Status of Energy Efficiency in Cambodia

Workshop on Minimum Energy Performance Standards (MEPS)

Of Room Air-Conditioner

5th-8th November 2024

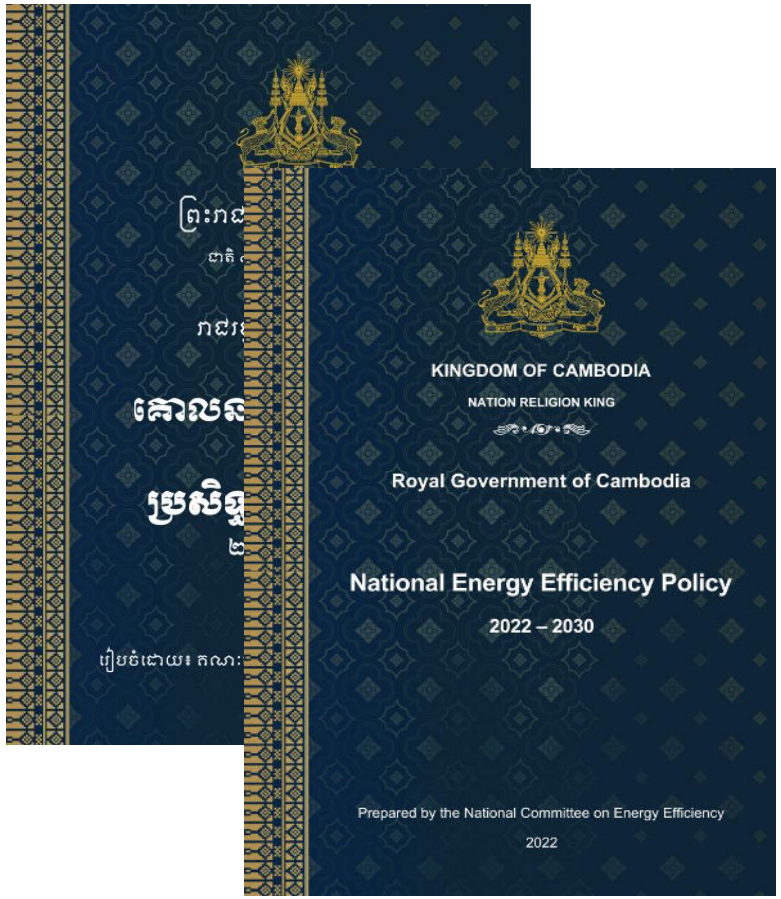
Singapore

Content

1. Overview of National Energy Efficiency Policy 2022-2030 (NEEP)
2. Supporting Policies/ Regulations
3. Status of Energy Efficiency Standard and Labelling

1. Overview of National Energy Efficiency Policy 2022-2030 (NEEP)

1.1. Policy Target

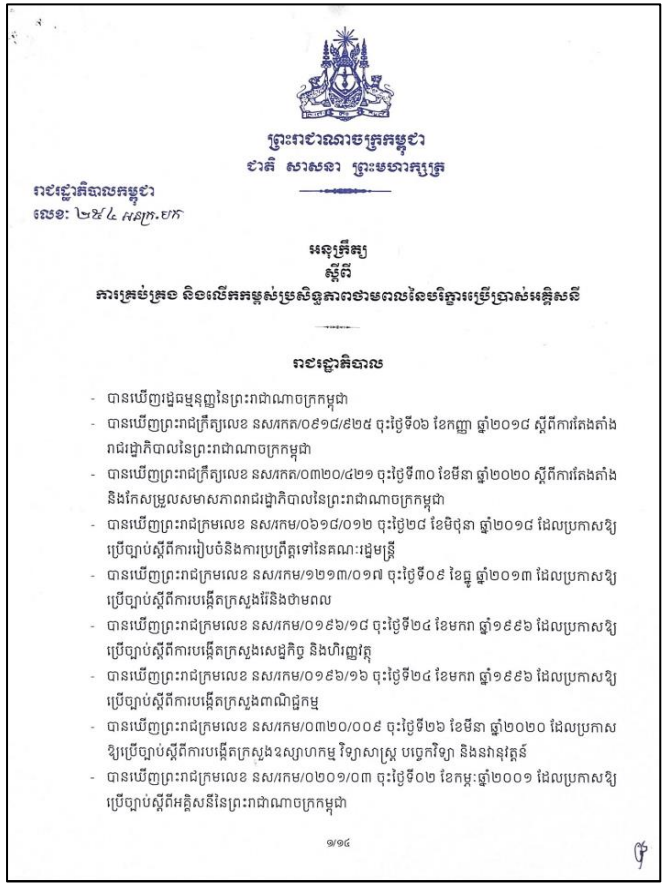


NATIONAL ENERGY EFFICIENCY POLICY

National target for the reduction of total energy consumption of **at least19%** in relation to a BAU trajectory by 2030.

- 20% in the industrial sector, from 38,600 GWh to 30,800 GWh;
- 34% in the residential sector, from 17,981 GWh to 11,826 GWh;
- 25% in commercial buildings (including public buildings), from 8,552 GWh to 6,431 GWh;
- 29% in public services, from 42 GWh to 30 GWh;
- 5% in the transport sector, from 24,662 GWh to 23,383 GWh

2. Supporting Policies/ Regulations



ព្រះរាជាណាចក្រកម្ពុជា
ជាតិ សាសនា ព្រះមហាក្សត្រ

រាជរដ្ឋាភិបាលកម្ពុជា
លេខ: ២៥៤ អនក្រ.តក

អនុក្រឹត្យ
ស្តីពី
ការគ្រប់គ្រង និងលើកកម្ពស់ប្រសិទ្ធភាពថាមពលនៃបរិក្ខារប្រើប្រាស់អគ្គិសនី

រាជរដ្ឋាភិបាល

- បានឃើញរដ្ឋធម្មនុញ្ញនៃព្រះរាជាណាចក្រកម្ពុជា
- បានឃើញព្រះរាជក្រឹត្យលេខ នស/រកត/០៩១៨/៩២៥ ចុះថ្ងៃទី០៦ ខែកញ្ញា ឆ្នាំ២០១៨ ស្តីពីការតែងតាំងរាជរដ្ឋាភិបាលនៃព្រះរាជាណាចក្រកម្ពុជា
- បានឃើញព្រះរាជក្រឹត្យលេខ នស/រកត/០៣២០/៤២១ ចុះថ្ងៃទី៣០ ខែមីនា ឆ្នាំ២០២០ ស្តីពីការតែងតាំងនិងកែសម្រួលសមាសភាពរាជរដ្ឋាភិបាលនៃព្រះរាជាណាចក្រកម្ពុជា
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- បានឃើញព្រះរាជក្រមលេខ នស/រកម/១២១៣/០១៧ ចុះថ្ងៃទី០៩ ខែធ្នូ ឆ្នាំ២០១៣ ដែលប្រកាសឱ្យប្រើច្បាប់ស្តីពីការបង្កើតក្រសួងរ៉ែនិងថាមពល
- បានឃើញព្រះរាជក្រមលេខ នស/រកម/០១៩៦/១៨ ចុះថ្ងៃទី២៤ ខែមករា ឆ្នាំ១៩៩៦ ដែលប្រកាសឱ្យប្រើច្បាប់ស្តីពីការបង្កើតក្រសួងសេដ្ឋកិច្ច និងហិរញ្ញវត្ថុ
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Sub-decree on the management and improvement of energy efficiency of electrical appliances.

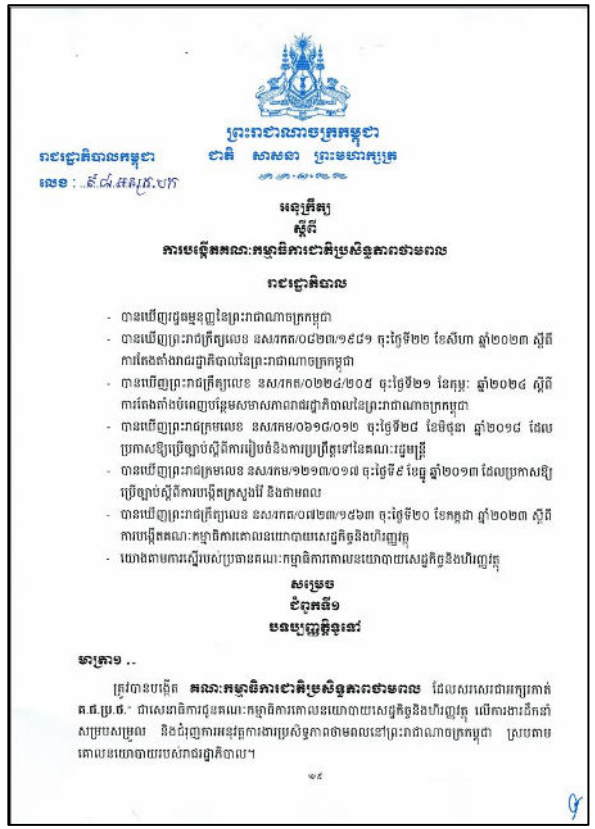
(Approved on 11th August 2023)

Prakas on Energy Efficiency Label for Designated Appliances

(RACs, Refrigerators, Fans, Rice Cooker, and LED/Lamp)

(Expected Approval: 2024)

2. Supporting Policies/ Regulations



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អនុក្រឹត្យ
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ការបង្កើតគណៈកម្មាធិការជាតិប្រសិទ្ធភាពថាមពល

រាជរដ្ឋាភិបាល

- បានឃើញរដ្ឋធម្មនុញ្ញនៃព្រះរាជាណាចក្រកម្ពុជា
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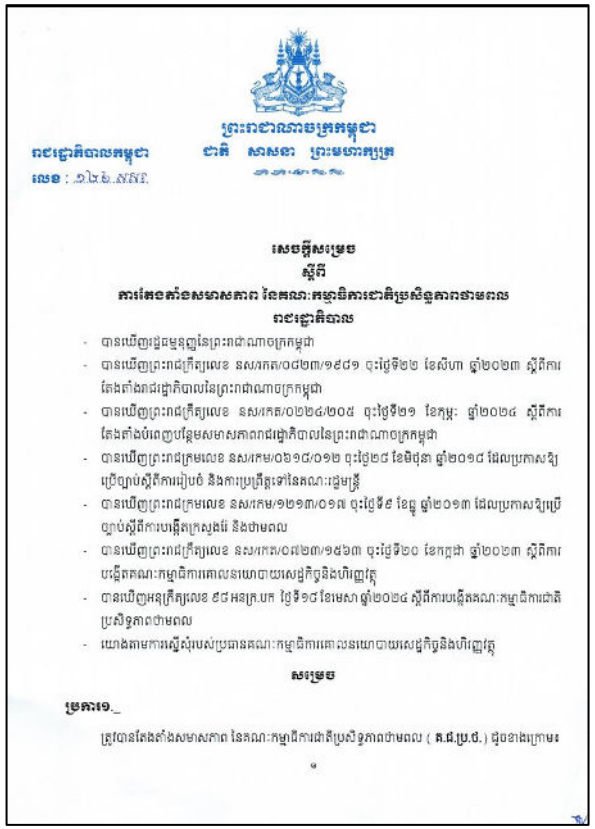
- យោងតាមការស្នើរបស់ប្រធានគណៈកម្មាធិការគោលនយោបាយសេដ្ឋកិច្ចនិងហិរញ្ញវត្ថុ

សម្រេច
ចំណុចទី១
បទប្បញ្ញត្តិទូទៅ

មាត្រា១ ..

ត្រូវបានបង្កើត **គណៈកម្មាធិការជាតិប្រសិទ្ធភាពថាមពល** ដែលសរសេរជាអក្សរកាត់ **គ.ជ.ប្រ.ថ.** ជាសេនាធិការជូនគណៈកម្មាធិការគោលនយោបាយសេដ្ឋកិច្ចនិងហិរញ្ញវត្ថុ បើការងារដឹកនាំ សម្របសម្រួល និងជំរុញការអនុវត្តការងារប្រសិទ្ធភាពថាមពលនៅព្រះរាជាណាចក្រកម្ពុជា ស្របតាម គោលនយោបាយរបស់រាជរដ្ឋាភិបាល។

Sub-decree on "Establishment of The National Committee on Energy Efficiency"
(Approved on 18th April 2024)



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សេចក្តីសម្រេច
ស្តីពី
ការតែងតាំងសមាសភាព នៃគណៈកម្មាធិការជាតិប្រសិទ្ធភាពថាមពល
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- បានឃើញអនុក្រឹត្យលេខ ៩៨ អនក្រ.បក ថ្ងៃទី១៨ ខែមេសា ឆ្នាំ២០២៤ ស្តីពីការបង្កើតគណៈកម្មាធិការជាតិ ប្រសិទ្ធភាពថាមពល
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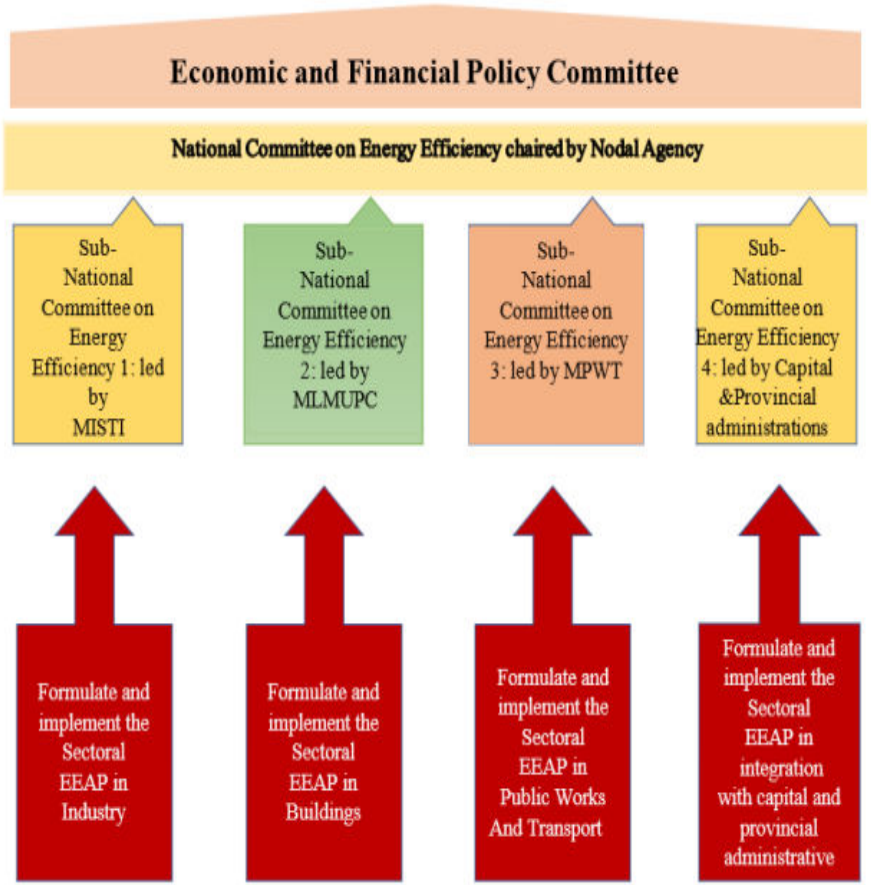
សម្រេច

ប្រការ១.

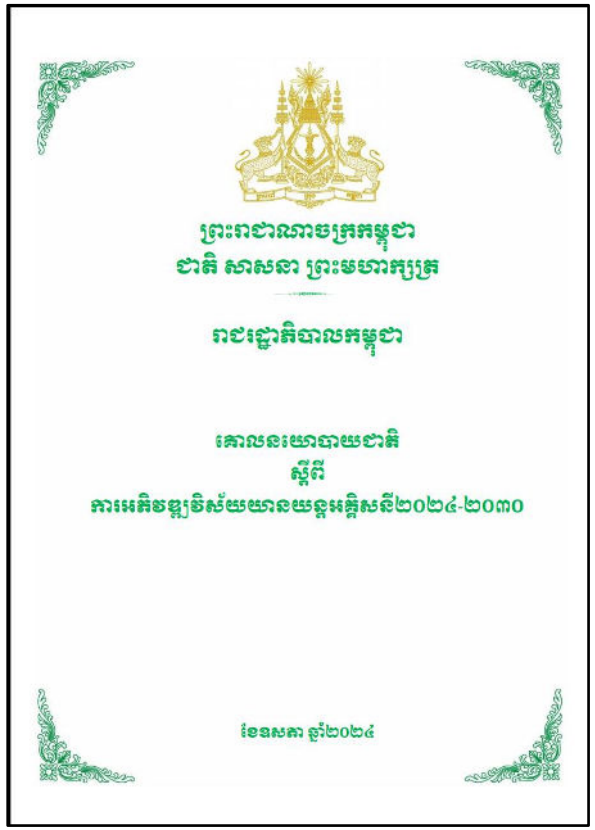
ត្រូវបានតែងតាំងសមាសភាព នៃគណៈកម្មាធិការជាតិប្រសិទ្ធភាពថាមពល (**គ.ជ.ប្រ.ថ.**) ដូចខាងក្រោម៖

Decision on "Appointment of Composition of The National Committee on Energy Efficiency"
(Approved on 01st July 2024)



Governance Framework of the National Committee on Energy Efficiency

2. Supporting Policies/ Regulations



NATIONAL EV DEVELOPMENT POLICY 2024-2030

(Approved on 29th May 2024)

NATIONAL EV DEVELOPMENT POLICY 2024-2030

The national policy aims to develop the ecosystem of the electric vehicle sector effectively and flexibly with the evolution of electric vehicle technology. The national targets includes:

- BEVs: 30 000, including 25 000 of private cars and 5000 of commercial cars;
- E-2 Wheelers: 720 000;
- E-3 Wheelers: 20 000.

3. Status of Energy Efficiency Standard and Labelling

3.1. EES&L for RAC

- MME is working with ADB in developing EES&L for Designated Appliances including: RACs, Refrigerators, Fans, Rice Cooker, and LED/Lamp
- Room Air conditioner (RAC) is chosen as the first appliance for EES&L.
- The Prakas of the EES&L for RACs and its SOP will be issued within this year.

Minimum Energy Performance Requirement

Category	Cooling capacity (kW)	CSPF (kWh/kWh)
All types of AC	< 4	3.5
	≥ 4 to < 8	3.3

Prakas on Energy Efficiency Label for Designated Appliances

(RACs, Refrigerators, Fans, Rice Cooker, and LED/Lamp)

(Expected Approval: 2024)

3. Status of Energy Efficiency Standard and Labelling

3.1. EES&L for RAC

The following particulars shall be displayed on the label:

1. **Logo of the MME**
2. **Registration number: (to be issued by MME on registration of a model)**
3. **Name of Manufacturer / Importer / Brand**
4. **Model number:**
5. **Cooling Seasonal Performance Factor or CSPF (Wh/Wh):**
6. **Energy Efficiency Rating (EE Level):**
7. **Annual Electricity Consumption in kWh:**

3. Status of Energy Efficiency Standard and Labelling

3.2. SOPs for EES&L Program

- One stop guide outlining the procedures for operationalizing the energy efficiency standards and labelling of appliances in Cambodia.

- Serves as the guidance document for implementing agencies (MME and partner agencies) and lays procedures for importers and manufacturers to ensure compliance with EES&L Program.

- Includes guidelines and procedures for MV&E to be followed by MME and partner agencies (MOC, MISTI, GDCE) to track the progress and measure the impact of the program

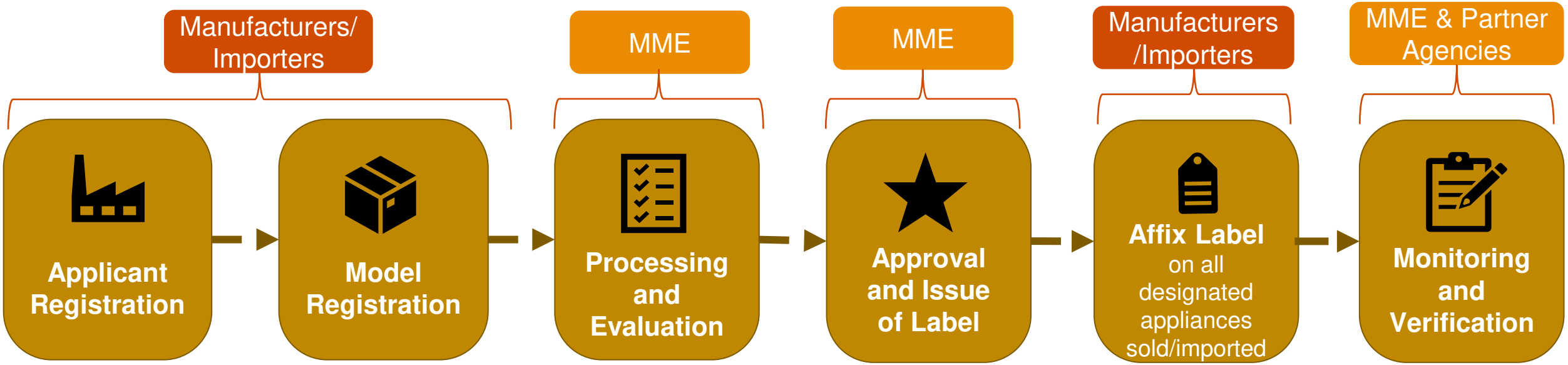
3. Status of Energy Efficiency Standard and Labelling

3.2. SOPs for EES&L Program

- All Importers/Manufacturers must register all models of Designated Electrical Appliances with MME
- Designated Electrical Appliances with EE Labels issued by MME can be sold in Cambodia

MME

Manufacturers/Importers



THANK YOU

ENERGY EFFICIENCY AND REGULATORY EFFORTS TO UPSCALE AIR CONDITIONERS ENERGY PERFORMANCE

Directorate of Energy Conservation
Directorate General of New, Renewable Energy, and Energy Conservation
Ministry Energy and Mineral Resources

Delivered on
"Singapore Study Tour 2024 – Discussion on MEPS Implementation Status by Country"

Singapore, November 6th, 2024

INDONESIA'S COMMITMENT TO REDUCE GHG EMISSIONS

Enhanced NDC 2030

(in million tons CO_2e)

No.	Sector	GHG emissions 2010 (Million Ton CO_2e)	GHG emissions in 2030			Emission Reduction	
			BaU	CM1	CM2	CM1	CM2
1	**Energy**	**453.2**	**1,669**	**1,311**	**1,223**	**358**	**446**
2	Waste	88	296	256	253	40	45,3
3	IPPU	36	70	63	61	7	9
4	Agriculture	111	120	110	108	10	12
5	Forestry	647	714	217	-15	500	729
	TOTAL	**1,334**	**2,869**	**1,953**	**1,632**	**915**	**1,240**

Energy Sector
358 million ton CO2

ENERGY EFFICIENCY
132.25 million ton CO2

Activity	million ton CO2
Energy Management	36.14
Efficiency at Household Utensils	83.84
Energy Saving Solar Road Lamp	1.76
Electric Vehicle	7.23
Energy Efficiency Improvement for Cooking	3.23
JCM Indonesia	0.032

RENEWABLE
181.45 million ton CO2

Activity	million ton CO2
RUPTL NRE PP	97.01
Rooftop PV, Solar PP PPU, Hydropower PPU, Off Grid NRE PP	27.59
Biofuel	47.53
Direct Utilization	0.44
Cofiring	8.88

CLEAN POWER TECHNOLOGY
21.53 million ton CO2

Activity	million ton CO2
CCT for CFPP	7.42
New Gas PP	14.12

LOW CARBON FUELS
16.83 million ton CO2

Activity	million ton CO2
Fuel Switching on Transportation Sector	0.14
Oil to LPG Conversion	15.39
Natural Gas for local public transportation	0.003
City Gas Network	1.29

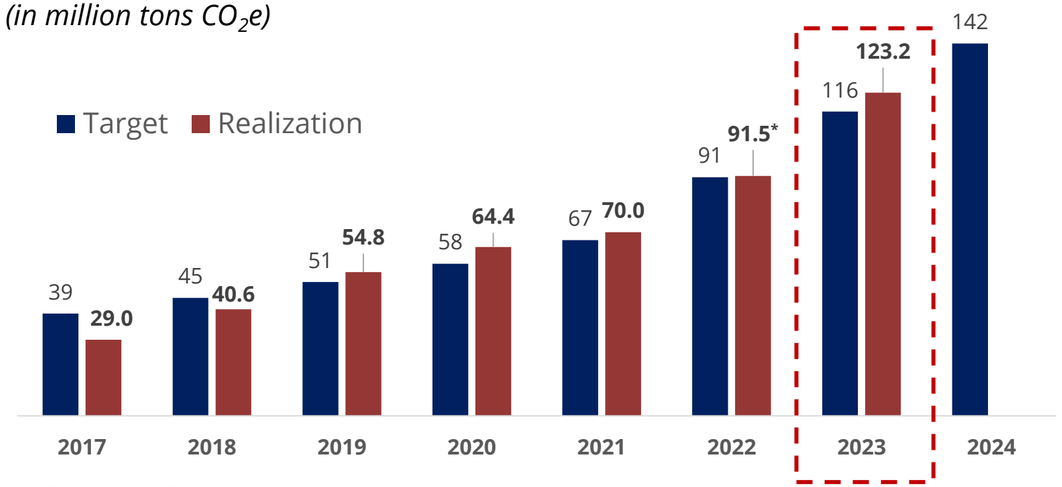
MINE RECLAMATION
5.84 million ton CO2

Note:
CM : Counter Measure
CM-1 : Self Effort

Note: Implementation of CCS/CCUS is outside of the targets planned in the e-NDC document

Realization of GHG Emission Reduction in the Energy Sector

(in million tons CO_2e)

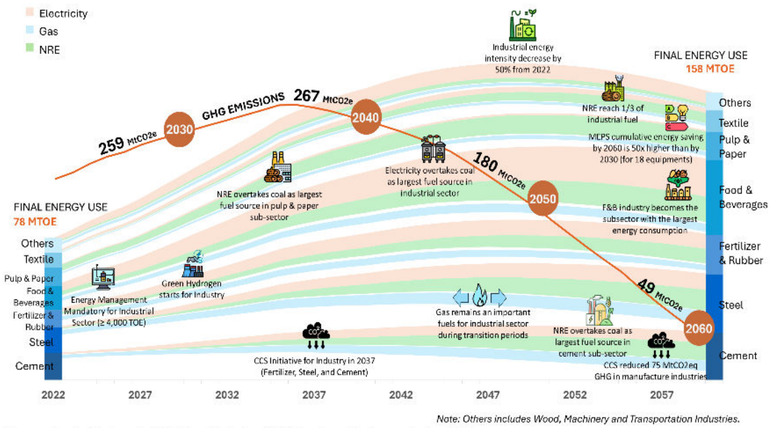


(in million tons CO_2e)

No.	Mitigation Actions	2023		2030 Target	% Achievement of 2030 Target
		Target	Achievements		
1	Energy efficiency	**29.14**	**31.87**	**132.25**	**24,1%**
2	New and Renewable Energy	**51.00**	**51.29**	**181.45**	**28,3%**
3	Low Carbon Fuel	**15.92**	**15.55**	**16.83**	**92,4%**
4	Use of Clean Generation Technology	**16.54**	**13.33**	**21.53**	**61,9%**
5	Other Activities	**3.95**	**11.18**	**5.84**	**191,4%**
	TOTAL	**116.45**	**123.22**	**358.00**	**34,4%**

DEMAND SECTOR DECARBONIZATION STRATEGY

INDUSTRIAL SECTOR



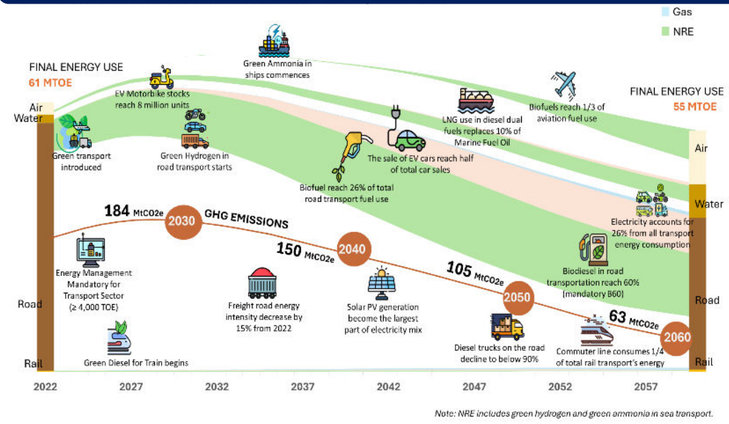
Note: Others includes Wood, Machinery and Transportation Industries.

Source: Draft of Indonesia's Net Zero Emission (NZE) Roadmap for Energy Sector 2060

HIGHLIGHTS:

1. Industry-wide mandatory energy management.
2. Green hydrogen as potential alternative fuel in fertilizer and metal productions.
3. **CCS for industries** (fertilizer, iron and steel metal, and cement) with a potential estimation of 75 million tons of avoided CO2e by 2060.
4. **Electrification and decarbonization in energy-intensive industries,** particularly F&B.
5. Gas remains as transitional fuel in high-temperature processes.
6. Energy intensity nearly halved **(doubling efficiency)** by 2050, compared to 2022.
7. NRE reaches 1/3 of industrial fuel by 2053.
8. Cumulative energy savings grow significantly due to **MEPS** on 18 equipment until 2060.

TRANSPORT SECTOR



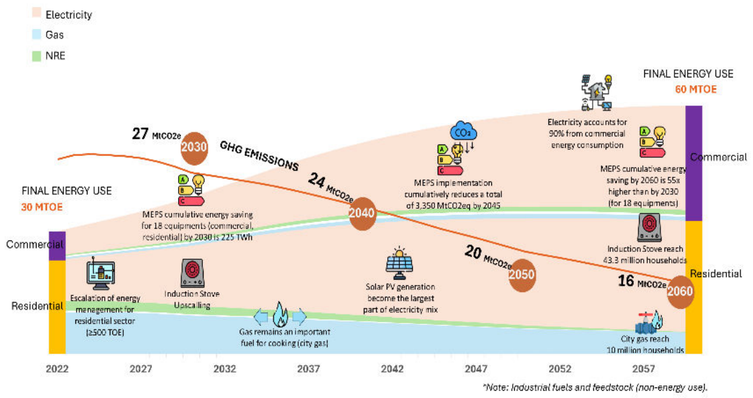
Note: NRE includes green hydrogen and green ammonia in sea transport.

Source: Draft of Indonesia's Net Zero Emission (NZE) Roadmap for Energy Sector 2060

HIGHLIGHTS:

1. Green fuel and low-carbon vehicle policy.
2. Mandatory energy management for transport.
3. **Electric Vehicle (EV)** in road (2-wheelers and 4-wheelers) and railway transport.
4. Reducing energy intensity of freight vehicles.
5. **Green hydrogen** for road transportation starting in 2030.
6. **Green ammonia from green hydrogen** for waterway/sea fleets.
7. Green jet fuel (SAF) in air transport (2053).
8. Solar PP domination in the power sector (**green electricity for EVs**).
9. Gas replaces marine fuel oil by 10% (2047).
10. Promotion of mass and public transport.
11. Mandatory biofuel blending (B60 in 2055).

RESIDENTIAL & COMMERCIAL SECTOR



**Note: Industrial fuels and feedstock (non-energy use).*

Source: Draft of Indonesia's Net Zero Emission (NZE) Roadmap for Energy Sector 2060

HIGHLIGHTS:

1. Mandatory energy management **in buildings** that consumes energy **>500 TOE per year.**
2. Electric/Induction stoves to replace traditional fuels and LPG.
3. **Cumulative energy savings** and emission reduction due to MEPS on 18 appliances (>3 billion tons of CO2eq avoided by 2045).
4. City gas to reduce LPG import dependency in the residential sector.
5. **Solar rooftop** to boost the NRE.
6. Electrification of >90% of commercial sector energy demand.
7. Implementation of **Minimum Energy Performance Standard** for appliances

IMPLEMENTATION OF GOVERNMENT REGULATION (PP) 33/2023

Energy Management must be carried out by Energy Providers, Energy Source Users and Energy Users if energy consumption in one year exceeds a certain threshold.

New Threshold For Mandatory Energy Management

Energy Suppliers	Industrial Sectors	Transport Sectors
≥ 6000 TOE	≥ 4000 TOE	≥ 4000 TOE

Building Sectors	Gov(National & Regional)
≥ 500 TOE	Mandatory

TOE = Tonnes Oil Equivalent

Scope of Energy Management

1. Appoint energy manager
2. Formulate energy efficiency program
3. Implement energy audit periodically
4. Implement recommendation from energy audit

Report to MEMR

Estimating the Impact of Threshold Changes on Energy Management

Note: Compared to the initial value in PP 70/2009, namely ≥6000 TOE for all energy users.

Potential Savings (in 2030)	Energy Provider	Industry	Transport	Building	TOTAL Estimated Impact
Energi	3,56 Mil TOE	5,28 Mil TOE	0,4 Mil TOE	66 Thousands TOE	**9,9 Mil TOE**
Biaya	Rp. 9,4 T	Rp. 20,8 T	Rp 4,2 T	Rp 0,9 T	**Rp 35,3 T**

Realization of EE in Buildings (2023)

Number of building that have reported:

38 Commercial Bld.
41 Government Bld.

292 Thousands BOE
Total Energy Consumption

17 Thousands BOE
Energy Savings

23 Thousands tCO2e
Emission Reduction

Indicative Realization (June 2024)

12 Commercial Bld.
have reported

6.334 MWh
Energy Savings

1.380 tCO2e
Emission Reduction

REGULATORY BASIS OF MINIMUM ENERGY PERFORMANCE STANDARD (1)

Law No. 30 of 2007 on Energy

→

Government Regulation No. 33 of 2023 on Energy Conservation

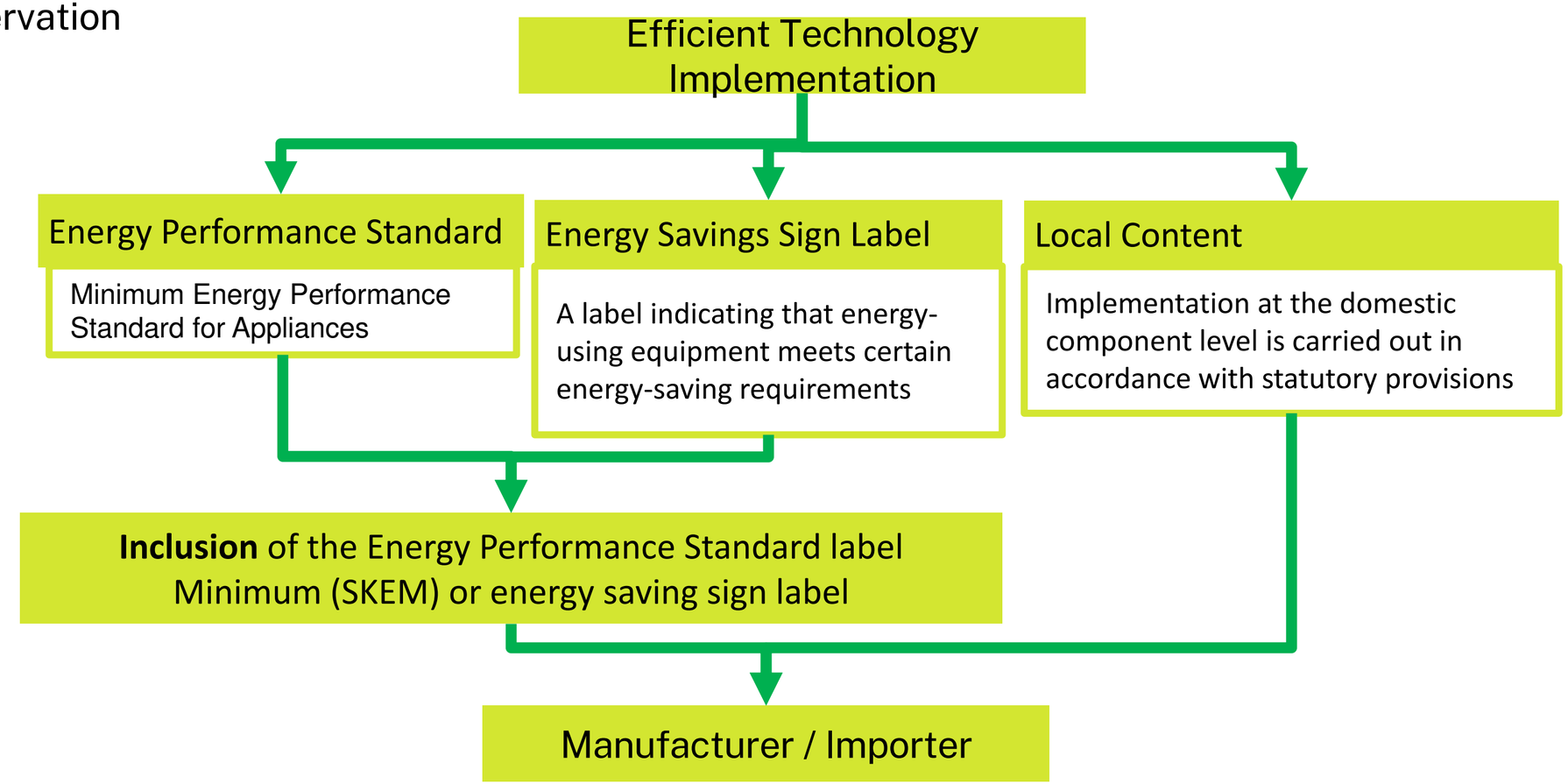
1. implementation of energy conservation measures in industrial, buildings, transportation, and household sectors
2. Implementation of energy conservation measures in Central and Municipality Governments
3. Implementation of minimum energy performance standards and energy labeling
4. Implementation of incentives and disincentives
5. Implementation of guidance and surveillance programs

↓

Regulation of the MEMR No. 14 of 2021 on Implementation of Minimum Energy Performance Standards for Energy-Using Equipment

REGULATORY BASIS OF MINIMUM ENERGY PERFORMANCE STANDARD (2)

The implementation n of efficient technology in energy-saving equipment is used in energy management and used by the household sector in energy conservation



Further provisions regarding the application and inclusion of minimum Energy performance standard labels or Energy saving sign labels are regulated in a Ministerial Regulation

APPLIANCES STANDARDIZATION

Minimum Energy Performance Standard (MEPS) & Labels

Roadmap of Aplliances Standardization

Established Ministerial Decree:
- Air Conditioner
- Rice Cooker
- Fan
- Refrigerator

2021

Finalization of Ministerial Decree:
- TV
- Showcase

2023

Established Ministerial Decree:
- LED Lamp

2022

Finalization of Ministerial Decree:
- Electrical Motor
- Water Pump
- Chiller
- Blender
- Boiller
- MEPS Value revision
- **washing machine**
- **water dispenser**

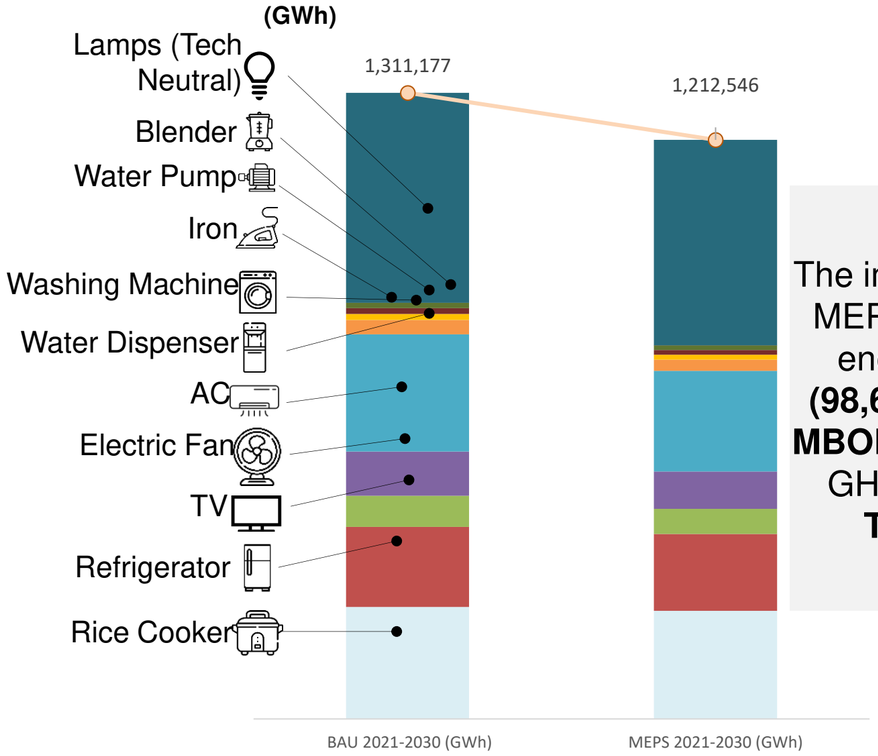
2024

Regulations:
- Ministry of EMR Regulation No. 14/2021 on Application of Minimum Energy Performance Standards (MEPS) for Energy Utilizing Appliances
- Ministry of EMR Decree No. 103.K/EK.07/DJE/2021 on MEPS and Energy Savings Label of **Air Conditioning**
- Ministry of EMR Decree No. 113.K/EK.07/DJE/2021 on MEPS and Energy Savings Label of **Refrigerator**
- Ministry of EMR Decree No. 114.K/EK.07/DJE/2021 on MEPS and Energy Savings Label of **Fan**
- Ministry of EMR Decree No. 115.K/EK.07/DJE/2021 on MEPS and Energy Savings Label of **Rice Cooker**
- Ministry of EMR Decree No. 135.K.EK.07/DJE/2022 on MEPS and Energy Savings Label of **LED Lamp**
- Ministry of EMR Decree No. 126.K.EK.06/DJE/2023 on MEPS and Energy Savings Label of **Refrigerated Display Case (RDC)**
- Ministry of EMR Decree No. 162.K/EK.06/DJE/2023 on MEPS and Energy Savings Label of **Television**

Standardization and Labeling Application

Regulation for Energy Efficiency in buildings through SNI:6390:2020 Energy Conservation of air conditioning systems in buildings. It provides recommendations for Performance Value (COP) for electric air conditioning appliances (chillers).

MEPS for appliances 2021-2030



The implementation of MEPS can save the energy up **to 8% (98,632 GWh) or 62 MBOE** and will reduce GHG **83.8 Million Tons of CO2**

Potential Minimum Energy Performance Standards for the industrial sector: Electric vehicles, chillers, transformers and boilers.

IMPLEMENTATION OF MINIMUM ENERGY PERFORMANCE STANDARDS (MEPS) AND LABELS

MEPS Goals:

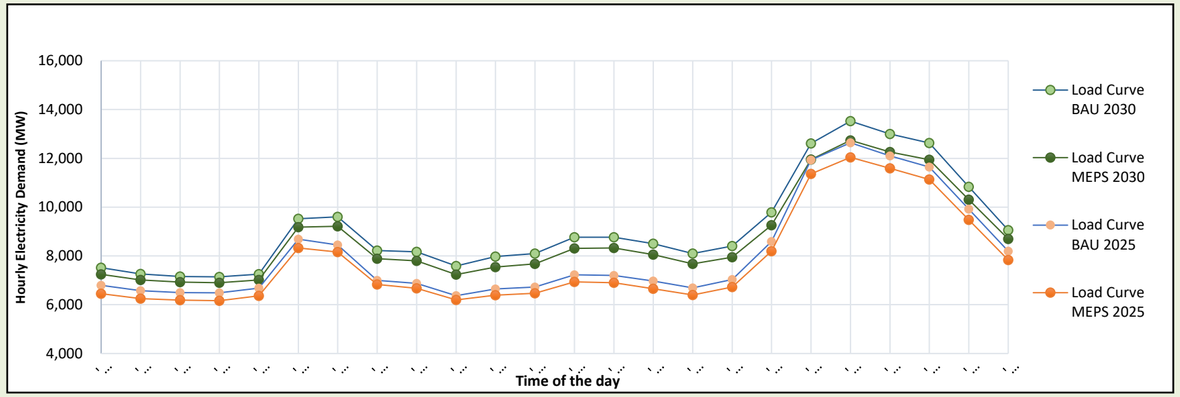
- Protect and provide information to the public to choose energy-saving equipment;
- Supporting domestic manufacturing industries and importers to produce energy-saving equipment;
- Prevent inefficient products from entering the Indonesian market

No.	Appliances	Total Production / Import	Energy Savings	Emission Reduction	Cost Savings
		(units)	(GWh)	(million ton CO2)	(IDR trillion)
1	Air Conditioning	2,616,326	1,907.91	1.76	2.76
2	Rice Cooker	4,868,459	5.84	0.27	0.000008
3	Refrigerator	1,466,035	158.66	0.15	0.23
		TOTAL	**2,066.57**	**2.18**	**2.99**

ENERGY SAVINGS ACHIEVEMENT 2023

- **energy savings** of **2.07 TWh, electricity cost savings** of **IDR 3 trillion,** and **reduced emissions** of **2.18 million tons of CO2.**

Impact of Peak Load Reduction on 5 appliances implemented MEPS & Labeling in 2025 and 2030



Implementation MEPS and label on five main appliances (AC, rice cooker, fan , refrigerator, LED lamps):

- 2025: **reduce peak electricity** by **599 MW** and **save energy 3,0 TWh**.
- 2030: **reduce electricity load** by **787 MW** and save energy by **3,8 TWh**.

MEPS Achievement & Energy Savings (%)

Ket: % energy savings compared to baseline

AIR CONDITIONING

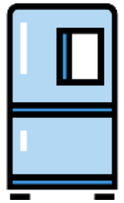
Mandatory Augs 2021

★	phase out
★★	baseline
★★★	11%
★★★★	19%
★★★★★	32%

Rice COoker

Mandatory Sept 2022

★	baseline
★★	8%
★★★	16%
★★★★	24%
★★★★★	32%



Refrigerator

Mandatory Sept 2022

★	baseline
★★	25%
★★★	44%
★★★★	58%
★★★★★	68%

Fan

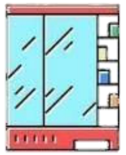
Mandatory Sept 2022

★	baseline
★★	17%
★★★	29%
★★★★	38%
★★★★★	44%

LED Lamps

Mandatory July 2023

★	baseline
★★	19%
★★★	27%
★★★★	33%
★★★★★	41%



Refrigerated Display Case

Mandatory Oct 2024

★	baseline
★★	20%
★★★	40%
★★★★	59%
★★★★★	75%

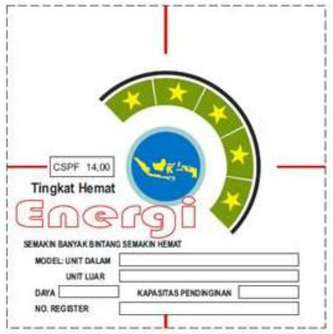
Television

Mandatory Des 2024

★	baseline
★★	15%
★★★	32%
★★★★	49%
★★★★★	64%

INDONESIA'S MEPS ROADMAP

SKEM



2021

- Air conditioner
- Refrigerator
- Fan
- Rice cooker

2022

- LED Lamp

2023

- Refrigerated Display Case
- Television

2024

- Water dispenser
- Washing machine

Ongoing process

2025

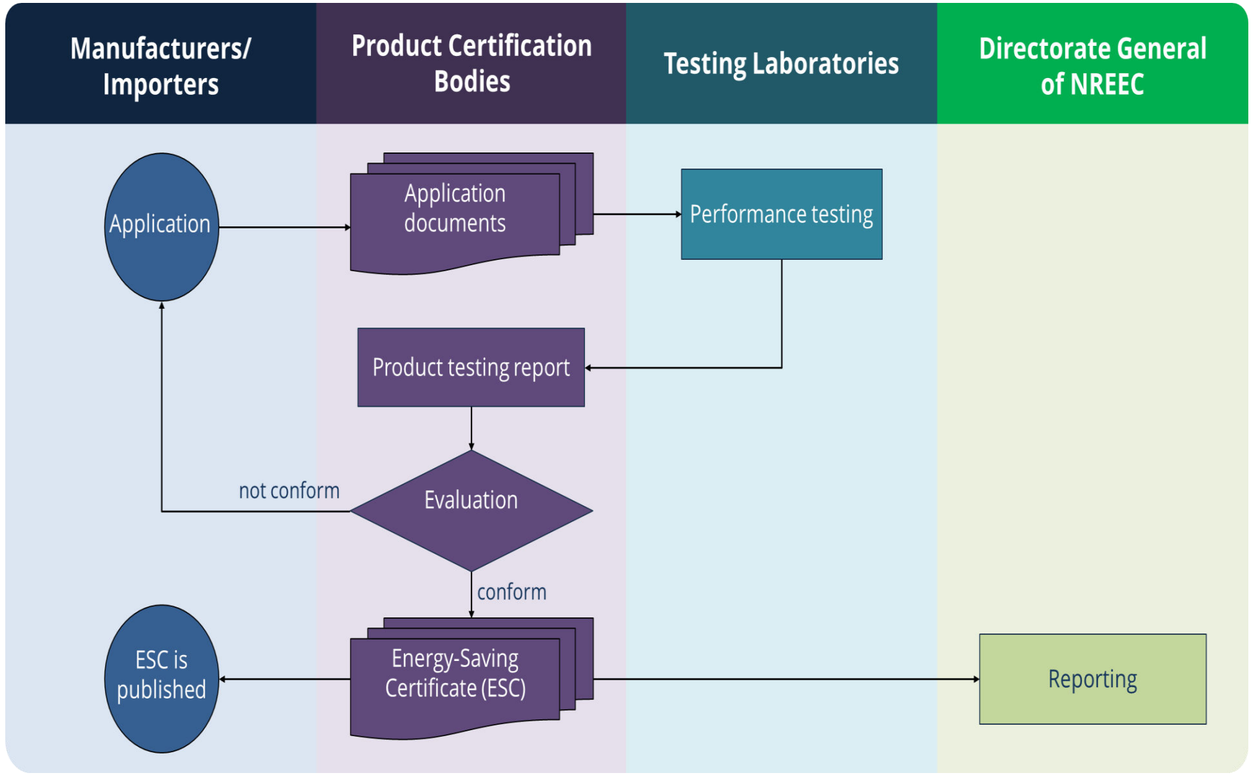
- Water pump
- Electric motor

Planned

IMPLEMENTATION OF MEPS AND FLOW CHART BASED ON MEMR REG. NO. 14/2021

1. Manufacturers and importers **are required to comply to the MEPS**
2. **MEPS are implemented** through the affixation of **MEPS Mark or Energy Label**
3. MEPS Mark or Energy Label is **affixed to the packaging and the product**
4. Before allowed to affix MEPS Mark or Energy Label, manufacturers and importers **are required to own Energy-Saving Certificate(s)**
5. Energy-Saving Certificates are published by **Product Certification Bodies** appointed by the MEMR
6. Energy-Saving Certificates **are valid for four years** and can be extended one time

The certification process will involve manufacturers and importers, product certification bodies, as well as testing laboratories in obtaining energy savings certificates.



SCOPE & IMPLEMENTATION OF REGULATION

MINISTERIAL DECREE NO. 103.K/EK.07/DJE/2021 ON MEPS AND ENERGY LABEL FOR AIR CONDITIONERS

- **Single split wall-mounted**
- **Cooling capacity of ≤ 27.000 BTU/hours**
- **Inverter** and **non-inverter**
- HS code **8415.10.10**
- **SNI ISO 5151:2015**;
  SNI 8560-1:2018 ISO 16358-1:2013

1. Ratified on October 23rd, 2023
2. **Mandatory** starting **October 24th, 2024**
3. **Revision of MEPS** for ACs
4. **Phase out** of **star-1** efficiency level

NEW MEPS AND STAR RATING FOR AIR CONDITIONERS

October 23rd, 2024

Current MEPS

CSPF 3.10 Wh/Wh

New MEPS

CSPF 3.40 Wh/Wh

Improvement of MEPS **from CSPF 3.10 to CSPF 3.40** will trigger the **phasing out** of air conditioners with **star-1** rating.

Star Rating	Efficiency (Wh/Wh)
★	~~3.10 ≤ CSPF < 3.40~~
★★	3.40 ≤ CSPF < 3.80
★★★	3.80 ≤ CSPF < 4.20
★★★★	4.20 ≤ CSPF < 5.00
★★★★★	5.00 ≤ CSPF

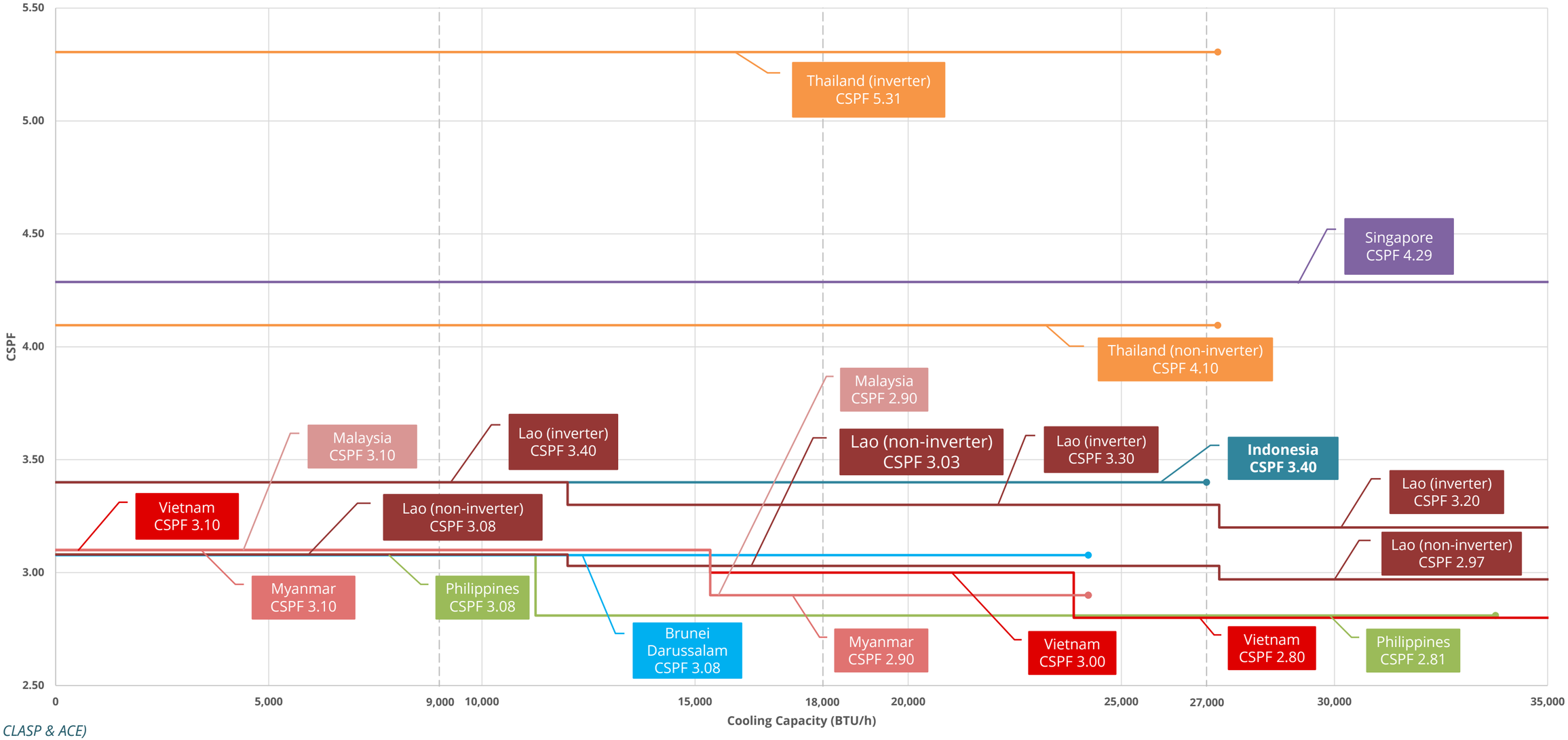
(will be in effect on October 23rd, 2024)

Product Certification Body and Testing Laboratories

Certification Body	Status
BSI	Goverment
TUV Rheinland	Private
Sucofindo ICS	State-owned
Baristand	Government
PT. Qualis	Private
B4T Bandung	Government

Testing Laboratories	Status
B2TKE – BPPT	Government
Baristand Surabaya	Government
TUV Rheinland	Private
Qualis Indonesia	Private
PT Hartono	Manufacturer
PT Panasonic Manufacturing Indonesia	Manufacturer

AIR CONDITIONER MEPS IN ASEAN



(Sources: CLASP & ACE)

Indonesia National Cooling Action Plan (I-NCAP)

- The cooling sector consumes a significant share of final energy consumption in Indonesia and contributes a large share of national emissions.
- Emissions from the refrigeration and air conditioning sector reached 77 million tons of carbon dioxide equivalent (CO_2e) in 2015, equivalent to 15 per cent of total energy sector emissions. At the same time, the cooling sector is expected to grow rapidly along with the growth of both Indonesia's population and economy.
- The Indonesia National Cooling Action Plan (NCAP) has been developed based on the Cool Coalition's NCAP Methodology. The NCAP utilizes data covering three thematic areas: **space cooling**; **mobile air conditioning**; and **the food cold chain**. The NCAP has also helped identify gaps in cooling data within different sectors and end uses.
- This NCAP is designed to assist the government to:
  - understand and address cooling through a comprehensive approach covering different sectors and end uses;
  - ensure the integration of both met and unmet cooling needs into policy and regulation;
  - drive alignment and integrative action across multiple sectors of cooling;
  - integrate existing policies and institutional efforts related to cooling; and
  - identify solutions for energy-efficient and climate-friendly cooling and the implementation pathway maximizing the socio-economic benefits.

KEY CHALLENGES

- Industry's (mainly local manufacturers') **lack of technological and financial capacities** in developing and/or producing more efficient products.
- Industry's **fear of slowing business** due to increasing selling price caused by the development cost of more efficient products.
- Consumer **mindset** which still tends toward **cost-centric** instead of **efficiency-centric**.

Thank You
Terima Kasih

www.ebtke.esdm.go.id

@djebtke Ditjen EBTKE

Address

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Cikini, Menteng Jakarta

ພະລັງງານແລະບໍ່ແຮ່
ENERGY AND MINES

The current status for EE&C policy, MEPS, energy labelling for appliance and Product Registration System in Lao PDR

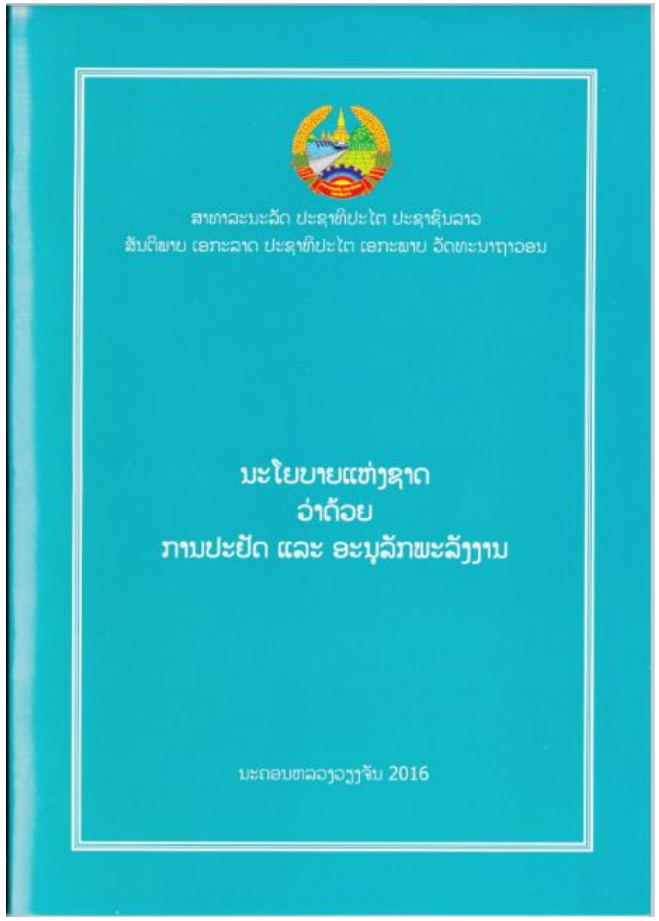
Presented by: Latsayakone PHOLSENA
Department of Energy Efficiency and Promotion
Ministry of Energy and Mines

06 November 2024, Singapore

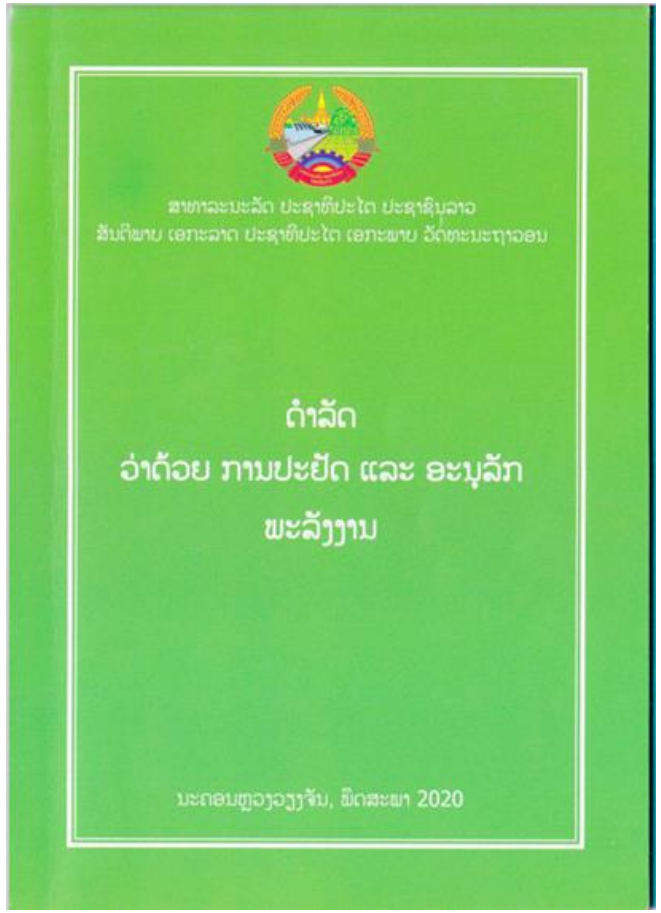
Content

- EE&C Policy
- MEPS for Air Conditioner in Lao PDR
- Product Registration System for Air Conditioner in Lao PDR
- DSLAC to Sustainable Environment
- Key challenges/barriers for energy efficiency measures in appliances
- ASEAN and IOs support us
- Future Plan

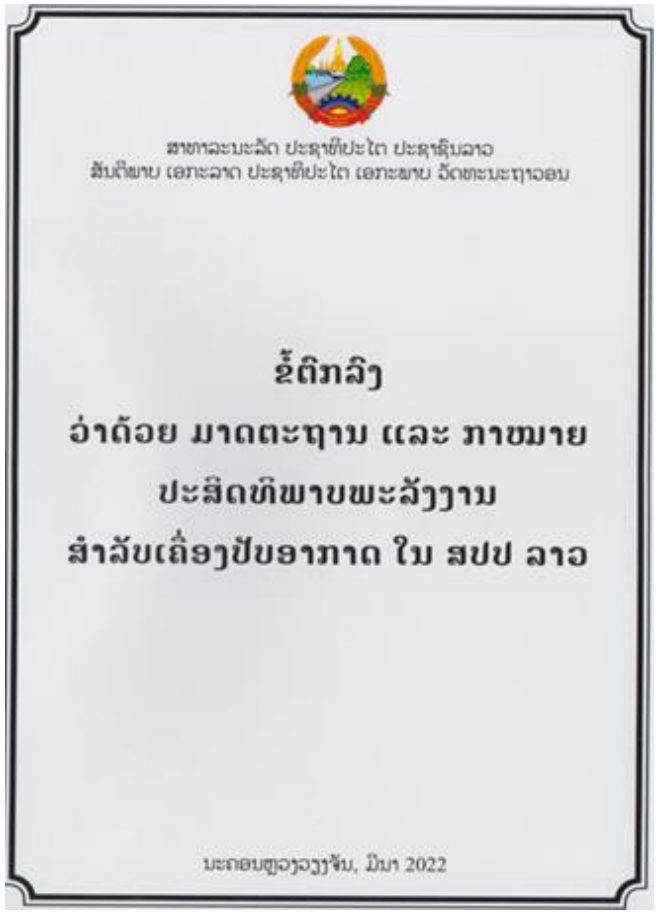
Regulations Framework



EE&C Policy



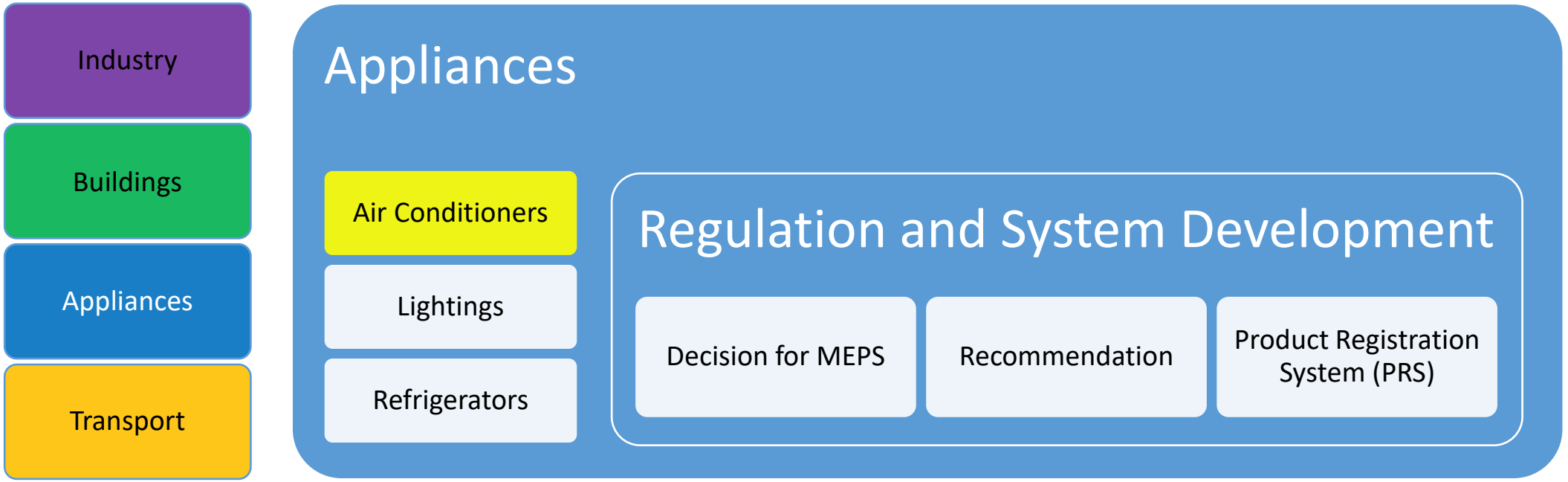
EE&C Decree

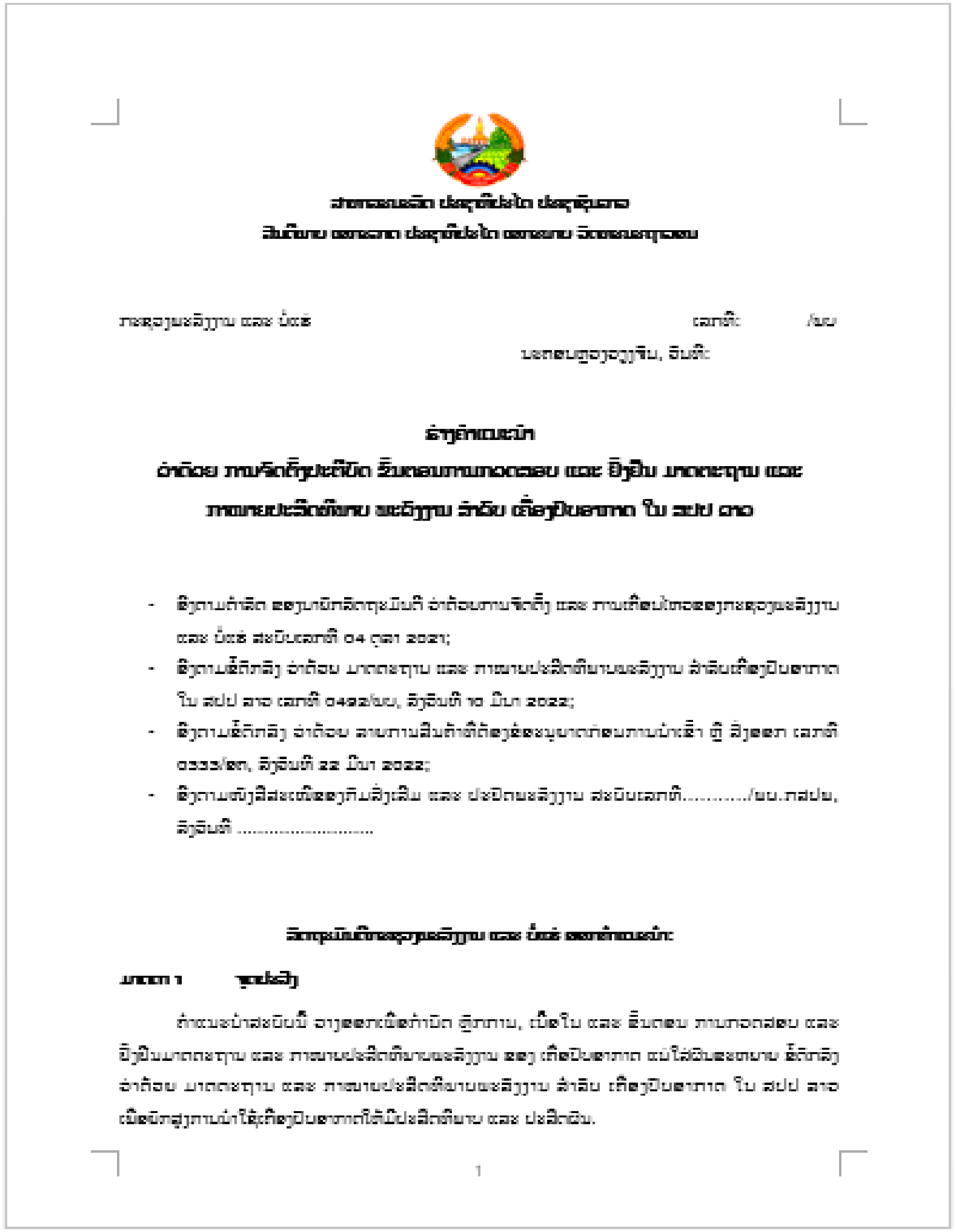


Decision on Standard and EE Label for AC (DSLAC)

EE&C Policy Framework

EE&C target: to reduce energy consumption 10% by 2030





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ກະຊວງພະລັງງານ ແລະ ບໍ່ແຮ່

Draft of Recommendation on Implementing of AC Product Registration is expected to approve by this year

MEPS for Air Conditioner in Lao PDR

Type of AC	Cooling capacity (W)	MEPS (unit: CSPF)
Non-Inverter	$CC \leq 3{,}520$	3.08
	$3{,}520 < CC \leq 8{,}000$	3.03
	$8{,}000 < CC \leq 12{,}000$	2.97
Inverter	$CC \leq 3{,}520$	3.4
	$3{,}520 < CC \leq 8{,}000$	3.3
	$8{,}000 < CC \leq 12{,}000$	3.2

Energy efficiency label in Lao PDR

EE label

Type	Capacity(CC) W	Energy efficiency (CSPF) Level				
		No 1	No 2	No 3	No 4	No 5
None-Inverter	CC ≤ 3520	3.08-3.18	3.19-3.28	3.29-3.39	3.40-3.49	≥3.5
	3520<CC≤7000	3.03-3.12	3.13-3.23	3.24-3.33	3.34-3.44	≥3.45
	7000<CC≤12000	2.97-3.07	3.08-3.18	3.19-3.28	3.29-3.39	≥3.40

Type	Capacity (CC) W	Energy efficiency (CSPF) Level				
		No 1	No 2	No 3	No 4	No 5
Inverter	CC < 3520	3.40-3.79	3.80-4.19	4.20-4.59	4.60-4.99	≥5
	3520<CC≤7000	3.30-3.69	3.70-4.09	4.10-4.49	4.50-4.89	≥4.9
	7000<CC≤12000	3.20-3.59	3.60-3.99	4.00-4.39	4.40-4.79	≥4.8

Product Registration System Development

No.	Steps	Responsibility by	Definition
1	EE&C Labeling Requirement	DEEP/MEM	DEEP much check and transfer to DSM for the Conformity Testing and Accreditation
2	Conformity Testing and Accreditation	DSM / MOIC	DSM much accredited of the conformity testing base on ISOs are mentioned below and give back to DEEP within 4-5 days - ISO 17065:2012 - ISO 17025:2017 - ISO 17000:2020 - ISO 17043:2023
3	EE labelling Certification	DEEP/MEM	DEEP much certificated the EE label After receive the conformity testing and accreditation from DSM within 2-3 days
4	Printing EE label	EDL	EDL much print out the EE label base on the PRAC programme and send the EE label to suppliers or Manufacturers
5	Stick the EE label	Manufacturers/Factories	the EE label much be sticked from Factories only
6	Product Registration for AC (PRAC)	DEEP/MEM	Suppliers or importers much do the PRAC before the air conditioners import by register AC product with DEEP
7	Import application permit	Border Checkpoint Authorities	Checking PRAC and EE labelling
8	Inspection/Investigation	Provincials Authorities	Random Sampling
9	Laboratory Testing	RIEM/MEM	The testing stand for AC is followed by ISO 5151:2010 ISO 16358-1:2013

Product Registration for AC (Online)

https://docs.google.com/forms/d/e/1FAIpQLSd3ajZZXZ6KmAbt4Oq_ZxVrqJGCzSKcbTuLkWjMJpBnH1PybQ/viewform?usp=sf_link

DSLAC to Sustainable Environment

To avoids the import-export and retail the cooling powder chemical which impacts to ozone and climate change such as:

- CFC-11
- CFC-12
- CFC-115
- HCFC-22
- HCFC-123

Key challenges/barriers for energy efficiency measures in appliances

- Limitation of regulation development for appliances management;
- Limitation of human resource development;
- Limitation of the testing facilities as such the laboratories and certifying EE appliances;
- Lack of the financial support for EE&C activities such as the capacity building workshop, training,…;
- Not available of the PRS for appliances.

ASEAN and IOs support us

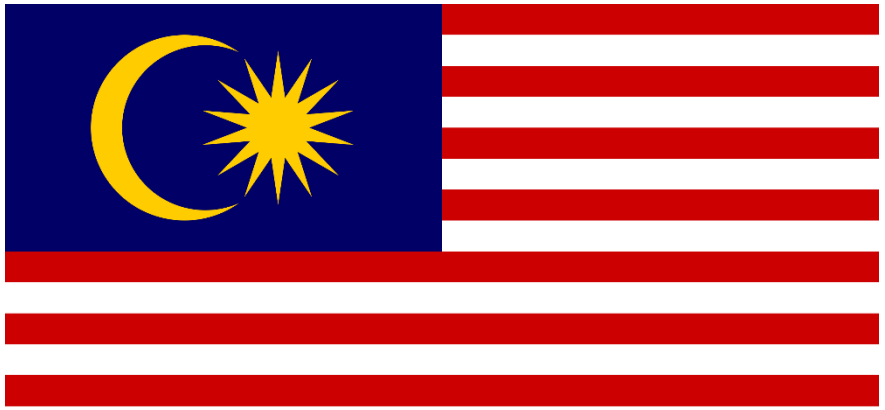
- AMS Counties
- ASEAN Center Energy (ACE)
- Energy Conservation Center of Japan (ECCJ)
- International Energy Agency (IEA)
- Korea Energy Agency (KEA)
- UN
- USAID
- U4E
- Etc.,.

Future Plan

Developing the EE&C regulations on the promoting the EE appliances utilization

Air Conditioner ▪ **Improving Decision on Standard and EE Label for AC** ▪ **Drafting of Recommendation on Implementing of AC Product Registration** ▪ **Developing the PRS for AC**	**Refrigerator** ▪ **Conducting of the refrigerator product until the end of 2024** ▪ **Determining the MEPS for refrigerator by 2025** ▪ **Developing the PRS for refrigerator product**
Lighting ▪ Offering the National Roadmap for MEPS for the lighting products to the government (this year); ▪ Conducting the lighting product and determine the MEPS by 2025 ▪ Developing the PRS for lighting product	Etc.,.

Thank you for your kind attention



Suruhanjaya Tenaga
Energy Commission

MINIMUM ENERGY PERFORMANCE STANDARD (MEPS)

6 November 2024

Nur Hamiza Binti Mirsa Hussain
Energy Efficiency Development Unit
Energy Efficiency & Conservation Department

CURRENT LEGAL FRAMEWORK

97. Certificate of Approval of equipment

(1) No person shall manufacture, import, display, sell or advertise –

a) any domestic equipment;
b) any equipment which is usually sold direct to the general public; or
c) any equipment which does not require special skills in its operation unless the equipment is approved by the Commission.

101A. (1) For the purpose of efficient use of electricity, prior to an application for a Certificate of Approval under regulation 97, any person who manufactures, imports, sells or offers for sale or lease any equipment under that regulation, shall ensure that such equipment meets the energy performance testing standards, the minimum energy performance standards and the efficiency ratings as set out in the Fourth Schedule.

(2) For the purposes of subregulation (1), a manufacturer or an importer of such equipment shall submit an energy performance testing report in accordance with regulation 101B.

Be Energy smart

Suruhanjaya Tenaga
Energy Commission

MINIMUM ENERGY PERFORMANCE STANDARDS (MEPS)

Govern by Electricity Regulation 1994 gazetted on 3rd May 2013

MEPS Requirement is 2 Star.

More Stars More Efficient

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

MINIMUM ENERGY PERFORMANCE STANDARDS (MEPS)

Govern by Electricity Regulation 1994 gazetted on 3rd May 2013

MEPS Requirement is 2 Star.

More Stars More Efficient

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.

For lighting, the packaging for Light Emitting Diode (LED) lamps need to have the efficacy value together with the number of hours the LED has been tested

i) After completing first 1,000 hours test

Efficacy Value: 55 lm/W

This product has been tested up to 1000 hours

ii) After completing 6,000 hours test

Efficacy Value: 55 lm/W

This product has been tested up to 6000 hours

For other types of lamp, the packaging only need to have the efficacy value.

ENERGY EFFICIENCY & CONSERVATION ACT

Be Energy smart

Energy Efficiency & Conservation Act

Energy Consumer
(Industry & Commercial with energy consumption threshold of 21,600 GJ)

Building
(Phase 1 : Purpose Built Office)

Energy Using Product

Registration of Energy Manager Type 1 & Type 2

Registration of Energy Auditor

Registration of Training Institution

Registration of Manufacturer and Importers

MINIMUM ENERGY PERFORMANCE STANDARDS (MEPS) UNDER EECA

Requirement for Manufacturers and Importers to obtain Certificate of Registration (COR).

Requirement for energy using product to meet the prescribed minimum requirement and obtain a Certificate of Efficiency (COE).

Requirement for energy using product in the domestic, commercial and industrial sector to be affixed with an energy efficiency rating label.

Any energy using product as specified in the guidelines.

CURRENT STAR RATING

Standard : MS ISO 5151 & ISO 16358 - 1

5.0 Star Rating

The star rating shall be in accordance with Tables 1 and 2.

Table 1 :

The rated cooling capacity < 4.5kW

Star Rating	Tested CSPF (Wh/Wh)
5	≥5.30
4	4.60 ≤CSPF<5.30
3	3.30 ≤ CSPF<4.60
2	3.10 ≤ CSPF<3.30
1	<3.10

Table 2:

4.5kW ≤Rated Cooling Capacity ≤ 7.1kW

Star Rating	Tested CSPF (Wh/Wh)
5	5.10≤
4	4.00≤ CSPF<5.10
3	3.10≤ CSPF<4.00
2	2.90 ≤ CSPF<3.10
1	<2.90

Note : Star Rating will be given by certification body appointed by the Commission in the test report or assessment letter

Be Energy Smart

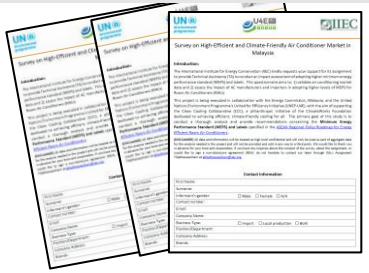
ASEAN Cool Initiative - Malaysia

Market Assessment

U4E and its partners carried out the market assessment of room air conditioners which was finalized in Q2 2024. We provided recommendations on retail outlets and helped them liaise with manufacturers and industrial associations- Malaysian Air-conditioning & Refrigeration Association and Malaysian Green Technology and Climate Change Corporation to administer surveys and obtain local data.

Retailer Surveys

Manufacturer Surveys

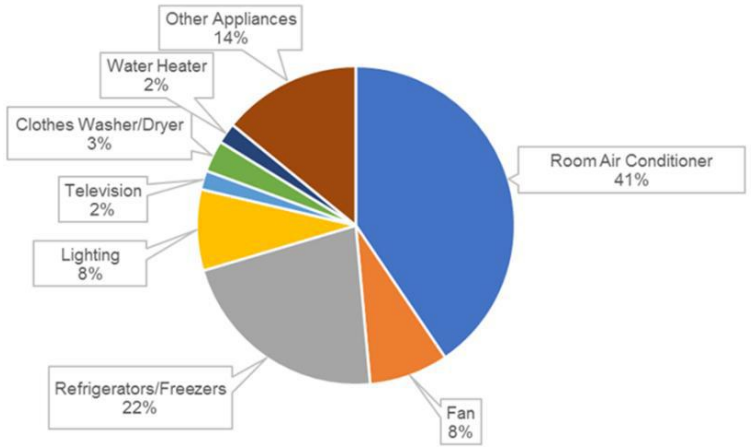


Household Surveys

Key Findings

- RAC sales reached 790,000 units in 2021 where leading brands like Daikin and Panasonic dominate the market with 80% over the total market share.
- Cooling appliances (RACs, fans, and refrigerators/freezers) in each household contribute 40% to 70% of the annual electricity consumption with 5.4 hours as the average daily usage consumption of the RACs.
- Inverter RACs consistently outperform fixed-speed counterparts across all cooling capacities.

Cooling Capacity	Inverter			Fixed speed/non-inverter		
	Highest CSPF	Lowest CSPF	Selling Price	Highest CSPF	Lowest CSPF	Selling Price
1.0 HP 2.6 kW (9,000 Btu/hr)	7.81	3.40	999 – 3,278 RM (210 – 688 USD)	3.98	3.20	788 – 1,759 RM (165-369 USD)
1.5 HP 3.5 kW (12,000 Btu/hr)	6.42	4.60	1,397 – 3,297 RM (293 – 692 USD)	3.64	3.26	999 – 2,799 RM (210 – 589 USD)
2.0 HP 4.5 – 5.2 kW (15,000 – 18,000 Btu/hr)	6.96	3.69	2,097 – 4,499 RM (440 – 945 USD)	3.73	3.13	1,899 – 3,999 RM (399 – 840 USD)
2.5 HP 6.1 kW (21,000 Btu/hr)	6.46	4.60	2,547 – 5,182 RM (535 – 1,088 USD)	3.98	3.03	2,509 – 4,549 RM (527 – 955 USD)
3.0 HP 7.1 kW (24,000 Btu/hr)	5.44	5.19	3,098 – 4,699 RM (651 – 987 USD)			



Suruhanjaya Tenaga
Energy Commission

ASEAN Cool Initiative - Malaysia

Stakeholder Consultations

U4E colleagues participated in stakeholder consultations with Energy Commission and Malaysia ASHRAE chapter in August and discussed on the technical recommendations provided by U4E on new MEPS levels

Capacity <4.5 kW (1.0–1.5 HP)

		Phase 1	Phase 2
	Current	2026–2027	2028–
5	≥5.30	≥ 6.60	≥ 8.00
4	4.60 ≤ CSPF < 5.30	6.09 ≤ CSPF < 6.70	7.30 ≤ CSPF < 8.00
3	3.30 ≤ CSPF < 4.60	5.50 ≤ CSPF < 6.09	6.60 ≤ CSPF < 7.30
2	3.10 ≤ CSPF < 3.30	5.00 ≤ CSPF < 5.50	6.09 ≤ CSPF < 6.60

4.5 kW ≤ Capacity <7.1 kW (2.0–2.5 HP)

		Phase 1	Phase 2
	Current	2026–2027	2028–
5	≥ 5.10	≥ 6.09	≥ 7.40
4	4.00 ≤ CSPF < 5.10	5.50 ≤ CSPF < 6.09	6.80 ≤ CSPF < 7.40
3	3.10 ≤ CSPF < 4.00	5.00 ≤ CSPF < 5.50	6.40 ≤ CSPF < 6.80
2	2.90 ≤ CSPF < 3.10	4.50 ≤ CSPF < 5.00	6.00 ≤ CSPF < 6.40

U4E Recommendations per the Techno-economic assessment

Category A: (1.0 to 1.5 hp)

Star Rating	Capacity < 4.5kW Existing	Recommendation Phase 1 Year: 2026-2029	Recommendation Phase 2 Year: 2030-2035
5	≥5.30	≥ 6.09	≥ 7.5
4	4.60 ≤ CSPF < 5.30	5.40 ≤ CSPF < 6.09	7.00 ≤ CSPF < 7.50
3	3.30 ≤ CSPF < 4.60	4.80 ≤ CSPF < 5.40	6.50 ≤ CSPF < 7.00
2	3.10 ≤ CSPF < 3.30	4.10 ≤ CSPF < 4.80	6.09 ≤ CSPF < 6.50

Category B: (2.0 to 2.5 hp)

Star Rating	Capacity ≥ 4.5kW ≤ 7.1kW Existing	Proposal 4 Phase 1 Year: 2026-2029	Proposal 4 Phase 2 Year: 2030-2035
5	≥5.1	≥ 5.60	≥ 7.00
4	4.00 ≤ CSPF < 5.10	5.00 ≤ CSPF < 5.60	6.50 ≤ CSPF < 7.00
3	3.10 ≤ CSPF < 4.00	4.40 ≤ CSPF < 5.00	6.09 ≤ CSPF < 6.50
2	2.90≤ CSPF < 3.10	4.00 ≤ CSPF < 4.40	5.60 ≤ CSPF < 6.09

Malaysia ASHRAE Recommendations

CHALLENGES AND MITIGATION :

Challenges in Achieving the Regional Roadmap Target of CSPF 6.09 by 2025:

- For Malaysia, several key factors are considered before adopting the regional roadmap. These include timing, market availability, and the potential impact on local manufacturers. Stakeholder consultations are conducted as follows::

DATE	Outcome
2 July 2024	• Not ready for CSPF 6.09 implementation by 2029
11 September 2024	• Briefing to all Air Conditioner manufacturer & importers on new rating proposal

- Hence our mitigation in achieving the ASEAN Regional Roadmap is as follow :

Star Rating	Capacity < 4.5kW (1.0-1.5HP)	4.5kW ≤ Capacity ≤ 7.1kW (2.0-2.5HP)
5	≥ 6.09	≥ 5.60
4	5.40 ≤ CSPF < 6.09	5.00 ≤ CSPF < 5.60
3	4.80 ≤ CSPF < 5.40	4.40 ≤ CSPF < 5.00
2	4.10 ≤ CSPF < 4.80	4.00 ≤ CSPF < 4.40
1	CSPF < 4.10	CSPF < 4.00

1 JAN 2026 -31 DEC 2029

Star Rating	Capacity < 4.5kW (1.0-1.5HP)	Capacity ≥ 4.5kW ≤ 7.1kW (2.0-2.5HP)
5	≥ 7.5	≥ 7.00
4	7.00 ≤ CSPF < 7.50	6.50 ≤ CSPF < 7.00
3	6.50 ≤ CSPF < 7.00	6.09 ≤ CSPF < 6.50
2	6.09 ≤ CSPF < 6.50	5.60 ≤ CSPF < 6.09
1	CSPF < 6.09	CSPF < 5.60

1 JAN 2030 - 31 DEC 2035

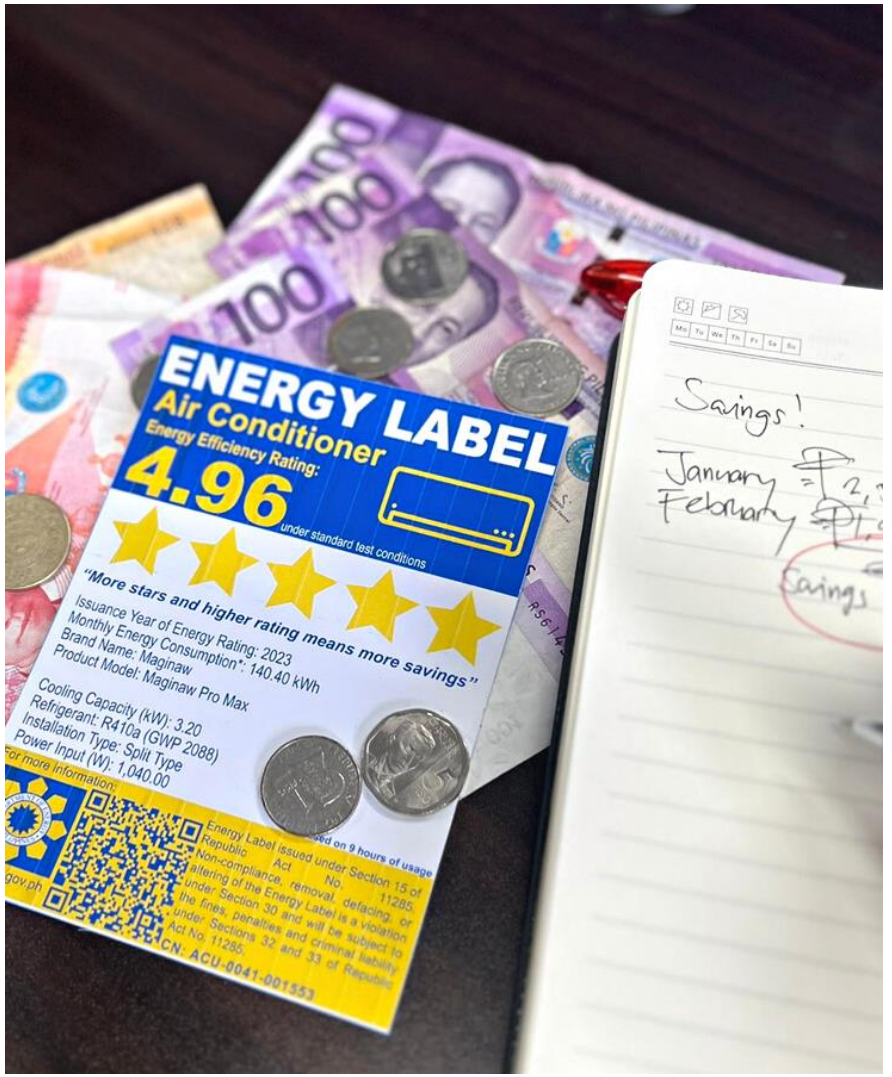

Suruhanjaya Tenaga
Energy Commission
Be Energy
smart

PHILIPPINE ENERGY LABELING PROGRAM

MARIENELLE S. SANTOS
DEPARTMENT OF ENERGY - PHILIPPINES

BACKGROUND

With the enactment of Republic Act 11285, otherwise known as the “Energy Efficiency and Conservation Act”, the Department of Energy has been mandated to formulate and implement energy efficiency programs to help promote sustainable development, reduce energy consumption, realize energy savings and contribute to climate change mitigation. One of these initiatives is the regulation of energy performance and labeling of energy-consuming products (ECPs) through the Philippine Energy Labeling Program (PELP).



PHILIPPINE ENERGY LABELING PROGRAM

National labeling system for energy consuming products (ECPs) based on the energy performance

"Prescribing the Guidelines of the Philippine Energy Labeling Program (PELP) for Compliance of Importers, Manufacturers, Distributors and Dealers of Electrical Appliances and other Energy Consuming Products (ECP)"

PELP Covered Products

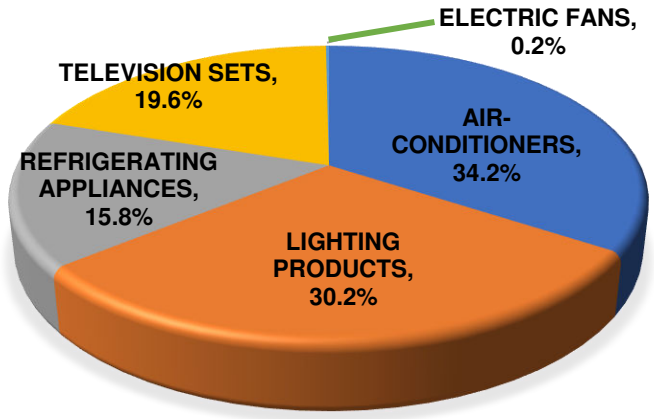
- Air Conditioners
- Lighting Products
- Refrigerating Appliances
- Television Sets
- Electric Fans
- Clothes Washing Machines
- Display Monitors
- Energy Saving Devices

Summary of PELP Registrations

As of 11 October 2024

REGISTRATION	NO. OF APPROVED REGISTRATION	NO. OF PROCESSING DAYS
COMPANY REGISTRATION	180	3 days
PRODUCT REGISTRATION	8,671	7 days
ENERGY LABEL ISSUANCE	10,387	3 days
CERTIFICATE OF EXEMPTION ISSUANCE	3,019	3 days

10,387 Energy Labels Issued

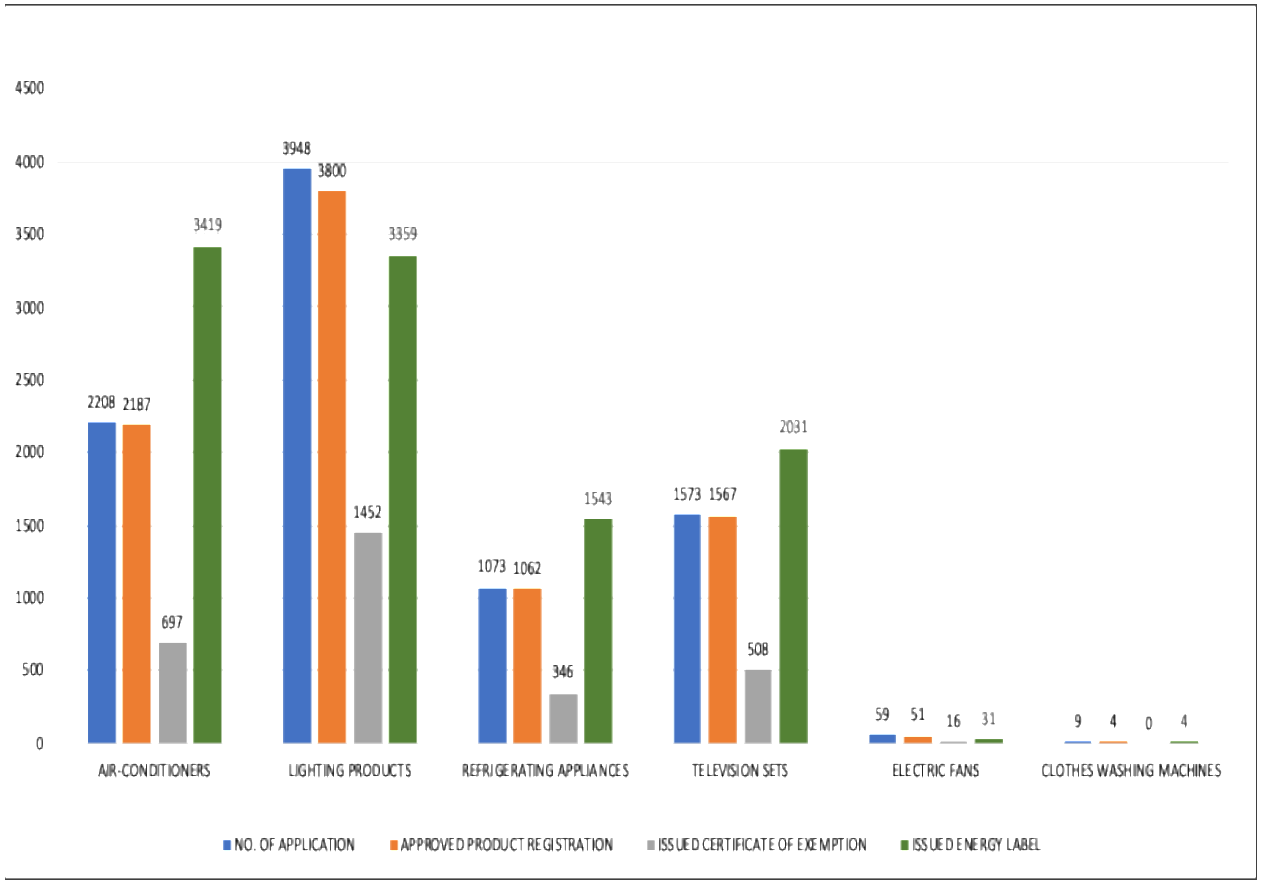


Note: PELP System Registration for Display Monitor and Energy Saving Device are on-going development.

PHILIPPINE ENERGY LABELING PROGRAM

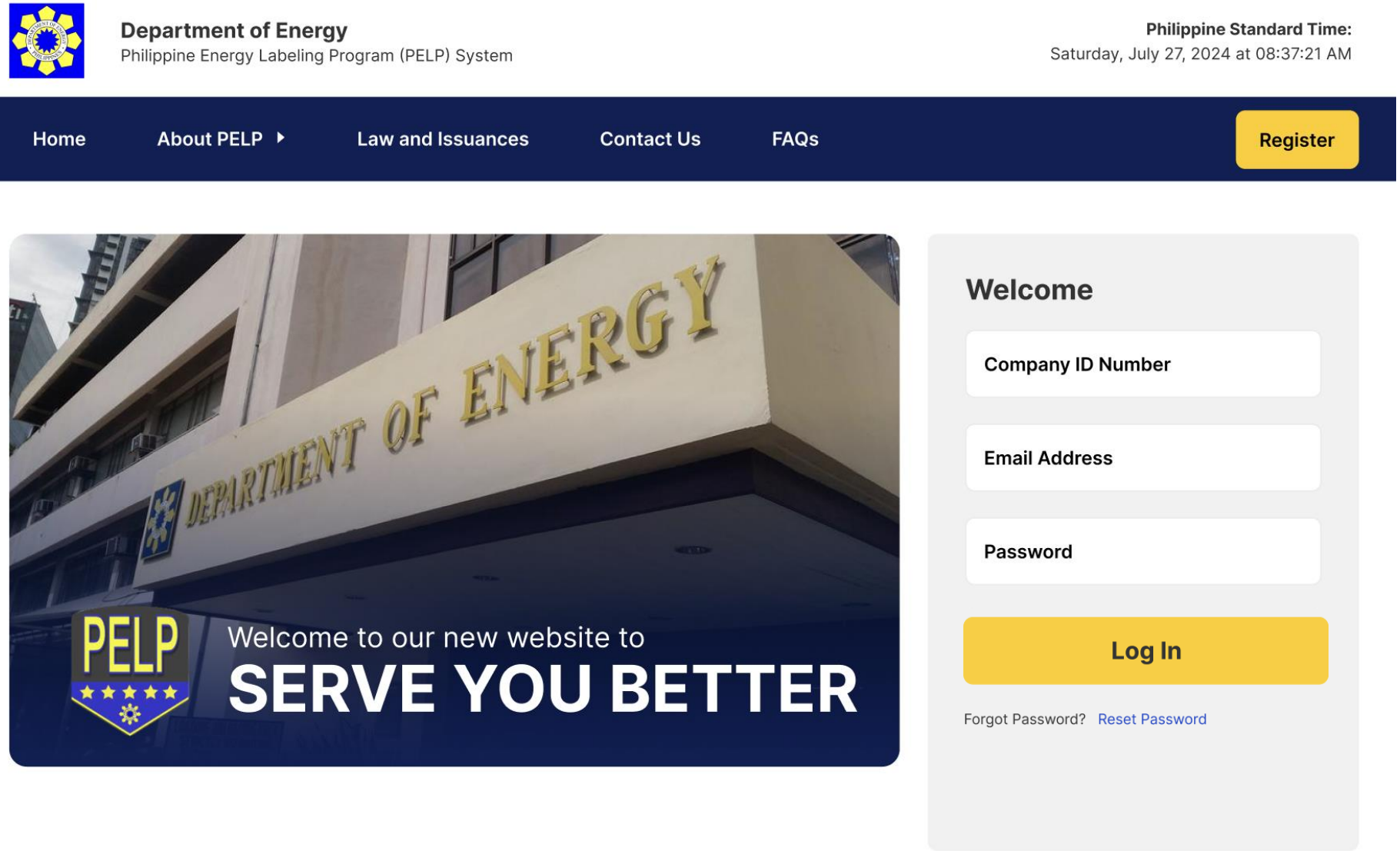
PELP System Registration Status
As of October 11, 2024

TYPE OF ECPS	NO. OF APPLICATION	APPROVED PRODUCT REGISTRATION	ISSUED CERTIFICATE OF EXEMPTION	ISSUED ENERGY LABEL
AIR-CONDITIONERS	2,208	2,187	697	3,419
LIGHTING PRODUCTS	3,948	3,800	1,452	3,359
REFRIGERATING APPLIANCES	1,073	1,062	346	1,543
TELEVISION SETS	1,573	1,567	508	2,031
ELECTRIC FANS	59	51	16	31
CLOTHES WASHING MACHINES	9	4	0	4
TOTAL	**8,870**	**8,671**	**3,019**	**10,387**



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.



PHILIPPINE ENERGY LABELING PROGRAM

Scope for Air-Conditioners

- Window-type and Split-type (Inverter and Non- Inverter)
- Cooling capacity up to 50,400 kJ/hr or 14kW

Old MEPP

Product Parameter (Cooling Capacity)	CSPF
< 3.33 kW	3.08
Between 3.33 to 9.99 kW	2.81
Between 10.0 to 14.0 kW	MEPP-less

New MEPP

Product Parameter (Cooling Capacity)	CSPF
≤ 4.50 kW	3.32
Between 4.51 to 9.99 kW	3.70
Between 10.0 to 14.0 kW	3.70

PHILIPPINE ENERGY LABELING PROGRAM (PELP)

(as of October 11, 2024)

Profile for Refrigerants

	TYPE OF ECPs	REFRIGERANT	NO. PRODUCT MODEL	TOTAL
	AIR CONDITIONERS	R22	130*	**2,170**
		R23	10	
		R32	1,323	
		R410a	707	
	REFRIGERATING APPLIANCES	R600a	898	**1,052**
		R134a	154	
	TOTAL			**3,202**

**** Units with R22 refrigerant are existing models that have been granted with certificates of exemption through PELP.***

PHILIPPINE ENERGY LABELING PROGRAM

- As requested, below is an estimate of local and imported ACU units using the available data submission through PELP:

	2021	2022
Local Quantity	0.337 M	0.201 M
Imported Quantity	1.207 M	1.007 M

KEY CHALLENGES FOR PELP IMPLEMENTATION

- Updating the PELP Online Registration System to implement the adjusted MEPP.
- Cyber security risk to PELP Online Registration System
- Replacement of the physical energy label that are already affixed with the products into new issued energy label with adjusted MEPP and Star Rating.
- Ensuring compliance to PELP Guidelines
- Level of awareness especially in the stores located in remote areas

WAY FORWARD

- Enhancement of PELP Online Registration System features to further accelerate the registration process
- Continuous conduct of Information, Education, and Communication (IEC) Campaign to the Stakeholders regarding the Philippine Energy Labeling Program (PELP)
- Continuous conduct of Enforcement, Monitoring, and Verification (EMV) activities
- Formulation of policies to strengthen the implementation of PELP
- Accelerating the development of Implementing Guidelines for other energy consuming products.

POLICY FORMULATION

4

- Development of Department Circular on Prescribing the Guidelines of the PELP for Compliance of Retailers of Electrical Appliances and other Energy-Consuming Products
- Development of Implementing Guidelines of the PELP for Microwave Oven
- Development of Implementing Guidelines of the PELP for Electric Kettle
- Development of Implementing Guidelines of the PELP for Flat Iron

Note:
Nominations for the Technical Working Groups (TWGs) of each will start by October 2024

PHILIPPINE ENERGY LABELING PROGRAM

Department of Energy Website

https://doe.gov.ph
https://doe.gov.ph/pelp

PELP Implementing Guidelines for ECPs

https://doe.gov.ph/pelp?q=pelp/related-laws-issuances-and-implementing-guidelines-06192024

PELP Implementing Guidelines for REMVCM

https://doe.gov.ph/sites/default/files/pdf/issuances/pelp-implementing-guidelines-energy-label-registration-05252023.pdf

Thank you

Contact us.

eumb.epred@doe.gov.ph
doe.eumb@gmail.com (Alternate)

https://doe.gov.ph

(02) 8-479-2900 Loc 272
(02) 8-840-2243

EE&C PERFORMANCE REGULATION AND ENFORCEMENT DIVISION (EPRED)

Air Conditioner Test Infrastructure and Capacity Development for the Philippines

Maraida Licerio – GIZ Philippines

November 2024

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Clean Cooling COLLABORATIVE

Making cooling a hot topic since 1995 – GIZ Proklima

© GIZ Proklima / Green Cooling Initiative

- Programme established in 1995 in the context of implementing technical projects for **ozone protection** under the Montreal Protocol. In 2016, the Kigali Amendment broadened the focus from ozone to **climate protection**.
- Goal: promoting and introducing **natural refrigerants and energy-efficient appliances** in the **RAC sector**.
- Proklima is working on behalf of **BMZ**, **BMUV** and other donors, e.g. EU, AFD, MAF, CCC.

Proklima works in the areas of:

policy advice

technology transfer

capacity building

Agenda

1. AC Test Standards and Scope

2. AC Test Infrastructure

3. Support for the Balanced Ambient Calorimeter for Upgrade/Retrofit to allow ATEX II compliance for testing AC units with A2L ~A3 refrigerants

4. Training Course on Proficiency Testing (PT) Provision: ISO/IEC 17043 Conformity Assessment and ISO 13528 Guidance for Statistical Methods

Test Standards

Test Methodology

- PNS ISO 5151 – Non-ducted air conditioners and heat pumps: Testing and rating for performance
- PNS ISO 16358-1: Part -1 Calculation of Cooling Seasonal Performance Factor (CSPF)
- Scope and coverage of the MEPS is only up to 14kW

AC Testing Infrastructure for the Philippines

One (1) – Reference Laboratory at the Department of Energy

Balanced Ambient Calorimeter (up to 14kW test capacity)

not designed for flammable refrigerants A2L to A3

Three (3) – Private Third-Party Test Laboratories for Impartial Results

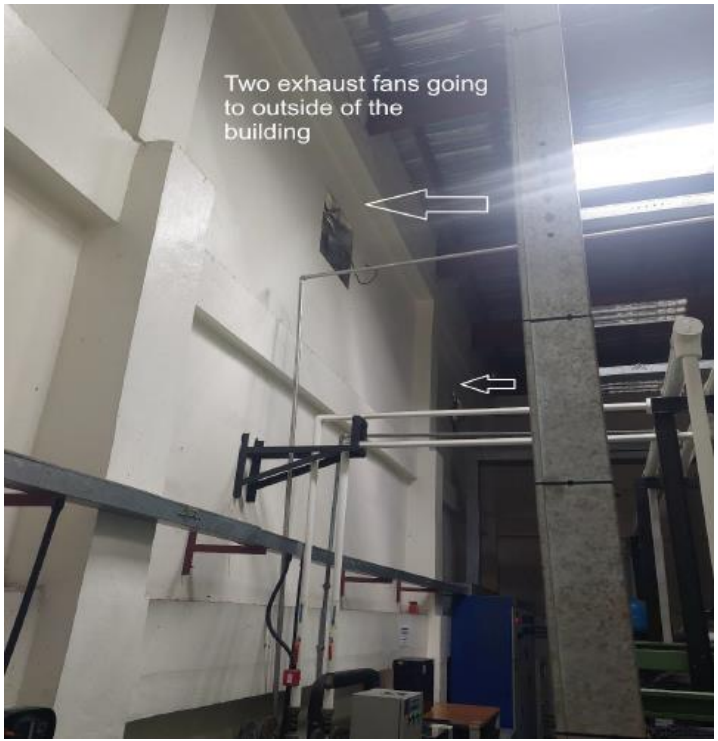
Air Enthalpy Psychrometric Chamber (test capacities up to 20kW~24kW)

At least one (1) for each of the four (4) domestic manufacturer

Likely using Air Enthalpy Psychrometric Chamber (limited information due to data privacy concerns)

Calorimeter Assessment for ATEX II Compliance

- Ongoing discussion with Lawrence Berkeley National Laboratory on potential approach for upgrade or retrofit
- Absence of adequate ventilation in the event of A2L~A3 refrigerant release
- Potential for installation of leak detection through sensors and alarms when refrigerant reaches Lower Flammability Limit (LFL) or Lower Explosive Limit (LEL)



ISO/IEC 17043 Conformity Assessment and ISO 13528 Guidance for Statistical Methods on 10-13 September 2024

- A review of the mandatory requirements of the ISO/IEC 17043 and ISO 13528 standards
- Development of a Proficiency Test Scheme for AC testing of private test labs

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TISI Better Live, Better Economy

Energy Efficiency Standards for Air-conditioner

Presented by
Thai Industrial Standards Institute (TISI)

TISI Team

Dr. Nuanapa Chaisuwan

Chief of Standards
division Group 4

Mr. Theeraphat Manoi

Standards Officer
Practitioner

1. Introduction

Thai Industrial Standards Institute (TISI) is the national standards organization for Thailand, established under the Ministry of Industry by virtue of the Industrial Product Standards Act B.E. 2511 (A.D. 1968) .

According to the Act, TISI has, as its governing body, the INDUSTRIAL PRODUCT COUNCIL which controls its policy, sets the priority of standards to be prepared, recommends qualified persons for the Minister to appoint to TISI technical committees, arbitrates and awards licenses under certification scheme.

1. Introduction

1. Standards development

1.1 National standards development TISI develops both mandatory and voluntary standards

Voluntary certification mark

Mandatory Certification Mark

TC = 64
SC = 347

5,032 standards =
Voluntary : 4,886
Mandatory : 144

1.2 International standards development TISI participates in the development of International standards of the International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC).

ISO
P member : 75
O member : 229

IEC
P member : 28
O member : 56

TISI

Better Live, Better Economy

2. Product certification
3. WTO /TBT Agreements
4. Standardization promotion

2. Current MEPS and labelling status on RACs in the country

TIS No. 2134-2553

Room air conditioners : energy efficiency

Currently active

Energy Efficiency Standard
Room air conditioners : energy efficiency
TIS No. 2134-2553

Critical Topic	Detail
Scope	• Cover air-conditioner with cooling capacity not over 12,000 W • Cover both of split type and non-split type
(Energy Efficiency Ratio: EER) Requirement (Unit : W/W)	Cooling capacity not over 8,000 W • Split type : 2.82 • Non-split type : 2.82 Cooling capacity between 8,001 W – 12,000 W • Split type : 2.82 • Non-split type : 2.53

Relevance of Standards

Motor-compressors : safety requirements
TIS No. 812-2558
Adopted IEC 60335-2-34:2012 (Modified)

Room air conditioners : energy efficiency
TIS No. 2134-2553

Air-cooled split type room air conditioners
TIS No. 1155-2557

Room air conditioners
TIS No. 385-2524

TIS No. 2134-2565

Room air conditioner : energy efficiency

During public as mandatory standard

Energy Efficiency Standard
Room air conditioners : energy efficiency
TIS No. 2134-2565

Critical Topic	Detail
Scope	• Cover air-conditioner with cooling capacity not over 18,000 W • Cover split type, non-split type and ducted air-conditioner with cooling capacity not over 8,000 W
(Cooling Seasonal Performance Factor : CSPF) Requirement (Unit : W/W)	Cooling capacity not over 8,000 W • Fixed speed split type : 3.19 • Variable speed split type : 3.90 • Fixed speed non-split type : 3.19 • Variable speed non-split type : 3.19

Energy Efficiency Standard
Room air conditioners : energy efficiency
TIS No. 2134-2565

Critical Topic	Detail
(Cooling Seasonal Performance Factor : CSPF) Requirement (Unit : W/W) Cont.	Cooling capacity between 8,001 W – 12,000 W • Fixed speed split type : 3.15 • Variable speed split type : 3.46 • Fixed speed non-split type : 3.15 • Variable speed non-split type : 3.15 Cooling capacity between 12,001 W – 18,000 W • Fixed speed split type : 2.68 • Variable speed split type : 3.46

Relevance of Standards

Ducted Air-Conditioners and Air-to-Air Heat pumps - Testing and Rating for Performance
TIS No. 2711-2558
Adopted ISO 13253:2011

Multiple Split-System Air-Conditioners And Air-to-Air Heat Pumps – Testing And Rating For Performance
TIS No. 2712-2558
Adopted ISO 15042:2011

Air-cooled air conditioners and air-to-air heat pumps - Testing and calculating methods for seasonal performance factors - Part 1: Cooling seasonal performance factor
TIS No. 2714-1-2558
Adopted ISO 16358-1:2013

Room air conditioners : energy efficiency
TIS No. 2134-2565

Air-cooled split type room air conditioners
TIS No. 1155-2557

Non-ducted air conditioners and heat pumps - Testing and rating for performance
TIS No. 2710-2558
Adopted ISO 5151-2010

3. RAC stock projections and high-level quantification of import/export

- In August 2024 : Thailand exports of air-conditioner and components worth 531 million USD (Expand 27.8 YOY)
- 25% use in Thailand
- 75% export (Thailand is the 2nd export in the world)
- Export market : USA, EU, ASEAN, Middle east, India, Japan)

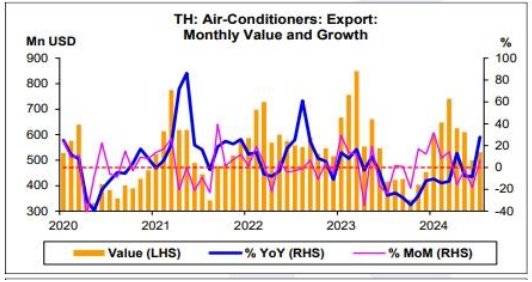
การประเมินอันดับค่า อิงค่าต่ำสุด ค่าเฉลี่ย และค่าสูงสุด (ปี 2557-67)

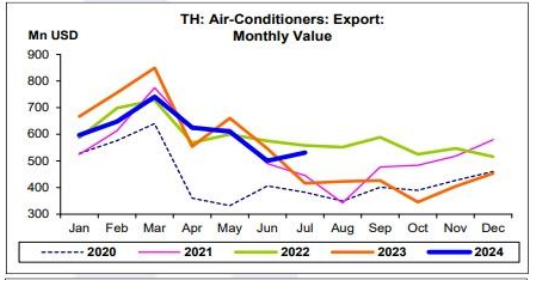
	All Periods			Same Periods			Latest
	Month	Quarter	Year	YTD	Quarter	Month	
Air-Conditioners: Export Value	3	4	5	5	5	5	Jul-24

หมายเหตุ: 5 สูง 4 ค่อนข้างสูง 3 ปานกลาง 2 ค่อนข้างต่ำ 1 ต่ำ

อัตราการเปลี่ยนแปลงรายปี (ปี 2557-66)

%	Average YoY Growth	CAGR
Air-Conditioners: Export Value	4.1	3.7





ธนาคารกรุงเทพ Bangkok Bank Research Department

3. RAC stock projections and high-level quantification of import/export

Jan - Aug 2024 (Baht)

HS-Code 8415	Air conditioning machines, comprising a motor-driven fan and elements for changing the temperature and humidity, including those machines in which the humidity cannot be separately regulated.

UNITED STATES
Brazil
China
FRANCE
GERMANY
INDIA
JAPAN
NETHERLANDS
PHILIPPINES
SAUDI ARABIA
SINGAPORE

169,723,342,368

17,818,891,028

CHINA
UNITED STATES
NORWAY
MALAYSIA
JAPAN
KOREA,REPUBLIC OF

4. Challengers and mitigation strategies for implementing regional roadmap targets

The MEPS

มาตรฐานผลิตภัณฑ์อุตสาหกรรม
THAI INDUSTRIAL STANDARD
มอก. 2134–2565

TISI Roadmap (Under process)

- The MEPS value will be adjusted to be equivalent to the HEPS
- Voluntary -→ Mandatory standards (30 standards)

เครื่องปรับอากาศสำหรับห้อง
ด้านประสิทธิภาพพลังงาน
ROOM AIR CONDITIONER : ENERGY EFFICIENCY

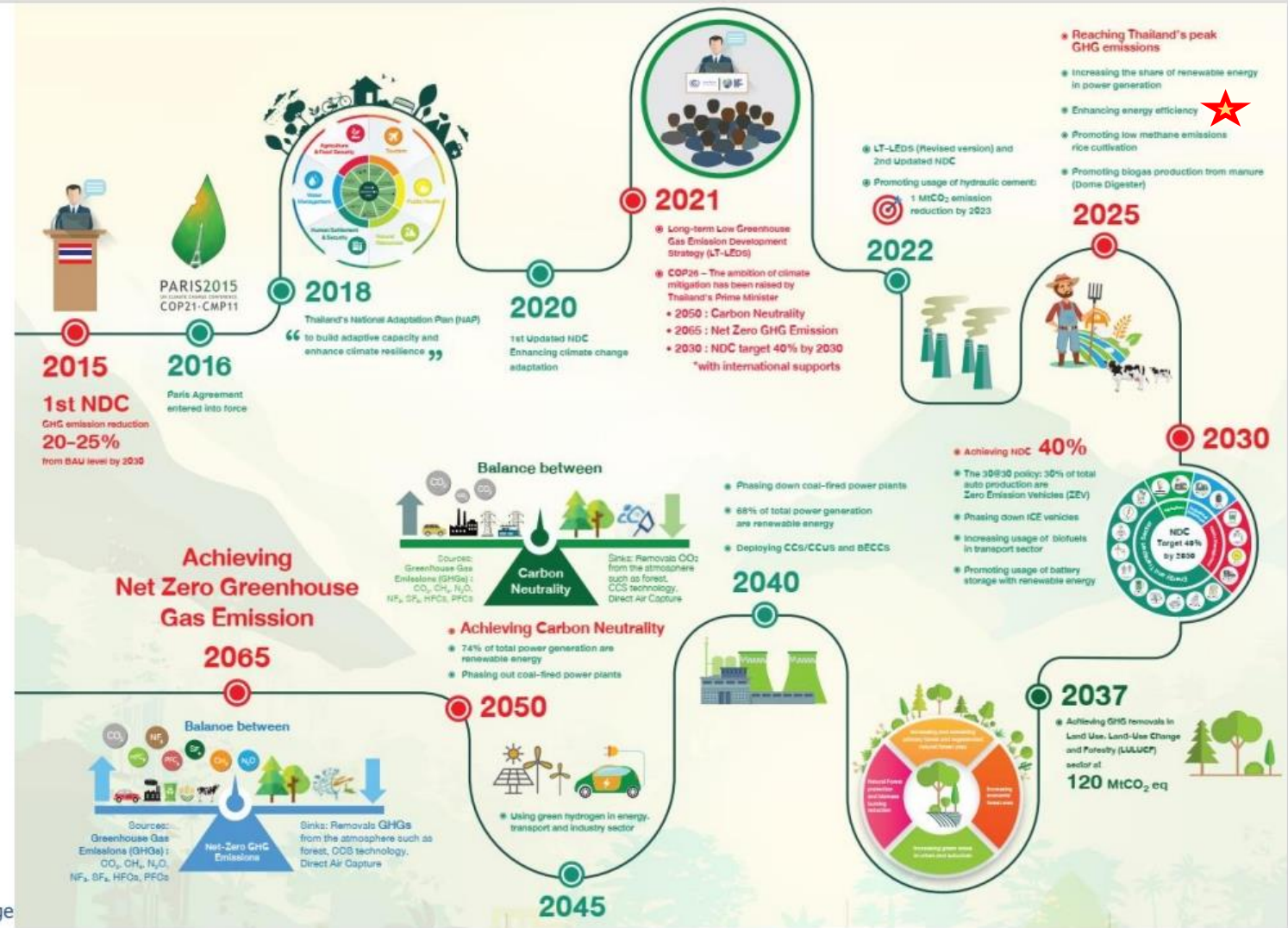
Challengers

- Laws (Internal process)
- Lack of Expert
- Economy

5. High Level political commitments or national (efficiency) strategies related to RACs

Thailand's Long-term GHG Emission Development Strategy - Thailand, like many other countries, had developed its Nationally Determined Contributions (NDCs) as part of its commitment to the Paris Agreement on climate change. The NDCs outline the country's goals and strategies to address climate change and reduce greenhouse gas emissions. From update NDC, Thailand set reduction target at 40 % by 2030.

Thailand's Net Zero Roadmap 2065



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ASEAN Cool Initiative

MEPS Implementation Status in Viet Nam

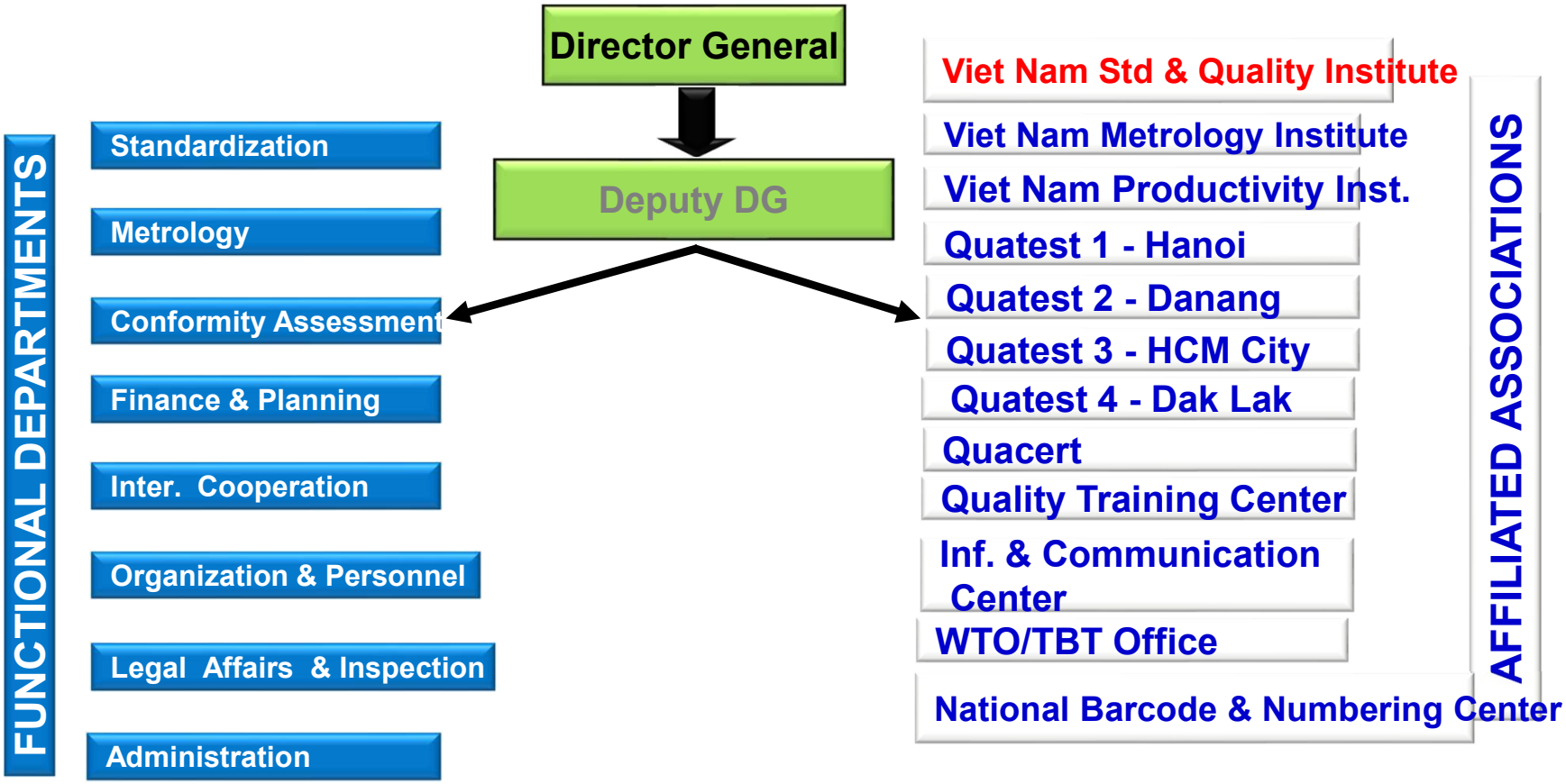
Ms Doan Thi Thanh Van
Head of Electric and Electronic Division
Vietnam Standards and Quality Institute,
Commission for Standards, Metrology and Quality of Vietnam

Singapore, 2024

Content

1. Introduction
2. Energy labelling program in Viet Nam
3. National Standards on MEPS of ACs
4. Challenges
5. Future plan

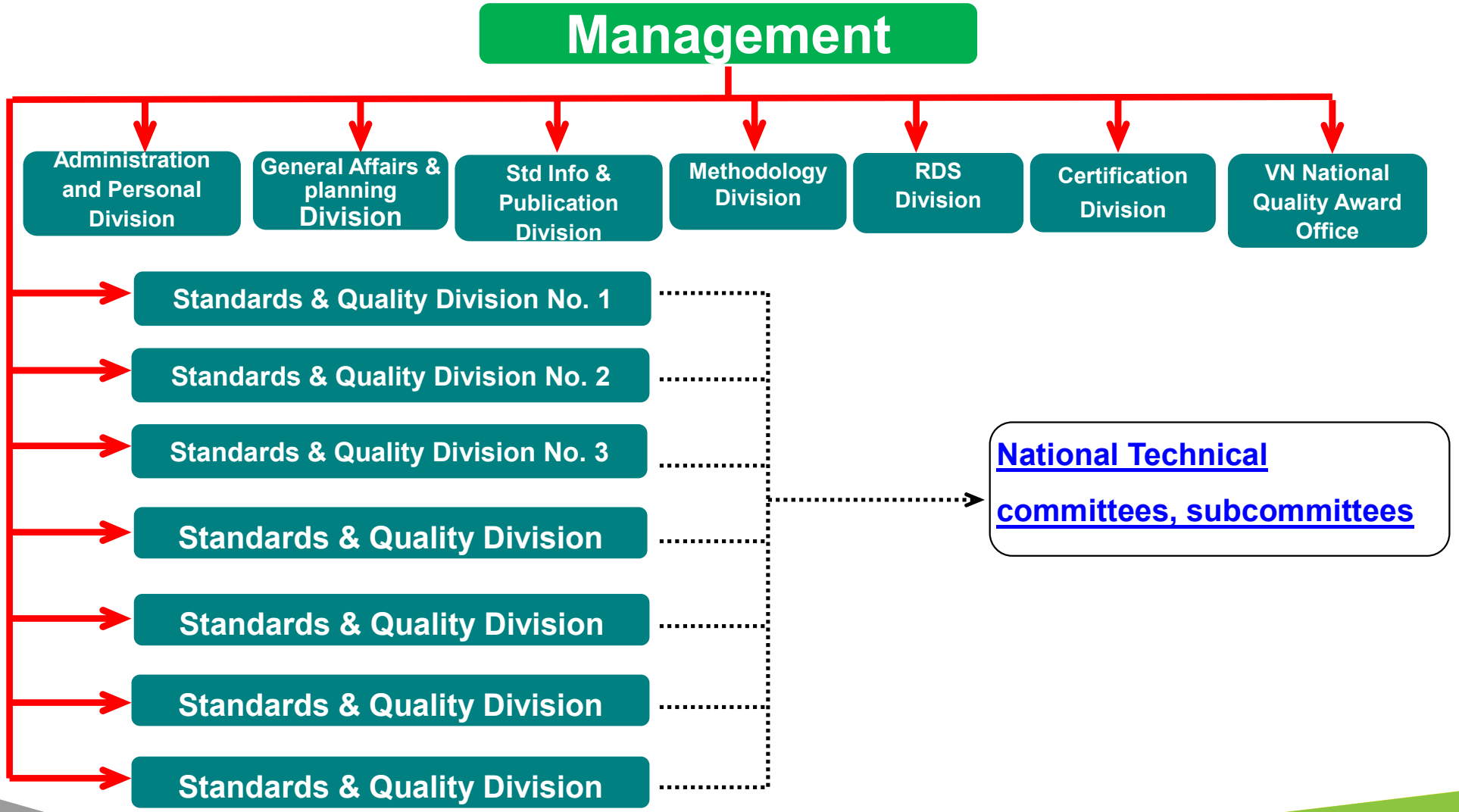
1. Introduction
Organization Structure



Organizational structure of STAMEQ

1. Introduction

Organization Structure



2. Energy labeling program in Viet Nam

Functions of Key Authorities

MOIT

- Policy drafting
- Labels grading
- Database
- Public education
- Market surveillance
- Monitoring S&L
- Sanction

MOST

- EE Standards development
- MEPS
- Testing Labs

Local Gov.

- Market surveillance
- Sanction

MOF

- Incentives and supporting policies
- Procurement guidelines
- Customs clearance

2. Energy labeling program in Viet Nam

Label

Comparative label

Endorsement label

The more stars
the more efficient

Manufacturers
Origin
Model
Rated power
Energy efficiency
Number of TCVN

MOIT
Energy labeling
program

2. Energy labeling program in Viet Nam

List of products

Group 1: Household appliances

- Tubular fluorescent lamp, compact fluorescent lamp
- Ballast
- Air conditioner, refrigerator
- Washing machine
- Rice cooker
- Electric fan
- Television

(Decision 51/2011/QD-TTg)

2. Energy labeling program in Viet Nam

List of products

Group 2: Office and commercial equipment

- Copier
- Computer monitor
- Printer
- Commercial refrigerated cabinet

(Decision 51/2011/QD-TTg)

2. Energy labeling program in Viet Nam

List of products

Group 3: Industrial equipment

- Three-phase distribution transformer
- Three phase asynchronous motor

Group 4: Transportation vehicle

- Cars having up to and including 7 seats

(Decision 51/2011/QD-TTg)

2. Energy labeling program in Viet Nam

List of products

Group 1: Household appliances (addition)

- LED lamps
- Storage water heater

Group 2: Office and commercial equipment (addition)

- Laptops

(Decision 04/2017/QĐ-TTg)

2. Energy labeling program in Viet Nam

List of products

Group 3: Industrial equipment

(No change)

Group 4: Transportation vehicle (addition)

- Cars having up to and including 9 seats and motorbikes

(Decision 04/2017/QĐ-TTg)

2. Energy labeling program in Viet Nam
List of National Vietnam Standards (TCVNs)

No	Product	Number of TCVN	Title	Label
Group 1: Household appliances				
1	Tubular Fluorescent Lamps	TCVN 8249:2013	Tubular Fluorescent Lamps – Energy Efficiency	Endorsement
2	Compact fluorescent lamps	TCVN 7896:2015	Compact fluorescent lamps – Energy efficiency	Comparative
3	Electromagnetic Ballasts for fluorescent lamps	TCVN 8248:2013	Electromagnetic Ballasts fluorescent lamps – Energy Efficiency	Endorsement
4	Electronic ballasts for fluorescent lamps	TCVN 7897:2013	Electronic ballasts for fluorescent lamps – Energy efficiency	Endorsement

2. Energy labeling program in Viet Nam
List of National Vietnam Standards (TCVNs)

No	Product	Number of TCVN	Title	Label
Group 1: Household appliances				
5	Air conditioners	TCVN 7830:2015 TCVN 7830:2021	Air conditioners – Energy efficiency ratio	Comparative
6	Refrigerator, refrigerator-freezer, and freezer	TCVN 7828:2016 TCVN 7829:2016	Refrigerator, refrigerator-freezer, and freezer – Energy efficiency ratio Refrigerator, refrigerator-freezer, freezer – Methods for determination of energy efficiency	Comparative
7	Electrical washing machine	TCVN 8526:2013	Electrical washing machine – Minimum energy performance and method of determination	Comparative

2. Energy labeling program in Viet Nam
List of National Vietnam Standards (TCVNs)

No	Product	Number of TCVN	Title	Label
Group 1: Household appliances				
8	Electric rice cookers	TCVN 8252:2015	Electric rice cookers – Energy efficiency	Comparative
9	Electric fans	TCVN 7826:2015 TCVN 7827:2015	Electric fans – Energy efficiency ratio Electric fans – Methods for determination of energy efficiency	Comparative
10	Television sets	TCVN 9536:2021	Television sets – Energy efficiency Television sets – Method for determination of energy efficiency	Comparative
11	LED lamps	TCVN 11844:2017	LED Lamps – Energy efficiency	Endorsement
12	Storage water heater	TCVN 7898:2018	Storage water heaters – Energy efficiency	Endorsement

2. Energy labeling program in Viet Nam
List of National Vietnam Standards (TCVNs)

Group 2: Office equipment and commercial				
11	Copiers	TCVN 9510:2012	Copiers – Energy efficiency	Endorsement
12	Computer monitors	TCVN 9508:2012	Computer monitors – Energy efficiency	Endorsement
13	Printers	TCVN 9509:2012	Printers – Energy efficiency	Endorsement
14	Commercial refrigerators	TCVN 10289:2014 TCVN 10290:2014	Commercial refrigerators - Energy efficiency Commercial refrigerators – Method for determination of energy efficiency	Endorsement

2. Energy labeling program in Viet Nam
List of National Vietnam Standards (TCVNs)

Group 3: Industrial equipment				
15	Distribution transformer	TCVN 8525:2015	Distribution transformer – Minimum energy performance and method of determination	Endorsement
16	Three-phase asynchronous squirrel cage electrical motors	TCVN 7540-1:2013 TCVN 7540-2:2013	Three-phase asynchronous squirrel cage electrical motors – Part 1: Minimum energy performance	Endorsement
			Three-phase asynchronous squirrel cage electrical motors – Part 2: Methods for determination of performance	

2. Energy labeling program in Viet Nam
List of National Vietnam Standards (TCVNs)

Group 4: Transportation vehicle				
17	Cars having up to and including 7 seats	TCVN 9854:2013	Road vehicles – Passenger cars – Limit of fuel consumption and method for determination	
18	Cars having up to and including 9 seats	TCVN 9854:2013		
19	Motorcycles	TCVN 7536:2014		

3. National Standards on MEPS of ACs

Versions of standards

	Title of Standard	NO.
1	*Non-ducted air conditioners - Energy Efficiency*	TCVN 7830:2007
2	*Non-ducted air conditioners – Method for determination of energy efficiency*	TCVN 7831:2007
3	*Non-ducted air conditioners – Energy Efficiency*	TCVN 7830:2012
4	*Non-ducted air conditioners – Method for determination of energy efficiency*	TCVN 7831:2012
5	*Non-ducted air conditioners – Energy Efficiency*	TCVN 7830:2015
6	*Non-ducted air conditioners – Energy Efficiency*	TCVN 7830:2021

3. National Standards on MEPS of ACs

Versions of standards

TCVN 7830:2007

Type	Rated capacity Q, W	Grade				
		1	2	3	4	5
Single	–	2,30	2,50	2,70	2,90	3,10
Split	Q < 4 500	2,60	2,80	3,00	3,20	3,40
	4 500 ≤ Q < 7 000	2,50	2,70	2,90	3,10	3,30
	7 000 ≤ Q < 14 000	2,40	2,60	2,80	3,00	3,20

3. National Standards on MEPS of ACs

Versions of standards

TCVN 7830:2012

Type	Rated capacity (ϕ) W (BTU/h)	Grade (EER)				
		1	2	3	4	5
Single	–	2,30	2,50	2,70	2,90	3,10
Split	ϕ < 4 500 ϕ < 15 000	2,60	2,80	3,00	3,20	3,40
	4 500 ≤ ϕ < 7 000 (15 000 ≤ ϕ < 24 000)	2,50	2,70	2,90	3,10	3,30
	7 000 ≤ ϕ < 14 000 (24 000 ≤ ϕ < 48 000)	2,40	2,60	2,80	3,00	3,20

3. National Standards on MEPS of ACs

Versions of standards

TCVN 7830:2012

Type	Rated capacity (ϕ) W (BTU/h)	Grade (CSPF)				
		1	2	3	4	5
Single	–	2,60	2,80	3,00	3,20	3,40
Split	ϕ < 4 500 ϕ < 15 000	3,00	3,20	3,40	3,60	3,80
	4 500 ≤ ϕ < 7 000 (15 000 ≤ ϕ < 24 000)	2,80	3,00	3,20	3,40	3,60
	7 000 ≤ ϕ < 14 000 (24 000 ≤ ϕ < 41 000)	2,60	2,80	3,00	3,20	3,40

3. National Standards on MEPS of ACs

Versions of standards

TCVN 7830:2015

Type	Rated capacity (ϕ) W (BTU/h)	Grade				
		1	2	3	4	5
Single	–	2,80	3,00	3,20	3,40	3,60
Split	ϕ < 4 500 ϕ < 15 000	3,10	3,40	3,60	3,80	4,20
	4 500 ≤ ϕ < 7 000 (15 000 ≤ ϕ < 24 000)	3,00	3,20	3,40	3,60	4,00
	7 000 ≤ ϕ < 14 000 (24 000 ≤ ϕ < 41 000)	2,80	3,00	3,20	3,40	3,80

3. National Standards on MEPS of ACs

Versions of standards

TCVN 7830:2021

Type	Rated capacity (ϕ) W (BTU/h)	Grade				
		1	2	3	4	5
Single	–	2,80	3,00	3,20	3,40	3,60
Split	ϕ < 4 500 ϕ < 15 000	3,10	3,40	3,60	**4,80**	**5,20**
	4 500 ≤ ϕ < 7 000 (15 000 ≤ ϕ < 24 000)	3,00	3,20	3,40	**4,60**	**5,00**
	7 000 ≤ ϕ < 14 000 (24 000 ≤ ϕ < 41 000)	2,80	3,00	3,20	**4,40**	**4,80**

4. Challenges

- MEPS for non-inverter and inverter ACs in the same standard/same MEPS level

- Local manufacturers' capacity

5. Future plan

- Revise TCVN 7830 to increase MEPS at least for inverter ACs
- Develop MEPS standards for Muti, VRF, and Sky ACs
- Built testing capacity for these ACs

Thank you!

SECRETÁRIO DE ESTADO DA ELETRICIDADE, ÁGUA E SANEAMENTO
Direção Geral Para a Regulação dos Setores da Eletricidade, Água e Saneamento
Direção Nacional Para a Regulação da Eletricidade
Avenida Mártires da Pátria (antiga rua Mouzinho de Albuquerque) Beco Tahu-Isin
Ministério das Obras Públicas

TIMOR LESTE IN ENERGY EFFICIENCY

DNRE

Outline

1. Introduction
2. General Information
3. Action Plan to establish MEPS
4. Institutional Structure of establishment and implementation of the MEPS
5. Challenges and Solution

DNRE

1. Introduction

Directorate-General for Electricity Water and Sanitation Regulation (DGREAS) was established on August 2023 Decree Law No. 50/2023 as a electricity water and sanitation regulatory body.

supporting the development of an energy efficiency (TL National strategic Development Plan 2011-2030)

Promote more efficient energy use (Energy Efficiency) Decree Law No. 50/2023

DNRE

2. General information

No regulation on energy efficiency

↓

People are relying on First price market

Custom Authority

↓

Market

↓

End User

TL Poin of consideration in choosing the products

Price | **Brand** | **Model**

DNRE

3. Action Plan to establish MEPS

Establish the Decree Law on Energy in Demand Side by Improving the energy efficiency of appliances, buildings, and industrial processes to reduce energy consumption.

Establish the subsidiary Ministerial Diploma on MEPS that will indicate the MEPS level

DNRE

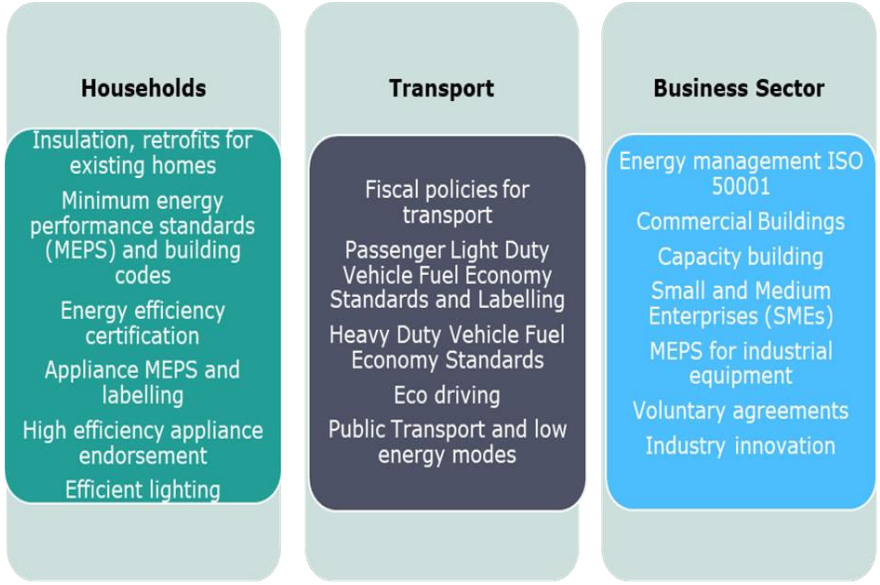
4. Institutional Structure of establishment and implementation of the MEPS

Draft an Energy Efficiency Decree Law outlining standards, regulations, and compliance mechanisms.

Establish Minimum Energy Performance Standards (MEPS) and labeling requirements for appliances and equipment through it's complemetary Laws (Ministerial Diploma)

DNRE

Cross-sectoral policies



Institutional strengthening

- **Bureau of Standards**
- **Establish the Energy Efficiency Technical Committee**
- **National Information System for Energy Consuming Products**
- **Human resources and training**
- **Dissemination and awareness campaign**

Relevant stakeholders

- **Manufacturers/ Distributors**
- **Product Certification Body**
- **Testing Laboratory**
- **Power regulatory body**

DNRE

5. Challenges and Solution

Challenges

- No energy efficiency policy (Energy Efficiency Decree Law), programs or incentives in place

- Lack of detailed data for determining minimum energy performance standard and labeling for appliances;

- Lack of control imported energy efficiency appliances;

Solutions

Draft and enact a Decree Law that sets mandatory energy efficiency standards, labeling requirements, and compliance mechanisms for appliances and systems.

Draft and enact a Decree Law that sets mandatory energy efficiency standards, labeling requirements, and compliance mechanisms for appliances and systems.

Establish a Data Collection Framework, such as Create a standardized framework for collecting and reporting energy performance data from manufacturers and retailers.

Awareness Campaigns for Importers and Consumers, such as Launch an educational campaigns targeting importers and consumers about the importance of energy efficiency and compliance requirements.

Many Thanx