



International Trends for Air Conditioning and Refrigeration

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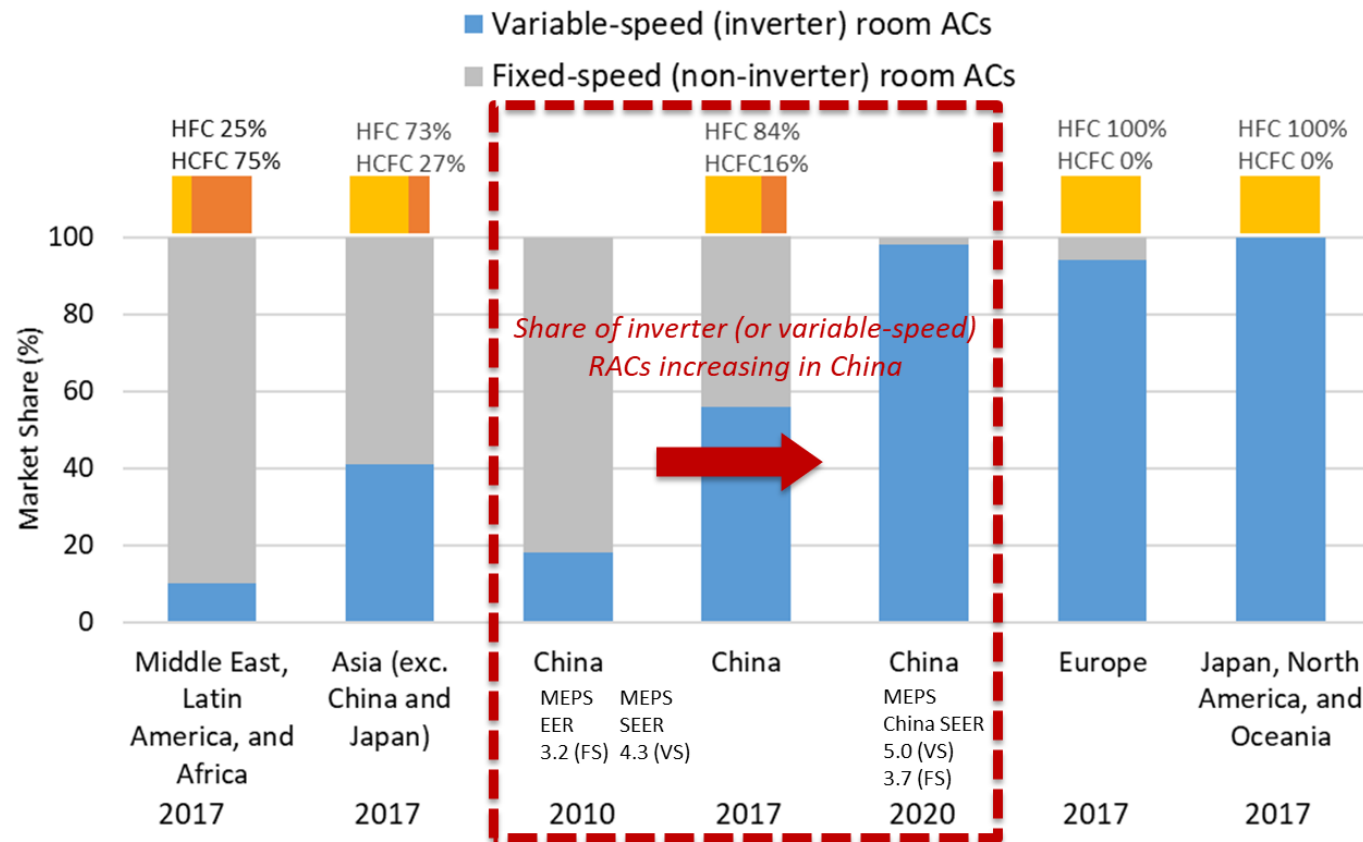
National Capacity Building Workshop

Global Air conditioner Trends: Overview



Global AC Market

The global RAC market and policies are amid transition toward energy-efficient and sustainable solutions.



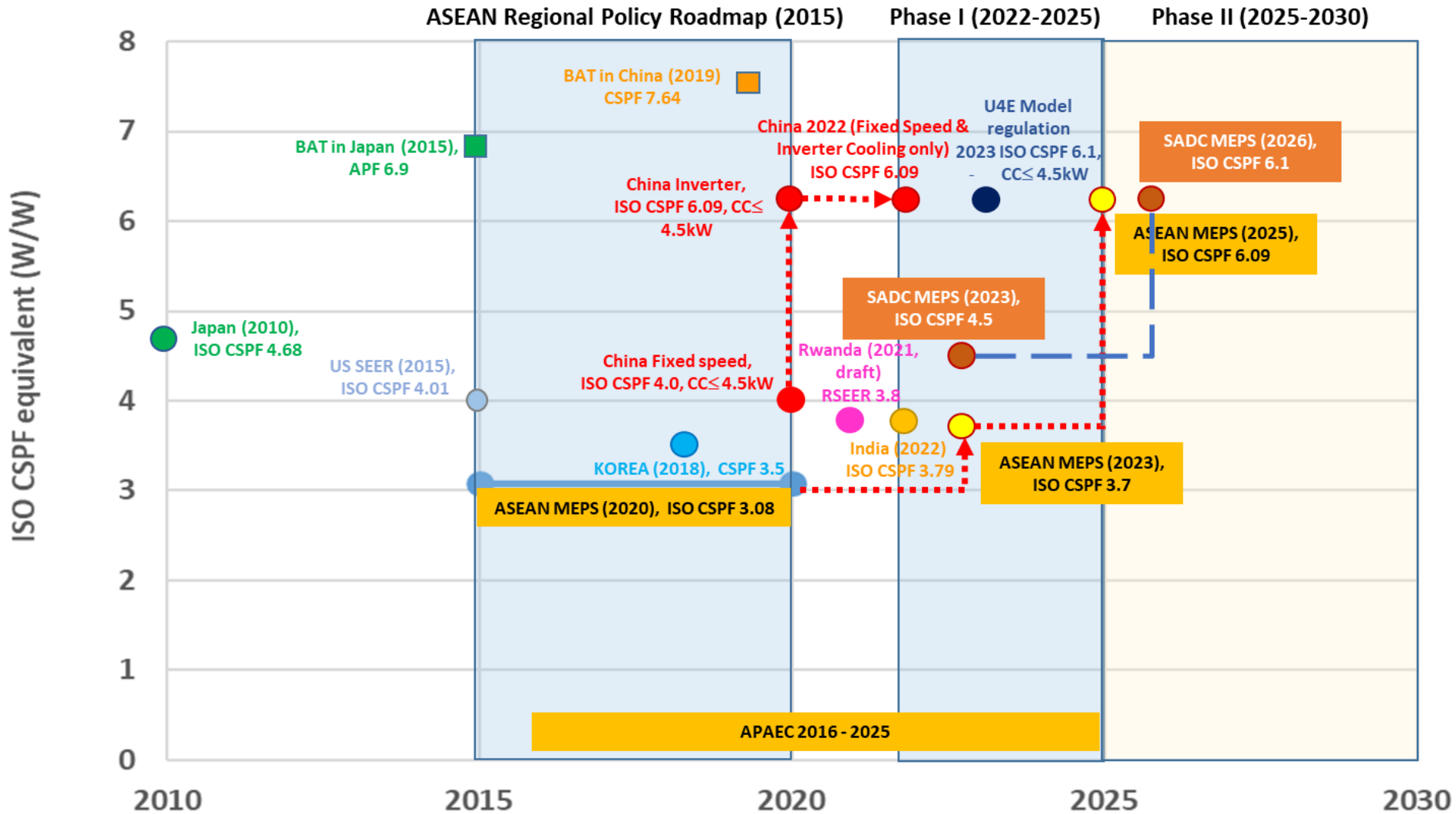
•Source: Updated from Park et al. (2021) Harmonizing Energy-Efficiency Standards for Room Air Conditioners in Southeast Asia, and JRAIA (2018) World AC Demand



Global Air conditioner MEPS trends: Overview

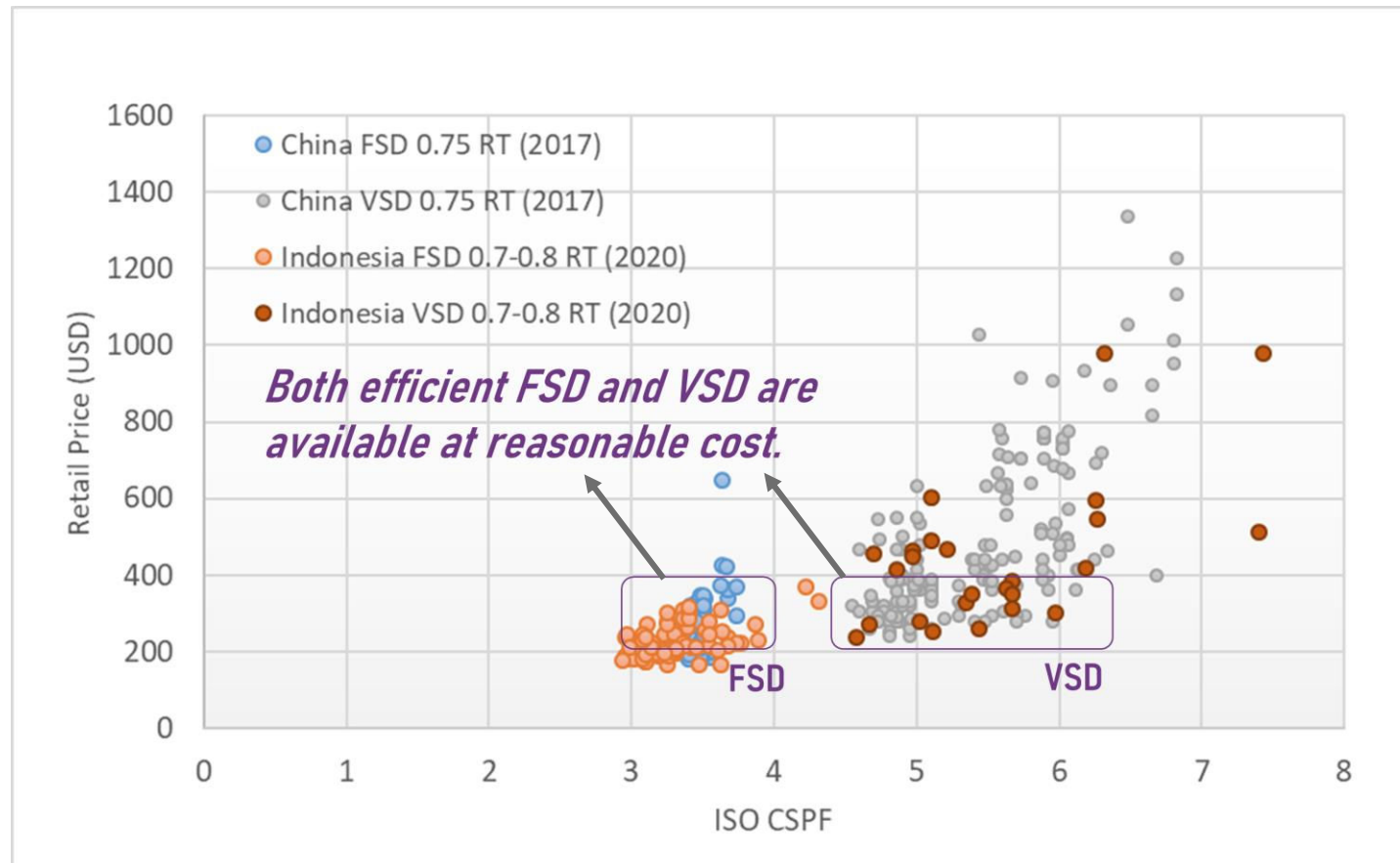


Global AC Market



Global Air conditioner: Price vs Performance

Market prices appear to reflect the bundling of AC features other than efficiency, because prices at the same efficiency level vary by over 200%.

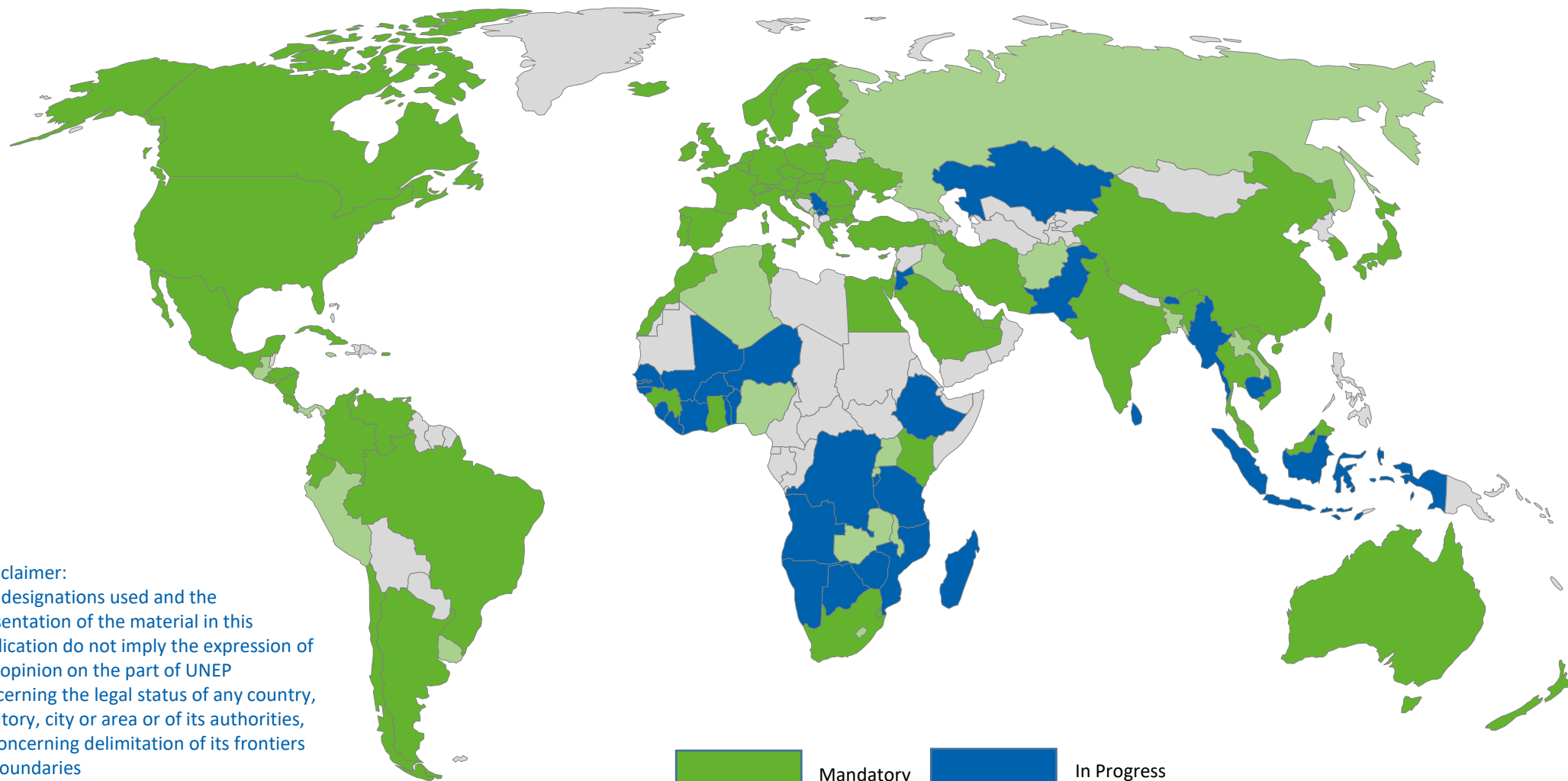


Global Air conditioner: Cooling technologies are still evolving

- Increasing **shift towards Inverter technologies** from fixed speed air conditioners
- High-efficiency room AC models available in many economies use
 - **advanced compressor** technologies optimized at a low frequency,
 - **large HX** with thermodynamically effective materials and designs,
 - highly efficient **direct current fan motors**,
 - advanced metering devices, **smart sensors** for temperature and humidity AC manufacturers have been improving seasonal efficiency—better reflecting part-load operation—especially via variable-speed (inverter) drives for compressor motors.
- Recent highest-efficiency room AC models **use low global warming potential (GWP)** refrigerants, having transitioned from conventional high-GWPs.

Component	Cost %
Valves	2 to 3
Fan motor	8 to 10
Compressor	30
Sheet metal	5
Fan blade	2 to 3
Blower	2 to 3
Aluminium +Copper tubes	20
Printed Circuit board/Controllers	20
Others	5 to 8
	100

Global Status of Refrigerator MEPS Implementation



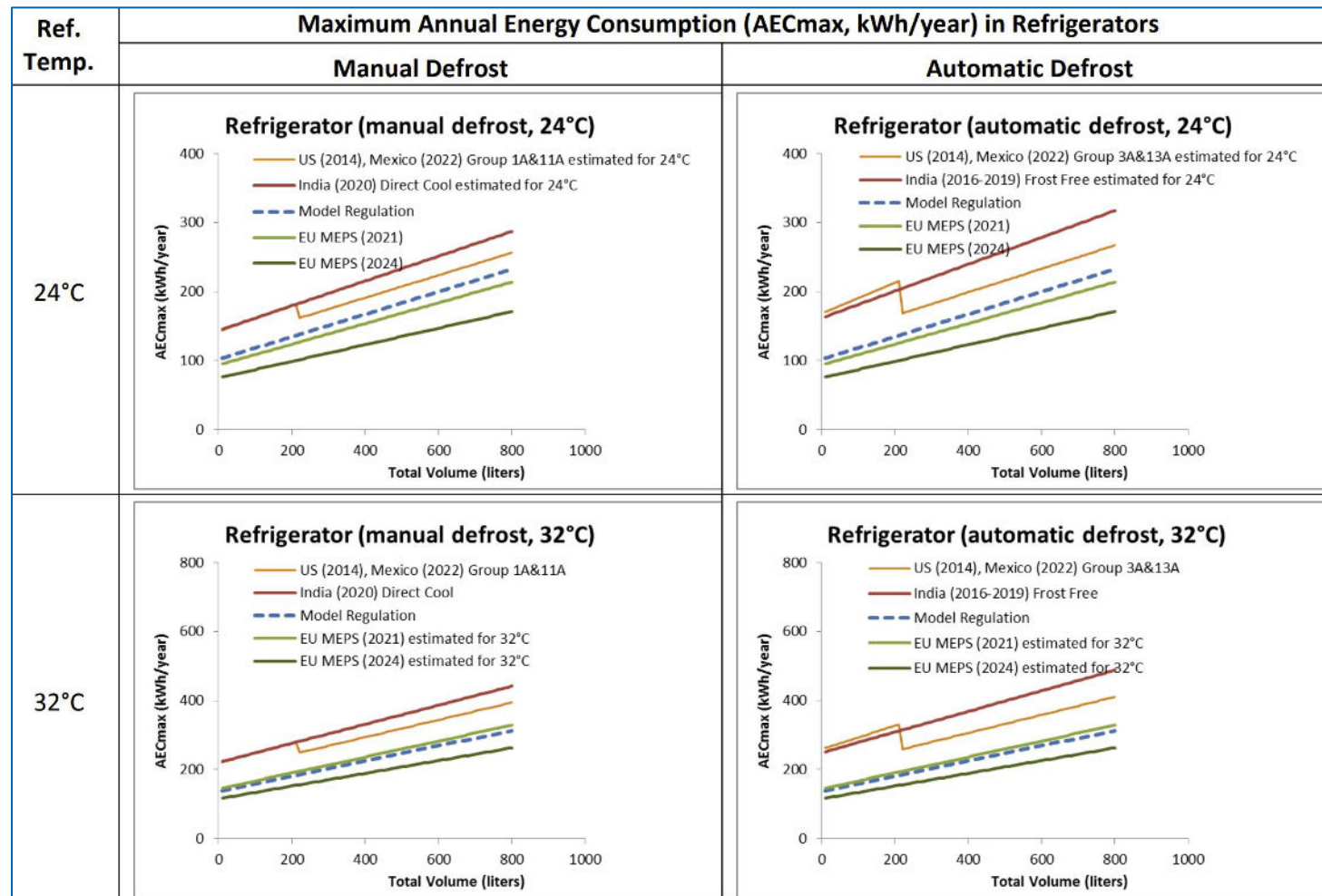
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Global Refrigerators labelling types: Overview

Economy	Best Grade	Worst Grade
Australia/New Zealand	10	1
Chile	A	G
PRC	1	5
Hong Kong, China	1	5
Chinese Taipei	1	5
Malaysia	5	1
Philippines	1	5
Russia	A	G
Singapore	4	1
Thailand	5	1
Viet Nam	5	1

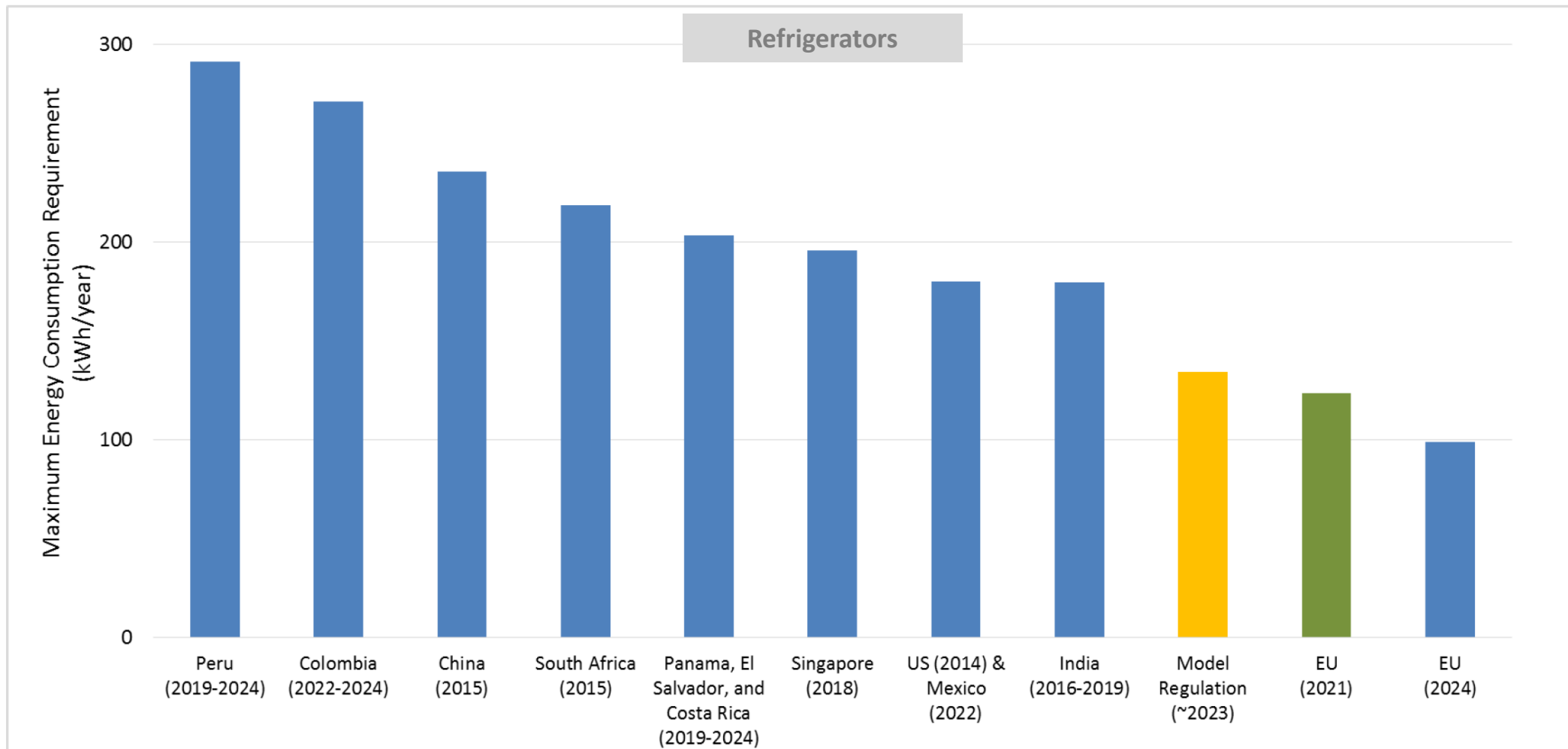
Global Refrigerators MEPS: Overview



Global Maximum energy use for Residential Refrigeration



Global Market

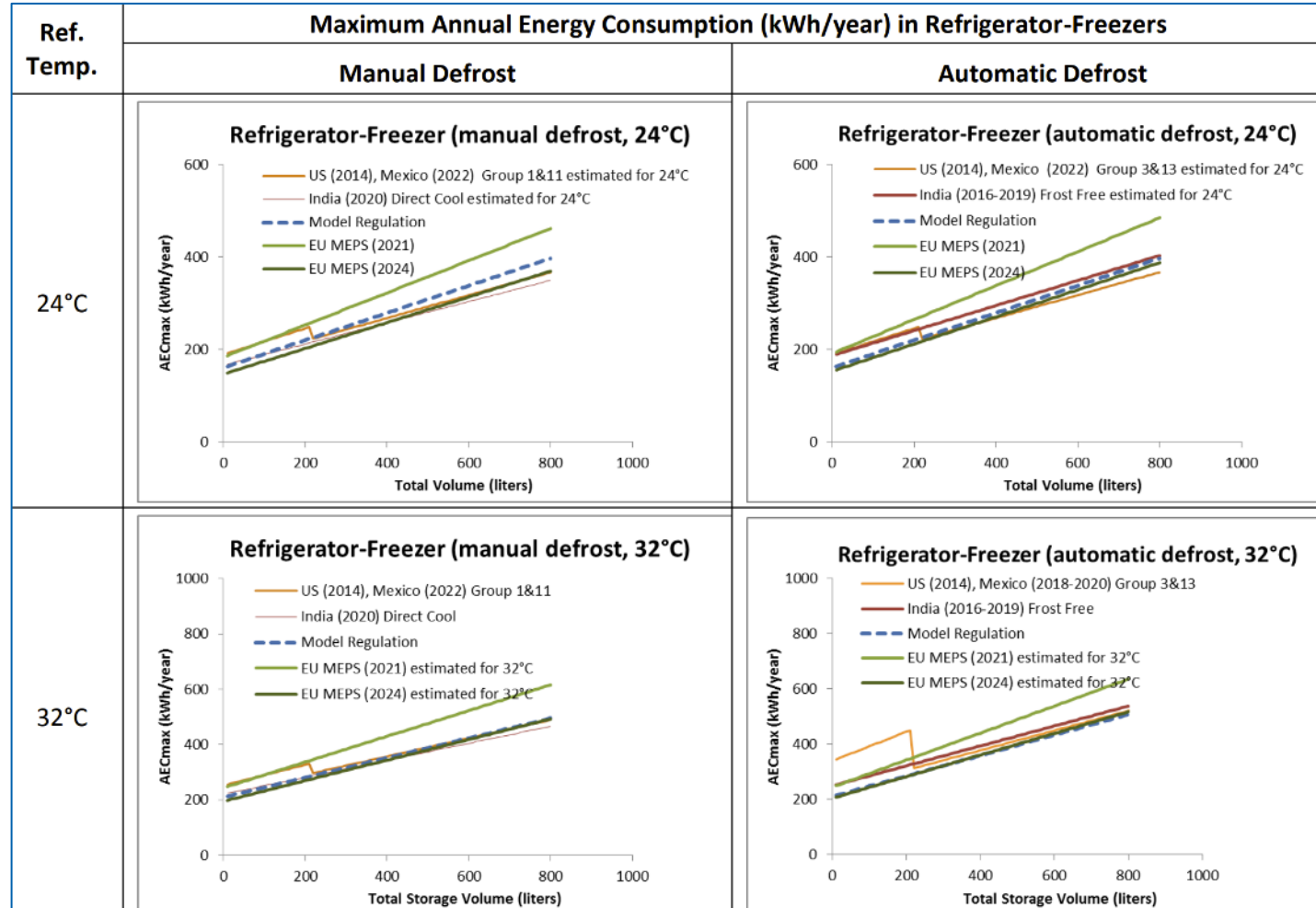


Source: https://united4efficiency.org/wp-content/uploads/2019/11/U4E_Refrigerators_Supporting-Info_20191029.pdf

Global Refrigerators-Freezers MEPS: Overview



Global Market

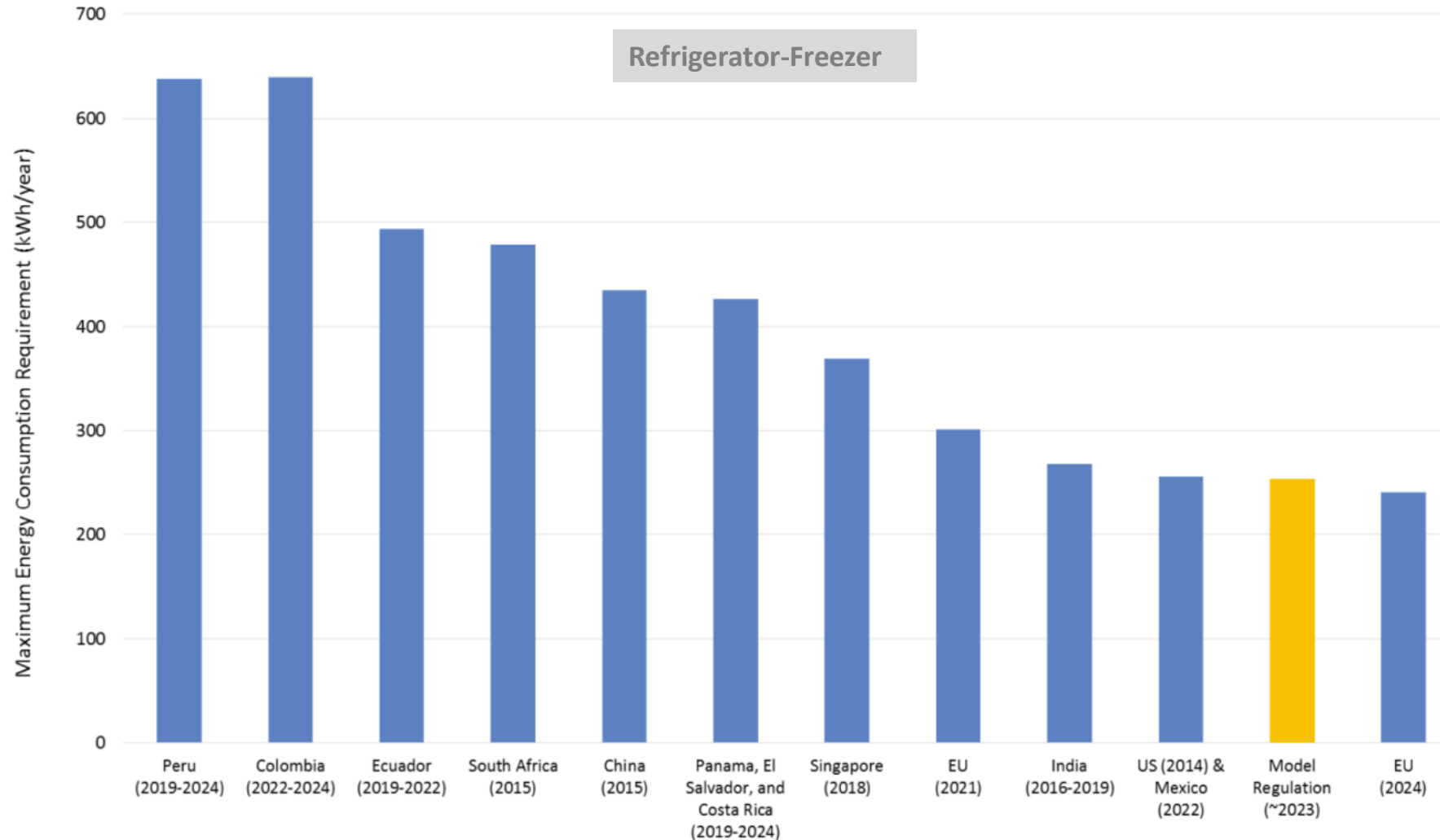


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Global Maximum energy use for Residential Refrigeration

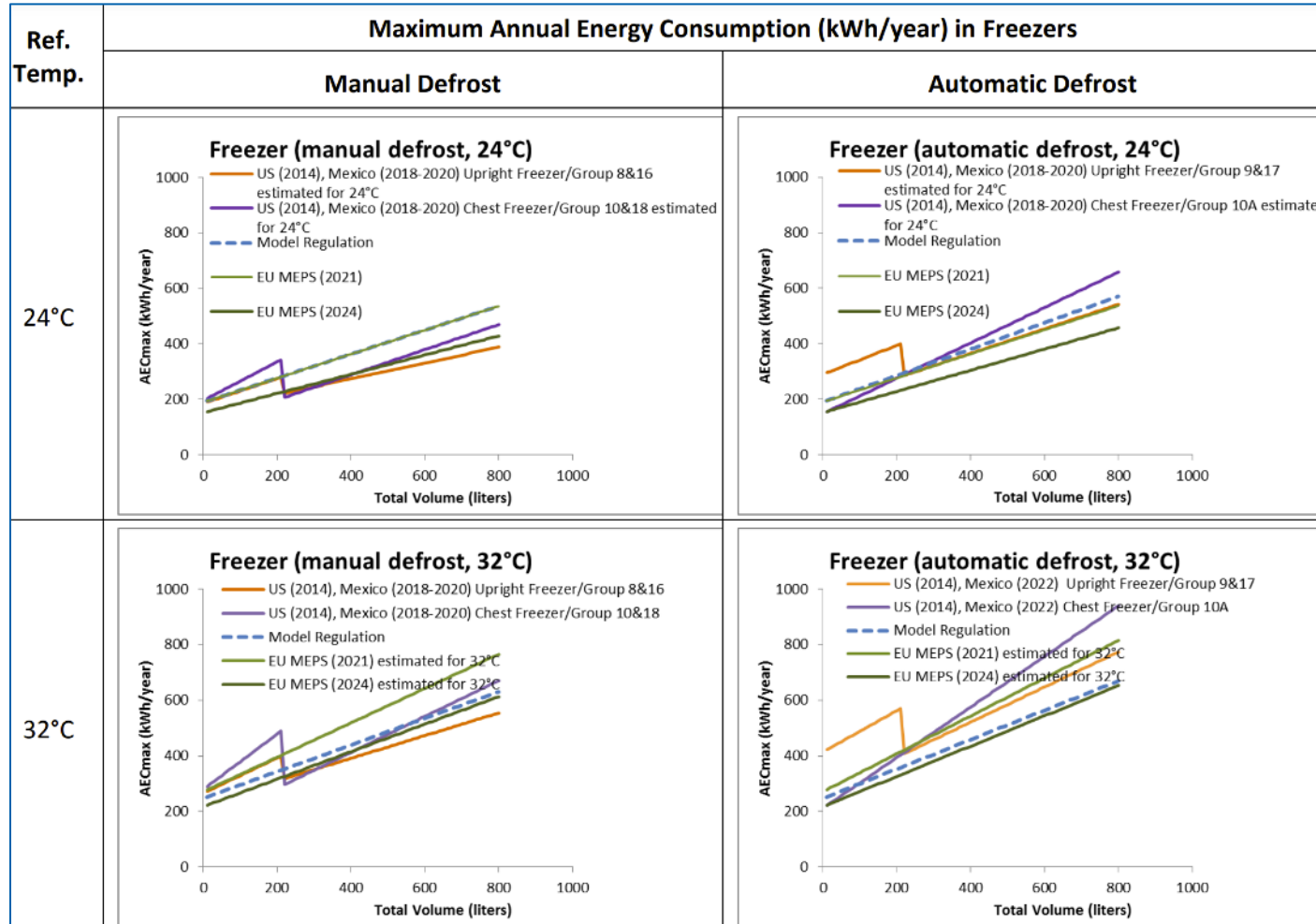


Global Market



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Global Freezers MEPS: Overview





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