National Environment Agency
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Mandatory Energy Labeling Scheme (MELS) and Minimum Energy Performance Standards (MEPS)

Overview

Presented at: Singapore Study Tour – ASEAN Cool

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Outline

1. Legislation
2. Mandatory Energy Labelling Scheme (MELS) and Minimum Energy Performance Standards (MEPS)
3. Registration
4. Testing
5. Current Policies (Air-Conditioner)
6. Impact

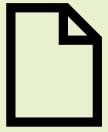
Energy Conservation Act (ECA)

What is the Energy Conservation Act?

Supports Minimum Energy Labeling Scheme (MELS) and Minimum Energy Performance Standards (MEPS) by providing the legal foundations for the standards and ensuring compliance

Mandates energy management practices or large energy users in the industrial and transport sectors

Enacted to ensure that energy efficiency becomes a national priority



Includes requirements for energy audits, reporting of energy uses and the submission of energy efficiency improvement plans

Objectives of Energy Labelling and Standards

1. Mandatory Energy Labelling Scheme (MELS) – mandatory labelling of regulated goods with a tick system based on energy efficiency

   a) Empowers end-users to make more informed purchasing choices
   b) Encourages suppliers to bring in more EE appliances as technology improves

2. Minimum Energy Performance Standards (MEPS) – restriction on the supply of regulated goods in Singapore based on minimum energy efficiency

   a) Raise average energy efficiency of households
   b) Result in lifecycle cost savings for households and industries

Mandatory Energy Labelling Scheme (MELS)

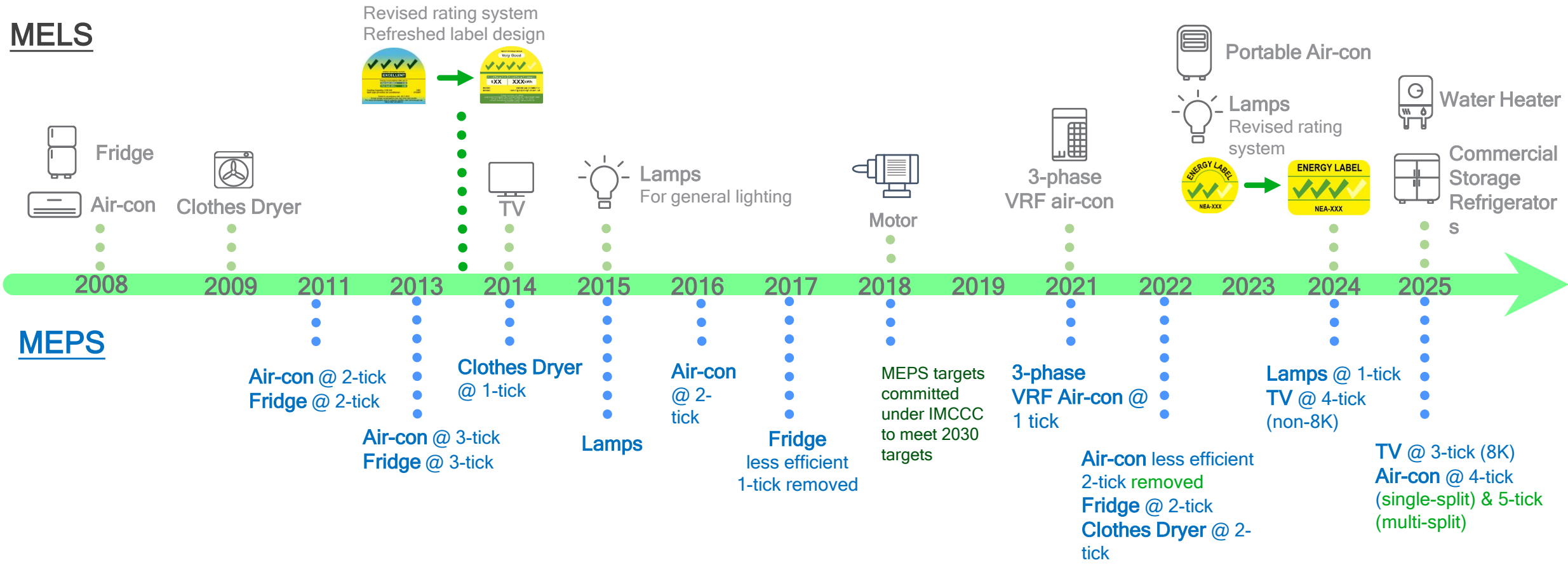
Introduced in 2008 to promote energy efficiency and environment sustainability

MELS require specific household appliances to carry an energy label, which must be prominently displayed on the product itself, as well as any advertising and marketing material

Appliances covered by MEPS	

- Air Conditioner
  - Window/Casement
  - Split-Type
  - VRF
  - Portable
- Refrigerator
	- Clothes Dryer
	- Television
	- Lamps
	- Motors
	- Water Heater (from 2025 onwards)
	- Commercial Storage Refrigerator (from 2025 onwards)

Evolution of MELS and MEPS in Singapore

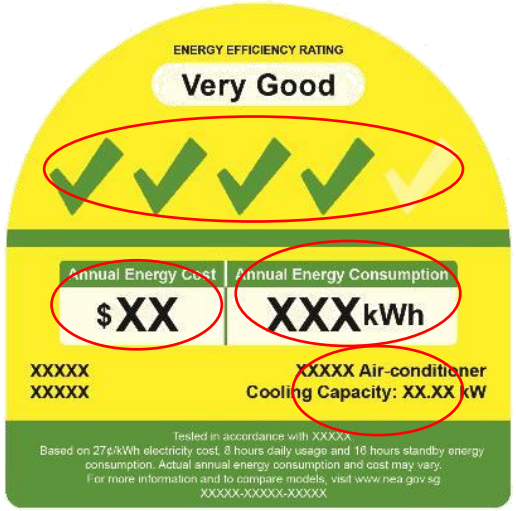


Singapore is progressively expanding MELS and MEPS to cover an increasing range of products. MEPS are regularly revised taking into account availability and affordability of more efficient alternatives.

Mandatory Energy Labelling (MELS)

Energy Label provides consumers with critical information, such as the appliance's annual energy consumption and energy efficient rating

The rating is expressed through a tick system, where more ticks indicate better energy efficiency



Tick:
1: Least efficient
5: Most efficient

Energy Labelling

- For the specific case of air conditioners (other than PACs), the energy labelling is as such:

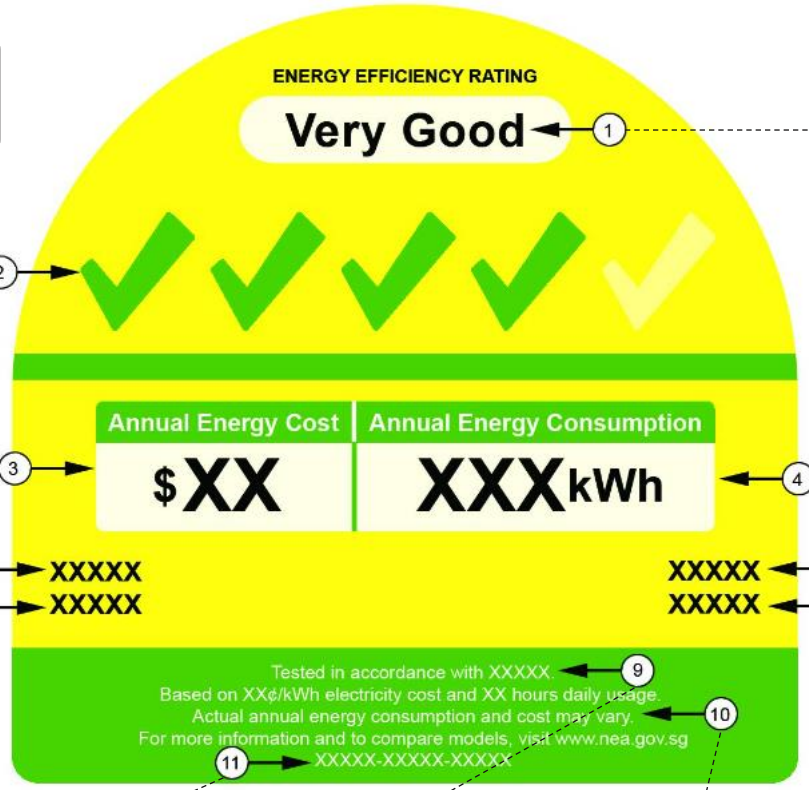
Energy Efficiency Rating in Ticks according to **Tick Ratings System**

Annual Energy Cost Based on 27 cents per kWh electricity cost, 8 hours daily usage and 16 hours standby energy consumption

Brand of air-conditioner

The **Model Number** found on the air-conditioner's nameplate. For single-split and multi-split air-conditioners, only the model number of the outdoor unit shall be displayed

COR Number which is issued by NEA upon successful registration of the model



Test Standard(s) used

Disclaimer: 'Actual energy consumption and cost may vary.'

Energy Efficiency Rating expressed in words:

- 1-Tick: Low
- 2-Tick: Fair
- 3-Tick: Good
- 4-Tick: Very Good
- 5-Tick: Excellent

Annual Energy Consumption based on 8 hours daily usage and 16 hours standby energy consumption (where applicable), expressed in kWh

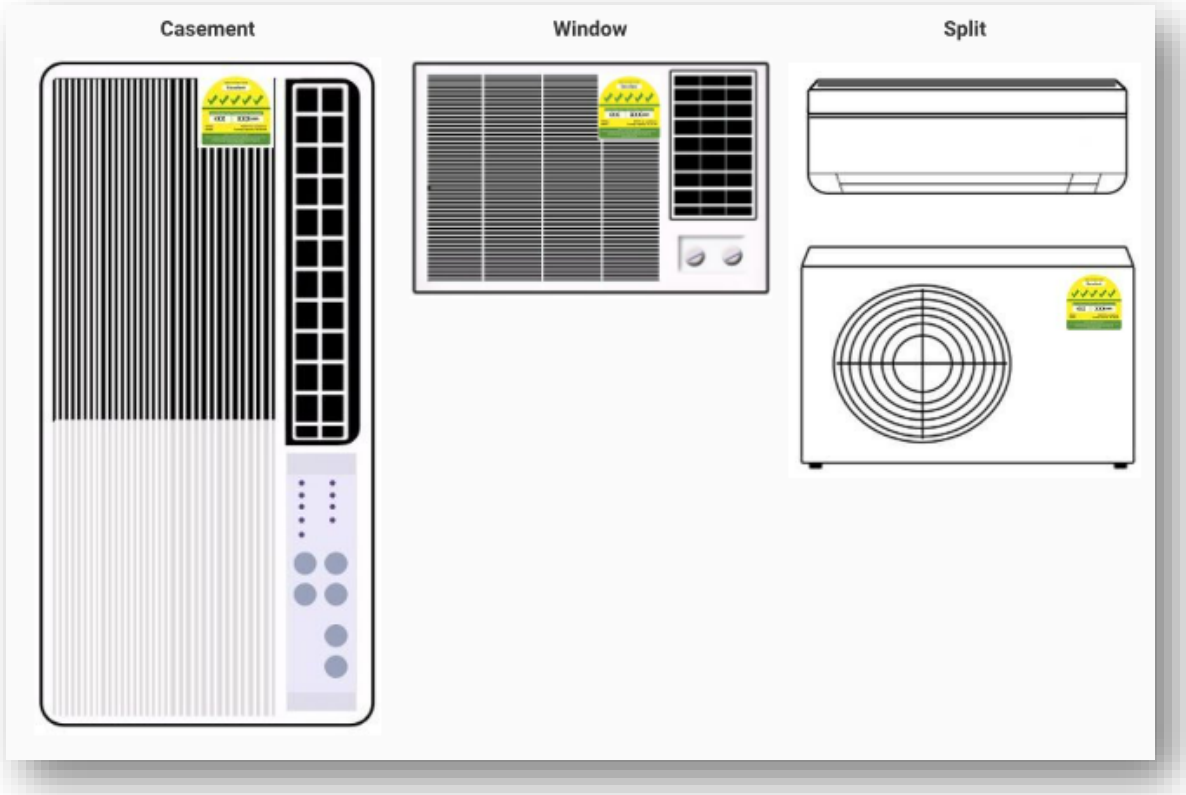
Type of air-conditioner: Casement Window/ Split type (non-inverter)/ Split type (inverter)

Full load cooling capacity expressed in kW and rounded to two decimal places

Suppliers must **display** the Energy Label on regulated goods.

Energy Labelling

- After NEA has issued out COR on registered models, suppliers must affix the Energy Label prominently on the units that they supply in Singapore.
- The following are examples of how Energy Labels can be displayed on air conditioners:

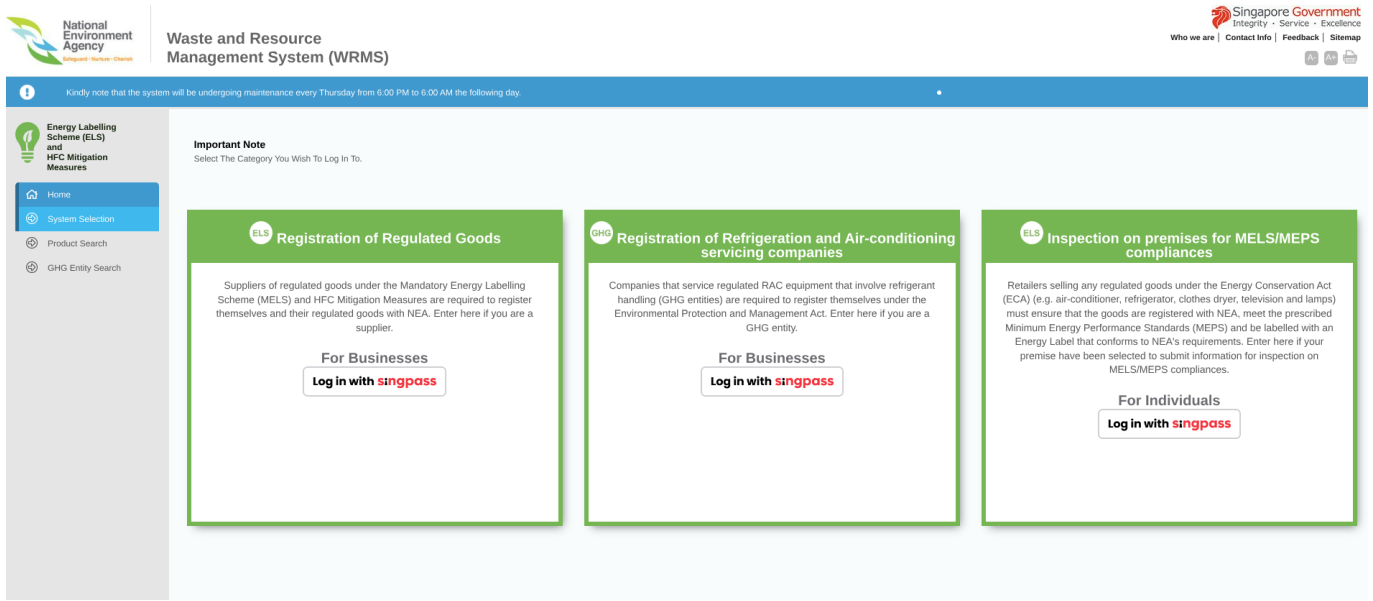


Suppliers must **display** the Energy Label on regulated goods.

Registration

Registration of suppliers and regulated goods is done through the **Energy Labelling Scheme (ELS)** portal. The following information and documents are required for registration:

- Company administrator's Corppass
- Test Report
- Letter of Authorization if registration is made by an appointed third party



Importers and manufacturers must **register** their companies and regulated goods

Registration

Upon successful registration, a **Certificate of Registration (COR)** will be issued to the supplier for each regulated good

- Each certificate is valid for 3 years
- Each certificate can be renewed at least 2 weeks, but not earlier than 90 days before expiry

CERTIFICATE OF REGISTRATION

National Environment Agency

Commercial Electrical 17 JUN 2013
ENVIRONMENT BUILDING 2, 21
SCOTTS ROAD 2 #10-03
Singapore 123488

Certificate Number	:	MELS-ABC-AC130002
Date of Registration	:	06-06-2013
Date of Expiry	:	05-06-2016

The following registrable goods are registered with the National Environment Agency under Part III Division 1 of the Energy Conservation Act (ECA):

Description	:	Split type (non-inverter) type air-conditioner
Trade Name	:	AC AC June 2
Model No	:	AC JUNE 0606 13
Cooling Capacity	:	1.00 kW
Country of Origin	:	aa
Test Report Ref No	:	aaaa
Testing Laboratory	:	aaa
Tested in accordance with	:	ISO 5151
Energy Consumption (Full load)	:	1.00 kWh per hr
Coefficient of Performance (Full load)	:	1.00
Annual Energy Consumption	:	2926 kWh
Annual Energy Cost	:	$790

Importers and manufacturers must **register** their companies and regulated goods

Testing

- Compliance to **MEPS** is enforced through the requirement of test reports to be submitted during registration which will provide necessary data for energy labelling as well.
- Test reports are accepted from any of the following test laboratories:

Test laboratory accredited by **Singapore Accreditation Council (SAC)**

Test laboratory accredited by local accreditation bodies, which have signed a **Mutual Recognition Arrangement (MRA) with SAC**

Manufacturer's **in-house testing laboratory**

Suppliers must **comply** with Minimum Energy Performance Standards (MEPS) for the regulated goods

Testing

- All tests shall be carried out in accordance with the applicable test standards:
  - **International test standards** are used to reduce cost of compliance.
  - Test report templates are provided by NEA to suppliers to ensure consistency in test reports received.
  - The following are test standards used for the various types of air conditioner as of Nov'24:

Regulated Goods	Type	Test Standard	Relevant Test	Climate Class
Air-conditioner	Casement, window and single-split	ISO[2] 5151:2017	Section 5.1: Cooling capacity test	T1
	Multi-split	ISO 15042:2017	Section 6.1: Cooling capacity test	T1
	All (for standby power)	IEC 62301:2011	Section 5.3.2, 5.3.3 or 5.3.4 of IEC 62301:2011	Nil

Suppliers must **comply** with Minimum Energy Performance Standards (MEPS) for the regulated goods

MELS/MEPS Air-conditioners

Type	Revised MEPS	CSPF Equivalent*
Single-Split (inverter)	$COP_{weighted} \geq 4.86$	6.10
Single-Split (non-inverter)	$COP_{100\%} \geq 4.86$	6.10
Multi-Split (inverter)	$COP_{weighted} \geq 5.50$	6.86
Multi-Split (non-inverter)	$COP_{100\%} \geq 5.50$	6.86

*CSPF = 1.1917COP + 0.3111
COPweighted = 0.4 x COP100% + 0.6 x COP50%

Impact

Since the introduction of MELS/MEPS in 2008, Air-conditioners, Refrigerators, Clothes Dryers, Lightings have improved their efficiency by 47%, 47%, 17% and 47% respectively.

Table 5 — Improving Energy Performance Standards of Household Appliance and Promoting Energy Efficiency to Households

Mitigation Action	Objectives	Description	Progress of Implementation/ Steps taken or envisaged to achieve action	Nature of Action	2020 Quantitative Goal ($MtCO_2$ eq)	Methodologies and Assumptions	Gas Coverage	Progress Indicators	Results Achieved
MEPS for household appliances – air conditioners, fridges, lighting, clothes dryers.	To improve the overall energy efficiency of appliances in the market.	Disallowing the supply of inefficient appliances that fall short of specified minimum energy efficiency levels.	Ongoing MEPS for air conditioners and fridges were implemented in September 2011 and raised between 2013 and 2017 respectively. MEPS for air conditioners and refrigerators were raised again in 2021. MEPS for clothes dryers were implemented in April 2014 and were raised again in 2021. MEPS for general lighting were implemented in July 2015. The MELS was extended to common CFLni and fluorescent tubes, and their LED direct replacements in November 2019. MEPS were raised to phase out incandescent lamps in November 2019. MEPS were introduced for fluorescent lamp ballasts in November 2019.	Legislation	0.71–0.79	The carbon emissions arise from the energy use of home appliances. The emissions in two scenarios, the BAU and Policy scenarios, are calculated. In both scenarios, the annual hours of usage of home appliances is assumed to remain the same as that of the reference year, 2005. In the BAU scenario, since there are no policies affecting purchasing decisions, it is assumed that there is no change in the purchasing pattern of home appliances by energy efficiency rating over the forecast period 2006–2020. The emissions are calculated based on the predicted stock of appliances (initial stock plus purchases less displaced and retired stock), annual hours of usage and annual energy consumption based on energy efficiency rating.	CO_2	Annual purchase pattern o applianc models by tick-rating.	Estimated abatement achieved in 2020: 0.72 Mt *MEPS commenced in 2011.
Promotion of energy efficiency to households.	To promote energy efficiency to households.	Promoting the purchase of energy-efficient appliances through the MELS for household appliances and outreach efforts. SSUL Programme.	Ongoing The MELS for air conditioners and fridges was introduced in 2008 and extended to clothes dryers in 2009, TVs in 2014 and general lighting in 2015. Household energy efficiency awareness programmes (e.g. media publicity, energy-saving contests, energy efficiency roadshows) have been rolled out since 2008. Under the programme, each one- to two-room public housing household received a S$25 voucher to switch to using LED lights, which are more energy efficient.	Promotion	0–0.28	In the Policy scenario, purchasing decisions are modified by mandated standards and energy labelling. The purchasing pattern of home appliances by energy efficiency rating is obtained from market data on purchases of products of different efficiency levels. This, together with estimated lifespans of the appliances, is used to calculate the mix of appliances by energy efficiency rating in the stock. The carbon emissions of the stock are calculated based on energy consumption. The emissions abatement is the difference in carbon emissions between the BAU and Policy scenarios.			

Collectively, an abatement of 0.72 Mt was achieved up to 2020.

As reported in Singapore's fifth NC and fifth BUR (https://www.nea.gov.sg/our-services/climate-change-energy-efficiency/climate-change/national-communications-and-biennial-update-reports)

Environmental Impact – Energy Consumption

Energy consumption of equipment with higher ticks is lower

Model	Type	Ticks	Purchase Price	Lifespan Energy Cost	Life Cycle Cost
Daikin RXMQ6AVE	mini VRF	2	1000.00	14445.85	15445.85
Daikin RXMUQ4AVEG	mini VRF	5	1000.00	7652.74	8652.74

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Thank you!

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