Buildings and Cooling Pavilion

Global Alliance for Buildings and Construction | Cool Coalition

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GOVERNO FEDERAL BRASIL UNIÃO E RECONSTRUÇÃO

Efficient Cooling and Ventilation for Comfort and Decarbonisation

19 November 09:30 – 10:30

Supported by:

TRANE TECHNOLOGIES

DAIKIN ARUP AUTODESK DELTA 台達 Delta Electronics Foundation GBPN Sidara AIA SAINT-GOBAIN L'UNION SOCIALE POUR L'HABITAT Les Hlm, l'habitat en Mouvement

Buildings and Cooling Pavilion

Opening Remarks

Hongpeng Lei
Chief of the Mitigation Branch, UNEP

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DAIKIN

U4E United for Efficiency

Keynote Speech

Mustapha Abdullahi
Director-General and Chief Executive Officer of the Energy Commission of Nigeria (ECN)

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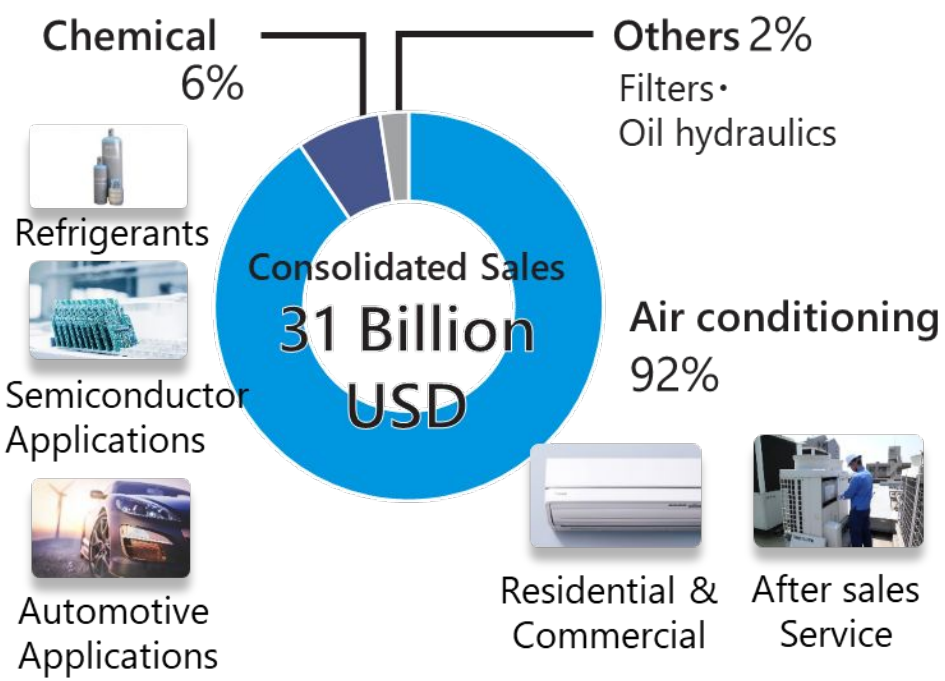
DAIKIN

U4E United for Efficiency

Efficient Cooling and Ventilation for Comfort and Decarbonization

Takahiro Asahi
Manager,
External Relations Department,
Daikin Industries

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

GHG EMISSIONS

Result, 2024FY

Scope 3 Up Stream	5 million tons-CO2
Scope1・2	1 million tons-CO2
Scope 3 Down Stream	307 million tons-CO2

APPROACH TO ACHIEVING CARBON NEUTRALITY

Reduce electricity consumption during use

Promote the spread of inverter products

Convert from combustion heating using fossil fuels

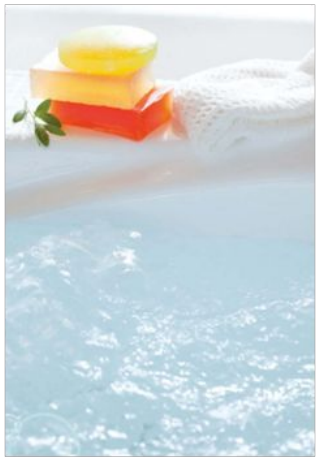
Spread and expand heat-pumps

Reduce impacts of refrigerants

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

Bringing the benefits of AC & HP to more people

Healthy and safe living



Boosting productivity and economic growth

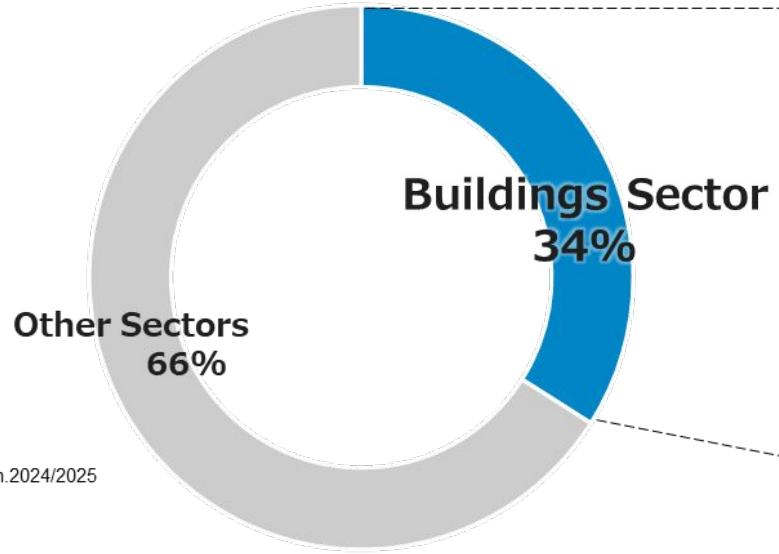
Adaptation to climate change

Air conditioning as a social infrastructure

Lee Kuan Yew, Singapore's founding prime minister, once said
"Air conditioning was a most important invention for us, perhaps one of the signal inventions of history. It changed the nature of civilization by making development possible in the tropics."

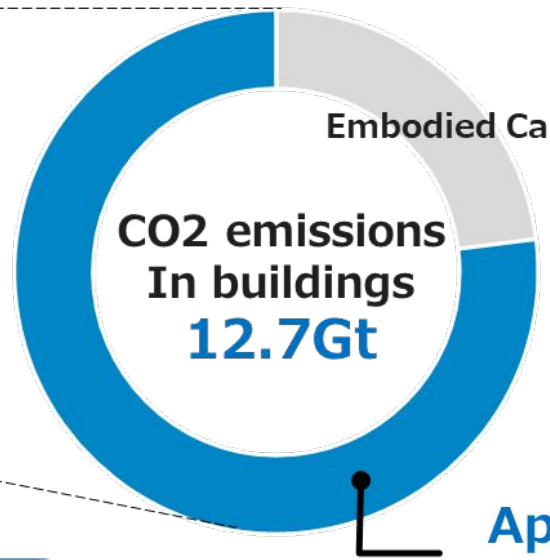
Reducing “Operational Carbon” of Buildings is Key !

Global GHG Emissions



Ref. Global Status Report for Buildings and Construction.2024/2025

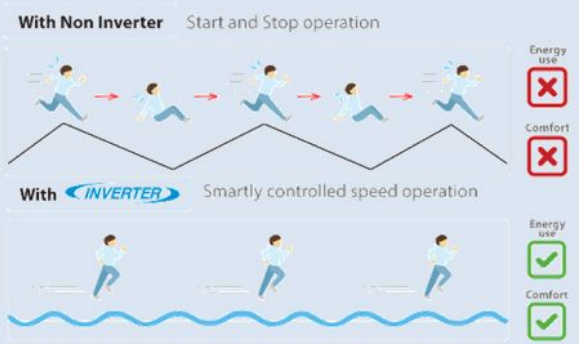
Reducing “Operational Carbon” is key to Buildings Decarbonization



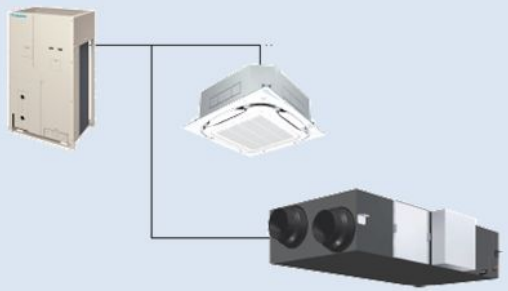
Approx. 80%
Operational Carbon

Daikin’s Solutions

Inverter air conditioners



Air Conditioning system with Excessive Cooling Prevention “AC-ECP”



Heat pumps

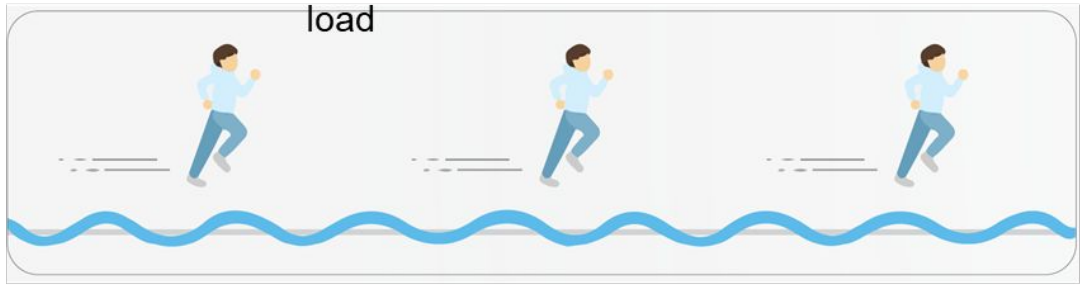
...

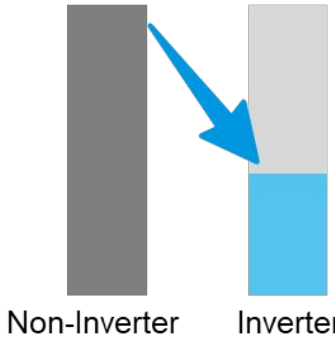
Inverter Air Conditioners

How Inverter ACs work

Non-Inverter Repeat ON／OFF Operation

Inverter Adjust power smoothly according to the heat load

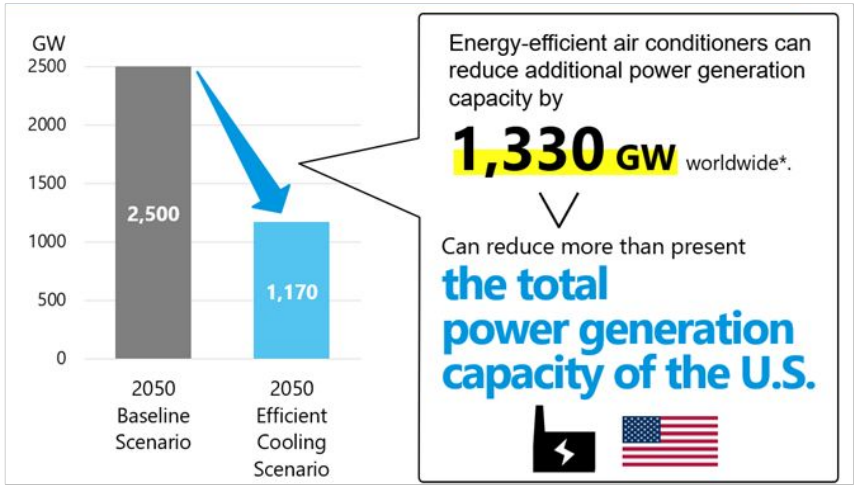




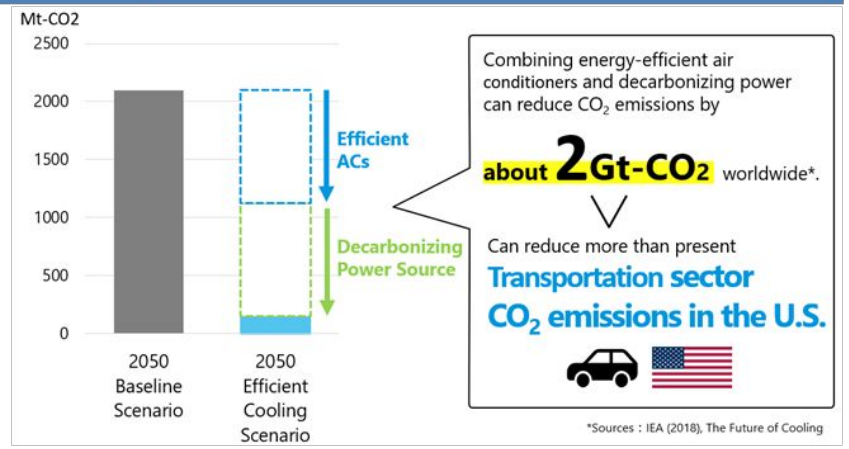
Energy Consumption
50% Reduction

*Based on demonstration test by Daikin

Impact on Power



Impact on CO2 Emissions



Inverter Air Conditioners

Comparison demo test of Inverter vs Non-inverter in some countries

Result: 35% - 64% energy savings

Brazil

City	FLORIANÓPOLIS	SÃO CAETANO	RIO DE JANEIRO
Energy Saving Rate	58%	65%	59%

* The test and data analysis was conducted by universities in Brazil under JICA support program.

Mexico

City	Cancun	Mexico City	Guadalajara	Mexicali	Monterrey
Energy Saving Rate	61%	64%	64%	56%	47%

* The test and data analysis was conducted by national institutions under JICA support program.

Jeddah, Saudi Arabia

* High ambient

Energy Saving Rate **44%**

* The test was conducted by MRI and Daikin under the cooperation of SASO and METI. The data was analyzed by a national institution in KSA.

Dubai, UAE

* High ambient

35%

* The test was conducted by MRI and Daikin under the cooperation of METI. The data was analyzed by a university in UAE.

Nigeria

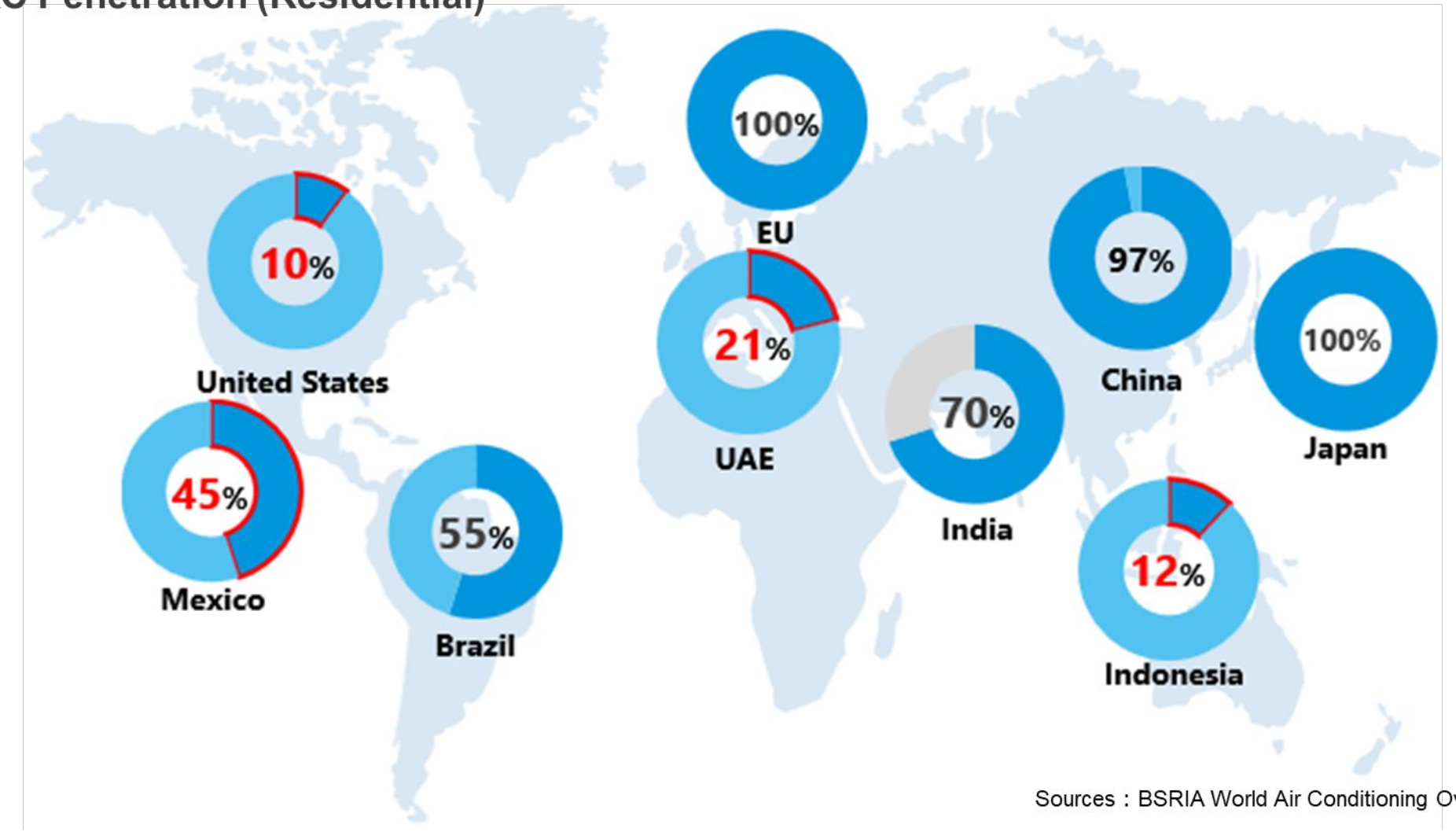
40-48%

* The test was conducted by Daikin under the JICA' project. The data was analyzed by Dr. Ityona Amber et al.

Inverter Air Conditioners

The spread of Inverter ACs still needs to be accelerated

Inverter AC Penetration (Residential)

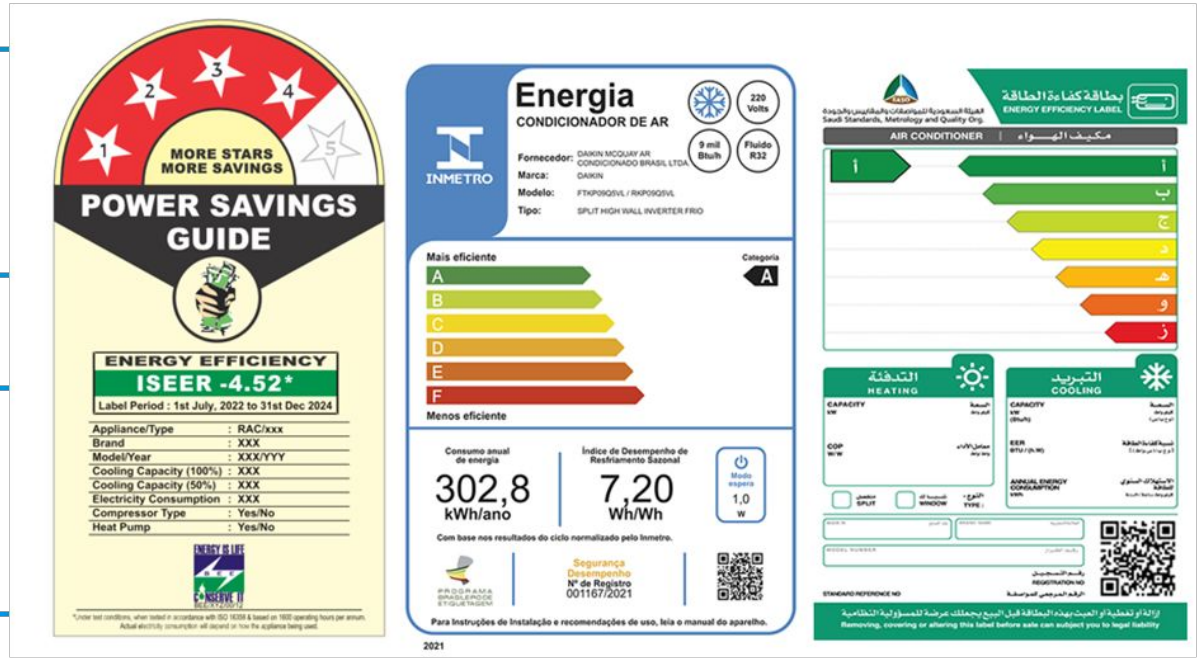


Sources：BSRIA World Air Conditioning Overview 2023

Inverter Air Conditioners

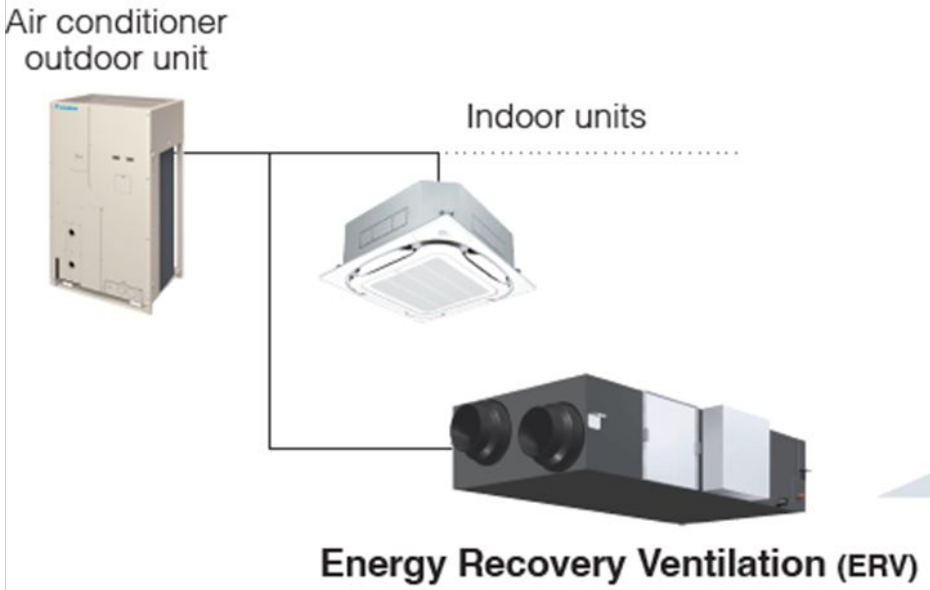
Proper standards and labeling need to be implemented

1. **Use seasonal performance evaluation standard** (CSPF, SEER, APF etc.) to evaluate AC's performance under conditions closer to actual usage.
   * Whole life carbon calculation also needs to consider seasonal air conditioning load.
2. **Establish labeling program to guide consumers to choose energy efficient AC.**
3. **Regularly review MEPS to raise energy efficiency of the market.**

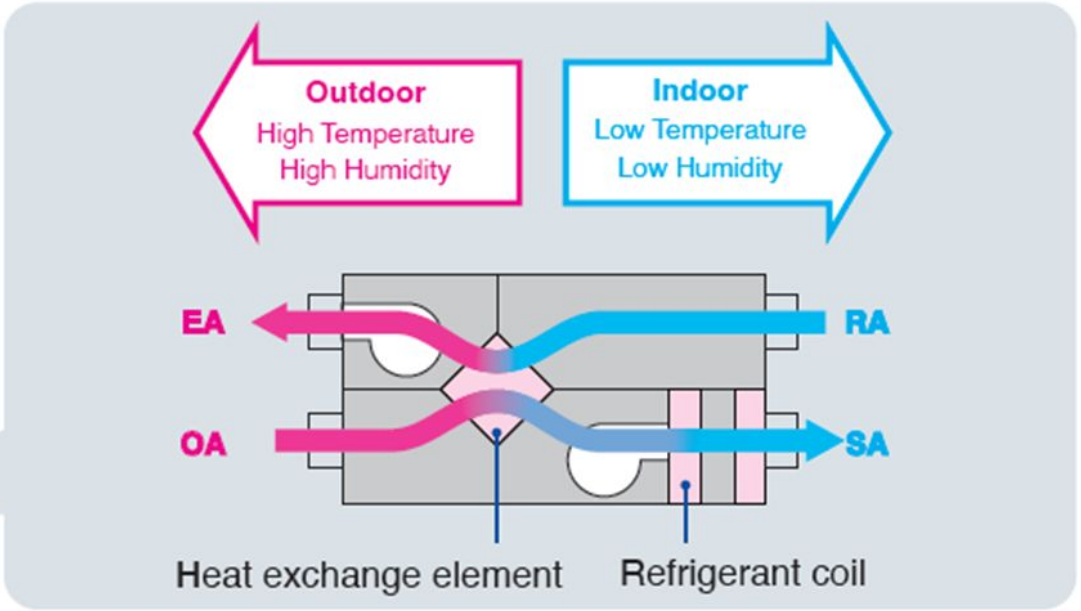


“AC-ECP” (Air Conditioning system with Excessive Cooling Prevention)

Prevent Excessive Cooling! for better comfort with less emissions



Energy Recovery Ventilation (ERV)



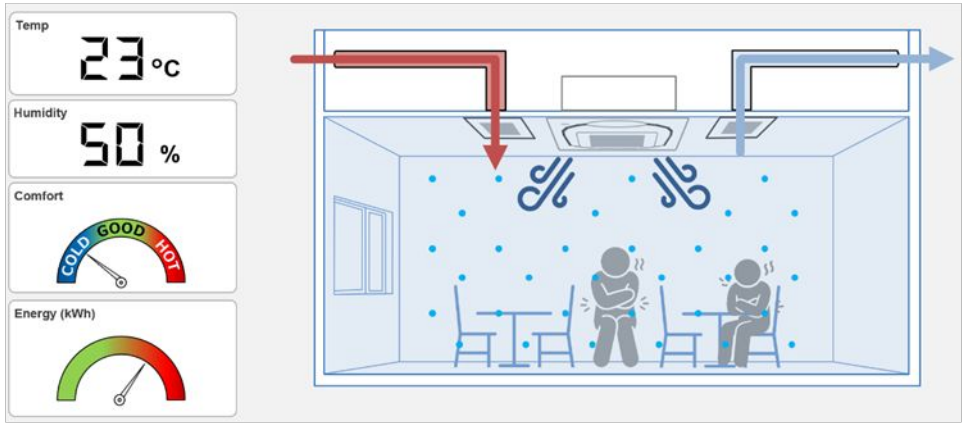
By reducing heat load and enabling moderate set temperature, AC-ECP significantly reduces operational energy and emissions.

Immediately practicable mitigation measures	No significant surplus cost	40% energy reduction demonstrated

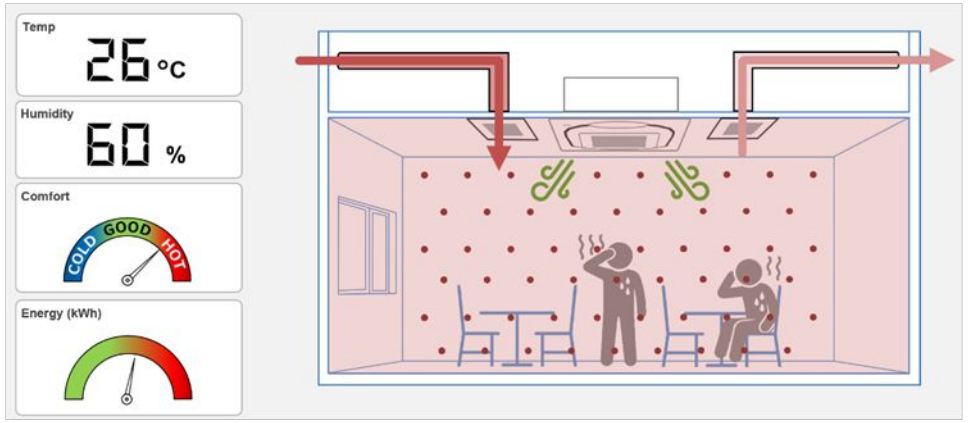
“AC-ECP” (Air Conditioning system with Excessive Cooling Prevention)

Conventional ventilation and AC

Too Cold

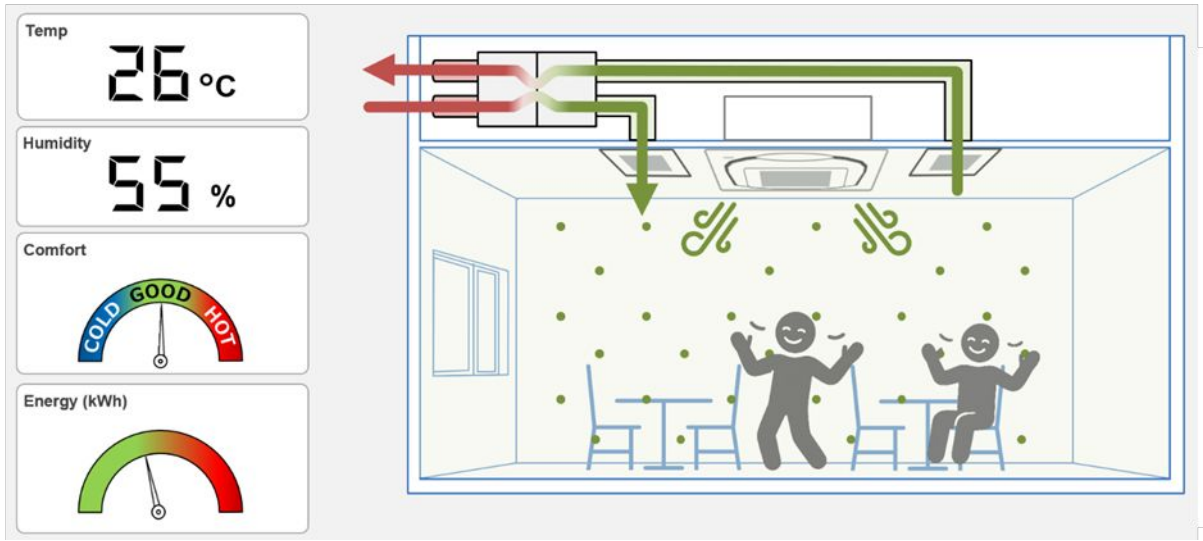


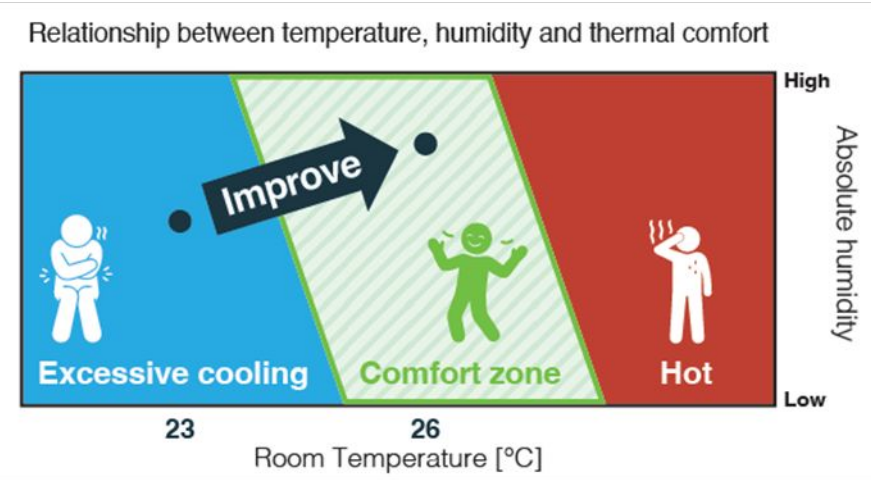
Too Hot



“AC-ECP”

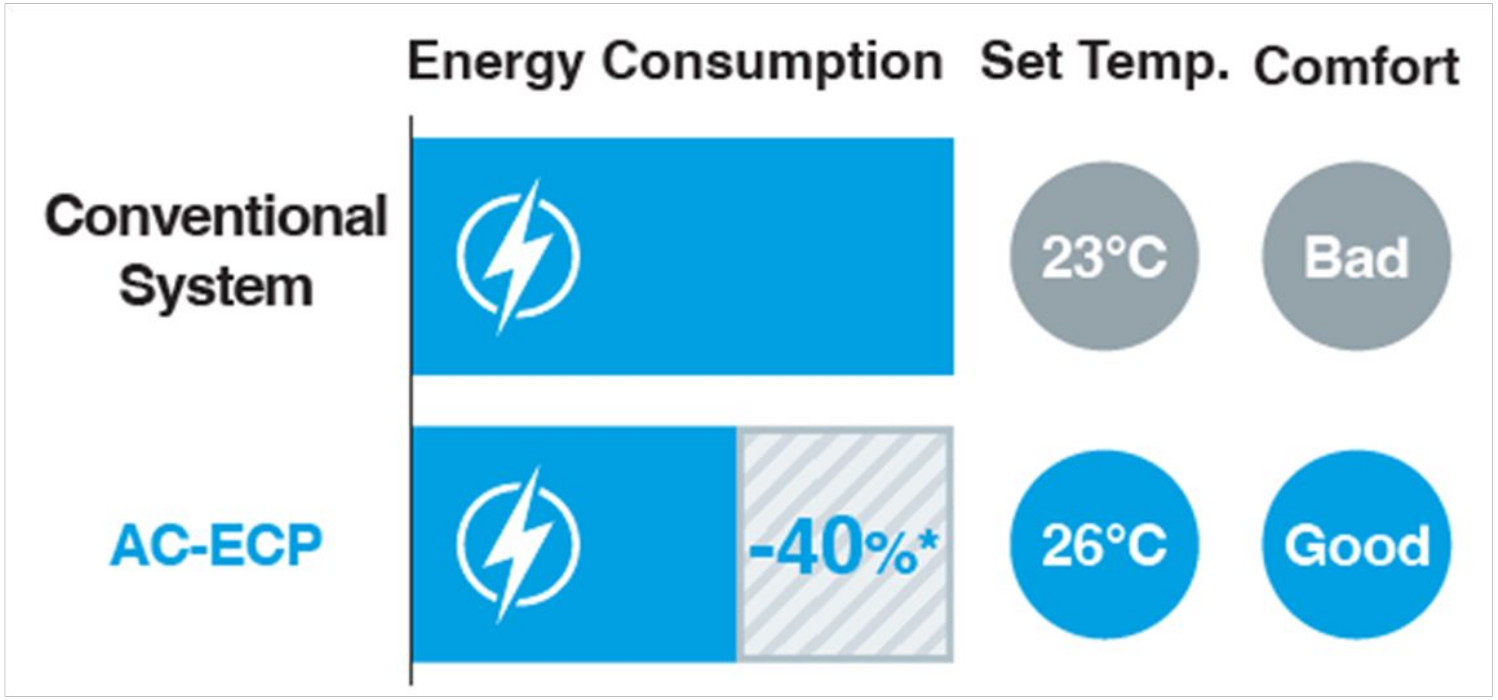
Comfortable!!



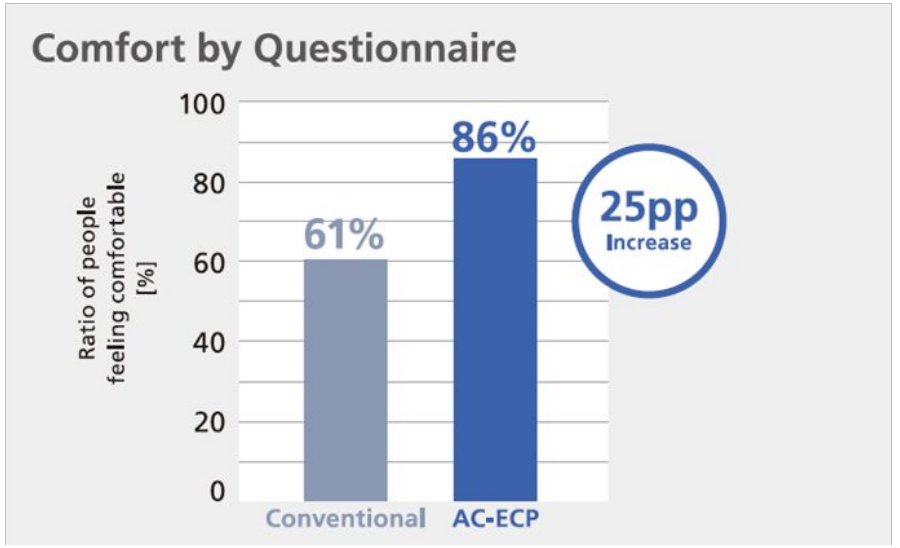


“AC-ECP” (Air Conditioning system with Excessive Cooling Prevention)

Approximately 40% energy reduction was demonstrated in Thailand



Demonstration site in Thailand



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DAIKIN

Thank you!

Daikin at COP30

https://www.daikin.com/corporate/overview/cop30

#BuildingsCoolingPavilion #BuildForClimate #ActOnCooling

Buildings and Cooling Pavilion

Presentation

Patrick Blake
United for Efficiency,
UNEP

Click here for the recording video

#BuildingsCoolingPavilion #BuildForClimate #ActOnCooling

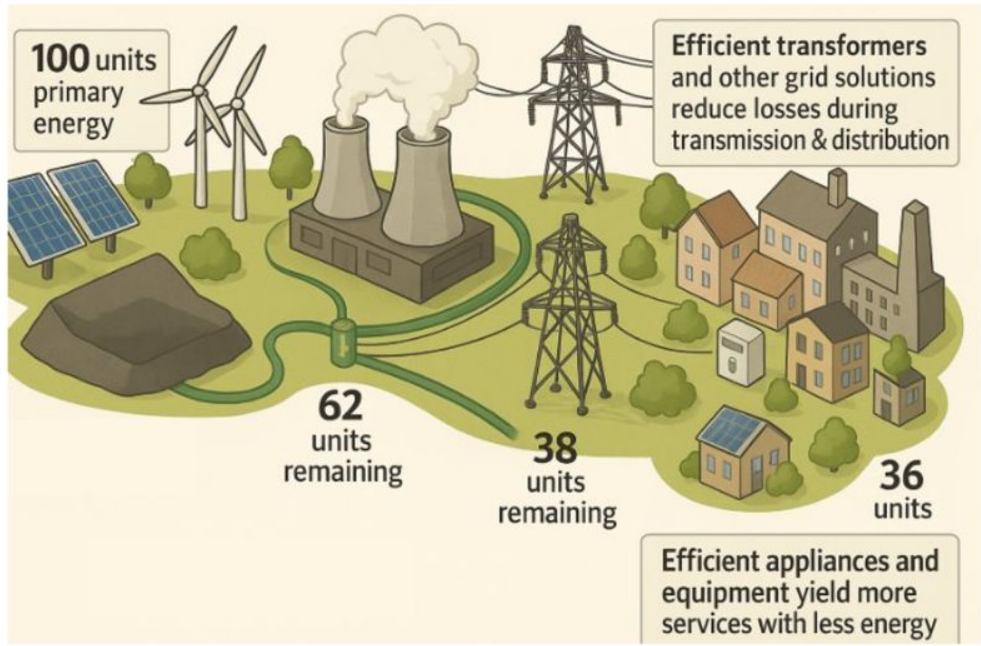
DRIVING WIDESPREAD POLICY ADOPTION AND IMPLEMENTATION: EXAMPLES FROM U4E

19 November 2025

Patrick Blake, Programme Manager

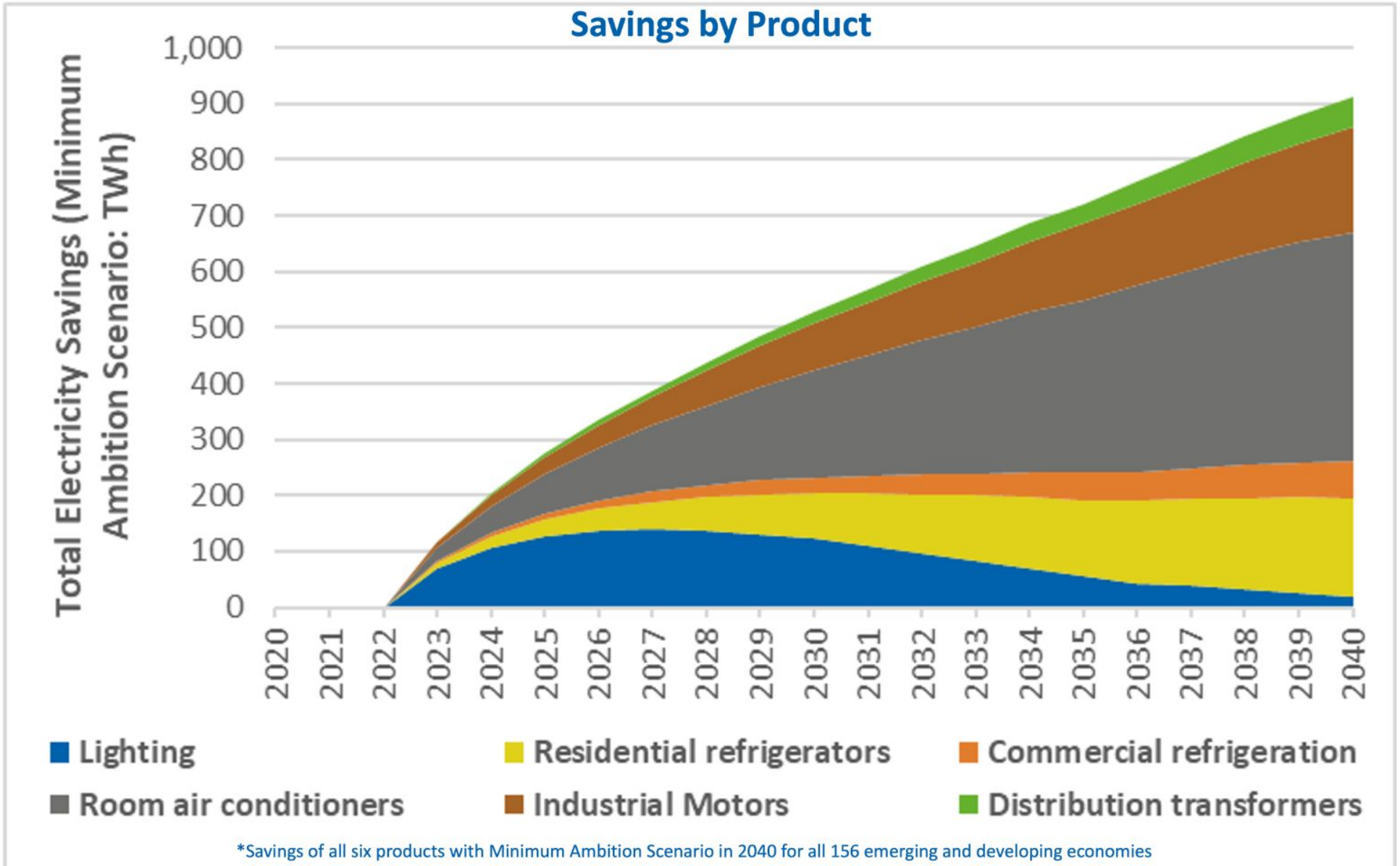
United for Efficiency (U4E) overview

- **Role:** Deliver energy system efficiency solutions in developing and emerging markets for GHG savings, healthy people and strong economies
- **History**: Launched in 2009, experience with 50 national market transformation projects and 6 regional harmonizations and growing
- **Scale:** Global awareness, tools, training. Regional policy harmonization commitments. National implementation of market transformation solutions.
- **Focus:** Applied technical assistance to countries over 3-5 years for deep and sustained market transformation
- **Integrated Approach:** Regulate new and used products + financing and incentives + monitor, verify, enforce + build awareness and capacity + address equipment at the end of life
- **Technical Expertise**: Appliances, equipment, whole building systems, data centers, off-grid and weak-grid solutions, integrated networks and logistics



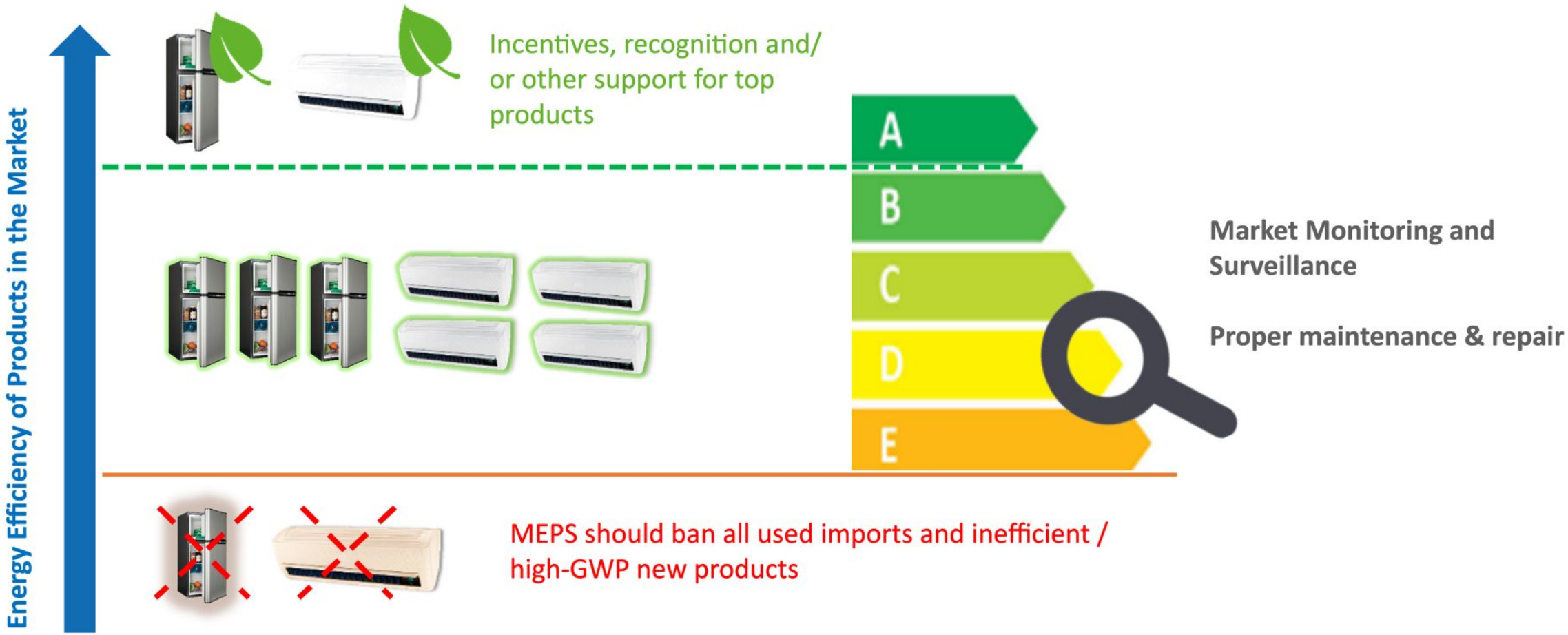
U4E Solutions Help Make the Most of the Electricity Supply

Saving Opportunities Globally from Energy-Efficient Lighting, Appliances and Equipment



*Savings of all six products with Minimum Ambition Scenario in 2040 for all 156 emerging and developing economies

Role of MEPS & High-Performance Product Labels



U4E Model Regulation Guidelines

Simplify **adoption and implementation** of a robust regulation

Includes **minimum efficiency** floor and **higher tiers** consistent with technology and market opportunities

For cooling products-robust **refrigerant GWP ceiling** for viable, faster action on Kigali Amendment

Encourage higher performing products through **labelling**

Vary requirements to capture **climatic differences**

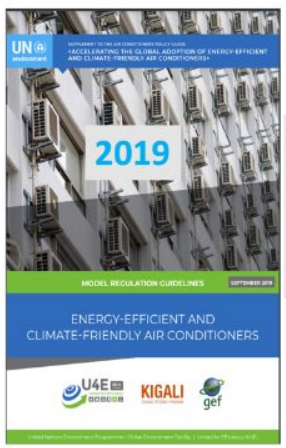
Over **60+ global technical experts** contributed and referenced global technology and policy trends

Implemented by WorldBank, CLASP, LBNL, IIEC, BASE, NRDC, UNIDO, and beyond

Supporting documents available, which debrief on the scope, product categories, market, policy, technological trends in energy-efficiency

Available for

- Lighting: GSL and Linear
- Room Air Conditioners
- Residential Refrigerators
- Commercial Refrigeration
- Off-grid Refrigeration
- Ceiling Fans
- Industrial Motors
- Distribution Transformers



Upcoming revision by Q4 2025

Translations: English (all), Arabic, Spanish, Chinese, French, Portuguese
https://united4efficiency.org/resources/model-regulation-guidelines/

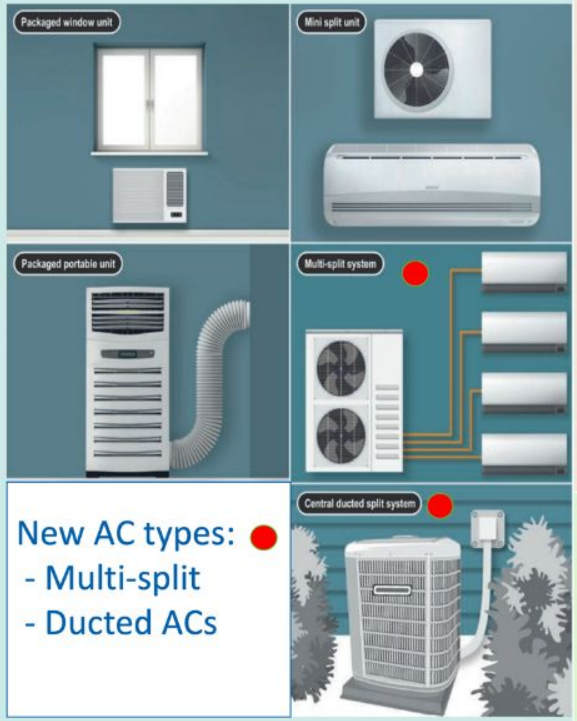
Upcoming Guidelines and Revisions

Expected for Q1 2026

New SPG for space heating and hot water systems using HPs and updated Model Regulations Guidelines (MRG) and Sustainable Procurement Guides (SPG) for air-to-air ACs & HPs

Main Model Regulation Updates - Air-to-Air ACs & HPs

- Expanded Scope
  - ✓ Multi-split (including VRF)
  - ✓ Ducted-split
- Higher Capacity
  - ✓ Up to 70 kW (currently 16 kW)
  - ✓ New efficiency ranges: < 6 kW ; 6 to 14 kW ; 14 to 70 kw
- Add HSPF Heating Metric
  - ✓ Currently only APF
- New Performance Evaluation for Dehumidification (optional)
  - ✓ To identify super-efficient ACs
  - ✓ Will be used for higher efficiency tiers (sustainable procurement and endorsement labels, not for MEPS)



New Procurement Guide - Space & Water Heating using HPs

- Will cover water-based HPs (air; water; ground source; or waste heat)
- Includes:
  - ✓ HP requirements (efficiency, refrigerant, safety, warranty, etc.)
  - ✓ System components and conditions: emitters, buffer tank, controls, working temperatures, Life Cycle Cost, etc.

Procurement Guide Updates - Air-to-Air ACs & HPs

- Aligning with MRG revisions
  - ✓ Update efficiency levels
  - ✓ Add HSPF metric
  - ✓ Include Super-efficient AC criteria

East and Southern African Regions

Key achievements:

- Harmonized MEPS for Refrigerators and room ir conditioners now available for all 21 countries of the EAC and SADC regions

- MEPS implementation achieved for many countries at national level and still ongoing for further countries.

EAC: Burundi, Dem. Rep of the Congo, Kenya, Rwanda, Somalia, South Sudan, Tanzania, Uganda,

SADC: Angola, Botswana, Comoros, Dem. Rep of the Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Tanzania, Zambia, Zimbabwe

Donors:

Department for Environment Food & Rural Affairs

gef

Clean Cooling COLLABORATIVE

Project Partners:

EACREEE Building a Sustainable Energy Future

SACREEE SADC CENTRE FOR RENEWABLE ENERGY & ENERGY EFFICIENCY

With technical support of:

BERKELEY LAB

ENERGY EFFICIENT LIGHTING AND APPLIANCES in East and Southern Africa

ASEAN Cool Initiative: Malaysia

Completed

Market assessment report

IIEC

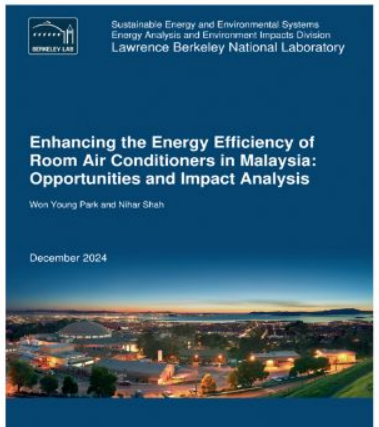
Retailer Surveys
Manufacturer Surveys
Household Surveys
Completed in August 2024

Completed

Techno-Economic Assessment Report

BERKELEY LAB

Cost-Benefit Analysis
Completed in October 2024



Completed

Technical Consultation

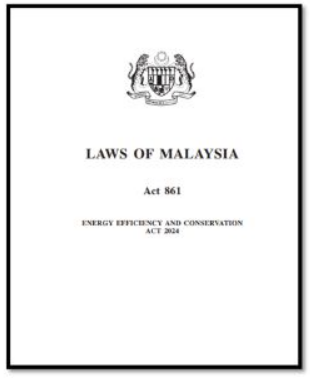
Suruhanjaya Tenaga
Energy Commission

Proposal on RAC's **MEPS tier revision** through **stakeholder consultation session** with industry players
Several stakeholder consultation session with ACs manufacturers & importers (13 brands) together with EC & ASHRAE Malaysia Chapter

Gazetted

EECA 2024

In force on 1 Jan 2025
MEPS revision for RACs
CSPF 4.1 in 2026
CSPF 6.09 by 2030


LAWS OF MALAYSIA
Act 861
ENERGY EFFICIENCY AND CONSERVATION ACT 2024

Awareness Raising Activities

On-Going

Collaboration with local NGO & EC to promote benefits of energy-efficient RACs and increase public awareness on the MEPS implementation on 1 January 2026

U4E United for Efficiency

ASEAN Cool Initiative: Malaysia

➢ Updated MEPS for RACs

Energy Efficiency and Conservation Act 2024 (EECA)

- Gazetted on 26 November 2024 and in force on 1 January 2025
- EECA introduced updated MEPS for RACs including CSPF at 4.1 in January 2026 and set to increase to 6.09 by 2030
- Aligned with ASEAN Regional Policy Roadmap for RACs Target Phase II and U4E Model Regulation Guidelines

	Effective from 1.1.2025 – 31.12.2025	Effective from 1.1.2026 - 31.12.2029	Effective from 1.1.2030
Star Rating	Tested CSPF (Wh/Wh)	Tested CSPF (Wh/Wh)	Tested CSPF (Wh/Wh)
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
1	< 3.10	< 4.10	< 6.09

	Effective from 1.1.2025 – 31.12.2025	Effective from 1.1.2026 - 31.12.2029	Effective from 1.1.2030
Star Rating	Tested CSPF (Wh/Wh)	Tested CSPF (Wh/Wh)	Tested CSPF (Wh/Wh)
5	≥ 5.10	≥ 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
1	<2.90	<4.00	<5.60

➢ Next Steps

Awareness Raising Activities (On-going)

- Collaboration with EC, NGOs and MACRA to promote the adoption of energy-efficient RACs while advocating to the public on the revised MEPS

Learn More about U4E

Check our Website

Find out tools, policy guides and policy briefs, webinars, model regulations, country assessments and news releases on our official website.

https://united4efficiency.org/

U4E Website

Subscribe to our Newsletter

Join your energy efficiency peers in receiving quarterly emails providing you with the latest project and industry news from U4E.

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U4E Newsletter

THANK YOU

Contact: patrick.blake@un.org

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GOVERNO FEDERAL BRASIL UNIÃO E RECONSTRUÇÃO

Efficient Cooling and Ventilation for Comfort and Decarbonization

[Click here for the recording video]

19/11/2025, 09:30 – 10:30 Belém local time

Supported by: TRANE TECHNOLOGIES

DAIKIN ARUP AUTODESK DELTA 台達 Delta Electronics Foundation GBPN Sidara AIA SAINT-GOBAIN

Buildings and Cooling Pavilion

Global Alliance for Buildings and Construction | Cool Coalition

SEAD SUPER-EFFICIENT EQUIPMENT & APPLIANCE DEPLOYMENT

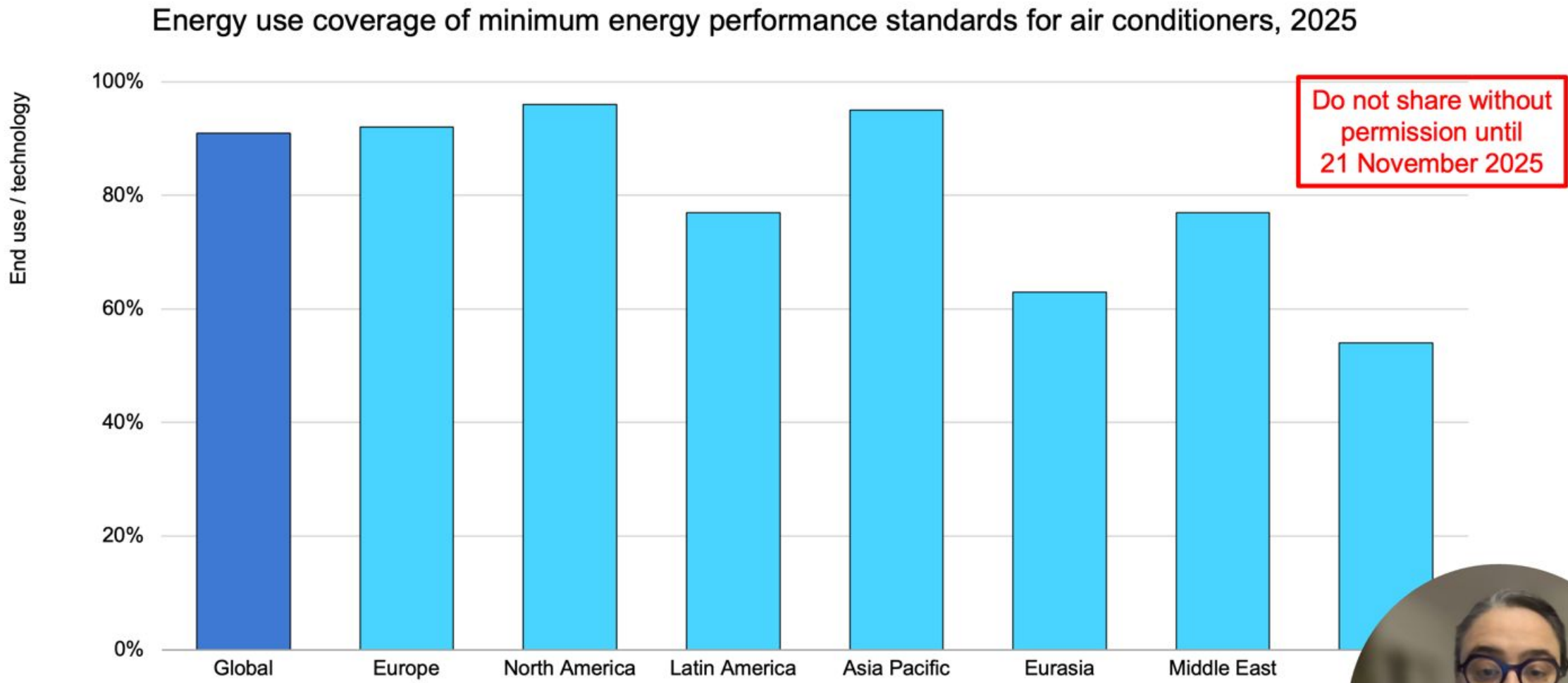
iea

Tracking Progress and Scaling Impact: IEA Analysis on Cooling Policy Adoption Worldwide

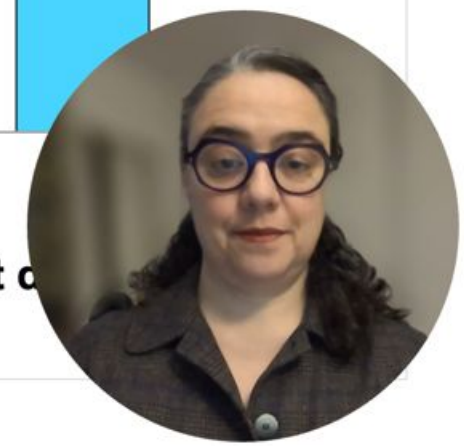
Sophie Attali
Policy Analyst
International Energy Agency
Energy Efficiency and Inclusive Transi

#BuildingsCoolingPavilion #BuildForClimate #ActOnCooling

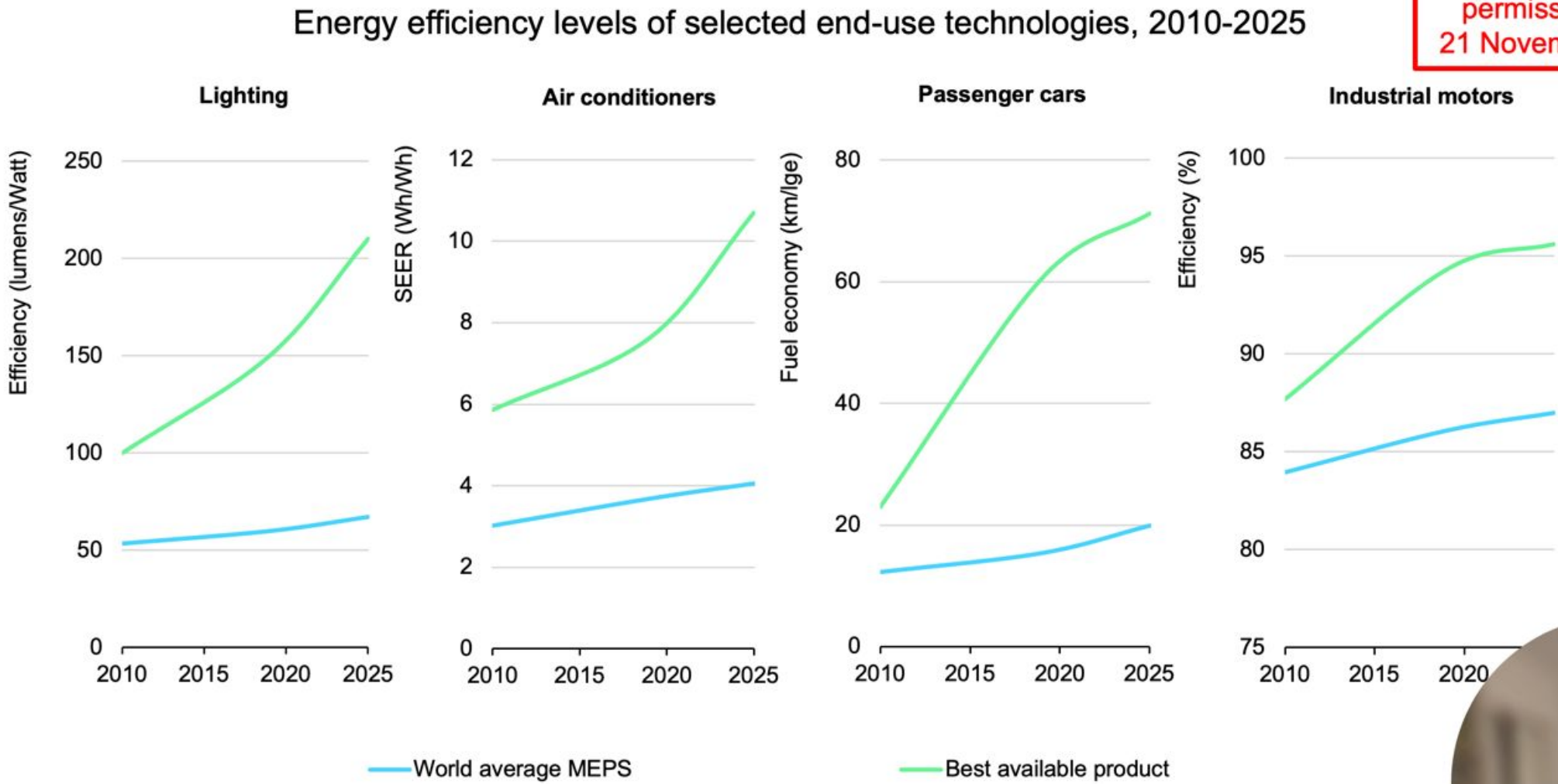
Policy coverage: important policy gaps to be filled



90% of energy used by air conditioners and refrigerators is regulated in 2025, with important g between regions



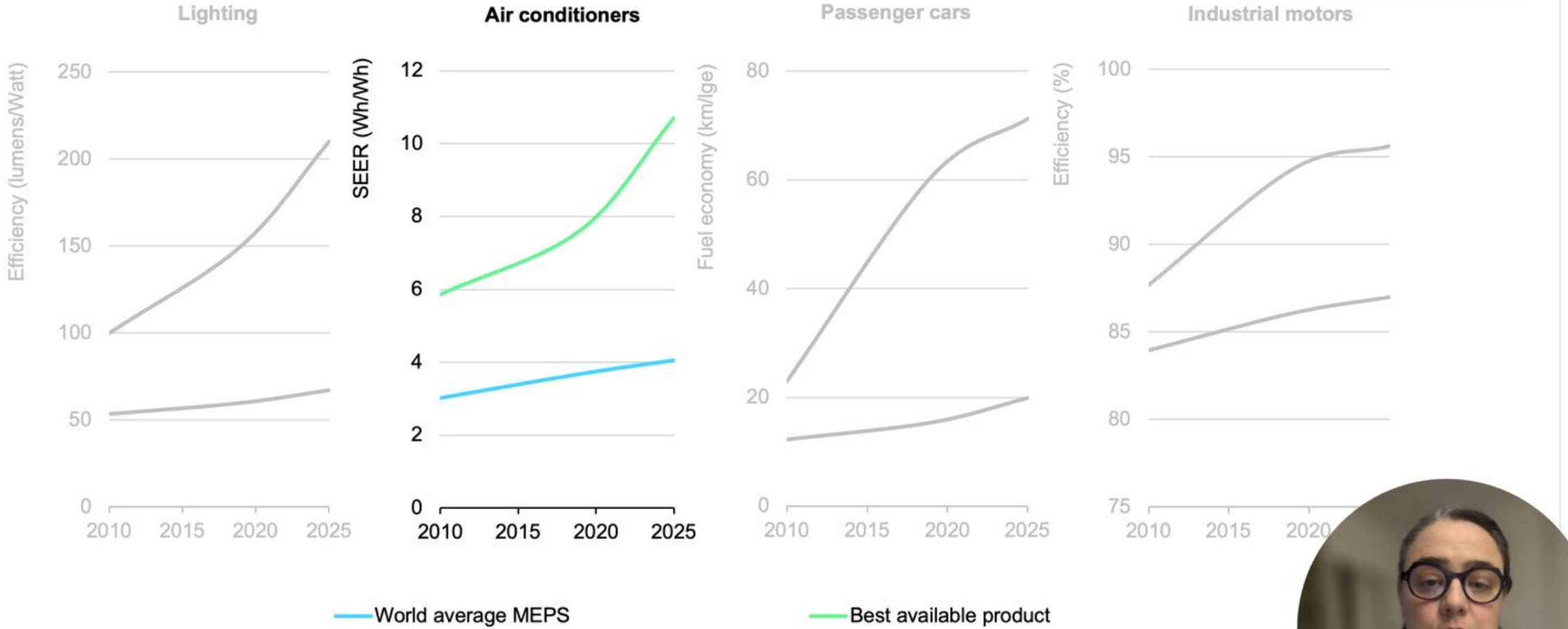
Policies have lagged behind technology progress



Today, appliances are often only half as efficient as the best models, showing policy has fallen beh

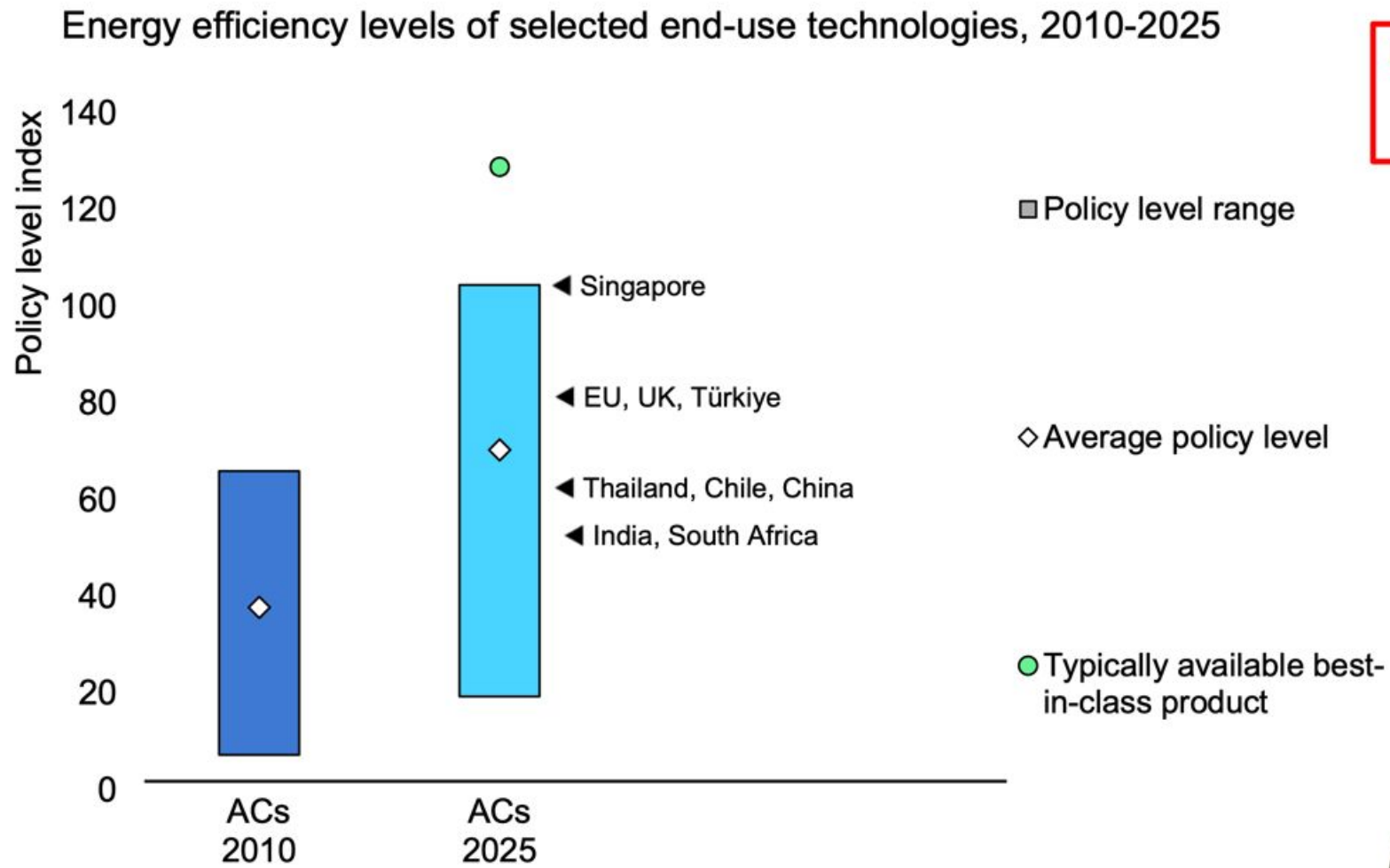
Policies have lagged behind technology progress

Energy efficiency levels of selected end-use technologies, 2010-2025



Today, appliances are often only half as efficient as the best models, showing policy has fallen beh

Policy stringency: Governments can raise policy ambition



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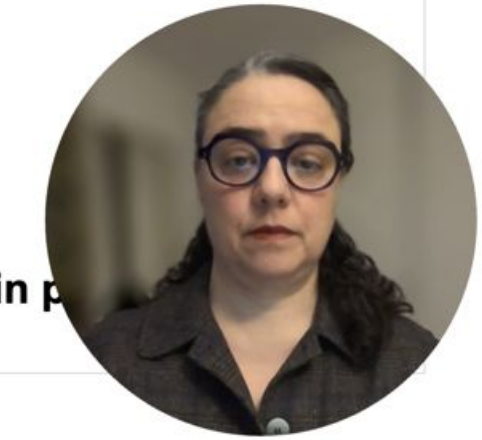
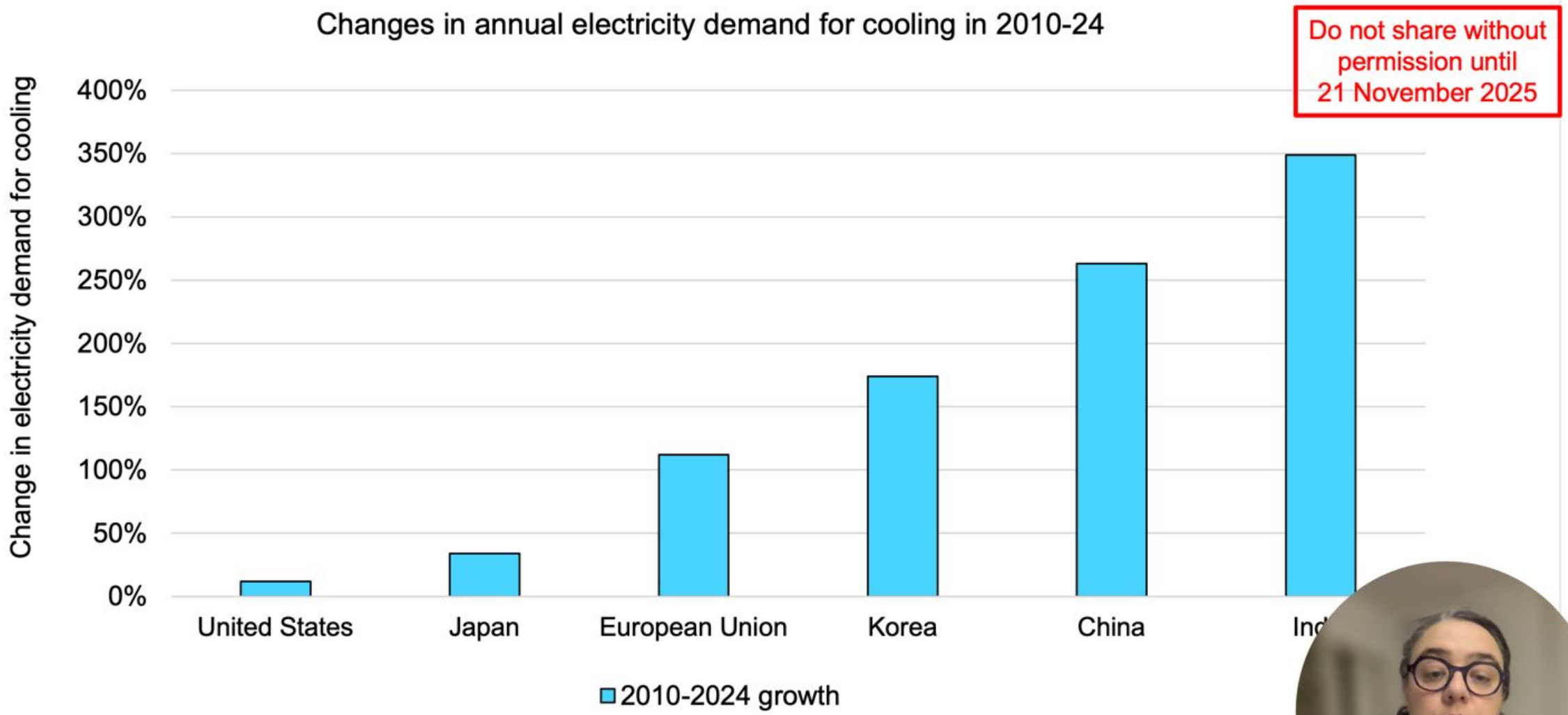
There is a wide range between the global average MEPS level and the most ambitious ones in p

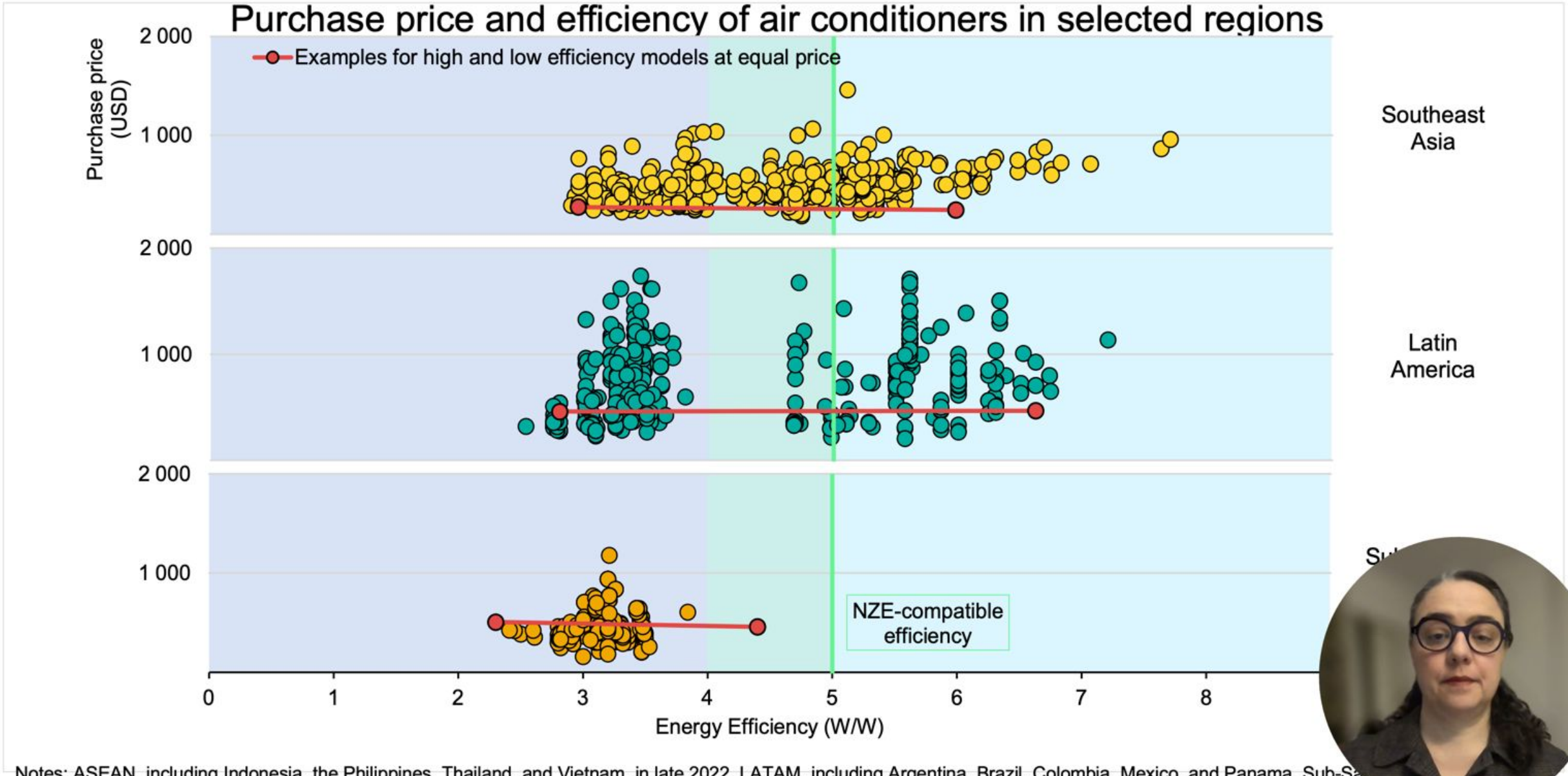


Increased access to ACs has pushed up cooling demand



Energy to keep people cool has seen the fastest growth of any end-use technology in buildings

More efficient devices are not necessarily more expensive



Notes: ASEAN, including Indonesia, the Philippines, Thailand, and Vietnam, in late 2022. LATAM, including Argentina, Brazil, Colombia, Mexico, and Panama. Sub-Sa… Ghana, Kenya, and South Africa. Purchase prices are normalised to 12 000 BTU/hour cooling capacity. Low efficiency = below 4 W/W; Medium efficiency = 4-5 W/W; High… …ove 5 W/W. BAT = best available technology

More efficient AC use does not compromise thermal comfort

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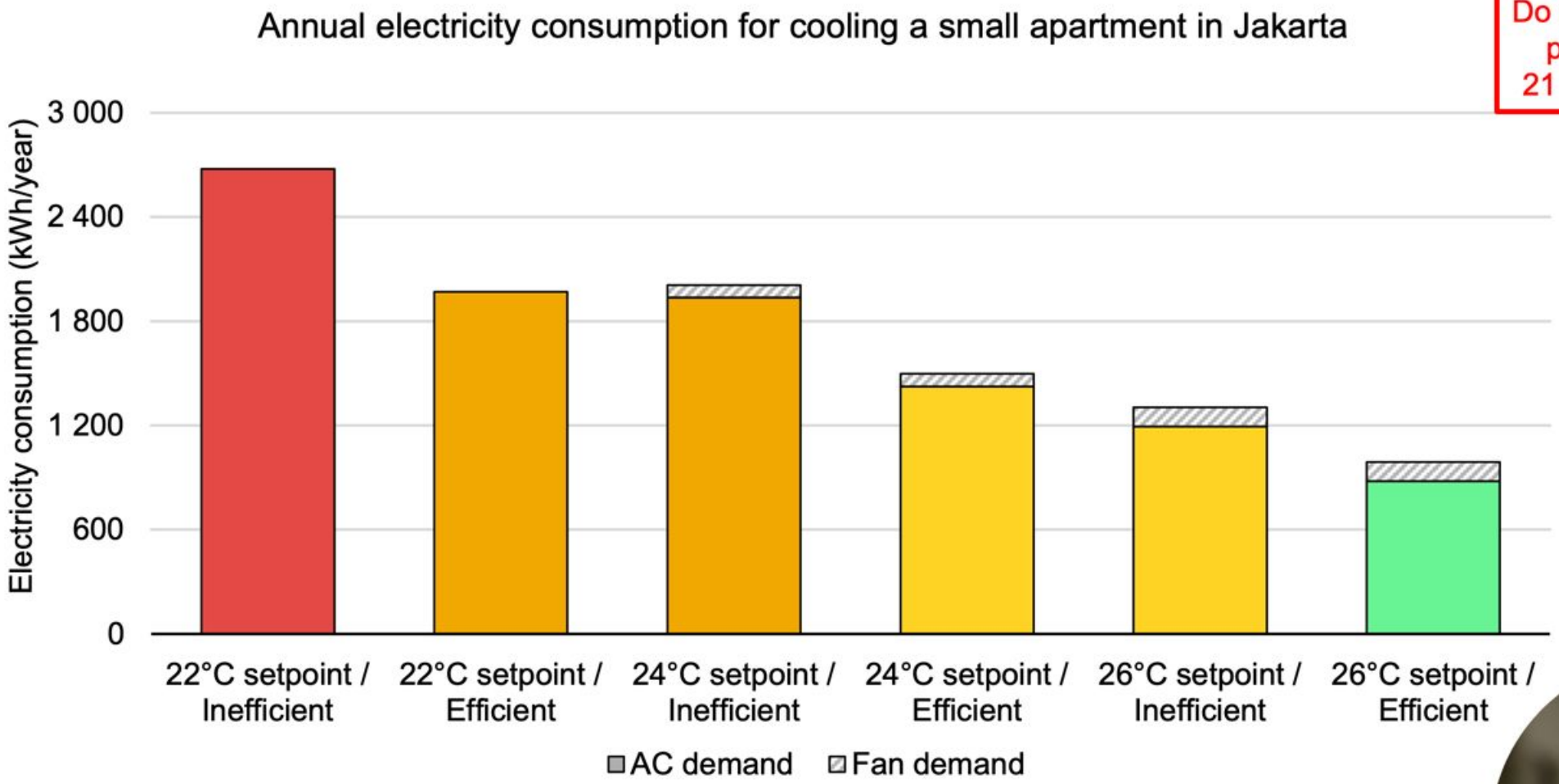
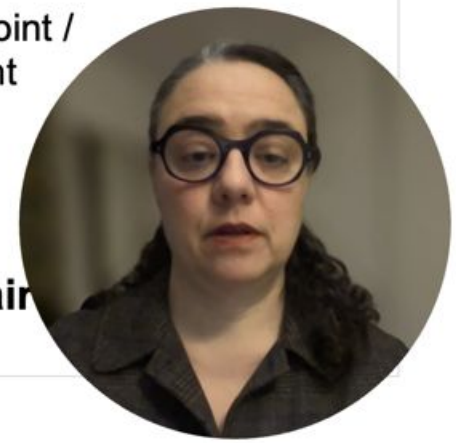


Combining technical efficiency with higher cooling set-points can shrink electricity demand of air



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Closing Remarks

Miki Yamanaka
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