CLIMATE

Sustainable Financing for ODS & HFC Bank Management

MOP37 Side Event (05/11/2025)

environmental investigation agency

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INTRODUCTION

Oceans
Wildlife
Forests
Climate

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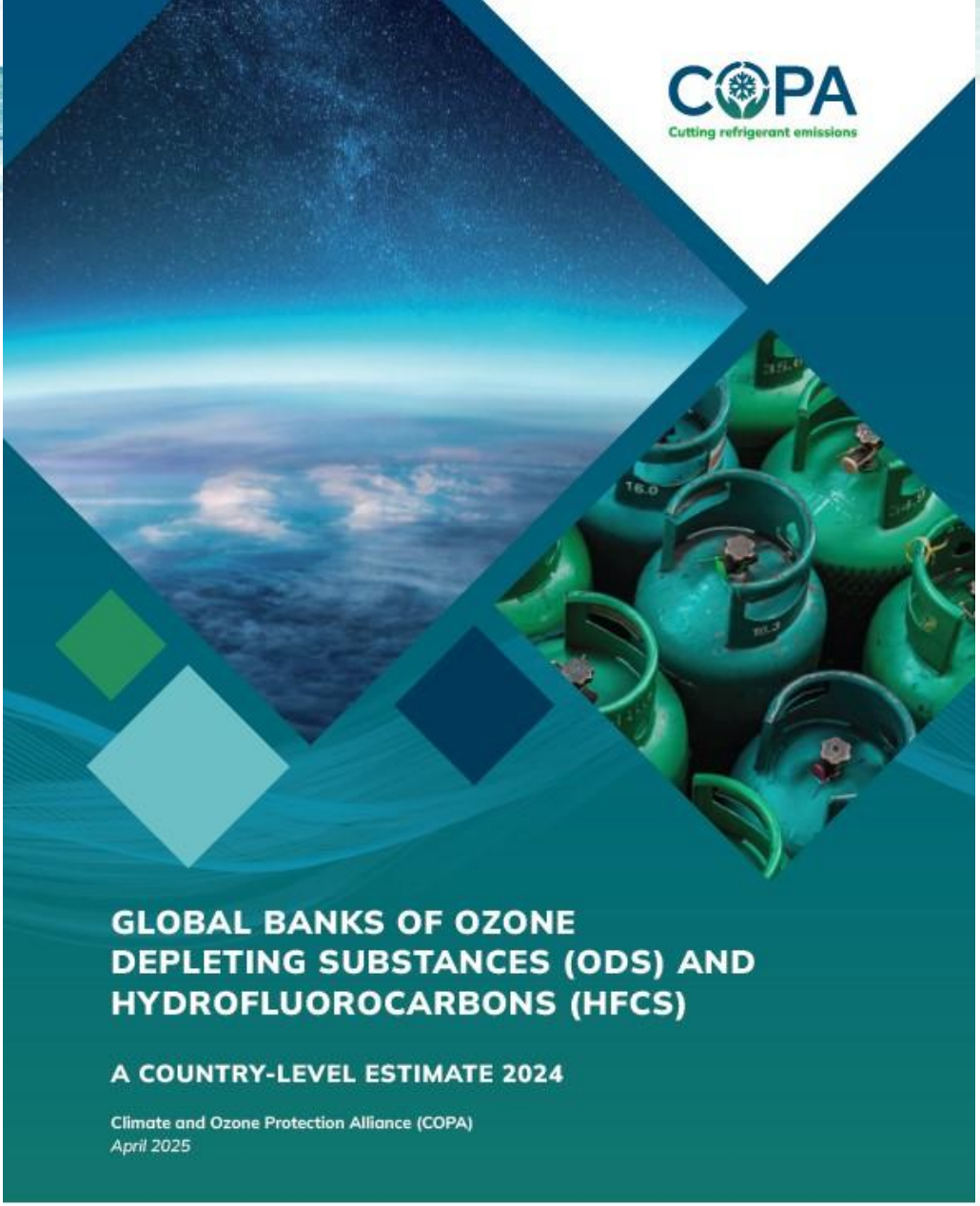
COPA
Cutting refrigerant emissions

Global Banks of ODS and HFCs

5 November 2025



COPA
Cutting refrigerant emissions

2025-04 COPA Global Banks ODS HFC update.pdf

Prepared by HEAT

DATA SOURCES

Methodology

1. DATA REPORTED UNDER ARTICLE 7 OF THE MONTREAL PROTOCOL FROM ALL COUNTRIES

- **Refrigerant data:** import virgin, export virgin, production for all uses, destruction, feedstock use, process agent use, QPS use, Lab use, essential and critical uses, import recycled/recovered/reclaimed, export recycled/recovered/reclaimed.

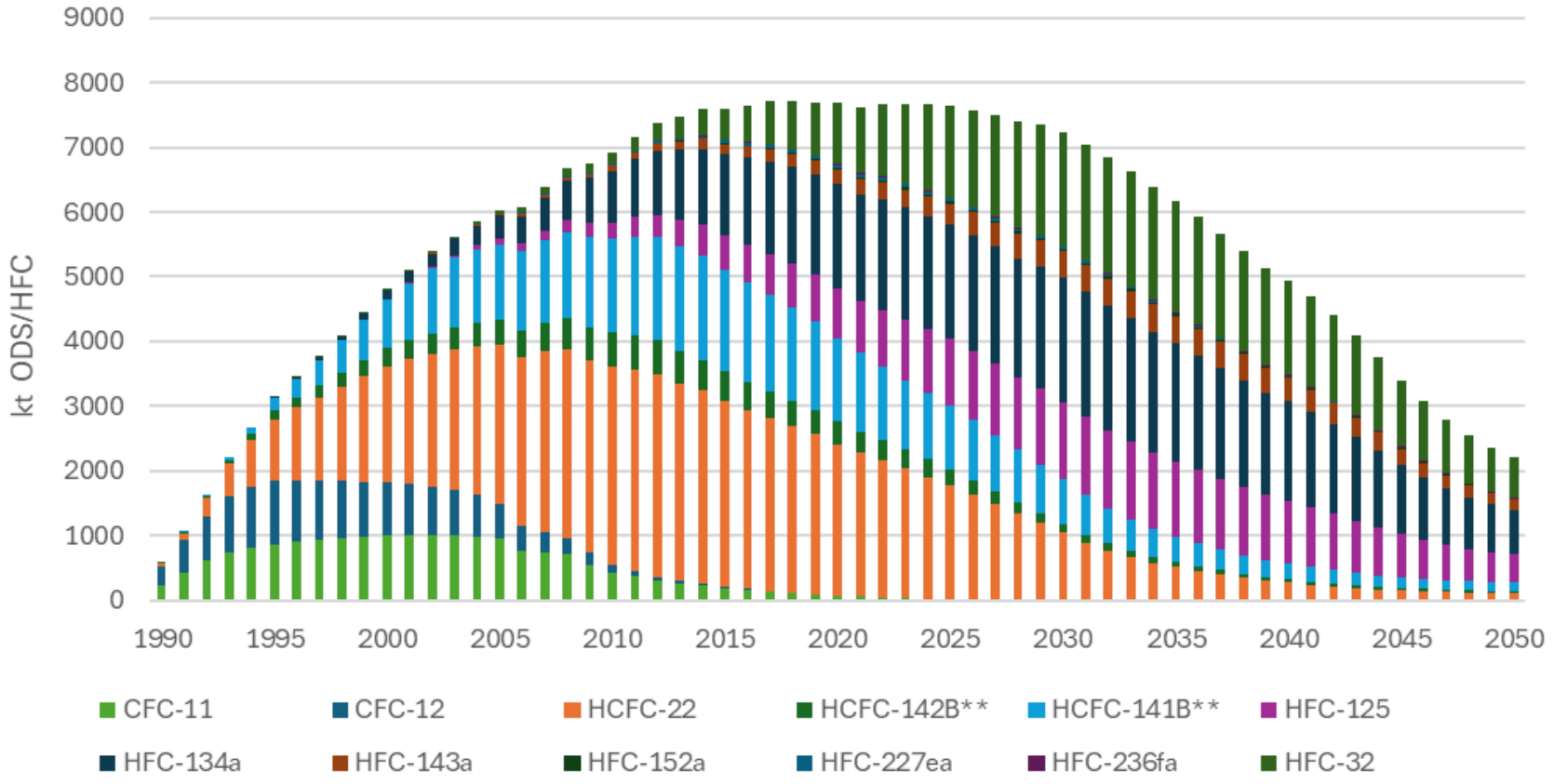
2. SECTORAL DISTRIBUTION OF THE ODS/HFCS

- With the aim of allocating the consumption to the different sectors for proper modelling
- Categories: manufacturing RAC, servicing RAC, foam and other uses.

3. UN COMTRADE DATABASE USED TO EXTRACT IMPORTS AND EXPORTS

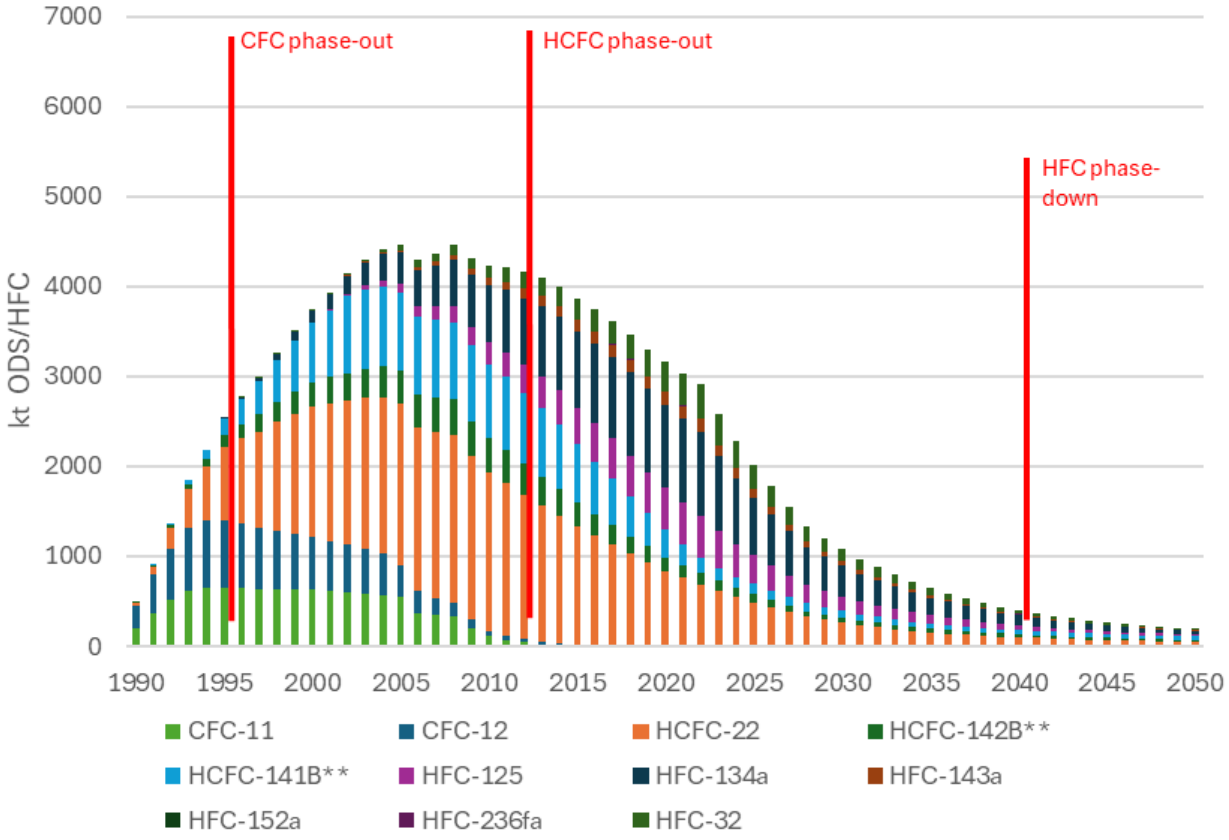
- Data for import/export of refrigerators and air conditioners
- Used to correct the consumption of large manufacturers (e.g., China) that export the refrigerant in pre-charged equipment (e.g., Split ACs)

RESULTS – BANKS (METRIC TONNES)

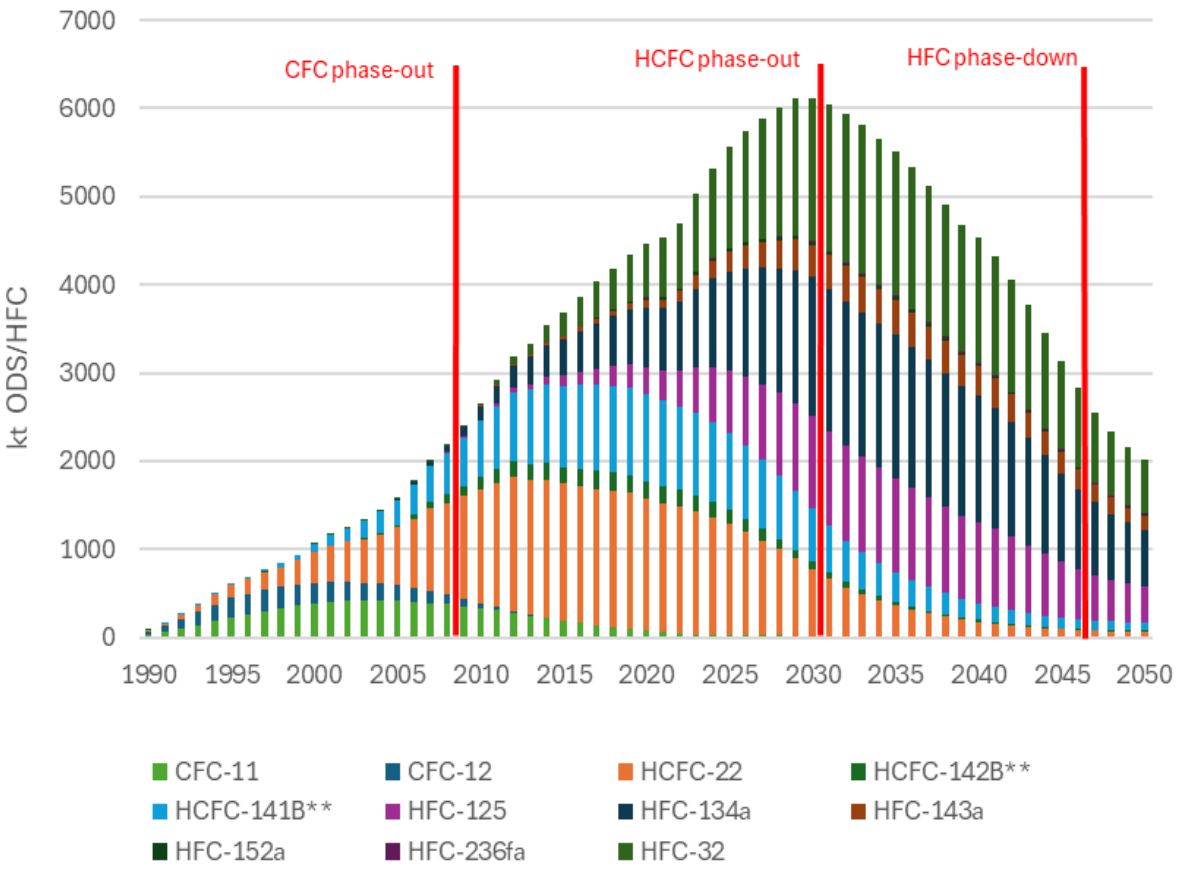


RESULTS – BANKS (METRIC TONNES)

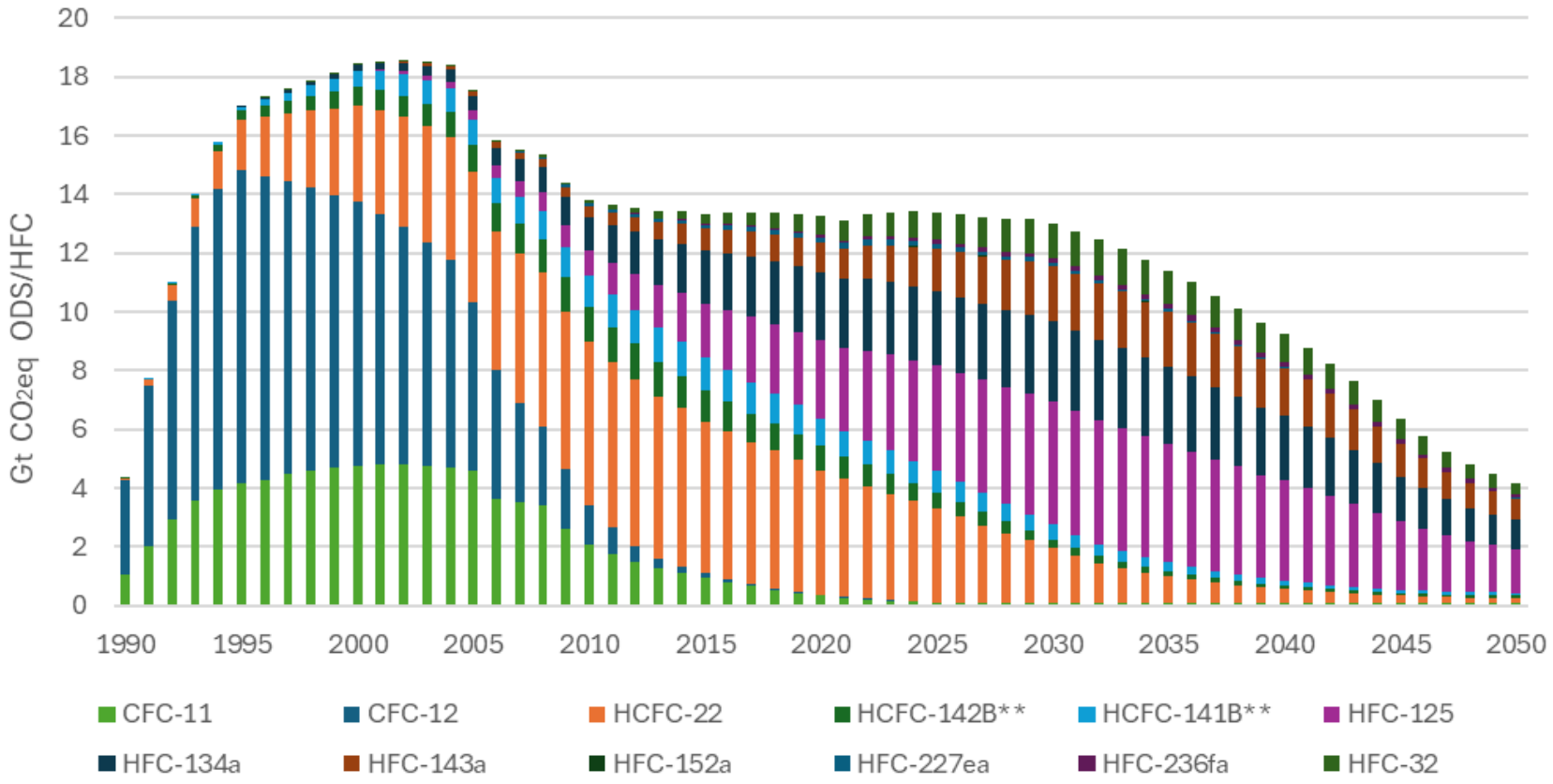
Non-Article 5 Countries



Article 5 Countries

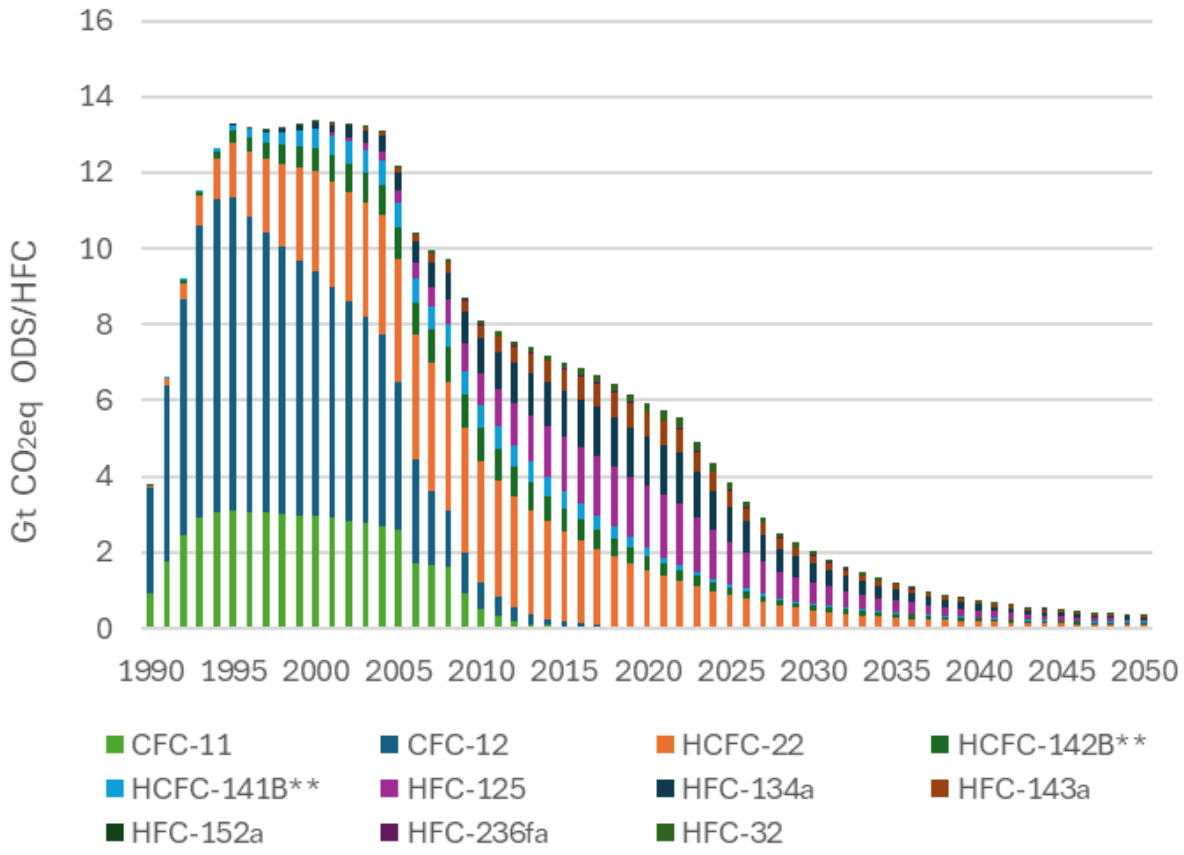


RESULTS – BANKS (CO2eq)

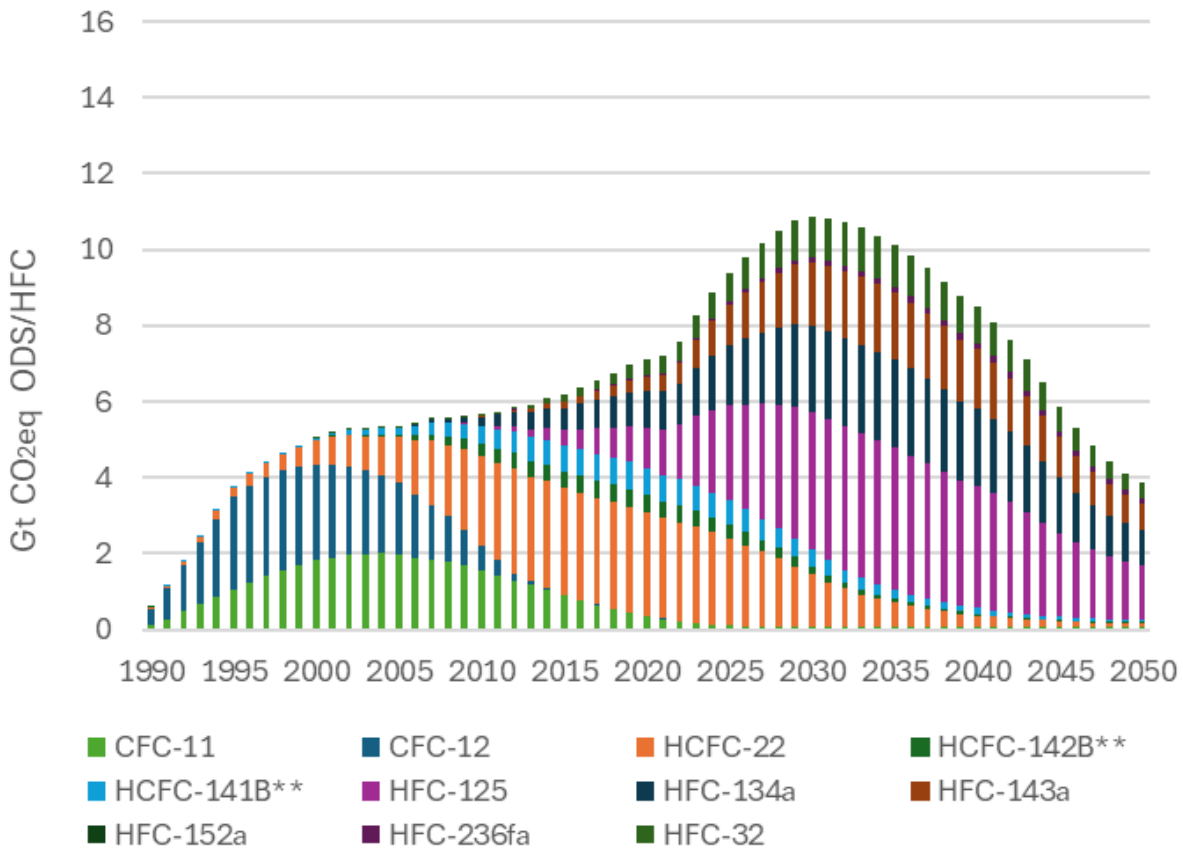


RESULTS – BANKS (CO2eq)

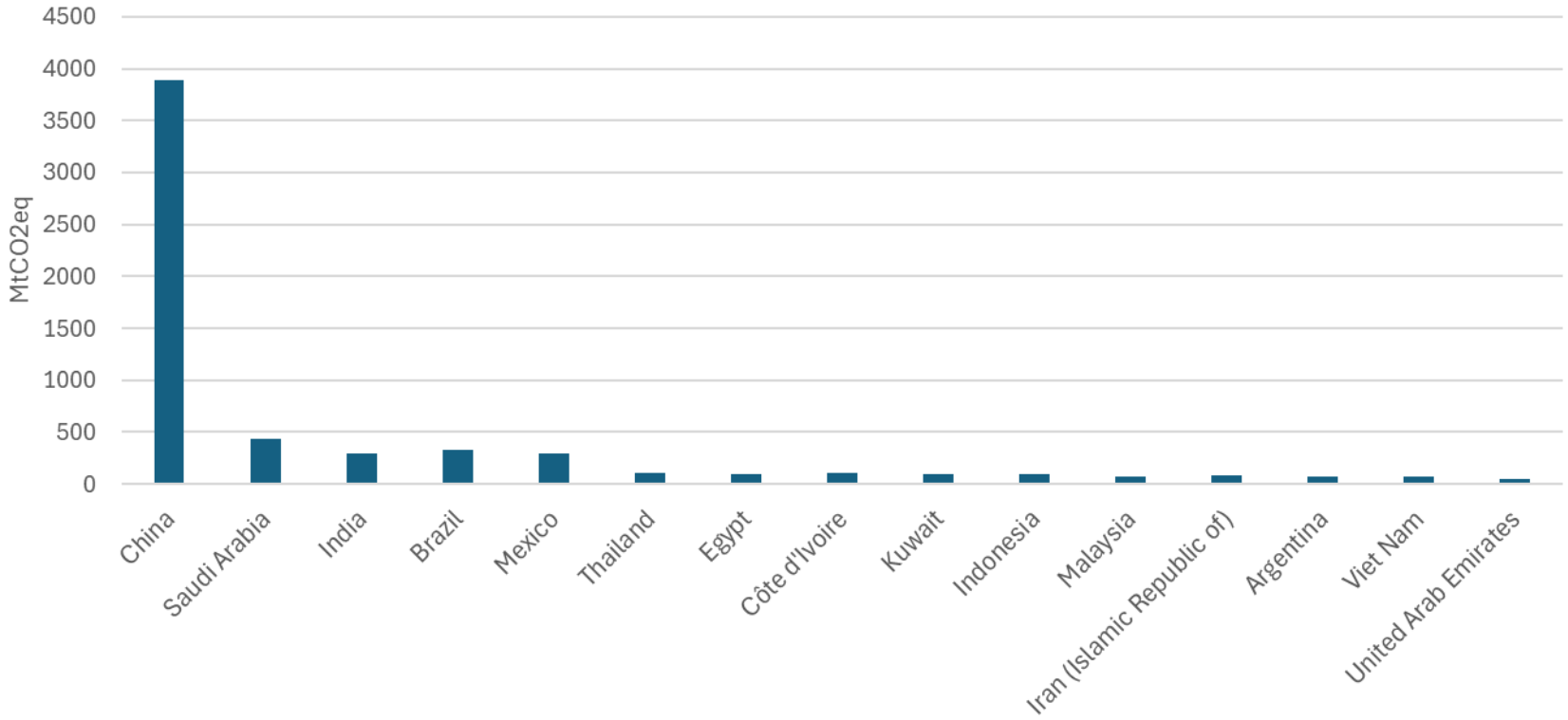
Non-Article 5 Countries



Article 5 Countries



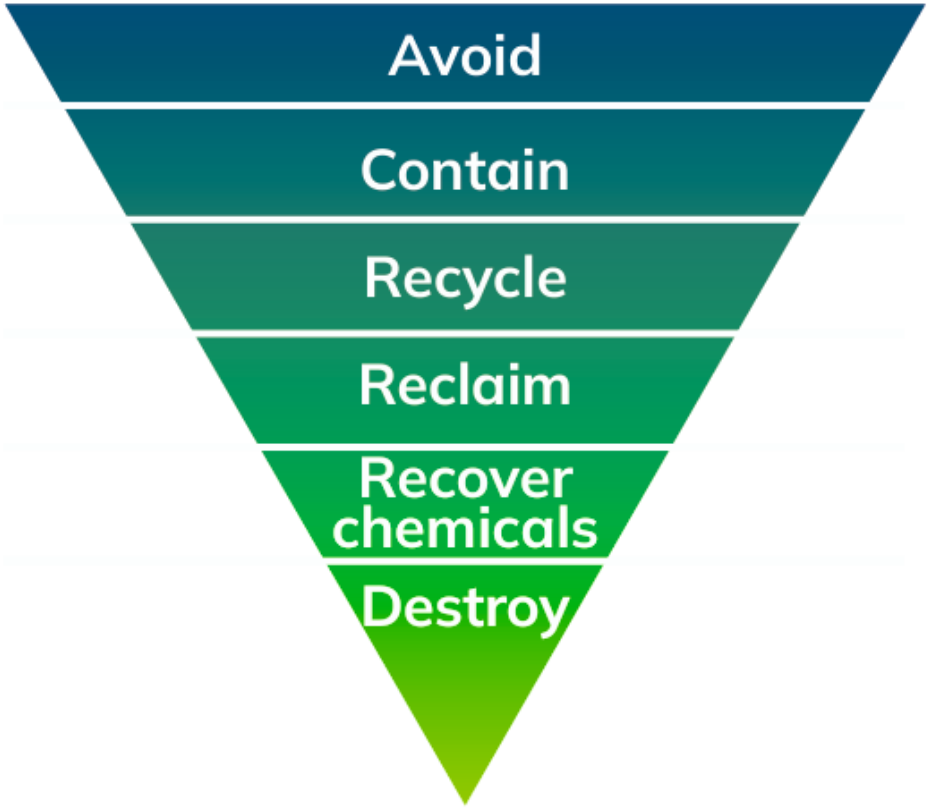
RESULTS - LARGEST BANKS



CALL FOR ACTION

- ODS and HFC banks are as high as never before – with an all-time high of potential emissions
- Banks will decline – either due to emissions or as a result of lifecycle refrigerant policies along the policy hierarchy
- Concerted Action is required to recover, recycle and reclaim/destroy ODS and HFC
- A global registry of banks would aid policy making and financing
- Efforts to support Art. 5 countries to undertake inventories and develop action plans are ongoing
- More efforts are needed to include the supply chain – including producers and manufacturers into finding sustainable solutions

HFC Bank Management Hierarchy



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Financing Options for ODS and HFC Banks

Cecilia Mercado

Duncan Brack

Objective

- Share findings and data from the report currently under preparation on Evaluating Options for Sustainably Financed Action on ODS and HFC Banks

- Get feedback, identify information gaps, and refine the report

Why are we discussing this now?

- ODS and HFC banks = 13–24 Gt CO_2e
- Annual emissions ≈ 1.5 Gt CO_2e (~3% of global GHGs)
- Current financing inadequate to support collection, recovery and destruction
- This year, MLF funding for inventories ends, need other funding options

Structure of the Report

1. Introduction
2. The climate and environmental threat of ODS and HFC banks
3. Key elements of Lifecycle Refrigerant Management
4. Financing options for addressing banks
5. Economic viability of bank management
6. Options for bank management and financing

TODAY'S FOCUS: Chapters 4-6

Chapter 4 Overview of Financing Pathways

- Multilateral and bilateral support
- National financing mechanisms
- Extended producer responsibility
- Carbon finance (compliance and voluntary markets)

4.1 Multilateral and Bilateral Sources

- Multilateral Fund: HPMPs/KIPs/inventories and plans for 100 countries approved; potential new funding window after 97th meeting
- Green Climate Fund: WB Green Cooling Facility
- Extended producer responsibility
- Carbon finance (compliance and voluntary markets)

4.2 National Financing Mechanisms

• Fiscal measures: loans, grants, subsidies, taxes, levies, import duties, emissions trading systems (ETS) revenues

Examples

- Denmark: HFC tax based according to the substance GWP contributed to reduction in import and use of HFCs
- Norway: excise taxes on production and import of HFCs ; recovered HFCs exempt; tax is reimbursed for HFC destruction
- New Zealand: ETS covers HFCs on new HFC by GWP, does not cover ODS, 11% refrigerant recovery rate from end-of-life equipment
- Possibly green banks?

4.3 Extended Producer Responsibility (EPR) models

- EU: WEEE Directive (Germany) – industry-financed collection
- Japan: Appliance and Vehicle Recycling Laws
- Canada: Refrigerant Management Canada – industry-funded destruction
- Australia: Refrigerant Reclaim Australia – levy + rebates to technicians
- New Zealand: Cool-Safe scheme – ETS-funded bounty system

4.3 Lessons from EPR implementation

- Success when combining regulation and industry-led funding
- Deposit-refund = direct recovery incentive
- Centralized funds ensure coverage
- Developing countries: need monitoring & auditing systems

4.4 Carbon Finance (1)

Fundamental problems with carbon markets:

- Over-crediting
- Additionality
- Leakage
- Double-counting

4.4 Carbon Finance (2)

Limitations particularly problematic in voluntary markets:

- Many offsets lack integrity and risk greenwashing or double-counting.
- Volatile carbon prices make projects unsustainable over time.
- Profits are not reinvested in host countries.
- Offsets can delay national regulation and create fragmented systems.
- Weak or no link to Paris Agreement targets reduces accountability.

5: Economic Viability of Bank Management

Cost and drivers:

- Global cost: US$4.5–10 billion/yr (≈US$20–30/kg).
- Costs depend on scale, infrastructure, regulation, and technology.
- LRM abatement cost: US$2.5–17/t CO_2-eq, among lowest globally.

Are these cost assumptions realistic for your country?

5 Viability and Financing Strategies

- Focus on aggregation, integration, and efficient technologies.
- Use phased implementation and levy systems for sustainability.
- Carbon finance may supplement but not replace stable funding.

From Costs to Solutions – Transition to Chapter 6

- How can sustainable financing be achieved?
- What regulatory models and governance systems are needed?
- How can countries cooperate regionally to reduce and optimize costs?

Core Themes of Chapter 6

- Sustainable financing
- Regulatory and governance frameworks
  - National coordination mechanisms
  - Regional and sectoral cooperation

6.1 Sustainable Financing Approaches

- Multi-layered grant and concessional financing
- International support for capital investments
- Simple levy systems
- GWP-based taxation
- Deposit-refund and bounty schemes
- Blended finance for private investment

6.1 Examples of Financing Models

- Levy systems – point-of-entry import levies using customs data
- Deposit-refund schemes – refunds upon verified disposal
- Bounty programmes – direct payments for recovery
- Regional destruction facilities – shared investment across countries

6.1 Ensuring Long-term Sustainability

- Use grants (e.g., MLF) for seed funding/start-up, transition to self-financing levy systems

- Case examples: Australia, Canada took a few years to achieve self-sufficiency

- Reduce long-term costs via regional infrastructure and standardization

6.2 Regulatory Frameworks

- Ban venting and mandate recovery and reporting
- Set quality standards for reclaimed refrigerants
- Integrate refrigerant waste in hazardous waste and EPR laws;
- Align data systems with import licensing and national databases

6.2 Governance and Capacity-Building

- Certification and training of technicians
- Transparent tracking and reporting systems
- Industry–government partnerships for stewardship backed by regulation
- National focal institutions for coordination
- Development of comprehensive national plans for LRM and banks

6.2 Regional and Cross-border Collaboration

- Shared destruction and reclamation hubs (e.g., cement kilns, reclamation facilities)
- Regional knowledge exchange and training
- Integration with energy efficiency and waste management programmes

6.2 Illustrative Phased Approach

- **Phase 1 (Years 1–3):** Commercial refrigeration in urban centres – supermarkets, hotels, restaurants. Large charges (10–100 kg), professional technicians, concentrated locations. Recovery: 20–80 tonnes annually. Funding: Multilateral Fund grants and bilateral assistance.
- **Phase 2 (Years 4–6):** Industrial cooling plus foam banks. Expand to 10–20 cities with levy revenues operational. Recovery: 100–300 tonnes annually. Funding: Multilateral Fund, Green Climate Fund and levy revenue.
- **Phase 3 (Years 7–10):** Residential appliances and mobile air-conditioning integrated with e-waste systems. National coverage with self-sustaining financing. Recovery: 300–600 tonnes annually. Funding: Levies + Green Climate Fund + reduced Multilateral Fund dependence.

Feedback

WE WOULD LIKE YOUR VIEWS ON THE FOLLOWING:

1. Most feasible financing mechanisms for your context
2. Practicality of regional facilities and levy systems
3. Role of industry stewardship
4. Data or cost gaps that should be improved
5. Any other information you want to see in the report?

Draft report open for comment

Comments very welcome, to:

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Duncan Brack

(dbrack@dbrack.org.uk)

By Wednesday 19 November

Thank you!

We will be happy to chat with you on the margins of the MOP.

MOP37

Nairobi, Kenya
3-7 November 2025

Frieda Elizabeth Goagoses

NAMIBIA

Vienna Convention
MONTREAL PROTOCOL

Namibia's view on ODS and HFC bank Management

- Namibia's view on ODS and HFC bank management is **holistic and forward-looking**
- The country recognizes the environmental risks of unmanaged refrigerant banks and prioritizes sustainable management as part of its **Vision 2030** and **climate-resilient development agenda**
- **Climate**: Hot and arid—high dependence on refrigeration and air conditioning (RAC)

Namibia's Commitment on ODS & HFC Bank Management

- ODS and HFC management is **a national priority** aligned with Vision 2030 and climate commitments
- Namibia supports the **global phase-out and phase-down** approach under the Montreal Protocol and Kigali Amendment
- Emphasizes **environmentally sound disposal** and **recovery systems**
- Advocates for **international financial and technical support** for developing countries

Methodology and approach for the Inventory

Both quantitative and qualitative approach was integrated to provide a comprehensive understanding of the situation

Methodology Used:

- Equipment approach (data on RAC population 2008–2023)

Key Steps:

- Literature review and secondary data collection
- Field inspections and stakeholder interviews
- Development of geospatial database of ODS/HFC stocks

Key findings

- HCFC elimination targeted for 2024
- HFCs are the main issue now (R-134a dominant)
- Largest banks: commercial and mobile air conditioning systems
- Estimated 39,152 kg HFC bank (2025)

Challenges in the data collection process for inventory

- Slow response from stakeholders
- Questionnaires not completely answered
- Lack of awareness on HCFC/HFC and the harm they can cause
- Lack of collection points for old HVAC units
- No national disposal/recovery infrastructure
- Weak enforcement of end-of-life RAC policies
- Insufficient funding for safe disposal
- Public and municipal awareness gaps

How they will be addressed?

- Addressing these regulatory gaps will be essential for creating an enabling environment for the successful implementation of the integrated approach
- Establish a Coordinating Task Force, Include representatives from key ministries, regulators, and industry groups.
- Clear Communication Plan with Set Realistic and Firm Deadlines
- Develop a shared online system for uploading and tracking data

Plan for collection

a) Decentralized collection points strategically located to maximize coverage while minimizing transportation costs addressing geographical challenges

- The first tier will consist of primary collection points established at existing refrigeration and air conditioning service workshops across the country.
- The second tier will consist of regional collection hubs established at vocational training centres in each of Namibia's 14 regions.
- Mobile collection units will be established to serve remote areas and large installations

Plan for collection

b) Collection Incentives and Financing

- Deposit-Refund System
- Extended Producer Responsibility
- International Funding

c) Awareness and Training

- Public Awareness Campaign
- Technical Training Programme

Plan for Reuse

- The reuse plan must accommodate the transition from ODS to HFCs and ultimately to low-GWP alternatives, requiring flexibility and forward-thinking approaches
- A two-tier approach to refrigerant recycling will be implemented to maximize the potential for reuse while accounting for Namibia's infrastructure limitations and refrigerant volumes
- The first tier will consist of basic recycling units distributed to regional collection hubs and major service companies
- The second tier will comprise an advanced reclamation facility established at the SADC RAC Centre in Ongwediva

Plan for Reuse

To build market confidence in recycled and reclaimed refrigerants, a robust quality assurance system will be established

Analysis Laboratory

A refrigerant analysis laboratory will be established at the SADC RAC Centre to:

- Test the purity and composition of recovered refrigerants
- Verify that recycled and reclaimed refrigerants meet quality standards
- Issue certificates of analysis for reclaimed refrigerants
- Support research on refrigerant quality and performance
- Provide identification services for unknown refrigerant samples

Plan for Reuse

National Standards for Recycled Refrigerants

National standards for recycled and reclaimed refrigerants will be developed in collaboration with the Namibia Standards Institution (NSI), aligned with international benchmarks like AHRI Standard 700. These standards will:

- Define minimum purity requirements for different refrigerant types
- Establish maximum allowable levels of moisture, acidity, and non-condensable gases
- Set labelling requirements for recycled and reclaimed refrigerants
- Specify appropriate applications for refrigerants of different quality levels
- Provide testing protocols and acceptance criteria

Pricing strategy

A tiered pricing structure will be established to ensure the competitiveness of recycled and reclaimed refrigerants:

- Recycled refrigerants will be priced at 60-70% of virgin refrigerant prices
- Reclaimed refrigerants meeting full purity standards will be priced at 70-80% of virgin prices
- Pricing will consider actual processing costs, market conditions, and incentives required
- Price advantages will be maintained through import tax adjustments on virgin refrigerants
- Volume discounts will be offered to encourage bulk purchases

Public procurement policy

Government procurement will be leveraged to create initial demand for recycled and reclaimed refrigerants:

- Public institutions will be required to prioritize recycled refrigerants for equipment maintenance
- Government tenders for RAC services will specify the use of recycled refrigerants where appropriate
- Public buildings will serve as demonstration sites for recycled refrigerant performance
- Results and cost savings will be documented and publicized
- Actively promote the participation of women-led businesses in the market for recycled and reclaimed refrigerants, ensuring they benefit from pricing strategies and public procurement policies

Industry partnerships

Strategic partnerships will be developed with key industry players to promote the use of recycled refrigerants:

- Major commercial refrigeration users like supermarket chains and beverage companies
- Hotel and hospitality sector with significant air conditioning loads
- Manufacturing facilities with industrial refrigeration systems
- Automotive service chains handling mobile air conditioning

Collection incentives and financing

2.4.1 Transitional Strategy

A transitional strategy will be developed to manage the evolving mix of refrigerants:

- Initial focus on high-value, high-volume refrigerants like R-22 and R-134a
- Gradual expansion to handle HFC blends as their recovery volumes increase
- Planning for the eventual decline in certain refrigerants as phase-outs progress
- Development of capabilities for handling natural refrigerants safely

Collection incentives and financing

2.4.2 Technology Adaptation

Recycling and reclamation technologies will be selected for adaptability to changing refrigerant types:

- Equipment capable of processing multiple refrigerant types will be prioritized
- Modular systems allowing for future upgrades will be selected
- Training programmes will emphasize adaptability to new refrigerants and technologies
- Research partnerships will explore recycling approaches for emerging refrigerants

Plan for disposal

3.1 Regional Partnership for Destruction

Given the high cost and technological complexity of destruction facilities, a regional partnership approach is the most viable solution for Namibia in the near to medium term.

While regional partnerships provide an immediate solution, developing domestic destruction capacity remains a long-term goal for Namibia

Plan for disposal

3.1.1 South African Destruction Partnership

A formal partnership will be established with South African destruction facilities, particularly A-Gas, which already has experience handling refrigerants from Namibia:

- Framework agreement to secure guaranteed destruction capacity
- Bulk shipment arrangements to minimize transportation costs
- Streamlined documentation procedures for transboundary movement
- Joint monitoring and verification protocols
- Cost-sharing mechanisms to reduce per-unit destruction costs

Plan for disposal

3.1.2 Transboundary Movement Protocols

Clear protocols for the transboundary movement of waste refrigerants will be established in compliance with the Basel Convention:

- Standardized documentation package for export permits
- Pre-approval process for regular shipments
- Staff training on compliance requirements
- Digital tracking system for shipment monitoring
- Regular communication channels with customs authorities

Plan for disposal

3.1.3 Regional SADC Initiative

Building on bilateral arrangements with South Africa, Namibia will initiate discussions within the Southern African Development Community (SADC) framework to develop a regional approach to refrigerant destruction:

- Assessment of destruction needs across SADC member states
- Feasibility study for a regional destruction facility
- Cost-sharing models for transportation and destruction
- Harmonized regulations for refrigerant management
- Joint funding proposals to international donors

Plan for disposal

3.2.1 Cement Kiln Co-processing Assessment

A detailed technical and economic assessment will be conducted to evaluate the potential for co-processing ODS and HFCs in Namibia's cement kilns:

- Technical evaluation of existing kiln operations
- Assessment of modifications required for refrigerant destruction
- Emissions monitoring protocols and equipment needs
- Cost-benefit analysis comparing investment to alternative options
- Environmental impact assessment of the proposed operation

Interim storage solution

While destruction capacity is being developed, a secure interim storage solution is necessary for refrigerants that cannot be recycled or immediately destroyed

Final word

Addressing gaps in data collection, regulatory frameworks, collection systems, capacity building, and technology will be critical for effective management of ODS/HFC banks in Namibia

Collaboration among stakeholders such as NOU, MEFT, MIRT, Customs, municipalities, RAC businesses, training institutions, and scrapyard dealers will ensure sustainable solutions that align with Namibia's environmental goals under the National Cooling Strategy

Thank you

Frieda Elizabeth Goagoses
NAMIBIA

REFRIGERANT RECLAIM AUSTRALIA

Refrigerant Reclaim Australia's Approach to Lifecycle Refrigerant Management

Nairobi, November 2025

REFRIGERANT RECLAIM AUSTRALIA

About RRA

- RRA is a not-for-profit organization
- Created over 30 years ago
- Started as a voluntary program
- Supported by manufacturers/importers of ODS
- **Industry funded, Industry run & Industry led**
- Australia's solution to the safe disposal of used and unwanted refrigerants

Details of the RRA Program

Administratively efficient

- Funded by a levy charged on every kilo of ODS or SGG refrigerant upon import into Australia
- RRA helps industry share the cost of recovering refrigerants through a rebate system
- RRA operate with 3 people
- RRA uses industries wholesale and agent network to collect unwanted ODS/SGG from >500 locations (reverse supply chain)
- The wholesaler or agent issues a rebate by way of credit to the technician for returned ODS/SGG
- The Wholesalers/Collection agents have the opportunity to retain recovered product for reclamation
- RRA pays the wholesaler a handling fee + reimburses the rebate given to technician by the wholesaler when product is returned for destruction

Supported by Robust Regulatory Landscape

Import

Refrigerant or Equipment

Must have licence

Must be member of a product stewardship scheme

Report Refrigerant kg & Species

Buy/Sell Refrigerant

Must have permit

Standards to minimise emissions

Record keeping and reporting

Obligation to collect recovered Refrigerant

Ban on discharge

Compels recovery of refrigerants

Sets expectation of avoiding emissions

Handle Refrigerant

Must have permit

Training

Qualifications

Follow standards and codes of practice

Return refrigerant

Destruction Facilities

Must be approved

Montreal Protocol approved processes

Destruction & removal efficiency

Records of refrigerants destroyed

Ban on Non-Refillable Cylinders – Since 1994

Helps prevent refrigerant emissions

Encourages recovery

Avoids waste of containers

Reduces illegal trade risks

REFRIGERANT SUPPLY AND RECOVERY CHAIN

Refrigerant Supply

Refrigerant Recovery

IMPORT

Bulk Refrigerant and equipment imported by licensed SGG/ODS quota holders

REPACK

Bulk refrigerant is repacked into refillable cylinders by licensed refrigerant handlers at a decanting facility

TECHNICIAN

Licensed technician recovers refrigerant gas from air conditioning or refrigeration unit

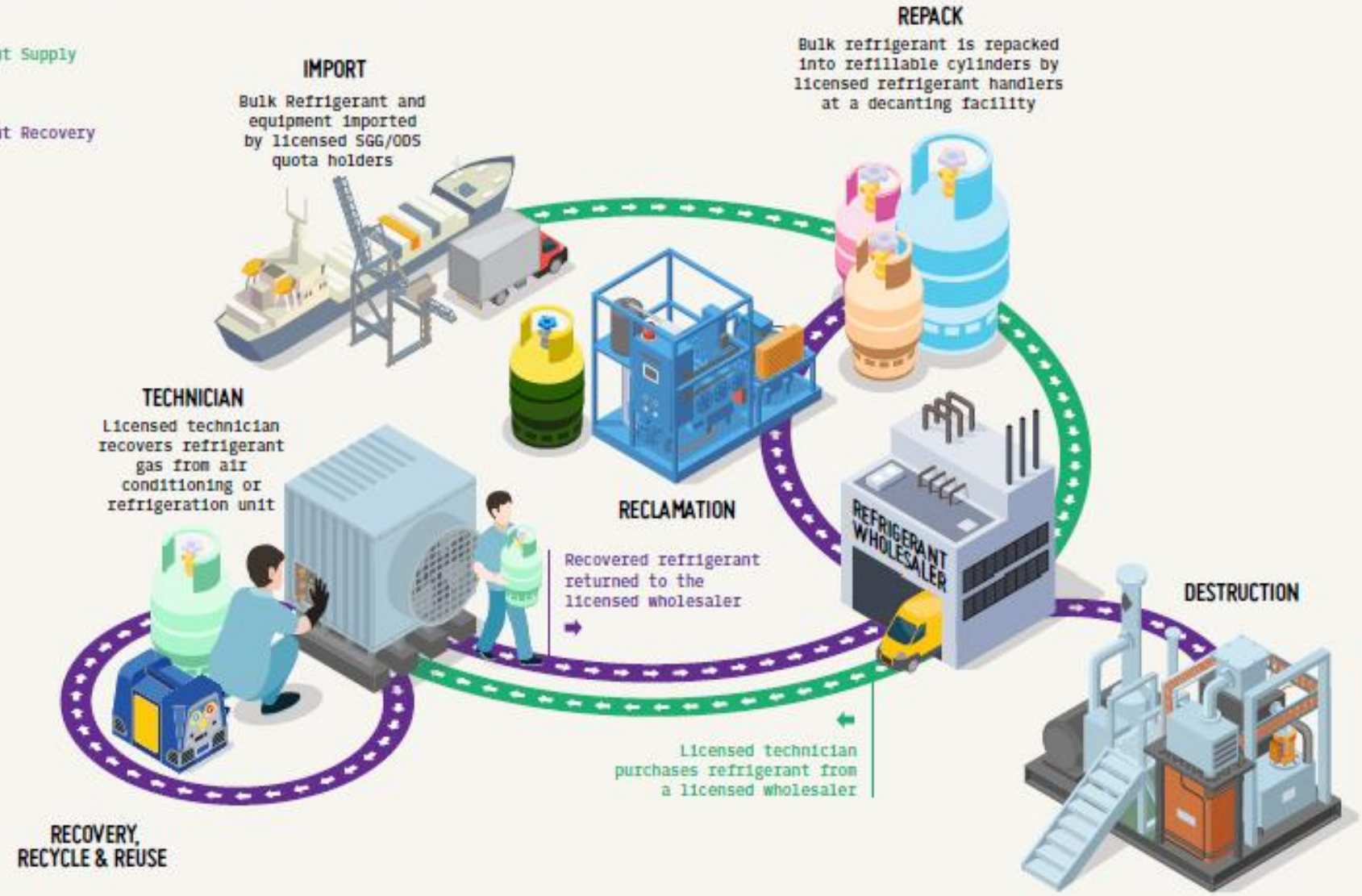
RECLAMATION

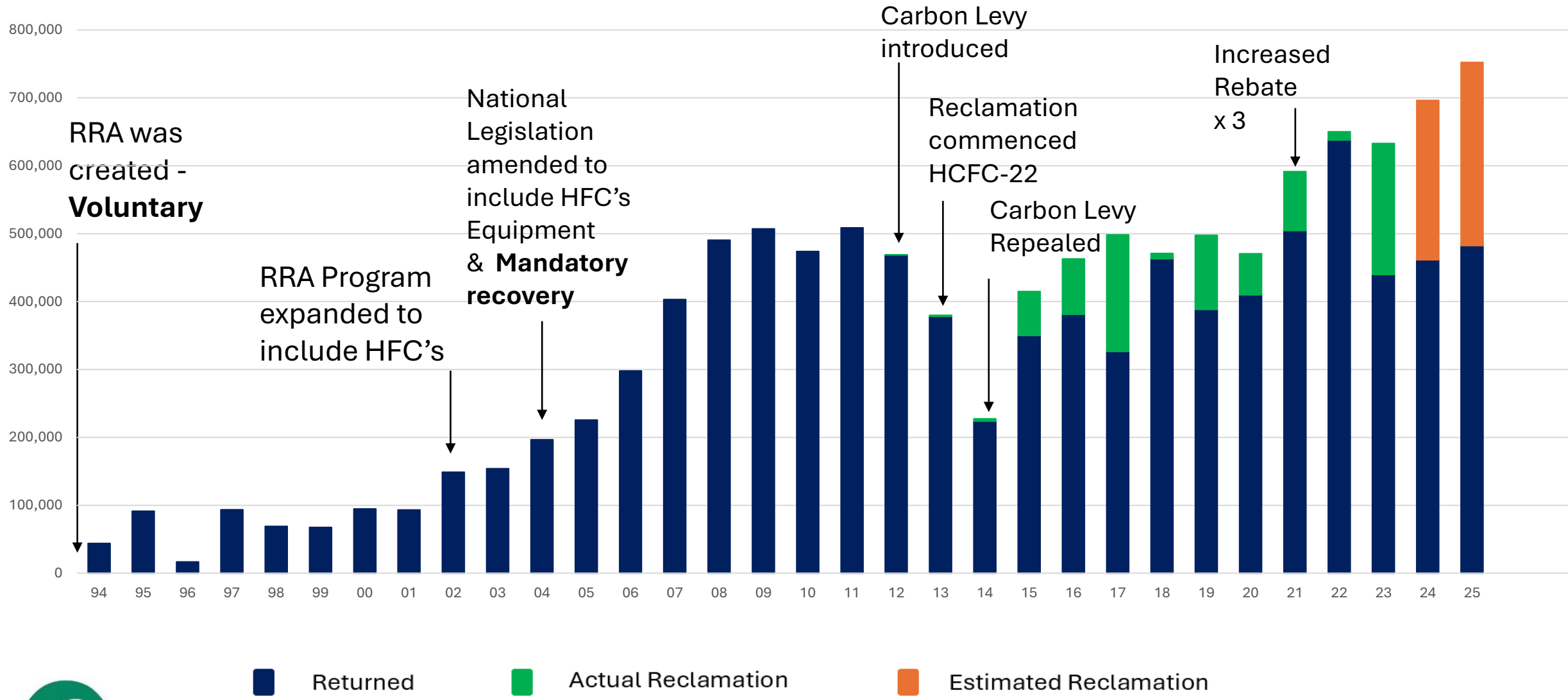
Recovered refrigerant returned to the licensed wholesaler

Licensed technician purchases refrigerant from a licensed wholesaler

DESTRUCTION

RECOVERY, RECYCLE & REUSE



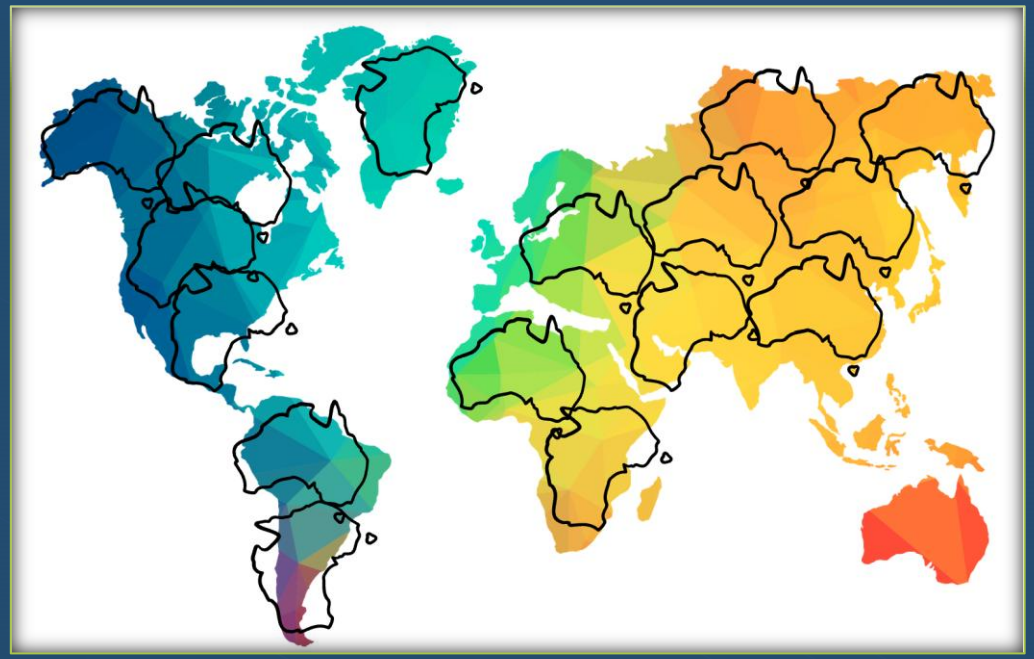


REFRIGERANT RECLAIM AUSTRALIA

Impact of Regulatory Levers

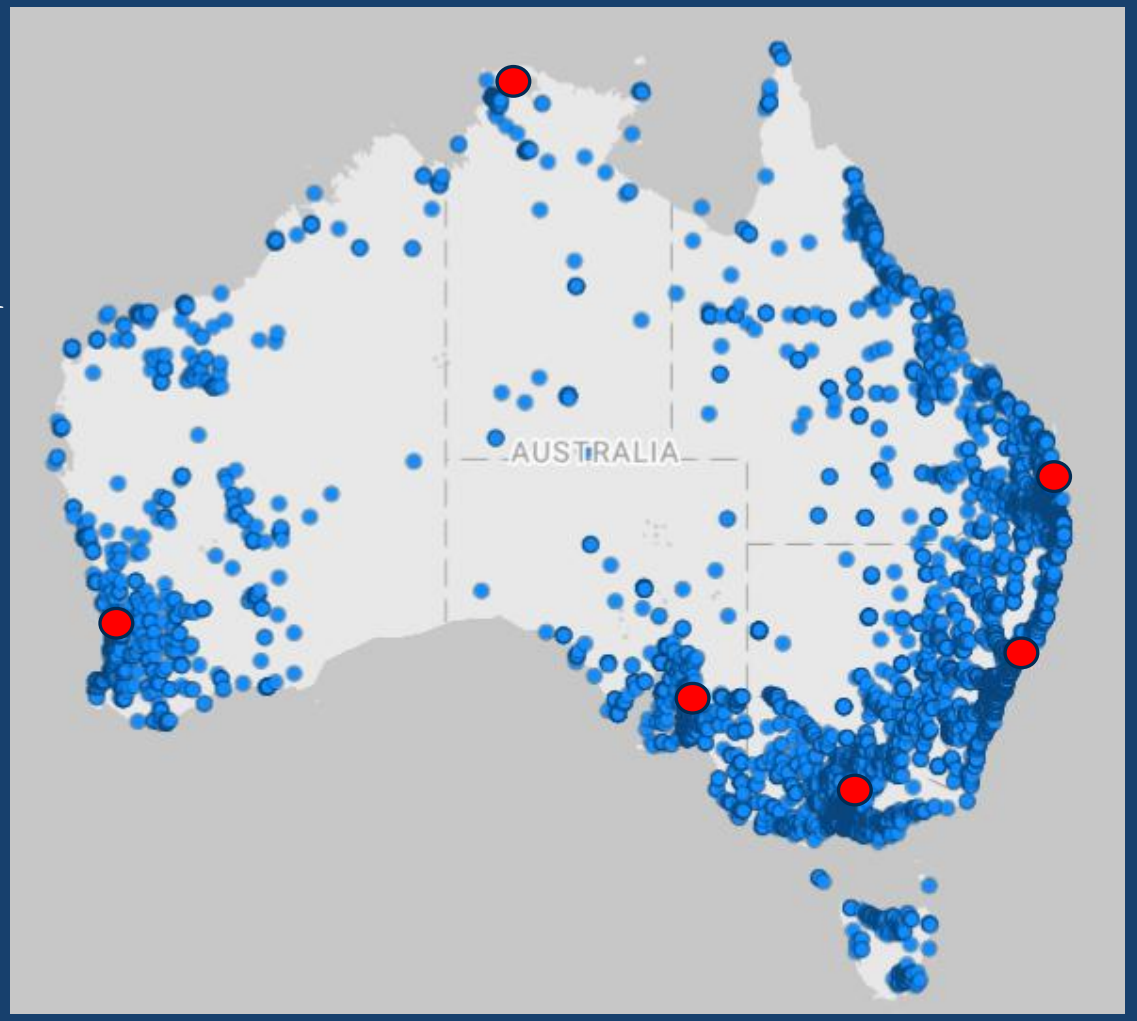
Why Does the Model Work in Australia

- Co-regulatory approach
- Australia is a big island – no producers
- Disposable cylinders banned 30 years ago - gave rise to reverse supply chain
- Anyone wanting to profit from sale/use of refrigerant has a responsibility in the recovery of used refrigerant
- Financials only stack up because of history



Lessons Learned

- Focus was heavily on destruction
- PSS requirements for end-of-life equipment may have improved recovery rates
- Relied too heavily on the reverse supply chain only
- Encouraged recovery of all species in one cylinder – making reclamation more challenging
- Better Focus on Maintenance
- Legislation doesn't include all refrigerants
    - Safety
    - Energy Efficiency
    - Competency



Take Away Messages

- The Australian model works in Australia may be difficult to replicate
- Take what works an adapt it to your country/region
- Look if and how industry can support Government vice versa
- Clear policy position gives industry certainty
- LRM is a huge undertaking, take small steps
- Start now


RECOVERED
RY KG COUNTS EVERY KG COUNT

CLIMATE

Draft report available for comment

Deadline: 19/11/25

Thank you for attending

environmental investigation agency