Sustainable ODS and HFC banks management through complementary action of the Climate and Ozone Protection Alliance to the Multilateral Fund
9 May 2023
1. Opening
Lara Teutsch, GIZ
GROUND RULES FOR ONLINE SESSIONS

- Please use **headphones** or **earphones** in order to prevent echoing-effects.

Use the chat for your questions.

You can use this feature for reactions or for raising your virtual hand.

If the connection allows it, please turn on your video when you speak.

For best audio quality, please stay muted.
# AGENDA

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>04:15 – 04:30</td>
<td>MLF funding window for activities related to banks of used or unwanted controlled substances</td>
<td>Irene Papst, HEAT GmbH</td>
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<tr>
<td>04:30 – 04:40</td>
<td>Introduction to COPA</td>
<td>Ellen Michel, COPA Secretariat</td>
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<td>04:40 – 04:50</td>
<td>COPA’s offer for complementary action to the MLF</td>
<td>Ellen Michel, COPA Secretariat</td>
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<td>04:50 – 05:10</td>
<td>Guidance on how to conduct an ODS and HFC banks inventory and action plan</td>
<td>Irene Papst, HEAT GmbH</td>
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<tr>
<td></td>
<td>Q&amp;A</td>
<td>All participants</td>
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</tbody>
</table>
Welcome Remarks
Rachel Pekker, BMWK
3. MLF funding window for activities related to banks of used or unwanted controlled substances

Irene Papst, HEAT GmbH
FUNDING OPPORTUNITY FOR STUDYING BANKS FOR USED OR UNWANTED CONTROLLED SUBSTANCES

Decision 91/66 taken in December 2022 by the Executive Committee contains

• Scope
• Criteria
• Funding levels
• Time line

for funding of an ODS/HFC banks inventory and an action plan for collection and treatment.
• Project proposals can be submitted starting at the 93rd meeting of the Executive Committee (December 2023) up to the 97th meeting (expected in December 2025)

• Completion of work expected 24 months after approval
  • Earliest completion: December 2025
  • Latest completion: December 2027
FUNDING LEVELS

- Provided funding depends on the HCFC baseline

<table>
<thead>
<tr>
<th>HCFC baseline (ODP tonnes)</th>
<th>Funding level (US $)</th>
<th>Number of Art. 5 countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 1</td>
<td>70 000</td>
<td>21</td>
</tr>
<tr>
<td>Between 1 and 6</td>
<td>80 000</td>
<td>37</td>
</tr>
<tr>
<td>Above 6 and up to 100</td>
<td>90 000</td>
<td>62</td>
</tr>
<tr>
<td>Above 100</td>
<td>100 000</td>
<td>27</td>
</tr>
</tbody>
</table>
FUNDING SCOPE

• Inventory of banks of used or unwanted controlled substances
• Plan for collection, transport and disposal of such substances, including consideration of recycling, reclamation and cost-effective destruction

Countries that have undertaken banks inventories and action plans as part of the refrigeration servicing sector under the HPMP or KIP will not receive further funding.
CRITERIA

• Coordination with national phase out/down
• Clear description of the concept, methodology and approach
• Specific content requirements (next slide)

• Follow guidance laid down in paragraphs 16 to 32 in Document 91/66
CONTENT EXPLICITLY MENTIONED IN DECISION 91/66

• Description of the policies and regulations describing the roles and obligations of manufacturers and distributors, including any recovery, recycling and reclamation programmes;

• For national plans that opt for export, required national legislation to enable transboundary movement will be described

• Include consideration of the development of regulations HPMPs and/or KIP that would support the identified actions

• Include existing national legislation and policies related to the environmentally sound management of chemical and unwanted controlled substances;

• Description of a potential business model (stakeholder arrangement, private sector commitment and involvement)
SUMMARIZED GUIDANCE (DOC 91/66)

**Analysis to be performed**

- National inventory of used or unwanted controlled substances, with distinction of amounts for recycling, reclamation and disposal, taking into account amounts that were previously collected and are awaiting disposal.
- Review of current regulatory framework, policies and existing programmes, including EPR, waste and hazardous waste management policies.
- Stakeholder analysis with responsibilities and roles.
- Assessment of technology options for recycling, reclamation and disposal for destruction: opportunities of co-processing or possibility for export (technical feasibility and cost).
### Methods to be used

<table>
<thead>
<tr>
<th><strong>Transparent methodology</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordinated with national phase out/down plans</td>
</tr>
<tr>
<td>Stakeholder engagement on objective of inventory and methodology and validation for results</td>
</tr>
<tr>
<td>Desk study on existing data to be used for ODS/HFC banks inventory</td>
</tr>
<tr>
<td>Additional data collection (depending on national circumstances), potentially focussing on:</td>
</tr>
<tr>
<td>- waste sources</td>
</tr>
<tr>
<td>- collection practices (including informal sector)</td>
</tr>
</tbody>
</table>
### Outcomes to be derived

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required policies and regulations incl. on transboundary movement if required for the export of</td>
</tr>
<tr>
<td>ODS/HFCs (also in relation to policy development under KIP)</td>
</tr>
<tr>
<td>Action plan for effective collection, transport, storage and setting up the infrastructure for</td>
</tr>
<tr>
<td>recycling and reclamation including a tracking system</td>
</tr>
<tr>
<td>Business plan for collection and treatment</td>
</tr>
</tbody>
</table>
QUESTIONS?
4. Introduction to COPA
Ellen Michel, GIZ
THE CHALLENGE

Market Volume of cooling Industry in the Global South

Source: own research, HEAT GmbH
GHG EMISSIONS FROM GLOBAL ODS AND HFC BANKS

<table>
<thead>
<tr>
<th></th>
<th>Current</th>
<th>Through 2050</th>
<th>Through 2100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global ODS &amp; HFC Refrigerants banks (GtCO2e)</td>
<td>24</td>
<td>61</td>
<td>91</td>
</tr>
</tbody>
</table>

„By 2100, the global total of ODSs and HFCs in use or expected to be produced rises to approximately 91 GtCO2e – nearly equal to three full years of global energy-related carbon dioxide emissions today“

Environmental Investigation Agency
THE GAP

- Due to a general lack of appropriate regulatory frameworks, financial means as well as infrastructure, the collection, reclamation or destruction of waste containing ODS and HFC presents a major challenge.

- Neither the Montreal Protocol nor any other international environmental convention regulates the management and destruction of existing ODS and HFC banks.
INTRODUCTION

Approach

COPA works jointly with partner countries and diverse actors across private and public sectors to advance the holistic solutions needed to reduce ODS and HFC banks, and ultimately complete the shift in the cooling sector to sustainable refrigerant management.
COPA COOPERATION WITH MEMBER COUNTRIES

**COPA**

empowers member country to manage refrigerants and thereby substantially mitigate CO$_2$ emissions in a cost-effective manner

**Member country**

commits to develop policies, enables technology transfer and build capacities to establish a sustainable refrigerant management in contribution to its NDC
IMPACT THROUGH ACTION

- Raise global awareness
- Bring actors together
- Advance holistic solutions
- Promote a global shift

Closing the loop to a circular economy in the cooling sector through sustainable refrigerant management
ACTIVITIES

Global level

Setting up of an international Alliance

Establishment of Working Groups

Promoting international dialogue and knowledge transfer

Partner Country level

Financed by current project

Pilot project development
- Status Quo Analysis
- Concept development
- Assistance in acquiring international finance

Additional funding required

Pilot project implementation
Establishment of HFC / ODS banks management in selected metropolitan regions
- Services and infrastructure
- Training of technicians
- MRV systems

Pilot projects advance…
1. **Technical and financial capacities** (reclamation and destruction technologies, skilled servicing industry, recovery and collection infrastructure)
2. **Policies and regulations** on sustainable ODS / HFC banks management
3. **NDCs** inclusion of HFC (ODS) banks management & emission reduction ambitions
COPA PILOT ACTIVITIES IN

Ghana
China

First COPA partner country

COUNTRY MEMBERS

Tunisia, COPA partner country
Mexico, COPA partner country
Grenada
Dominican Republic
The Gambia
Ecuador
COPA SERVICES

Expertise
- Fostering expertise across all sectors
- Provide access to technical know-how and mutual learning
- Prepare market studies and concepts for the pilot implementation of mitigation measures in diverse regions.

Networking
- Create a platform to network with all relevant actors from private sector, public sector, civil society and academia
- Connect experts on sustainable refrigerant management
- Enable international positioning
- Setting the scene: achieve amplified reach and enhanced impact

Mitigation Action Support
For COPA partner countries:
- Support in conceptualization of mitigation action
- Support in mobilizing finance
- Support in implementing action

Working Groups
The core of COPA’s work is driven by members-led working groups on:
- Policy measures
- Financing mechanisms
- Implementation models
- Recovery, reclamation and destruction technologies for the management of ODS and HFC banks

International Alliance
- Organisation of regular exchange and network meetings
- Participation in international events
- Organisation of Study Tours
- Raising awareness on the topic of ODS and HFC banks through global dialogue and exchange.

Technical Support
- Baseline Assessment
- Project conceptualization
- Implementation Support

Financing Mechanism
- Assistance in applying for international climate finance
- Access funding through COPA financing mechanism

1 COPA partner countries must commit to meeting the minimum criteria of the Climate and Ozone Protection Alliance. For more information, see the section “Become a member.”
BECOME A MEMBER

Find more Information on our [Website](#)

Members gain access to a global network of knowledge and resources. Match-making between actors will be enabled and a flexible array of services provided. The network will amplify the reach of actors and enhance the impact of activities in the field of ODS and HFC banks management.

COPA is open to all countries and organisations, willing to support the global shift to sustainable refrigerant management and closing the loop to a circular economy in the cooling sector.

**Join COPA and become a member**
5. COPA’s offer for complementary action to the MLF
Ellen Michel, GIZ
MLF AND COPA

MLF

- Supporting activities on a national level
- Development of Inventories and action plans; no implementation
- USD $70,000 up to $100,000 per country
- Submission of proposals earliest for Dec 2023 – Dec 2025
- Funding available earliest 2024

COPA

- Focussing on metropolitan regions and sub-sectors
- Development of concrete mitigation measures ready for financing
- Targeting additional funding for implementing measures
- Demonstration of feasibility of different ODS and HFC banks management approaches
- Support available now

Challenge: Relevant to act now and not wait for completed inventories and action plans → COPA activities will not hinder the full use of the funding window
COPA COUNTRY LEVEL SERVICES

COPA member countries will be supported by:

1. Providing standard methodology for inventories and national action plans funded by MLF decision 91/66 funding window

2. Complementing national inventories with status quo analyses in selected urban areas and sub-sectors:
   • Identifying the amounts and location of ODS and HFC banks
   • Analyse existing regulations and collection, transport, storage and destruction / reclamation infrastructure and capacities
   • Determine the gap between amounts of ODS & HFC banks at EOL and current collection, transport & destruction / reclamation capacities

3. Supporting mitigation project design based on inventories and status-quo analyses

4. Formulating NDC mitigation target for ODS / HFC banks sector

5. Mobilizing international finance for implementation

6. Implementing projects
Bank emission reduction is achieved through containment and reclamation or destruction.
RELEVANT PUBLICATIONS AND TOOLS

Global roadmap on ODS bank management (Download)

Updated Guideline to conduct an ODS bank inventory (Download)

Guideline on policy measures for the management and destruction of ODS (Download)

Guideline to establish a collection system for equipment containing ODS (Download)

Guideline for the transboundary movement of ODS waste (Download)
RELEVANT PUBLICATIONS AND TOOLS

Design of a Financing Mechanism for the Climate and Ozone Protection Alliance (Download)

Global Banks of ozone depleting substances. A country-level estimate (Download)

Thermal destruction of (H)CFCs and HFCs (Download)

Banks and Emissions of CFC-11 and CFC-12 (Download)

Guideline on the Manual Dismantling of Refrigerators and Air Conditioners (Download)
RELEVANT PUBLICATIONS AND TOOLS

Poster: Appropriate Dismantling of Refrigerators (Download)
Poster: Appropriate Dismantling of Air Conditioners (Download)
Poster: Key processes to manage ODS banks (Download)
Video: ODS Banks – An unseen threat (Download)
Video: A simple step with great impact: The reclaim process of refrigerants (Download)
QUESTIONS?
6. Guidance on how to conduct an ODS and HFC banks inventory and action plan
Irene Papst, Heat GmbH
CONTENT

• Goal of inventory guideline
• Exemplary procedure
• Methodological approaches
  • Equipment approach
  • Chemical consumption approach
• Waste sources and quality
• Summary
GOAL

• Provide a clear methodology and step-by step inventory guidance to be used by countries
• To achieve comparability across country results

• Include requirements of Decision 91/66
• Propose procedure for full implementation, linking items with existing guidance materials

→ To enable countries to seamlessly integrate COPA-supported action with activities under the MLF funding window
EXEMPLARY PROCEDURE

- Preliminary desk study on available data and regulatory framework and identification of data gaps
- Stakeholder analysis and first stakeholder consultations
- Further data collection and survey to complete ODS/HFC banks inventory, policy analysis, collection and treatment practice and waste quality
- Assessment of technical feasibility of ODS/HFC treatment options, as well as cost estimates. Treatment includes reclamation and destruction
- Action plan development and stakeholder consultations from plan refinement
- Final report
METHODOLOGICAL APPROACHES

• Equipment approach
  • Subsector split, estimating the number of equipment
  • Location of equipment can be integrated
  • Type and amount of refrigerant per equipment type
  → recommended approach

• Chemical consumption approach
  • Detailed understanding of substances for first fill and refill is required
  • Usually not subsector split
EQUIPMENT APPROACH

Step 1: defining the scope

Step 2: understanding the process calculation

Step 3: compiling sources of necessary data

Step 4: processing the data

Step 5: projection of banks
**DEFINING THE SCOPE**

- Use resources well, target large sectors first (use HPMP knowledge for prioritisation, including HFC-dominated sectors)
- COPA suggestion: focus on metropolitan areas with high concentration of ODS/HFC banks

<table>
<thead>
<tr>
<th>Subsector</th>
<th>Systems</th>
<th>Refrigerant</th>
<th>Foam</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unitary air conditioning</strong></td>
<td></td>
<td></td>
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<tr>
<td>Self-contained air conditioners</td>
<td>Commercial ducted splits(*)</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Split residential air conditioners</td>
<td>Rooftop ducted(*)</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Split commercial air conditioners</td>
<td>Multi-splits(*)</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Duct split residential air conditioners(*)</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td><strong>Chillers</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air conditioning chillers(*)</td>
<td>Process chillers*</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td><strong>Mobile AC</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car air conditioning*</td>
<td>Large vehicle air conditioning*</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td><strong>Domestic refrigeration</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic refrigeration</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td><strong>Commercial Refrigeration</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stand-alone equipment</td>
<td>Centralised systems for supermarkets*</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Condensing units*</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td><strong>Industrial Refrigeration</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stand-alone equipment</td>
<td>Centralised systems*</td>
<td></td>
<td>x</td>
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<tr>
<td>Condensing units*</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td><strong>Transport Refrigeration</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Refrigerated trucks / trailers*</td>
<td></td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>
UNDERSTANDING THE PROCESS

• Key parameters
  • Stock (number of equipment units in use)
  • Share of refrigerant/blowing agent (e.g. 40% of equipment stock contains R22 and 60% R410A)

• Stock can be derived from sales data or directly estimated
• Develop sales/stock time series
• Derive substance amounts available for management from equipment reaching its end-of-life using refrigerant charge/blowing agent content and recovery factor
1. Production + Import - Export = Sales figures

2. Extrapolation

3. Sum up sales figures over life time of equipment to get stock figures

4. Stock figures × Initial charge/blowing agent content

5. Empirical data

6. ODS/HFC bank
## COMPILING SOURCES OF NECESSARY DATA

- Use published statistical data as far as possible!
- Literature research, cross-check published data with expert opinions from the field

<table>
<thead>
<tr>
<th>Associations</th>
<th>BSRIA</th>
<th>Institutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufactures</td>
<td>Importers</td>
<td>HPMPs</td>
</tr>
<tr>
<td>Distributors</td>
<td>JARN</td>
<td>Custom Dept.</td>
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<tr>
<td>Nat. Statistic</td>
<td>Ministries</td>
<td>…</td>
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## PROCESSING THE DATA

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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales figures</td>
<td>100</td>
<td>200</td>
<td>300</td>
<td>400</td>
<td>500</td>
<td>600</td>
<td>700</td>
<td>800</td>
<td>900</td>
<td>1,000</td>
<td>1,100</td>
<td>1,200</td>
<td>1,300</td>
<td>1,400</td>
<td>1,500</td>
</tr>
</tbody>
</table>

Stock = \[ \sum_{i=2009}^{2023} \text{Sales figures} = 12,000 \text{ units} \]

ODS/HFC banks = Stock * initial charge
= 12,000 units * 1 kg = 12,000 kg

ODS/HFC potentially available for management = Sales figures\(i=2009\) * initial charge
= 100 units* 1 kg = 100 kg

ODS/HFC effectively available for management = ODS potentially available for management * recovery rate
= 100 kg * 5% = 5 kg
Apply linear interpolation to estimate annual data points, apply suitable equipment lifetime as developed in step 4

Stock = e.g. in 2030

$$\sum_{i=2030-LT}^{2030} \text{Sales figures}$$

ODS/HFC banks = Stock * initial charge

ODS/HFC potentially available for management = Sales figures$_{i=\text{projection year-LT}}$ * initial charge

ODS/HFC effectively available for management = ODS potentially available for management * recovery rate
CHEMICAL CONSUMPTION APPROACH

• Similar logic, but chemical consumption instead of equipment sales/stock is used

• Information is mostly available from HPMP/KIP
  • Split between first fill and refill is required!
  • Account for pre-charged imported and exported equipment

• Less information on location of banks (which is an important aspect for management plans)

→ Recommended as cross-check to equipment approach
WASTE SOURCES AND QUALITY

• Detailed survey on current collection practices, available recovery tools and infrastructure

• Questions proposed for

  • RAC technicians

  • Collection centers/refrigerant distributors, if applicable

Do you have the necessary equipment to collect refrigerants?

What happens to refrigerant that is not recycled on-site?

Are cylinder cleaning facilities available?

What cylinders are used for this recovery?

Who pays for your extra time that you need for recovery?
## REQUIRED TIME AND EFFORT?

<table>
<thead>
<tr>
<th>Item</th>
<th>Recommended resource share of total</th>
<th>Estimated expert days required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preliminary desk study on available data and regulatory framework</td>
<td>10%</td>
<td>4-13</td>
</tr>
<tr>
<td>Gap analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stakeholder analysis</td>
<td>5%</td>
<td>2-5</td>
</tr>
<tr>
<td>Stakeholder consultation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data collection and survey</td>
<td>35%</td>
<td>14-96</td>
</tr>
<tr>
<td>Development of plan, Draft report</td>
<td>50%</td>
<td>25-110</td>
</tr>
<tr>
<td>Stakeholder consultation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final report</td>
<td>100%</td>
<td>45-224</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SUMMARY/ENCOURAGEMENT

- The emission mitigation potential from end-of-life refrigerant management is high
- Data collection and inventory work is time-consuming but essential for policy and action plan
- Using similar methodologies aids the comparability of results
- COPA and MLF funded activities can complement each other
- The time to act is now!
New COPA Publication available now:

GUIDELINE TO CONDUCT AN INVENTORY
OF USED OR UNWANTED CONTROLLED
SUBSTANCES: ODS AND HFC BANKS

Available for download here
7. Q&A
All participants
By joining COPA, members gain access to a global network of knowledge and resources. Match-making between actors will be enabled and a flexible array of services provided. The network will amplify the reach of actors and enhance the impact of activities in the field of ODS and HFC banks management. COPA is open to all countries and organisations, willing to support the global shift to sustainable refrigerant management and closing the loop to a circular economy in the cooling sector.

**Join COPA and become a member**
THEMATIC WORKING GROUPS

OUR WORKING GROUPS
Together with partners and stakeholders from academia, the private sector, civil society and policy makers, we are working on the following topics:

Policy Framework
For an effective management of refrigerants and foams at end-of-life, suitable policy measures are required like venting bans or mandatory recovery.

Technology Solutions
Working towards the best technical solutions for ODS and HFC recovery, reclamation and destruction.

Financing Mechanism
The infrastructure for and operation of a collection scheme and the destruction or reclamation of ODS and HFCs needs to be based on a sustainable financing mechanism.

Implementation Models
Putting theory into practice and demonstrating how sustainable refrigerant management can be implemented.
THANK YOU FOR YOUR PARTICIPATION
CONTACT

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Lara.teutsch@giz.de