fostering regulatory alignment. Centralized product registration platforms and coordinated market surveillance enhance compliance and consumer trust. Each region's approach emphasizes the importance of governance and collaboration across countries. Challenges such as uneven market readiness and technical capacity gaps in specific countries require targeted support.

For the harmonization of MEPS in the Arab Mediterranean Region, the report recommends establishing a formal regional harmonization platform to lead the harmonization process; prioritizing a clear policy roadmap for high-impact appliances (such as space cooling and heating equipment, refrigerators and freezers, and lighting); promoting mutual recognition of testing and certification; strengthening regional standardization and accreditation bodies along with capacity development; developing a shared product database and enabling phased adoption with stakeholder involvement; leveraging international standards and technical assistance; and maintaining regular review cycles to keep standards relevant and impactful.

1. INTRODUCTION

Energy consumption by electric appliances is significantly increasing, driven by the expansion of the building sector and the continued use of electrical devices. As a result, implementing energy efficiency measures and adopting supporting policies have become important to **reduce energy** consumption and consequently mitigate climate change[1].

In the Arab region, the residential sector accounts for around **40%** of the overall electricity consumption, with a substantial portion attributed to home appliances (see Figure 1). In addition, the commercial and public services sectors also represent a significant share of electricity use (~30%). Cooling and heating systems are among the intensive energy consumption in all buildings generally. Therefore, dedicated efforts to enhance the implementation of Minimum Energy Performance Standards (MEPS) are expected to yield a positive impact[1]

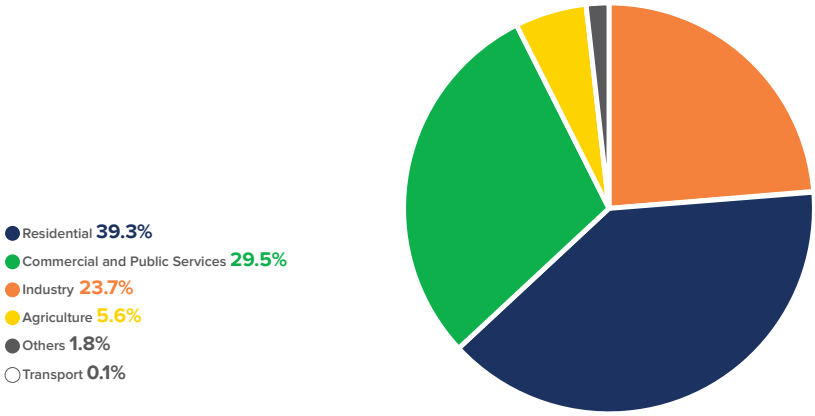

Figure 1: Energy consumption by sectors [2]

Over the previous years so far, Arab Mediterranean countries have exerted significant efforts to promote MEPS for appliances. Several countries, such as **Egypt and Jordan**, have adopted MEPS for a considerable number of appliances and apply mandatory standards and labeling schemes. Other countries are still in the process of adopting and/or enforcing MEPS and labels, while few, have voluntary MEPS and labeling programs in place (see Table 1).

This report builds on the MEETMED I&II projects' publications aimed to enhance energy efficiency of appliances countries and harmonize the appliances MEPS in the Arab Mediterranean countries. This report attempts to draw on the international experience on the harmonization of MEPS, highlighting lessons learned, success factors and best possible practices and possible strategies for harmonizing and alignment MEPS in the Mediterranean countries.

During the development of this report, a comprehensive literature review was conducted by examining reliable studies and research produced by trusted institutions. Furthermore, a questionnaire was designed and circulated along with several interviews and consultations were held with local and international experts.

1. IEA, Appliances and Equipment, https://www.iea.org/reports/appliances-and-equipment

Table 1: Status of MEPS and Labels in the Countries

Countries		Lighting	Refrigerators & Freezers	ACs	Washing Machine	Dishwasher	Solar Water Heater	TVs	Electric Oven	Vacuum Cleaner	Electric Heaters	Laundry Dryer	Fans
Algeria	Labels												
	MEPS												
Egypt	Labels												
	MEPS												
Jordan	Labels												
	MEPS												
Lebanon	Labels												
	MEPS												
Libya	Labels												
	MEPS												
Morocco	Labels												
	MEPS												
Palestine	Labels												
	MEPS												
Tunisia	Labels												
	MEPS												

Effective (Testing facilities have not yet been established)
Voluntary
Regulations still need to be adopted/enforced
Mandatory
Under preparation

Source: Based on interviews with local experts, 2024

1.1 THE IMPORTANCE OF MEPS HARMONIZATION

Harmonization or alignment of MEPS is important for facilitating trade by removing technical barriers, allowing products to move more freely across borders and creating more competitive markets. Such approach will reduce costs for both manufacturers and governments through unified testing (i.e., reduce duplication of testing) and certification processes, while ensuring that only energy-efficient products reach the local markets and consumers. This will result in significant energy and cost savings and also supports climate and sustainability goals by promoting the adoption of efficient appliances. In addition, this will prepare the countries for market transformation, prevent the dumping of inefficient appliances, and in turn benefiting economies, consumers, and the environment alike.

Over the past decades, several regional initiatives for the harmonization of MEPS have been established, such as those in the EU, Africa, and Asia-Pacific. These initiatives have demonstrated significant progress and effectiveness in promoting energy efficient products. However, no similarly effective initiative exists in the Mediterranean countries. Therefore, amid the absence of a coordinated effort for MEPS harmonization or alignment in the Mediterranean region, and due to the growing development of appliance manufacturing and assembly, establishing such an initiative would offer numerous benefits and pave the way toward a sustainable future. Although some countries in the region have not yet adopted MEPS or are not yet relatively prepared enough for the harmonization process, having a regional MEPS harmonization-related initiative would enable them to implement suitable and advanced harmonized MEPS, rather than starting from scratch to develop their own MEPS.

2. INTERNATIONAL EXPERIENCES ON THE REGIONAL CERTIFICATIONS AND MEPS AND LABELS HARMONIZING

This section aims to discuss examples of the regional harmonization programs that have been implemented worldwide, with focus on four programs existing in EU, Southeast Asia, Africa, and between Australia and New Zealand.

2.1 EUROPEAN UNION EXPERIENCE IN MEPS HARMONIZATION

Over the last 40 years, there are different policy instruments for appliances have been used, namely: Energy labeling, MEPS, Ecodesign Directive as well as voluntary agreements, such as Ecolabels and Green Public Procurement. There has been a need to have common legislation at European level to ensure same technical rules for all Member States and protect market and ensure a fair competition. The European Union launched its first compulsory energy labeling scheme, which introduced a classification system for household appliances using an A-to-G scale, where A represented the highest efficiency and G the lowest. Initially, only electric ovens were specifically regulated under this framework. In 1992, the framework was replaced by another directive that extended energy labeling to a wider range of domestic appliances, each appliance governed by its own implementing directive, covering, for example, refrigerators, washing machines, dishwashers, lamps, ovens, and air conditioners. Due to rapid technological developments and the international nature of the market, office equipment was excluded from the EU labeling program. Instead, the voluntary US Energy Star program, established in 1992, became the applied standard for office products and was adopted voluntarily in the EU from 2000 to 2018, under an agreement enable European Commission (EC) to have a role in setting the minimum energy requirements of these labels. In 2010, the EU expanded the labeling scheme through Directive 2010/30/EU to cover all energy-related products with significant energy consumption, supporting broader sustainability and industrial policies. This directive was updated in 2017 by Regulation (EU) 2017/1369, which retained the broad product coverage and enhanced label clarity and effectiveness, with considering the technological advancement achieved over recent years[3].

For MEPS, the first adoption was in the 1960s in some European countries (i.e., in Poland for a range of electrical appliances, and in France for cold appliances), most national regulations were withdrawn in the late 1970s and early 1980s to facilitate unified trade across Europe. At the EU level, MEPS were set for only a few product categories, such as heaters, boilers, refrigerators, freezers and lighting equipment. The lack of a framework directive for the implementation and opposition from some manufacturers and countries hindered broader implementation, leading to a preference for voluntary agreements with industry during the 1990s. These voluntary measures covered a range of appliances, including dishwashers, televisions, videocassette recorders and electric motors. Eventually, the EU introduced the Ecodesign Directive to ensure environmental considerations throughout the product life cycle, which led to update or replace previous MEPS legislation [3].

Ecodesign is a strategy that incorporates environmental concerns into every stage of product development, aiming to reduce negative impacts throughout a product's life. Although many tools and methods have been created to support ecodesign, industry uptake has been slow, leading the EU to establish the Ecodesign Directive. This regulation sets the groundwork for mandatory environmental requirements, first for energy-using products and later for all products influencing energy use, with the goal of eliminating the least efficient products from the market and correcting market imbalances. The framework allows for both mandatory requirements and voluntary agreements, though the latter are rare due to strict criteria. Requirements can be highly specific (like energy or water use limits) or more general (such as information on recycling). The process for setting these requirements is comprehensive and data-driven, but faces challenges such as keeping environmental data current and integrating broader sustainability aspects. Requirements are introduced in stages to ease the transition of manufacturers and are regularly reviewed to ensure continued progress towards sustainability [3].

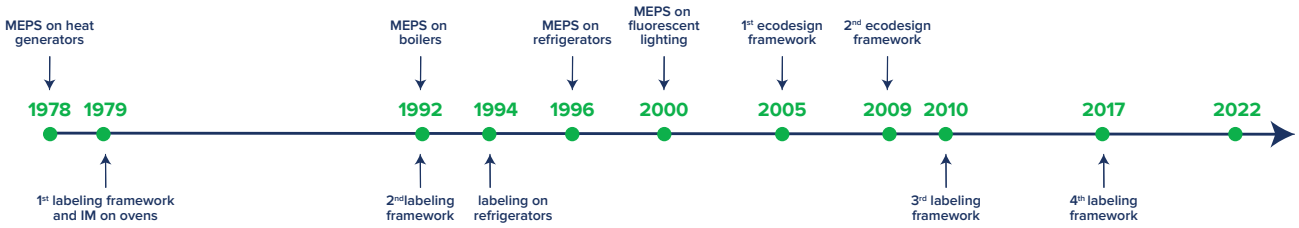

Figure 2: Product polices development in the EU (1978-2022)[3]

The process for defining and adopting implementing measures under the Ecodesign and Energy Labeling Directives is lengthy and involves multiple technical and consultative steps. Here is a summarized sequence of the main steps:

- Develop Working Plans to select and prioritize products for potential regulation.
- Conduct preparatory studies to identify possible requirements and determine their appropriate stringency.
- Compile results into a Working Paper as the baseline for further development.
- Perform an impact assessment to evaluate potential savings, costs, and benefits of different policy options.
- Formulate specific objectives and draft an implementing measure based on the impact assessment.
- Review the draft measure internally within the European Commission.
- Approve the draft measure through national experts in the Regulatory Committee.
- Scrutinize the draft measure by the European Parliament and the Council for political oversight.
- Adopt the measure formally and publish it in the Official Journal.
- Manage the process timeline, which often extends beyond the intended three and a half years due to complexity and delays.
- Address delays to prevent requirements from becoming outdated and to maximize energy savings and environmental benefits.

STANDARDIZATION ORGANIZATIONS

Regional Level: European Standardization Organizations (ESO)

The standards in Europe need to be adopted by one of the following European Standardization Organization[4].

- European Committee for Standardization (CEN)
- European Committee for Electrotechnical Standardization (CENELEC)
- European Telecommunications Standards Institute (ETSI)

There is a **Cooperation** between the three European standardization organizations (CEN, CENELEC, ETSI), the European Commission, and the European Free Trade Association (EFTA). In general, European standardization is a voluntary, consensus-based activity aimed at supporting the European Single Market, enhancing competitiveness, and protecting the environment and consumers. stakeholders, including non-governmental organizations, are involved in the process of developing standards. The standards play an important role in removing technical barriers to trade, supporting public policies and European legislation, and promoting innovation and economic and technological integration within Europe and with global markets[5].

NATIONAL STANDARDIZATION BODIES (NSBS)

National standardization bodies (NSBs) handle standardization at the national level, adopting and publishing national standards. All European standards are also transposed as identical national standards by the NSBs, and any conflicting national standards are removed.

HARMONIZED STANDARDS

European standards that have been developed in response to a request from the European Commission to a recognized European Standards Organization (i.e., CEN, CENELEC, or ETSI). These standards can be used by manufacturers, importers, or conformity assessment bodies to prove EU legislation compliance. Harmonized standards adoption is voluntary. Manufacturers or service providers can refer to non-harmonized European standards, national standards, international standards or their own technical specifications to prove compliance in order to fulfil the legal requirements.

NOTIFIED BODIES

Organizations designated by an EU member state to evaluate the compliance of specific products prior to being placed on the market. When a third party is required, these organizations perform duties connected to conformity assessment procedures outlined in applicable legislation. A list of such notified bodies is published by the European Commission.

MUTUAL RECOGNITION AGREEMENTS

Mutual Recognition Agreements (MRAs) promote and ease commerce in commodities between the European Union and foreign countries. These are multilateral agreements that aim to help industry by making conformity assessment more accessible.

European Cooperation for Accreditation (EA): a non-profit organization based in the Netherlands. Formally appointed by the European Commission to develop multilateral mutual recognition agreements, EA MLA, Regulation (EC) No 765/2008.
EA is responsible for harmonizing accreditation across Europe, aiming to reduce trade barriers and protect health, safety, and the environment.

The EA is composed of a network of **49 National** Accreditation Bodies (NAB) that have been officially recognized by their respective national governments to assess and verify organizations that perform conformity assessment activities such as certification, verification, inspection, testing, and calibration against international standards.
Conformity Assessment Bodies accredited by one of the NAB members in the EA network can give confidence to customers in the competence, independence, and impartiality of its conformity assessment work.

EUROPEAN PRODUCT DATABASE FOR ENERGY LABELING (EPREL)

The European Product Registry for Energy Labeling (EPREL) is an online database operated by the European Commission. It aims to provide information about the energy and environmental performance of products that have energy labels, including household products, lighting, and heating equipment. It helps consumers access detailed information about the energy efficiency of products sold in the EU and assists market surveillance authorities in accessing non-public product documentation and supplier contact information and also enables them to monitor technological advancement. Manufacturers and importers are required to register their products in EPREL to comply with EU energy labeling regulations.

Therefore, it increases transparency and most importantly helps consumers make more informed decisions to purchase energy-efficient products and ultimately reduce energy consumption.

For further information, check this link, https://energy-efficient-products.ec.europa.eu/eprel_en

AIR CONDITIONERS IN EU MARKET

Air conditioners and comfort fans sold in the EU must meet eco-design rules for minimum energy performance, maximum sound levels, and product information. Air conditioners with a rated capacity of less than or equal to 12 kW for cooling (or heating if there is no cooling function) and comfort fans with an electric fan power input less than or equal to 125W are subject to the regulations. This restriction does not apply to non-electric appliances or air conditioners that do not use air as a heat transfer medium.

Air conditioners are labeled with an energy efficiency label that provides information on the energy rating of their cooling and heating functions, as well as hourly or annual energy consumption and sound levels.

In 2020, the 27 member countries of the European Union (EU27) had around 57 million room air conditioners (RACs) in use, with 86% being fixed units and 14% portable. Among the fixed units, around half (47%) were also used for heating. These RACs consumed 15 terawatt-hours (TWh) of electricity for cooling and 29 TWh for heating, totaling 44 TWh, representing about 1.8% of the EU27's total electricity consumption in 2020, which stood at 2,384 TWh.

Check this link, https://energy-efficient-products.ec.europa.eu/product-list/air-conditioners-and-comfort-fans_en

MINIMUM ENERGY PERFORMANCE STANDARDS FOR AIR CONDITIONERS

The SEER and SCOP energy efficiency metrics (for cooling and heating, respectively) are used by the EU to rate air conditioner and heat pump efficiency and to set minimum efficiency performance standards. In addition, the EU specifies alternative temperature distributions for assessing SEER in hot or cold predominate climates. Table 2 shows examples of the required MEPS for different types of air conditioners according to Directive 2009/125/EC, effective form 1 January 2014.

Table 2: Minimum Energy Performance Standards for air conditioners in EU[3]

Product Capacity	Air Conditioners except single and double ducted		Single-ducted air conditioners		Double-ducted air conditioners	
	SEER	SCOP	EER	COP	EER	COP
< 6 kW (GWP > 150)	4.6	3.8	2.6	2.04	2.6	2.6
< 6 kW (GWP <= 150)	4.14	3.42	2.34	1.84	2.34	2.34
6-12 kW (GWP > 150)	4.3	3.8	2.6	2.04	2.6	2.6
6-12 kW (GWP <= 150)	3.87	3.42	2.34	1.84	2.34	2.34

2.2 REGIONAL HARMONIZATION OF MEPS FOR ENERGY-EFFICIENT AND CLIMATE-FRIENDLY ROOM AIR CONDITIONERS AND RESIDENTIAL REFRIGERATORS

Under the United Nations Environment Programme's (UNEP) United for Efficiency (U4E) Initiative, which aims to support developing countries in adopting energy-efficient products and appliances, U4E assists the East African Community (EAC) and the Southern African Development Community (SADC) in enhancing their policies, strategies, and actions to phase out inefficient appliances—especially air conditioners and residential refrigerators—by supporting the development of harmonized Minimum Energy Performance Standards (MEPS) for these appliances for adoption by the countries. Within the frameworks of this project, the U4E works in collaboration with the East African Centre of Excellence for Renewable Energy and Efficiency (EACREEE) and SADC's Centre for Renewable Energy and Energy Efficiency (SACREEE) to achieve the project activities.[4]

Target Countries: Republic of Angola, Republic of Botswana, Republic of Burundi, Union of the Comoros, Democratic Republic of Congo, Kingdom of Eswatini, Kingdom of Lesotho, Republic of Kenya, Republic of Madagascar, Republic of Malawi, Republic of Mauritius, Republic of Mozambique, Republic of Namibia, Republic of Rwanda, Republic of Seychelles, Republic of South Africa, Republic of South Sudan, Republic of Uganda, United Republic of Tanzania, Republic of Zambia and Republic of Zimbabwe.

U4E, ENERGY-EFFICIENT AND CLIMATE-FRIENDLY COOLING IN NIGERIA REGIONAL HARMONIZATION OF ENERGY-EFFICIENT AND CLIMATE-FRIENDLY COOLING IN EAST AND SOUTHERN AFRICA, 2021, https://united4efficiency.org/wp-content/uploads/2021/09/U4E_FACT-SHEETS_EAC-SADC_2021-09-24.pdf

Main activities of the programme:

The main objective of the programme goal is accelerating the transition to climate friendly and energy-efficient room air conditioners and residential refrigerators through:

- Conduct market assessment and analysis for 21 countries in the two regions

3. Official Journal of the European Union, COMMISSION REGULATION (EU) No 206/2012
4. U4E, East and Southern Africa, https://united4efficiency.org/country-regional-activities/eac-sadc/

- Technical recommendations based on global market trends.
- Development of regulatory framework and procedures for national implementation.
- Development and implementation of harmonized MEPS and labels
- Technical assistance for harmonization implementation.

The harmonizing initiative was conducted during the period 2021 – 2024 and involved several activities to reach a harmonized MEPS for the EAC and SADC countries, including:[5]

- Establishing a Technical Committee to support the development of harmonized MEPS and facilitate their adoption in the target countries. The committee was comprised of members of the national ministries and standards bodies involved, along with SACREEE as the regional organization with responsibility for energy efficiency and SADCSTAN as the regional standards body.
- Sharing the findings of the market assessments and details of the technical notes for air conditioners and residential refrigerating appliances undertaken to inform the standards development process.
- Drafting MEPS for air conditioners and residential refrigerating appliances based on technical notes, incorporating comments from Member States, and presented to SADCSTAN Technical Committee on Energy.
- Conduct national consultations on draft MEPS for air conditioners and residential refrigerating appliances undertaken.
- Agreeing on the draft MEPS by the Member States.
- Submitting the draft MEPS to the SADCSTAN Executive Committee for approval.
- Circulating the approved MEPS for Air Conditioners and Refrigerating Appliances to Member States.

Regional Savings Assessments were developed by U4E to demonstrate potential savings from the implementation of energy-efficient air conditioners and refrigerators in the SADC and EAC regions based on three scenarios depending on the level of energy efficiency of products sold on the market.

- **Business as Usual:** - 1% improvement in energy efficiency per year.
  - Additional 2% improvement in energy efficiency due increasing market share of variable speed models.
- **Minimum Ambition Scenario:** - U4E Model Regulation Guidelines - MEPS level.
- **High Ambition Scenario:** - U4E Model Regulation Guidelines Top-tier performance levels.

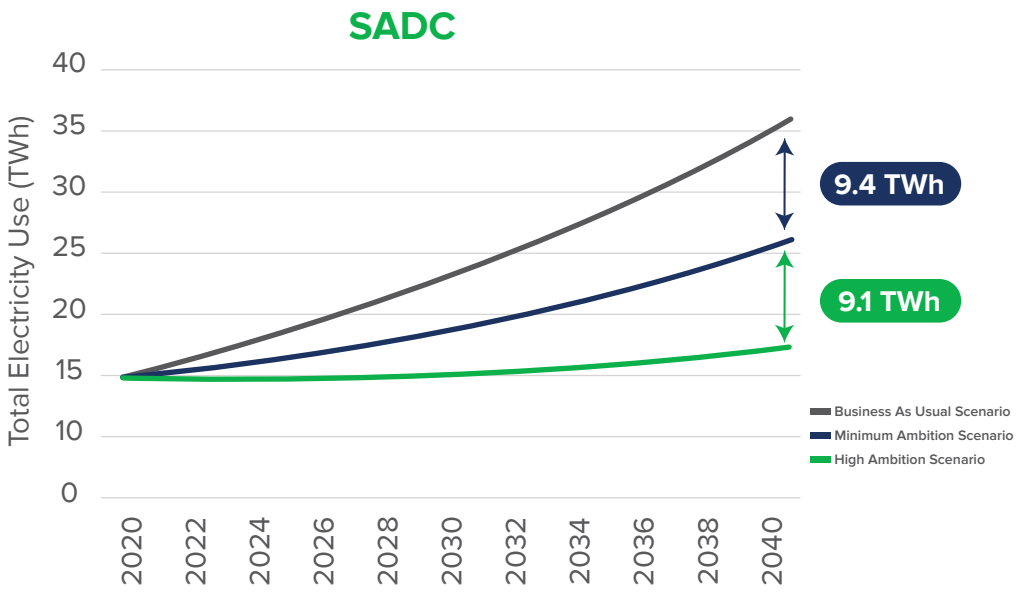

Figure 3: Savings potential for energy-efficient air conditioners and refrigerators in SADC region[6]

5. U4E, Harmonized regional MEPS for air conditioners and residential refrigeration appliances approved for the SADC region, https://united4efficiency.org/harmonized-regional-meps-for-cooling-products-approved-for-sadc-region/
6. U4E, AFREC Regional Savings Assessment, March 2021

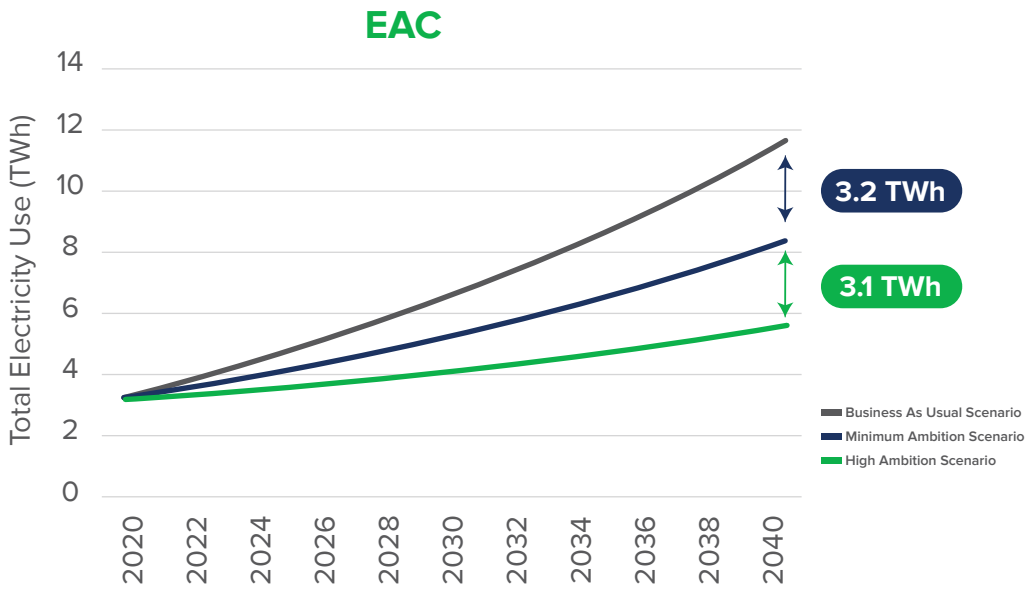

Figure 4: Savings potential for energy-efficient air conditioners and refrigerators in EAC region[7]

Figures 3 and 4 show regional potential savings from implementing energy-efficient air conditioners and refrigerators in SADC and EAC regions respectively. Annual savings of 9.4 TWh of electricity (4.8 TWh for air conditioners and 4.6 TWh for refrigerators) are shown for SADC region based on Minimum Ambition Scenario and 18.5 TWh based on High Ambition Scenario in 2040. Whereas EAC shows potential savings of 3.2 TWh (1.8 TWh for air conditioners and 1.4 TWh for refrigerators) based on Minimum Ambition Scenario and 6.3 TWh based on High Ambition Scenario in 2040. Potential savings by country are also summarized in Figures 5 and 6.

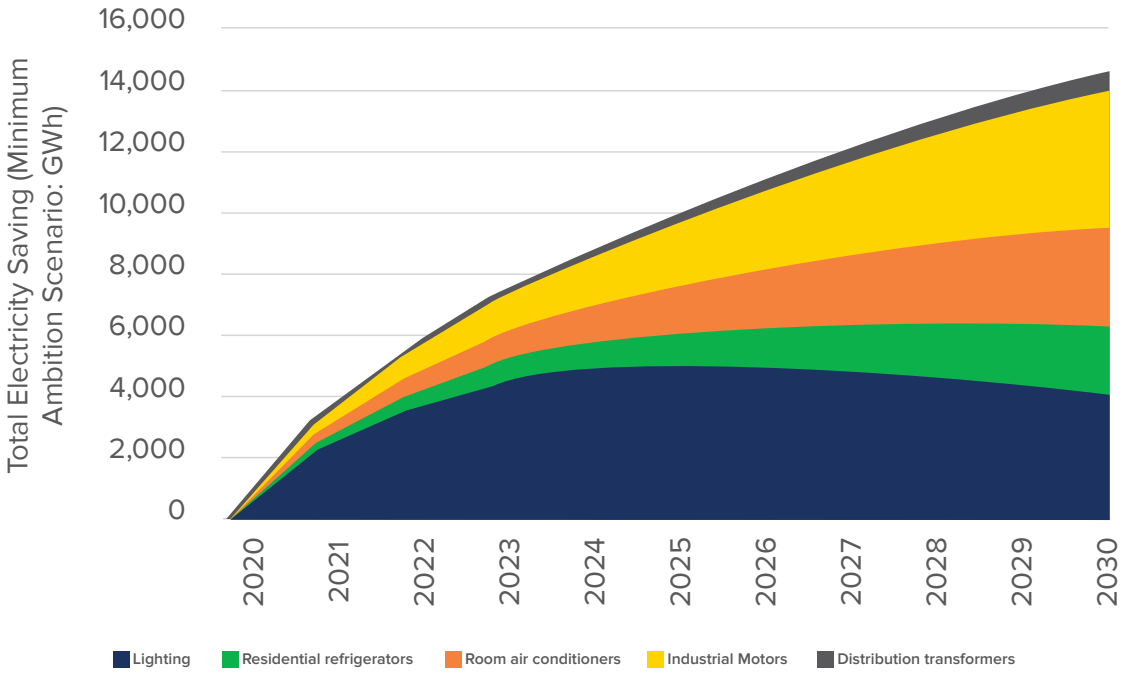

Figure 5: Regional savings potential for energy-efficient air conditioners and refrigerators in EAC region[8]

7. U4E Regional Savings Assessment for the East African Region, July 2022
8. U4E AFREC Regional Savings Assessment, March 2021

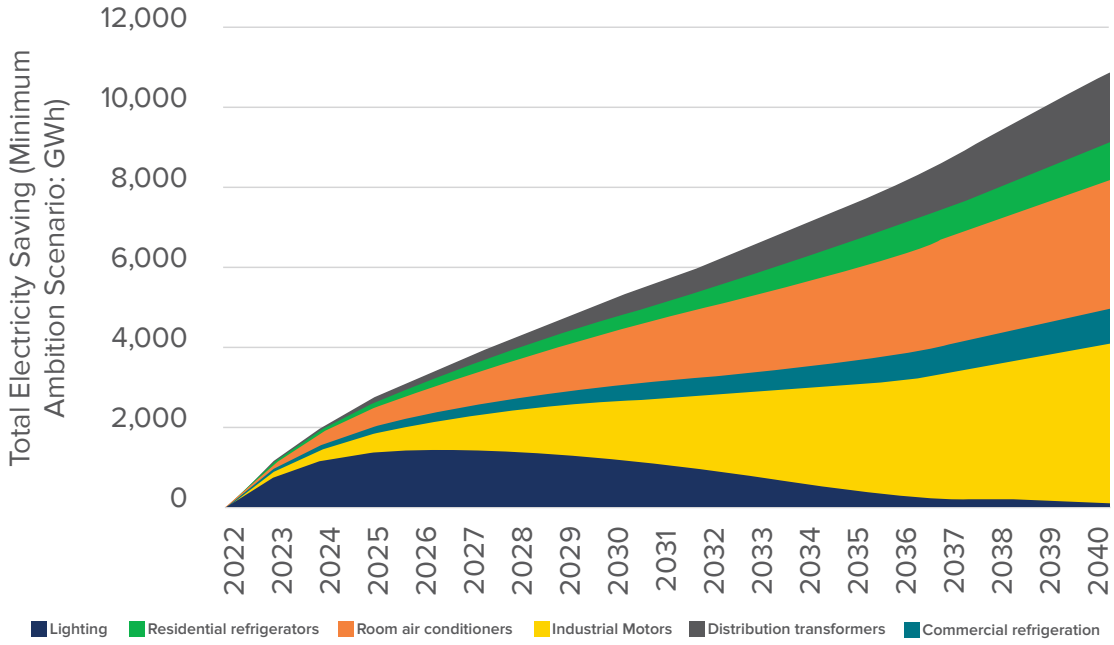

Figure 6: Potential Annual Savings for Energy-Efficient Products by Country for EAC region[9]

2.3 ASEAN-SHINE PROGRAM

The Association of Southeast Asian Nations (ASEAN) has ten member countries—Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam[6]. It has undertaken several steps to harmonize MEPS for appliances, e.g., air conditioners and lighting, aiming to enhance energy efficiency and reduce emissions.

The MEPS harmonization program initiated in 2010 by the International Copper Association (ICA) and the United Nations Environment Programme (UNEP), under the steering of the ASEAN Energy Efficiency and Conservation Sub-Sector Network (EE&C SSN), aimed to improve energy efficiency in ASEAN by focusing on air conditioners and refrigerators. It began with a study estimating the energy savings potential from raising MEPS for these appliances. The program identified the critical need to harmonize testing methods and MEPS across ASEAN countries to facilitate trade and improve compliance. As a result, a strategic framework for harmonizing energy efficiency standards for household appliances was developed and approved by the EE&C SSN, with air conditioners selected as the priority product for this effort [7]. This initiative laid the foundation for the ASEAN SHINE program and subsequent regional policy roadmaps to promote higher efficiency air conditioners across ASEAN.

The purpose was also that Asia-Pacific Economic Cooperation (APEC) economies draw lessons on harmonization in ASEAN. There were 3 phases for the project as follows [7]:

- **Phase 1:** Harmonize standards for testing methods for air conditioners among ASEAN members and develop a roadmap for the harmonization at APEC level based on lessons learned.
- **Phase 2:** Harmonize EE standards in ASEAN members through MEPS and HEPS policies.
- **Phase 3:** Build capacity of testing laboratories/increase consumer awareness.

This project was initiated by ICA and Japanese's Ministry of Economy, Trade, and Industry (METI) with developing market study on the impact of harmonization of energy efficiency standards. This study was published on 15th of November 2010. Then, the strategic roadmap

9. U4E Regional Savings Assessment for the East African Region, July 2022
10. APEC, APEC-ASEAN Harmonization of Energy Efficiency Standards for Air Conditioners: Phase 1, n.d., https://www.apec.org/docs/default-source/satellite/EGEEC/Files/APEC_ASEAN_EE_Standards_for_ACs.pdf

for regional harmonization was proposed and approved by the EE&C SSN Steering Committee on May 2011. The Policy and Technical Working Groups (TWG) were formed on early of 2013 and the first kick-off meetings of the Policy Working Group (PWG) and TWG were held in February 2013, followed by the 2nd Combined PWG/TWG meeting in July 2013. The final recommendation of the TWG was then submitted to PWG, and subsequently to EE&C SSN in November 2013[8]. The PWG and TWG key experts represent the member states and provide policy and technical guidance) lead the technical work on standards development [7]. Figure 7 shows the project development.

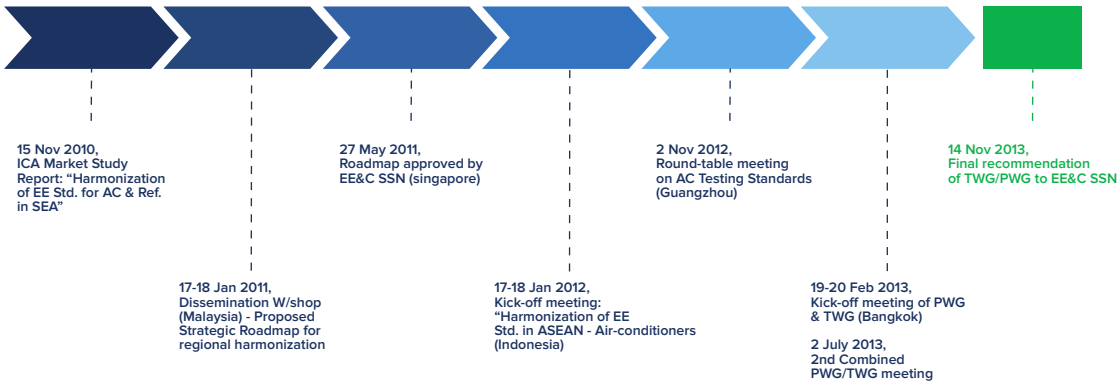

Figure 7: Project timeframe

In 2012, with grant from the European Union's SWITCH-Asia program (1.7 million EURO, represent 80% of the overall budget), the ASEAN-SHINE program was established and lunched in 2013 as the public private collaboration platform to implement the complete strategic framework for air conditioners.[11] The program led by International Copper Association Southeast Asia (ICASEA) in partnership with (SIRIM in Malaysia, the Research Center for Energy and Environment (RCEE) in Vietnam, Electrical and Electronics Institute (EEI) in Thailand, and the Integrated Institute of Electrical Engineers (IIEE) in the Philippines as well as UNEP. ASEAN SHINE was reporting to the Energy Efficiency and Conservation Sub-sector Network (EE&C-SSN), who acted as Steering Committee, with the central role played by the ASEAN Centre for Energy (ACE).[12]

The program implemented through the period of 2013-2016, during this period several outputs were achieved:

- Standards for the air conditioners testing methods have been harmonized to ISO 5151:2010.
-In October 2015, the ASEAN Ministers of Energy Meeting (AMEM) endorsed the "ASEAN Regional Policy Roadmap for Harmonization of Energy Performance Standards for Air Conditioners". Its objectives were:
  - "To provide clear guidelines in the adoption of policies to promote the use of more efficient air conditioning equipment and define the targets to be achieved by all ASEAN countries with regards to the adoption of harmonized energy performance standards of ACs by 2020."
  - "ASEAN countries have agreed for a uniform testing method derived from ISO 5151- 2010. The testing method is to be adopted and notified by countries by 2016, with the exception of Cambodia, Laos, Myanmar to be adopted and notified by 2018."
  - "A common evaluation method namely Cooling Seasonal Performance Factor (CSPF) using ISO 16358-1 may be considered by 2020."
  - "The ASEAN countries will notify a minimum Energy Efficiency Ration (EER) (also refers to weighted EER) of
- ASEAN ministries in charge of energy are now developing their national policy roadmaps, to be officially adopted during July-September 2016.
- Capacity of local AC manufacturers has been built on designing higher efficient Acs.
- Capacity of testing laboratories has been built.
- National consumer awareness campaigns are being designed and will be launched in August 2016, under official endorsement by the ASEAN ministries in charge of energy.[12]

11. SWITCH-Asia, Promotion and Deployment of Energy Efficient Air Conditioners in ASEAN, n.d., https://www.switch-asia.eu/project/asean-shine/
12. International Copper Association, A Private-Public Partnership to promote sustainable energy equipment and appliances in ASEAN, 2016, https://policy.asiapacificenergy.org/sites/default/files/003_background_paper_asean_shine_june_2016_-_v2.pdf

The ASEAN-SHINE program supported ASEAN Member States (AMS) to make considerable progress in meeting the milestones specified in the Regional Policy Roadmap. Indonesia, Malaysia, the Philippines, Thailand, and Vietnam have already adopted ISO 5151 and ISO 16358 as national standards. Cambodia, Lao PDR and Myanmar have referenced ISO 5151 and ISO 16358 in draft regulations for MEPS and labeling for RACs. All AMS have implemented or specified the minimum EER of 2.9 W/W and ISO CSPF of 3.08 Wh/Wh as MEPS for RACs with cooling capacity below 3.52 kW.

The Figure 8 shows regional savings assessment total potential savings of 144 TWh of electricity based on Minimum Ambition Scenario and 232 TWh based on High Ambition Scenario for ASEAN region. Savings by country are also summarized in the Figure 10.

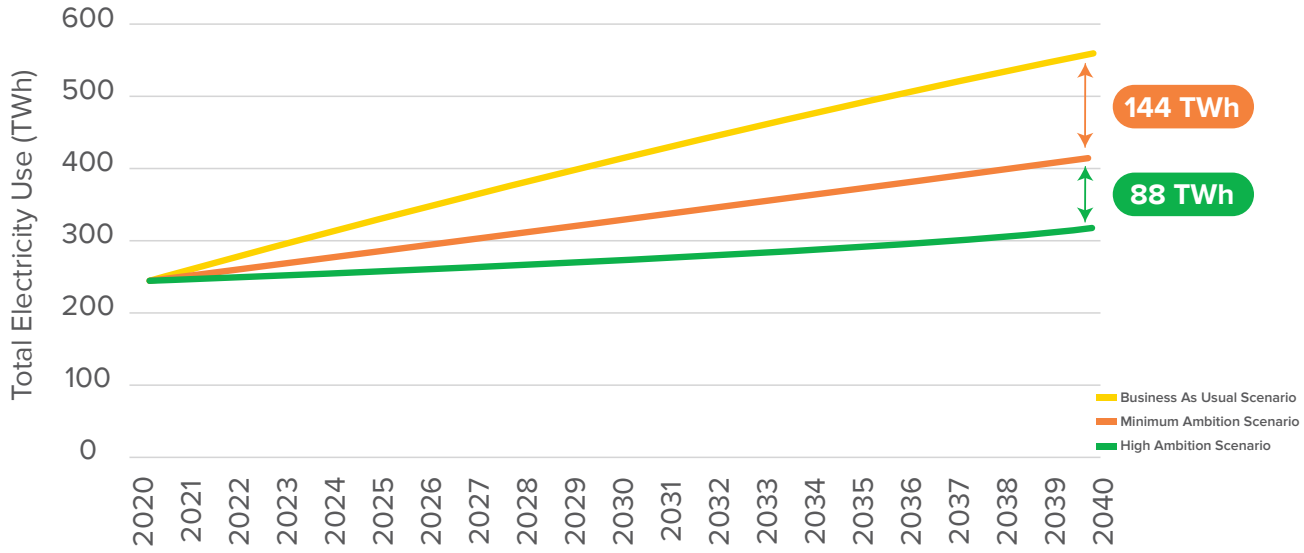

Figure 8: Regional savings potential for energy-efficient air conditioners[14]

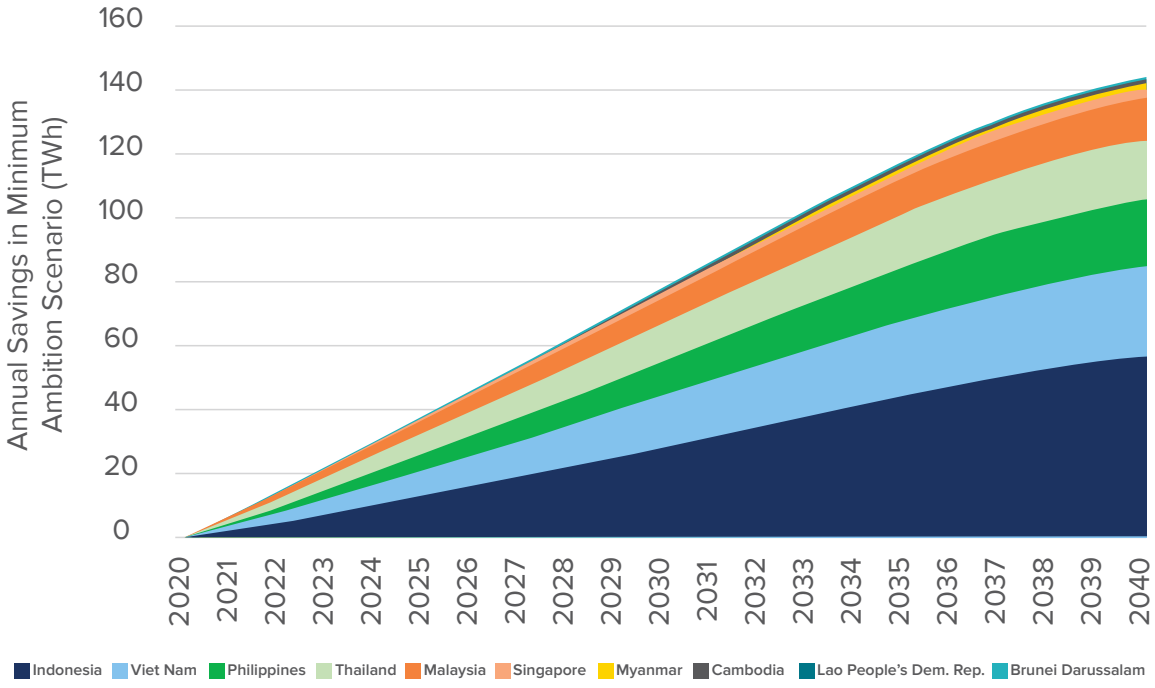

Figure 9: Potential Annual Savings of Energy-Efficient Air Conditioners[15]

13. U4E ACE ASEAN Regional Savings Assessment, August 2021
14. Recommendations for Updating the ASEAN Regional Policy Roadmap on Energy Efficient Air Conditioners, August 2021


Australia


New Zealand

2.4 EXPERIENCE OF AUSTRALIA AND NEW ZEALAND

Through the Equipment Energy Efficiency (E3) program, which is an initiative established by the Australian Government, states and territories and the New Zealand Government and aims to enhance the energy efficiency of appliances and equipment. The E3 Program aims to establish a unified and coordinated system for energy efficiency standards and labeling to promote the adoption of energy efficient appliances, which ultimately leads to reduce energy costs for both households and businesses. The specific program objectives are [9]:


Reduce energy bills for households and businesses.


Decrease greenhouse gas emissions from appliance use.


Drive energy efficiency improvements in new appliances and equipment.

In **Australia**, the E3 Program is based on the Greenhouse and Energy Minimum Standards Act 2012, which establishes a national framework for ensuring product energy efficiency. In New Zealand, the Energy Efficiency (Energy Using Products) Regulations 2002 serve a similar purpose and are managed by the Energy Efficiency and Conservation Authority. The program is overseen by the Energy Efficiency Working Group, which includes representatives from the Australian federal, state, and territory governments, as well as the New Zealand government. This working group offers strategic and technical advice and makes key decisions related to the E3 Program and the goal of improving the energy efficiency of appliances and equipment. Stakeholders like Industry and consumer groups contribute to the E3 Program through the E3 Review Committee [9]. Products registered in Australia do not require separate registration to be sold in New Zealand, provided they comply with all applicable New Zealand regulations or are covered by the Trans-Tasman Mutual Recognition Agreement[16], which facilitates mutual acceptance of product standards between the two countries [10].

In general, the process for any harmonized and joint Australia and New Zealand Standards) officially called “AS/NZS standards”) developed by a joint development committees, which include representatives of stakeholders from both New Zealand and Australian stakeholders. Either Standards Australia or Standards New Zealand manages these joint committees. Standards New Zealand and Standards Australia jointly work on the adoption of international standards (e.g., developed by international bodies, such as International Organization for Standardization (ISO), International Electrotechnical Commission (IEC), where needed[11].

Follow a similar process as New Zealand standards, which The drafts of joint Australian/New Zealand standards undergo a concurrent public comment period in both New Zealand and Australia. Once finalised and approved, these standards are published in both countries.

The steps below outline the process of developing New Zealand’s standards and highlight their similarity to the development of joint Australian/New Zealand standards [11]:

15. See, https://www.legislation.govt.nz/act/public/1997/0060/latest/DLM410793.html#DLM410795

1 PROPOSING A STANDARD

Any private and public organization in New Zealand (e.g., industry bodies as well as government departments) can initiates and helps fund the development of standards. In order to initiate a new standard, there is a need to submit a project brief explaining what the standard scope is, why it is needed, who it will affect, how it will be funded, and any risks involved. This helps build a strong case for why the standard should be created. The Standards Development team will then review your proposal, discuss options with you, and estimate how long it might take and what it might cost. They will also check if there's already an international standard that could be used or adapted.

2 FORMING A COMMITTEE

If the proposal is approved, a committee is formed, by the New Zealand Standards, to develop the standard. This committee includes representatives from stakeholders, including consumers, regulators, industry and professional association, academics and minority or affected groups. The Standards New Zealand Approval Board approves who joins the committee and appoints a chairperson. The committee members then meet to agree on what exactly the standard will cover, how they will work together, and set a timeframe. The technical content for the new standard may require research, consultations and discussions.

3 DEVELOPING THE FIRST DRAFT

After developing the first draft of the standard, the Standards New Zealand reviews the draft to make sure it is clear and presentable. The standards are normally developed as voluntary guidelines, but sometimes parts of a standard can become mandatory if referenced in legislation. If the draft involves new or uncertain/new scientific information, it may be reviewed by top science advisors.

4 PUBLIC CONSULTATION

The draft standard is then shared publicly for about eight weeks. The organisations that have an interest in the standard are communicated and encouraged to read it and share feedback on the draft standards. The committee then considers all feedback and may make changes to update the standard.

5 COMMITTEE VOTE AND APPROVAL

After receiving the public comments and revising the draft based on feedback, the committee votes to confirm everyone agrees on the final version. If there is consensus within the committee the new standard is publish based on an approval from the New Zealand Standards Approval Board.

6 PUBLICATION

Finally, the approved new standard is published and made available for users. Figure 10 summaries the standards development process.

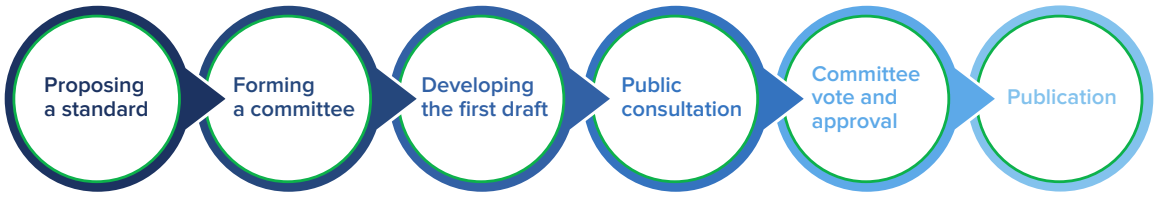

Figure 10: Standards development process in New Zealand

For the joint Australian/New Zealand standards are developed by a similar standards development process in New Zealand except that the standards development committee includes members representing both New Zealand and Australian stakeholders. Regarding the day-to-day operation of a committee for a joint Australian/New Zealand standards is managed by Standards Australia in most cases. Both Standards New Zealand and Standards Australia encourage the adoption of international standards, such as ISO and IEC, if possible, to follow the international practices [11].

3. KEY SUCCESS FACTORS FOR REGIONAL HARMONIZATION OF APPLIANCE STANDARDS

Success factors are the critical enablers that made harmonization efforts effective in other regions (EU, ASEAN, Africa, Australia/New Zealand). They are the foundational conditions that must be present for harmonization to succeed.

- Strong political and institutional commitment: high-level government support and dedicated regional bodies (e.g., EU Commission, ASEAN Secretariat) drive progress and ensure continuity.
- Inclusive stakeholder engagement: Early and ongoing involvement of industry, consumer groups, technical experts, and regulators build trust and buy-in.
- Adoption of Unified Standards and Testing Methods: Agreement on common technical standards and mutual recognition of testing and certification procedures lowers costs and facilitates trade.
- Robust legal and regulatory frameworks: Clear, enforceable regulations at both regional and national levels provide the backbone for harmonization.
- Capacity building and technical support: Ongoing training and knowledge sharing, especially for less-prepared countries, ensure all members can participate effectively.
- Transparent product information systems: Centralized registries (like EPREL in the EU) and clear labeling support enforcement and consumer awareness.
- Regular review and adaptation mechanisms: Periodic updates keep standards relevant as technology and markets evolve.

4. LESSONS LEARNED FROM INTERNATIONAL HARMONIZATION INITIATIVES

The lessons learned and takeaways from the successes and challenges encountered in other regions discussed in this report are as follows:

- Political commitment must be sustained over time to overcome resistance and ensure follow-through.
- Phased, gradual implementation reduces market resistance allows adaptation.
- Lack of stakeholder engagement can lead to non-compliance or adoption impractical standards.
- Mutual recognition of certification and testing is important to reducing costs and accelerating market access.
- Capacity gaps among countries can slow regional progress; targeted technical assistance is needed.
- Centralized databases improve transparency, enforcement, and consumer trust.
- Regular updates are crucial; outdated standards can hinder market transformation and energy savings.
- Robust market surveillance and enforcement are necessary to ensure only compliant products are sold.
- Alignment with international standards (IEC, ISO) facilitates global trade and access to efficient technologies.
- Managing transition periods carefully minimizes disruption for manufacturers and markets.

5. POSSIBLE STRATEGIES FOR MEPS HARMONIZATION AND CERTIFICATIONS IN MEDITERRANEAN COUNTRIES

The following steps summaries the possible option to harmonization in the Arab Mediterranean Countries, covered by MEETMED project

1

ESTABLISH A REGIONAL HARMONIZATION INITIATIVE

Create a formal regional platform or working group dedicated to MEPS harmonization and engage all Mediterranean countries, including those less advanced in MEPS adoption, to ensure inclusiveness and capacity building.

2

DEVELOP A COMMON POLICY AND REGULATORY FRAMEWORK

Draft a regional roadmap for MEPS harmonization that with clear goals, timelines, and priority product categories, most importantly those with higher opportunity for saving, especially space cooling and heating equipment, refrigerators and freezers, and lighting. In addition, it is important to align national regulations with the regional framework to ensure removing technical barriers to trade.

3

ADOPT UNIFIED TESTING AND CERTIFICATION PROCEDURES

Unify testing protocols for appliances (using international standards such as IEC, ISO, or those adopted by other regions, if applicable). Also, establish mutual recognition agreements of test results and certificates to allow product tested and certified in one country to be accepted in the other countries, as this will reduce duplication and costs incurred for testing.

4

REGIONAL STANDARDIZATION AND ACCREDITATION BODIES

Strengthen cooperation among national standardization bodies or have a regional body to coordinate the development and adoption of harmonized standards. Develop a network of accredited laboratories and conformity assessment bodies to ensure reliable testing and certification.

5

CREATE A REGIONAL PRODUCT REGISTRATION DATABASE

Develop a regional database for energy-labelled and certified products, accessible to regulators, market surveillance authorities, and consumers. Facilitate information sharing on compliant products, market surveillance results, and enforcement actions.

6 GRADUAL AND PHASED IMPLEMENTATION

Start with energy intensive appliances (e.g., cooling appliances) and gradually expand to other appliances. And allow for transitional periods to enable local manufacturers and suppliers to be prepared for the new requirements.

7 ENSURE STAKEHOLDER ENGAGEMENT

Involve manufacturers, importers, consumers, and technical experts in the harmonization process to ensure buy-in and practicality. Provide technical assistance and training for policymakers, testing labs, and industry, especially in less-prepared countries.

8 REGULAR REVIEW AND UPDATE OF STANDARDS

Conduct periodic reviews of MEPS to keep pace with technological advances and update the standards requirements based on new developments, and regional market needs.

9 STRENGTHEN MARKET SURVEILLANCE AND ENFORCEMENT

Coordinate regional market surveillance activities to monitor compliance and prevent the entry of non-compliant or inefficient appliances. Also, share enforcement best practices and develop joint actions to address non-compliance.

10 LEVERAGE INTERNATIONAL EXPERIENCE AND SUPPORT

Align with international standards (IEC, ISO) and seek technical support from international development organizations. Also, it would be beneficial to learn from successful regional harmonization approaches and adapt their best practices to the Mediterranean context, when needed.

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