GLOBAL COOLING PLEDGE ASSEMBLY

SINGAPORE 15 - 18 SEPTEMBER 2026

Parallel Session: Implementation Roundtables and Beat the Heat Training

Market Transformation: Efficient, Climate-friendly Cooling Appliances

09:00-10:30, 16 September 2026

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Opening remarks

Patrick Blake

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UNEP-U4E

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Opening Remarks

Objectives

1. Showcase practical country experience and approaches that have worked in advancing efficient cooling equipment.
2. Identify the barriers to high-efficiency cooling: policy, market, financial and consumer-side.
3. Highlight the support available from governments, industry, technical partners and finance, from public procurement to voluntary programmes and carbon markets.
4. Connect countries and partners to accelerate market transformation.

Expected outcomes

1. The top three policy and market mechanisms that drive uptake of efficient cooling appliances.
2. The top three barriers, and the top three enablers, for accelerating market transformation.
3. Country priorities matched to available technical, financial and industry support.
4. Concrete partnership opportunities to advance efficiency-related Global Cooling Pledge commitments, feeding Thursday's IGCC Session 2A.

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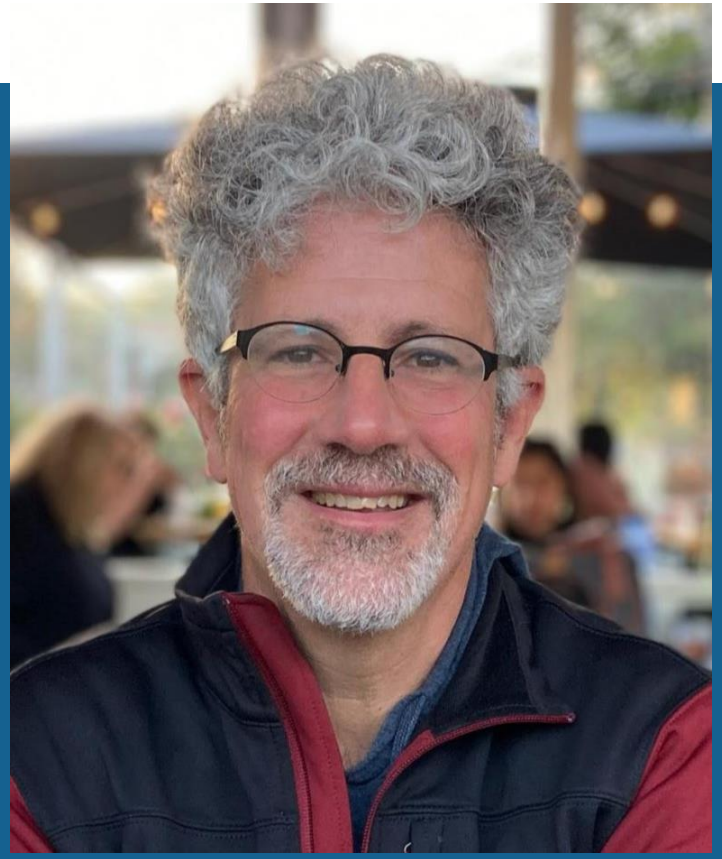
Thematic Spotlight: The Floor and Beyond



Noah Horowitz

Senior Director
Clean Cooling Collaborative

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Global Overview

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What are Minimum Energy Performance Standard (MEPS)?

Core function

- Eliminate the least efficient products from the market by setting mandatory minimum performance thresholds

Policy positioning

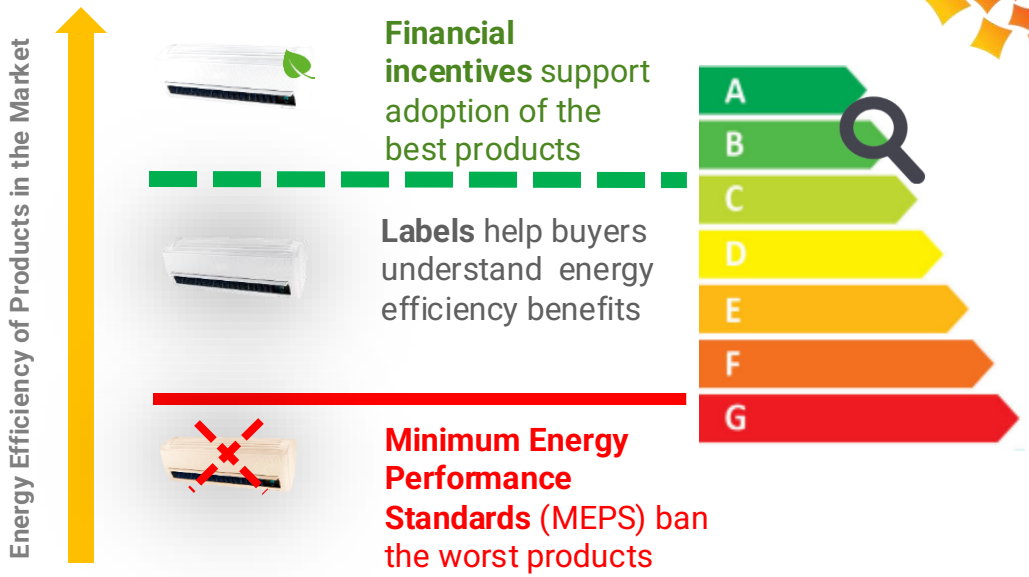
- A foundational regulatory tool that defines the minimum acceptable level of energy performance
- Should be combined with other requirements, including low-GWP refrigerants

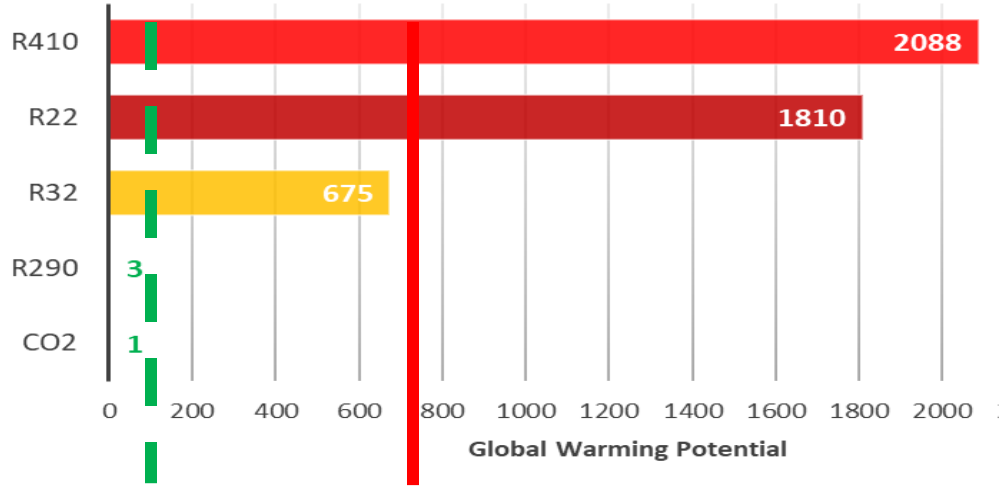
Complementary instruments

- **Labels**: inform consumers and differentiate products above the minimum threshold
- **Financial incentives:** accelerate uptake of high-efficiency, best-in-class technologies

Track record

- A well-established and cost-effective policy tool widely implemented in OECD countries, China, India and beyond



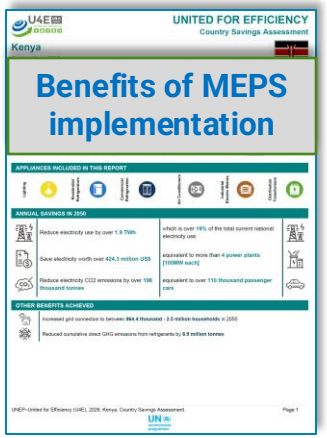


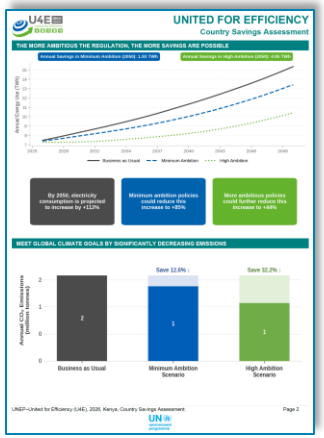
U4E's Country and Regional Savings Assessment

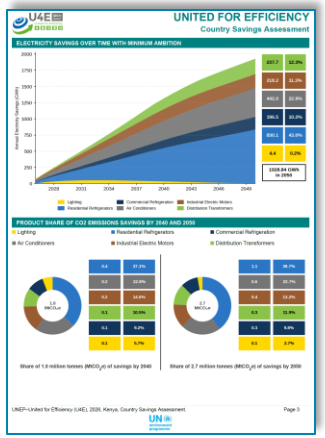
What's new?

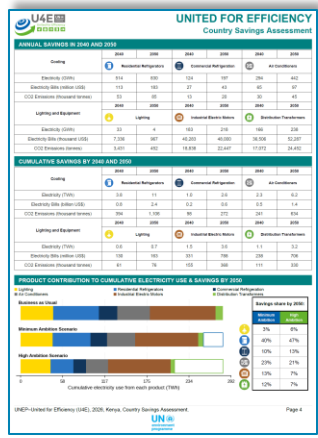
- Updated Key Assumptions & Macro Economic Indicators
- Extended Timelines from 2040 to 2050
- Scope Expansion: Inclusion of new/updated MEPS (ACs, motors, etc.)
- Flexible Analysis Tool
  - Select countries/ regions, desired years
  - Toggle between ambition levels
  - Interactive data dashboards

Annual and Cumulative Savings: electricity, economic and emissions under various scenarios for six products

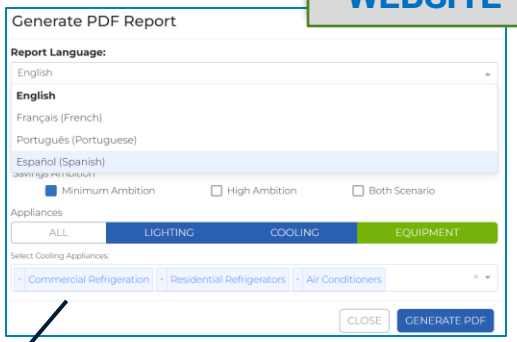




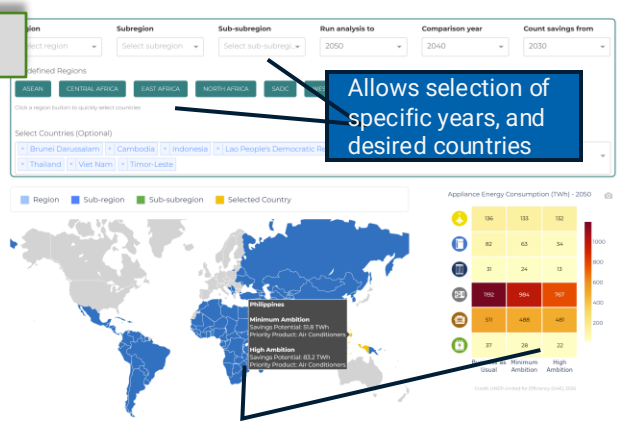




WEBSITE



Available for download in 4 languages



Allows selection of specific years, and desired countries

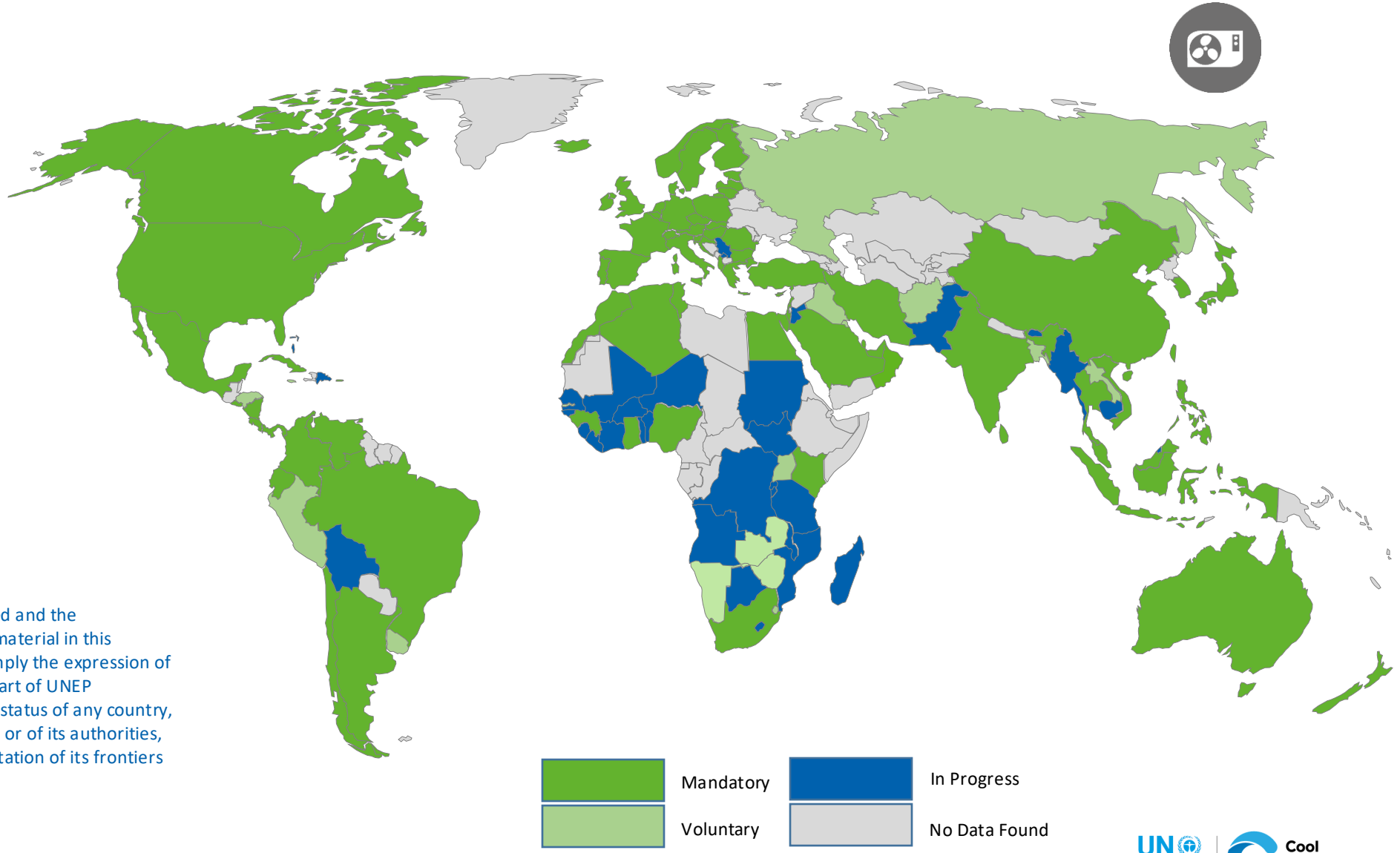
Key Findings; Heat maps to identify priority products in region/country

Why it matters?

CSA/RSA provide the potential financial, environmental, energy, and societal benefits of transitioning to energy-efficient products

- Enable governments to prioritize high-impact products and countries/region based on tangible energy and emissions outcomes
- Strengthen evidence-based policymaking through robust, country-specific data and scenario analysis
- Support the development and benchmarking of national energy efficiency and emissions targets (e.g., NDCs) and advance regional alignment and policy harmonization

Status of AC MEPS



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What's Available -> U4E Model Regulations

- Provides guidance to help inform regulatory authorities and policymakers
- Sets a **minimum efficiency floor** to prohibit future sales of inefficient products and defines higher tiers aligned with technology and market opportunities
- Encourages uptake of **higher-performing products** through **labelling**
- Focuses on both **efficiency** and **refrigerants** (for cooling products), promoting wide adoption with a strong refrigerant GWP ceiling to enable fast, viable action on the Kigali Amendment

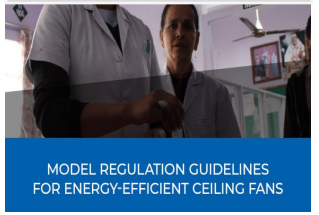
Commercial Refrigeration

Residential Refrigeration

Room Air Conditioners

Off-grid Refrigeration

Ceiling Fans



Air Conditioners and Heat-Pumps

Available in English and in other languages for selected publications at:
https://united4efficiency.org/resources/model-regulation-guidelines/

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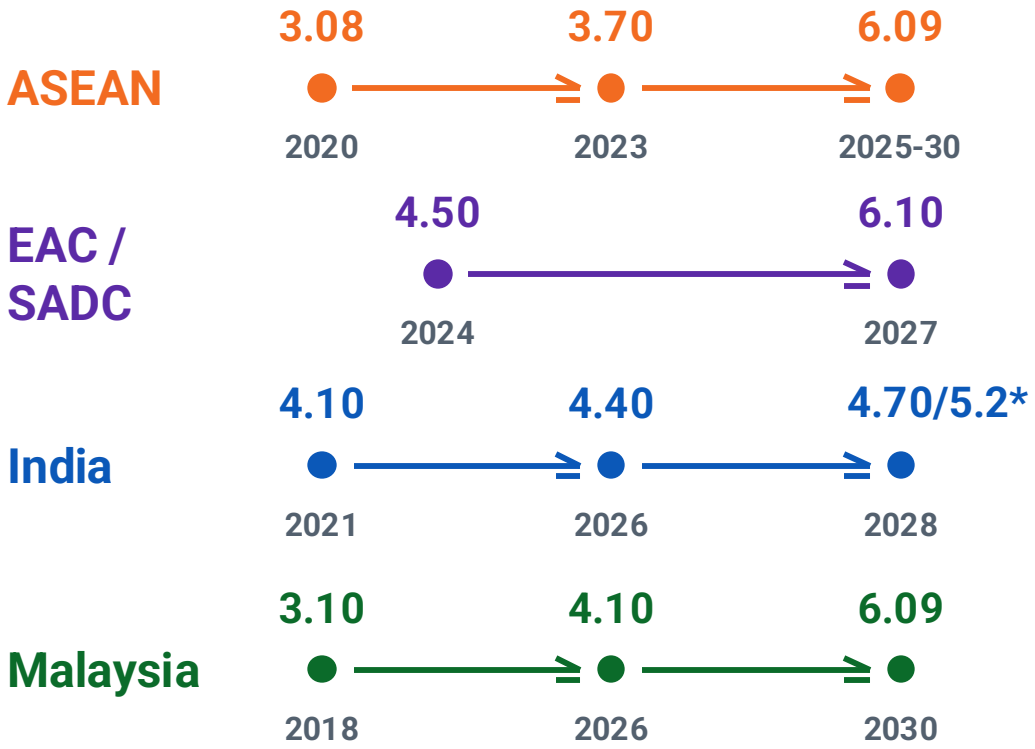
Global Trends in AC MEPS

1 Standards are rising over time



2 Markets are moving toward 6.10

U4E Model Regulation, 2026	ISO CSPF 6.10

✓	China	Achieved 2022	6.10
✓	Singapore	Achieved 2025	6.10
✓	ASEAN	Targeted 2025	6.09
✓	EAC / SADC	Expected 2027	6.10
✓	Malaysia	Implementation by 2030	6.09
✓	Nigeria	Implementation by 2031	6.10
✓	Rwanda	Implementation by 2031	6.10

Regional targets show growing alignment, but full implementation is still ongoing and many other markets remain below these levels

Note: Equivalent ISO CSPF values are approximate and primarily reflect residential AC capacity ranges commonly covered by national MEPS. While MEPS often decrease with capacity, this is not always the case. Where conversions were needed, they were estimated using only the mandatory ISO 16358 test points.
**India inverter residential AC MEPS from 2028 are approx CSPF 5.2.*

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Why Sustainable Procurement Guidelines matters

Public purchasing power can translate policy ambition into demand for more sustainable technologies

~12%

of GDP in OECD countries

up to 30%

in many developing economies

Public procurement is a strategic market lever — not only an administrative function.

Source: OECD (2019)

What the SPGs enable

- **Lower energy use, operating costs and emissions**
- **Clear demand signals for high-efficiency, lower-GWP technologies**
- **More reliable, safe and durable systems across the life cycle**
- **Practical implementation of sustainable procurement policies**

Procurement action: the SPGs help translate efficiency, refrigerant and sustainability objectives into tender-ready criteria, life-cycle cost and emissions comparison, and clear demand signals for better-performing products and systems.

Global Cooling Pledge 2030: procurement commitments for low-GWP, high-efficiency cooling technologies and lowest life-cycle cost in government buildings

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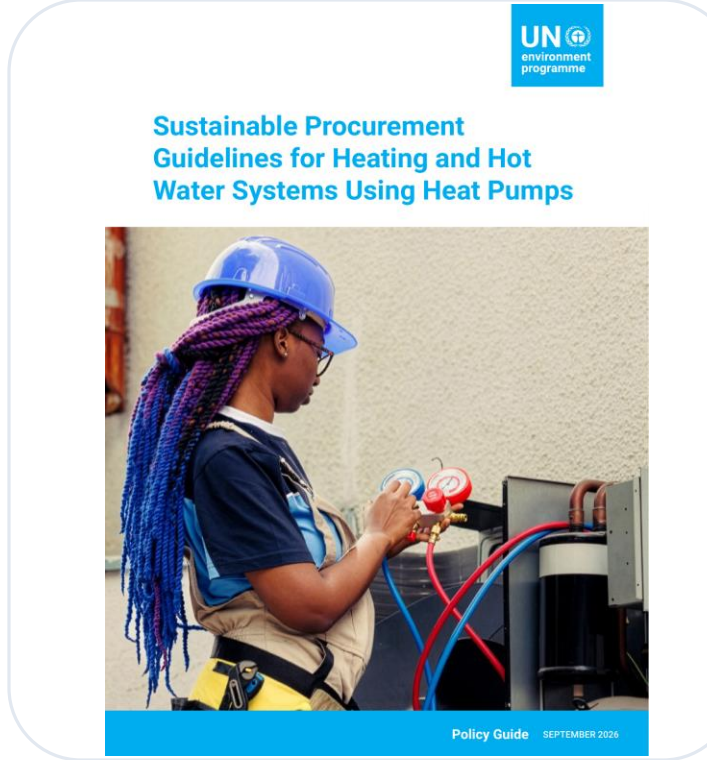
New 2026 U4E Sustainable Procurement Guidelines

Turning efficient, climate-friendly cooling and heating into procurement action

Air Conditioners & Air-to-Air Heat Pumps



Heating & Hot Water Systems Using Heat Pumps

General content:

- Practical criteria and tools for sustainable procurement of cooling and heating products and systems across their life cycle.

How to use it ?

- To support the preparation of tender documents by governments, institutions and the private sector.
- As a reference for developing sustainable procurement policies and programmes.

Development and outreach

- Both SPGs have been reviewed through the U4E Policy Working Group, with input from UNEP colleagues and external experts.
- Launch webinars and targeted outreach planned after publication.

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Policy signals only work if supply responds

Governments set the direction

WHAT GOVERNMENTS BRING

- MEPS, labels and procurement specifications
- The Kigali schedule for refrigerants
- EPIC requests: what is needed, by when
- Signals that are often late, fragmented across neighbours, or on different test methods

THE GAP SITS BETWEEN THEM

Timing
Rules and products rarely arrive together: each side waits for the other to move first.

Fragmentation
Neighbouring markets send different signals; the same benchmark yields different shelves.

Nothing on the record
Neither demand nor supply is stated in a form the other side can plan against.

No one holding both ends
No one reads the policy trajectory and the production plan side by side.

Industry delivers the products

WHAT MANUFACTURERS BRING

- Portfolio decisions that need years of lead time
- Investment that follows credible, predictable demand
- Servicing, components and refrigerant supply built market by market
- Compliance costs that rise when requirements diverge

This is the gap the Manufacturing Platform is designed to close: a place where governments and manufacturers put demand and supply on the record together, and plan against each other.

The Manufacturing Platform: what it means for a country

You set the signal

- MEPS trajectory and labels, aligned with U4E benchmarks and the Kigali schedule.
- Procurement specifications and buyers' club demand, including Beat the Heat cities.
- Your EPIC request: what you need, by when.

Manufacturers answer it

- Share of production meeting the benchmark, and by when.
- Refrigerant transition pathway, by product and market.
- Where they will supply, and what stands in the way: servicing, components, certification, cost.

The platform connects the two

- Matches country demand with manufacturer commitments.
- Flags availability gaps and works them through Platform actions.
- Annual Commitment Progress Reports, so signals stay credible on both sides.

WHERE WE ARE

Now to Sep 2026
Engagement
CSO/NGO working group; manufacturer consultations; commitment framework drafted.

Sep 2026 · Singapore
Introduction
Platform introduced; founding manufacturers engaged; first country–manufacturer matchmaking.

Nov 2026 · COP31, MOP38
Formal launch
Founding participants announced; commitments due within 12 months.

2027
Delivery
Baselines and targets set; procurement readiness; targeted matchmaking.

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What a manufacturer signs up to

Five commitments. All required. Three carry numbers; two are met through action.

1	**Product performance** Share of production meeting U4E benchmark efficiency levels, rising over time.	QUANTIFIED
2	**Refrigerant transition** Toward ultra-low-GWP; low-GWP as a transitional step; phase-down of high GWP refrigerant .	QUANTIFIED
3	**Transparency and reporting** Baseline and time-bound targets within 12 months of joining; annual Commitment Progress Report.	QUANTIFIED
4	**Market readiness, Servicing and LRM** An action plan on the barriers to availability: servicing, safety standards, components, certification, cost.	ENABLING
5	**Demand creation and procurement** Work with governments, buyers' clubs and finance on demonstration, procurement and aggregation.	ENABLING

How it is designed

- Aligned with the Global Cooling Pledge and the Kigali Amendment.
- Manufacturers set their own baselines and targets. Concrete figures and dates, not directional language.
- Covered portfolio can start focused and expand: AC and air-to-air heat pumps to 70 kW first; refrigeration can follow.
- No cross-company scoring. Progress is reported against a manufacturer's own pathway.
- Reporting balances transparency with commercial confidentiality; existing corporate reporting can be reused.

Country Perspectives: Priorities for Market Transformation

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Ghana

Daniel Collin G. Jornales

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Pei Chen NG

Principal Engineer,
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Michael Ivenso

Director of Energy, Transportation and Infrastructure,
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Li Xiaoyan

Senior Programme Officer, Montreal Protocol Division, Foreign Environmental Cooperation Center of the Ministry of Ecology and Environment, China

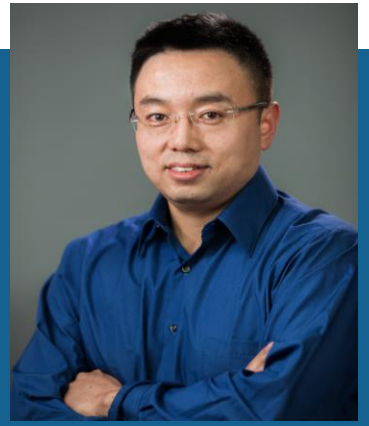
Partner Panel: Scaling Market Transformation

Steven Zeng

Director,
China Program,
CLASP

Miki Yamanaka

Senior Manager,
Global Policy Relations, Corporate Sustainability Office,
Daikin



Baolong Wang

Secretary of IIR Commission E1 (Air Conditioning);
Co-Chairperson for the IIR Working Group on Dehumidification in Air Conditioning,
Internal Institute of Refrigeration (IIR)

Stephanie Egger Haysmith

Montreal Protocol (Ozone) Secretariat

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PARTNER PANEL : SCALING MARKET TRANSFORMATION

MARKET SURVEILLANCE AND ENFORCEMENT

Effective MVE for appliances
Compliance with MEPS and energy labels

Steven Zeng

CLASP

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Core elements of effective MVE

- Clear rules and market visibility. Define supplier duties and regulatory powers. Require registration before sale. Singapore registers regulated air conditioners and VRF systems.

- Targeted surveillance and credible testing. Prioritize high-risk models, including online sales. Use recognized methods and competent laboratories. Australia's GEMS programme targets risk and uses staged check-testing.

- Predictable enforcement. Escalate from correction to withdrawal and penalties for serious or repeated failures. Publish significant actions, as the U.S. Department of Energy does.

Sustainable delivery and digital MVE

Permanent delivery capacity

- Assign a lead agency, trained staff and an annual surveillance budget.
- Use customs and regional laboratories to share capacity and costs.
- Publish results and engage suppliers. Australia uses GEMS registration charges to support compliance monitoring.

A practical digital platform

- Connect registration, product records, test documents and enforcement cases in one system.
- Start with these core functions, then add risk scoring, customs links and online surveillance.
- EU EPREL gives authorities access to product information and technical documentation.

PARTNER PANEL : SCALING MARKET TRANSFORMATION

Miki Yamanaka

Daikin

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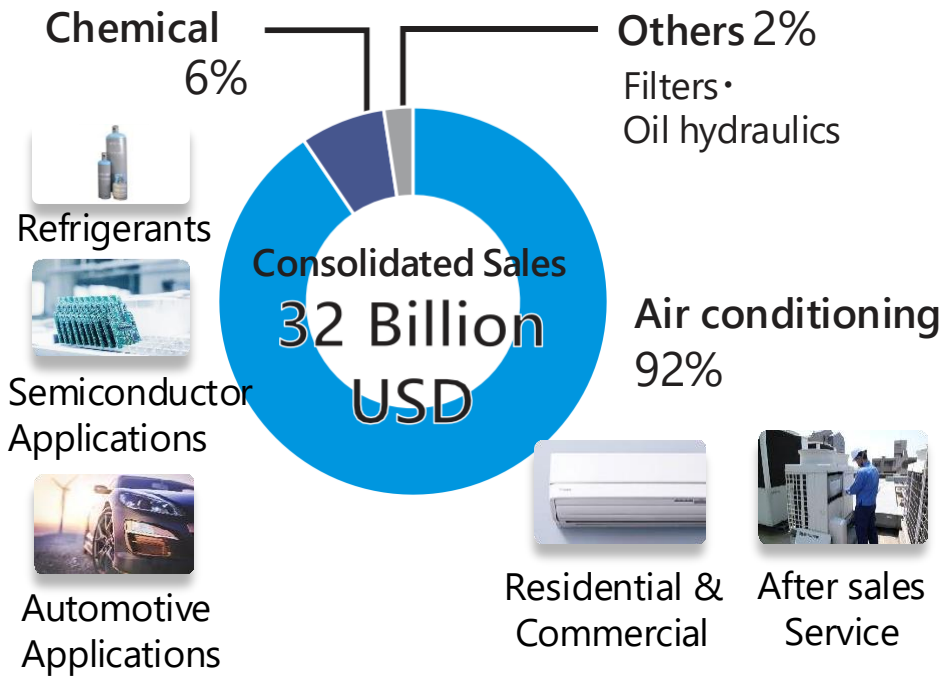
The Overview of Daikin Group and Our Efforts towards Net Zero



Founded in **1924**
100 Years of History

130+
Production Bases Worldwide

Business Development
170+
Countries

100,000+
Employees

Toward Achieving Carbon Neutrality by 2050

Scope3 Upstream
6.5 million tons-CO2

Scope 1&2
0.7 million tons-CO2
→Aiming to achieve net-zero GHG emissions by 2030 (all plants excluding the chemicals plant)

Scope3 Downstream
284 million tons-CO2
・Attributable to power consumption during use：**201 million tons-CO2**
・Leakage of fluorocarbon refrigerant during disposal：**37 million tons-CO2**

APPROACH TO ACHIEVING CARBON NEUTRALITY – Scope3

Reduce electricity consumption during use

Promote the spread of inverter products

Convert from combustion heating using fossil fuels

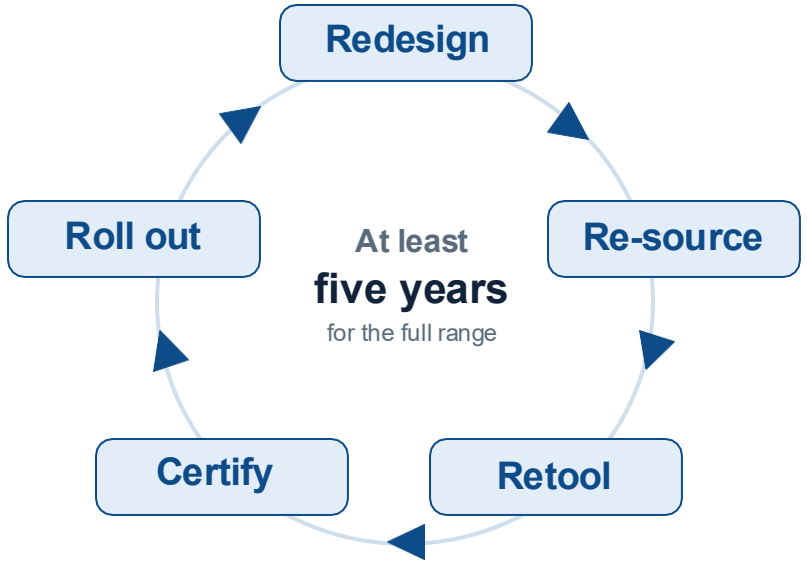
Spread and expand heat-pumps

Reduce impacts of refrigerants

Switch to refrigerants with lower global warming potential and build recovery/reclamation scheme

At least five years — every time the cycle restarts

A new efficiency or refrigerant step sends the whole product range around one cycle: redesign, re-source, retool, certify, roll out. Closing that cycle at safety, quality and price levels the market will accept takes at least five years — for the range, not one model. If a neighbouring market uses a different metric or test method, the cycle runs again: cost and time multiply rather than add.



Why at least five years

- **Every model, not one**
  The whole range moves together.
- **Supply chain, then production**
  Components and suppliers are re-qualified one by one.
- **Safety, quality, price**
  All three must reach a level the market will accept.
- **Matched to market maturity**
  Skills, servicing and supply differ by market.
- **A different metric next door**
  Means running the cycle again.

What is necessary

Mutual recognition of test reports.

It needs a common measurement layer — the test conditions and the data we report. The weighting layer, which applies each country's own climate, can stay national. The gain is largest where neighbouring markets are supplied with the same equipment.

PARTNER PANEL : SCALING MARKET TRANSFORMATION

Cooling Efficiency and Humidity Control

Baolong Wang

International Institute of Refrigeration (IIR)

Tsinghua University

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Cooling efficiency and MEPS

➢ How much can AC efficiency and MEPS improve?

Below 50% of the theoretical limit for rated EER and seasonal SEER

>80%

lower annual energy use and GHG emissions

Global Cooling Prize solution for New Delhi

Efficient AC + smart ventilation + low-GWP refrigerant + a small PV panel

➢ What affects efficiency and how should MEPS respond?

Technology: dynamic MEPS

Raise standards as technology improves and efficient products become affordable.

Climate and use: localized MEPS

Reflect local climate, setpoints and hours of use.

Humidity control

Latent heat ratio matters

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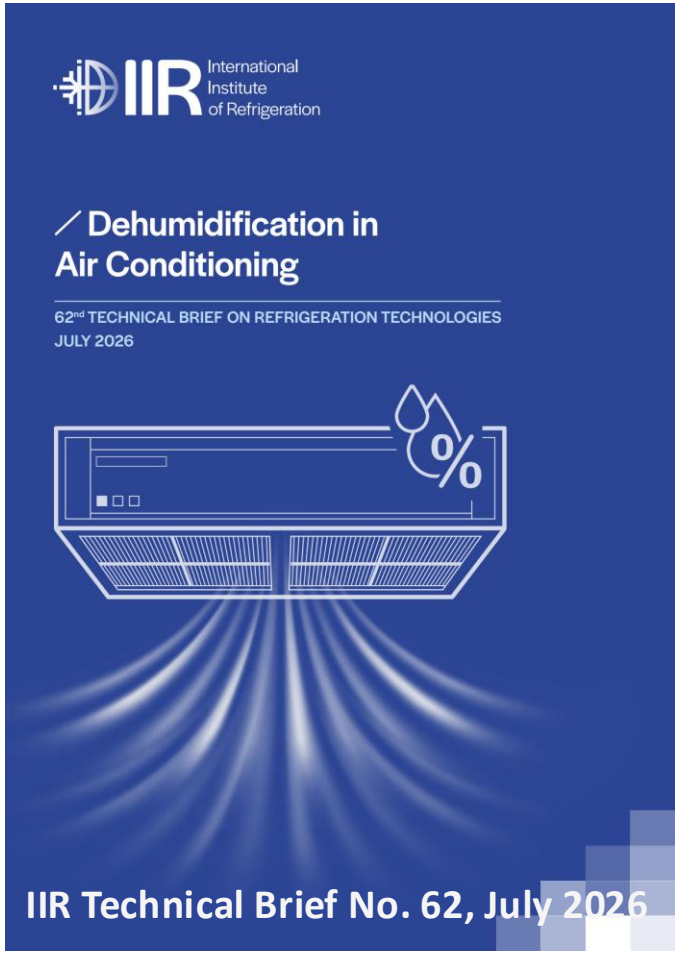
Can efficient dehumidification raise MEPS?

- **Central air conditioning systems**: air must be cooled well below its dew point to remove sufficient moisture, which may result in a supply chilled water temperature of 7–10°C

- **Room air conditioner**: evaporating temperature is also close to 7°C for dehumidification purposes

- With highly efficient dehumidification, there is significant potential to substantially improve both the energy efficiency and MEPS

Energy standards and MEPS should be dynamic, localized and humidity-inclusive.



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Open Discussion

MODERATED BY

Mr. Patrick Blake, Programme Manager, UNEP-U4E

Closing Remarks

Michael Ivenso

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