Overview of the HCFC Phase-out in the Refrigeration and Air-Conditioning Sector in the Asia Pacific

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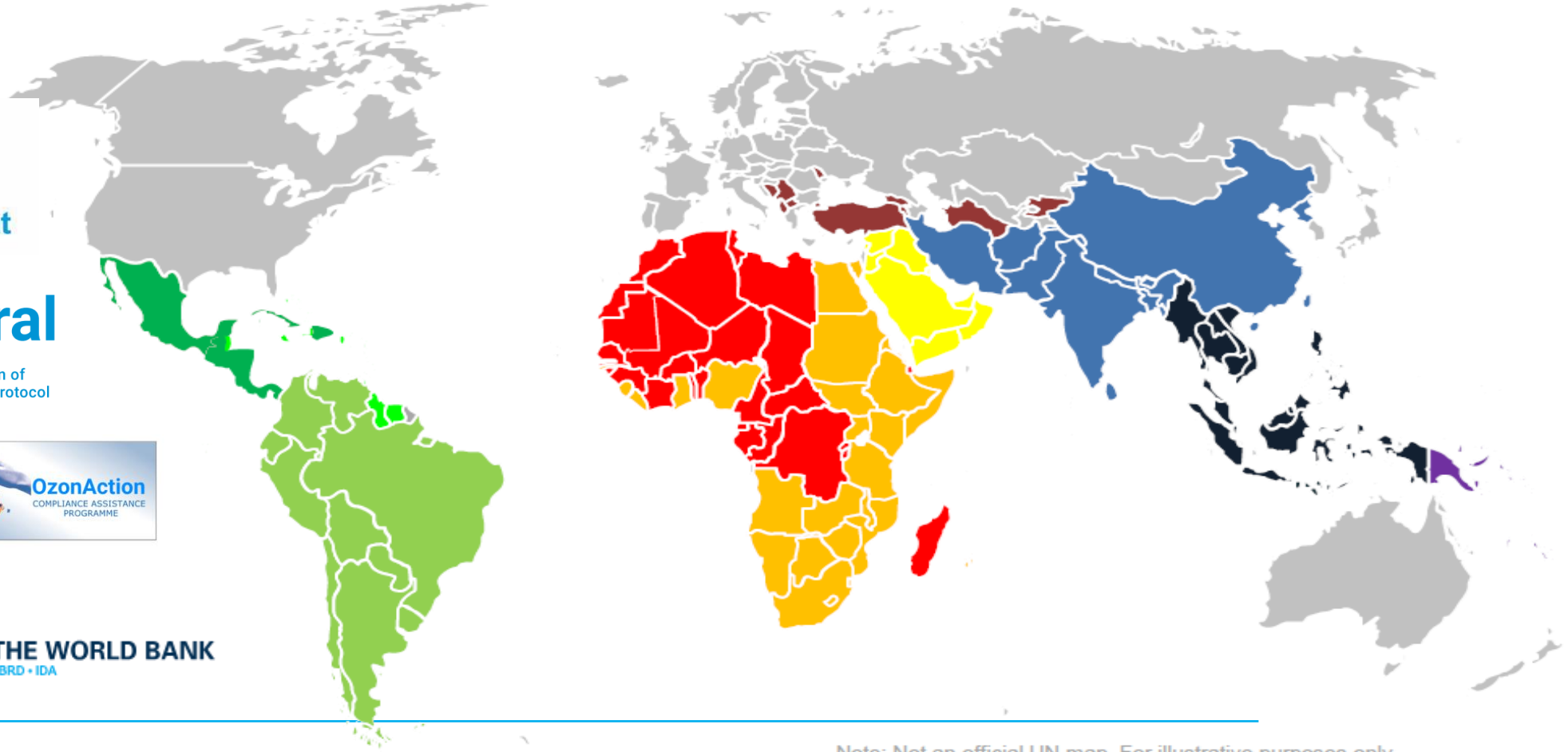
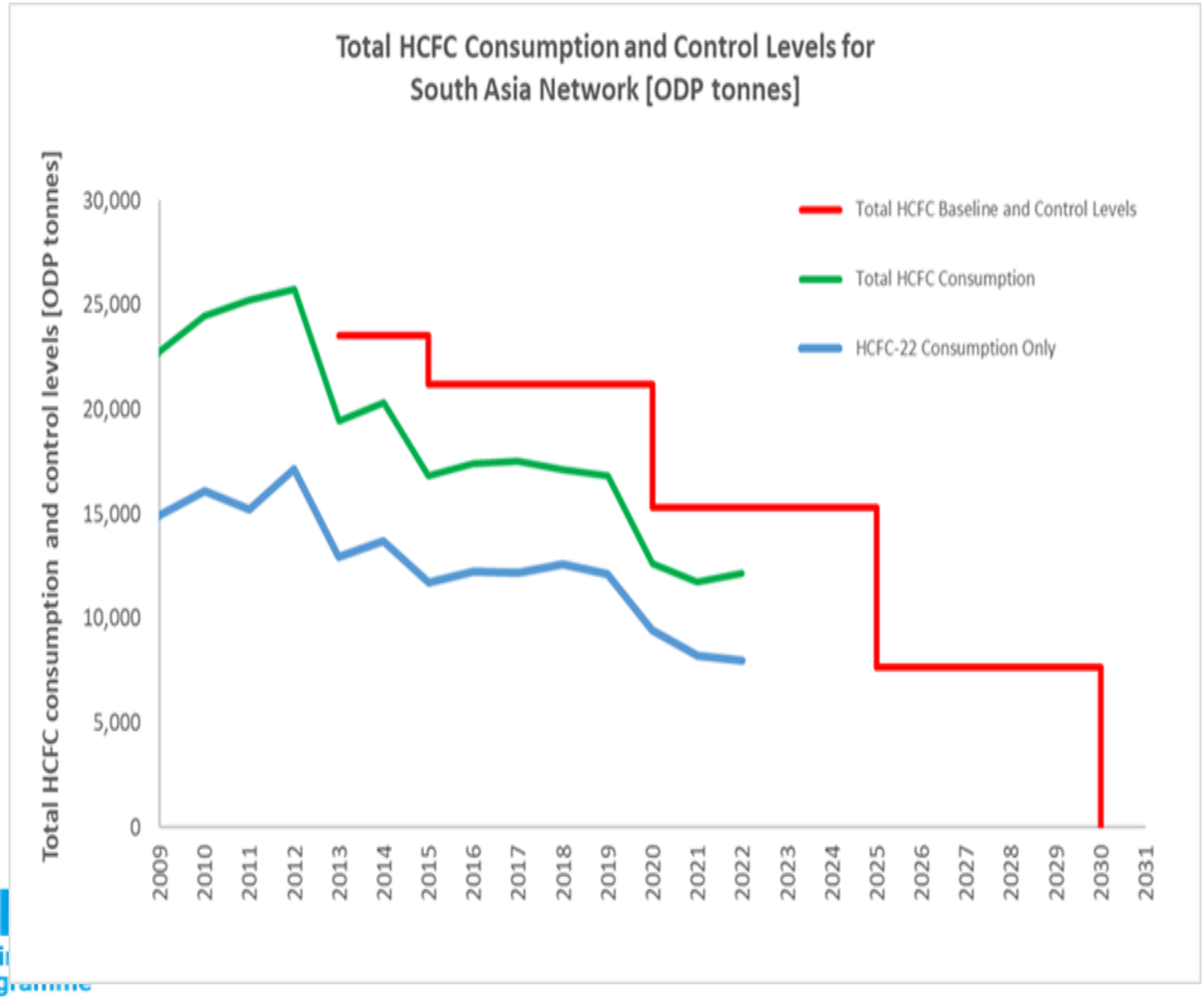


Note: Not an official UN map. For illustrative purposes only.

HCFC Consumption in the Asia/Pacific Region



HCFC phase-out schedule: Next milestone is 67.5% reduction by 2025

HCFC Consumption in R&AC Sector

- Manufacturing of HCFC refrigeration equipment is already banned in many countries
- Until 2030 HCFC consumption will be mainly in RAC servicing sector and between 2030-2040, small amount of HCFC will be allowed only for RAC servicing purposes (2.5% servicing tail)

Emerging Issues from HCFC Phaseout

- Kigali Amendment Context: HCFCs that need to be phased-out from current uses need to be replaced by alternative technologies - significant part of which still depend on HFCs
  - If growth in HFCs is uncontrolled, it will make it harder for countries to meet the HFC Phasedown obligations. Thus, some current HCFC applications need to directly adopt low GWP alternatives in order to curb the growth trajectory.
- Countries need to ban the import and use of HCFCs and HCFC-based equipment as soon as possible to comply with the full phase-out by 2030 (excluding the 2.5% servicing tail from 2030 through 2040).
- Environmental co-benefits of implementation:
  - Cumulative benefits of HCFC phaseout through 2030 is approximately 7.2 $GtCO_2eq$.
  - The decline in ODS emissions due to compliance with the Montreal Protocol avoids global warming of approximately 0.5–1 °C by mid-century compared to an extreme scenario with an uncontrolled increase in ODSs of 3–3.5% per year (Scientific Assessment of Ozone Depletion: 2022 Report)

Accessibility & Market Penetration of New Technologies

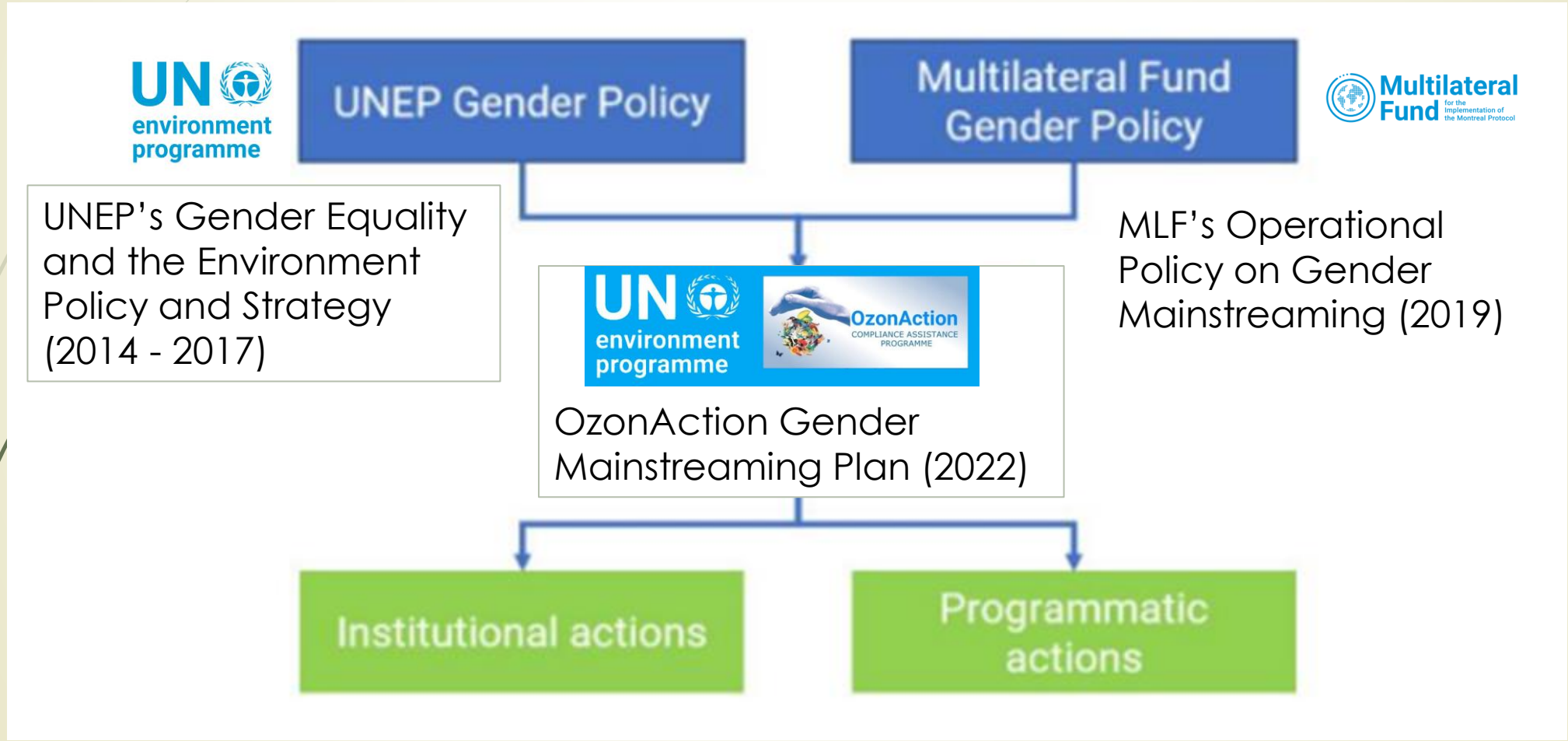
Low- and/or medium-GWP alternative refrigerants are available for all RACHP applications. However, their accessibility and market penetration vary greatly. Several factors affecting the low penetration rate include:

- Design challenges for component & system optimization compared to equipment based on conventional refrigerants
- High material costs of advanced/complicated systems
- High price of some low- and medium-GWP blend refrigerant alternatives (HFO blends)
- Availability and compatibility of system components
- Energy consumption rate of the equipment influences the choice that retailers make when selecting new equipment rather than refrigerant type
- The need for qualified human resources to maintain and service systems
- Flammability (A2, A2L, A3) and toxicity of some refrigerant blends and natural refrigerants – limiting the allowed charge size due to safety concerns

Cooling Development Challenges for the RAC Workforce

- Increased efforts to educate and train servicing technicians on the safe handling of alternatives is needed as the refrigeration and AC market grows towards using low-GWP alternatives that have characteristics such as high flammability, toxicity and high working pressure.
- Solid foundation of qualified technicians that can properly and safely handle flammable/toxic/high working pressure refrigerants is needed.
- Market will be more accepting of equipment containing flammable/toxic/high working pressure refrigerants if they know they have a workforce that is able to properly install, maintain and service the equipment.
- Methodical refrigerant management skills are needed to maintain performance and energy efficiency of the cooling systems.
- High cost of proper tools for servicing equipment

Gender Mainstreaming in UNEP and OzonAction



Thank you!

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