



Sustainable ODS and HFC banks management through complementary action of the Climate and Ozone Protection Alliance to the Multilateral Fund

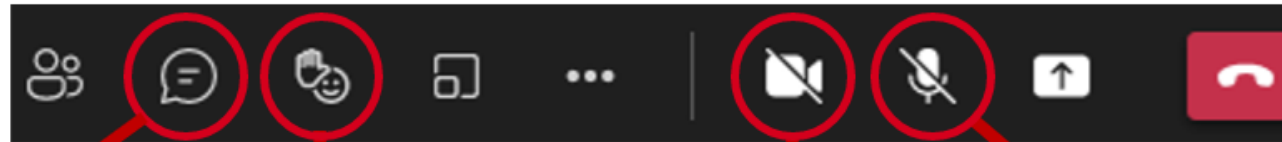
9 May 2023



1. Opening

Lara Teutsch, GIZ

GROUND RULES FOR ONLINE SESSIONS



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.

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

AGENDA

Opening	Lara Teutsch, COPA Secretariat
Welcome Remarks	Rachel Pekker, German Federal Ministry for Economic Affairs and Climate Action
04:15 – 04:30 MLF funding window for activities related to banks of used or unwanted controlled substances	Irene Papst, HEAT GmbH
04:30 – 04:40 Introduction to COPA	Ellen Michel, COPA Secretariat
04:40 – 04:50 COPA´s offer for complementary action to the MLF	Ellen Michel, COPA Secretariat
04:50 – 05:10 Guidance on how to conduct an ODS and HFC banks inventory and action plan	Irene Papst, HEAT GmbH
Q&A	All participants



2. Welcome Remarks

Rachel Pekker, BMWK



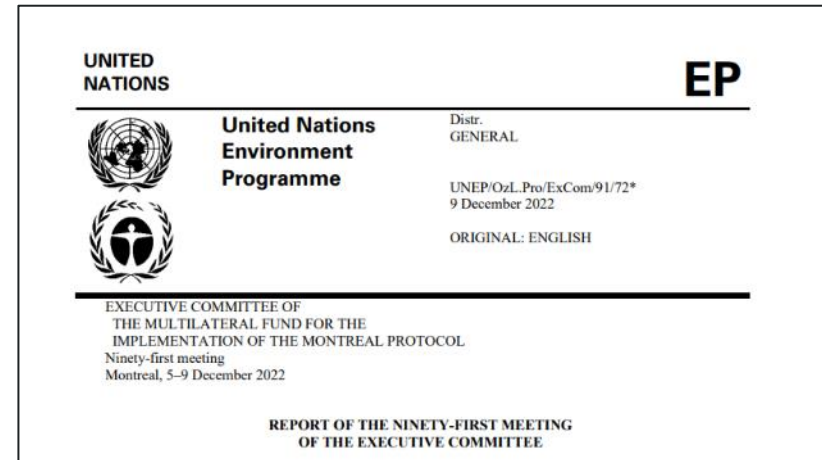
3. MLF funding window for activities related to banks
of used or unwanted controlled substances
Irene Papst, HEAT GmbH

FUNDING OPPORTUNITY FOR STUDYING BANKS FOR USED OR UNWANTED CONTROLLED SUBSTANCES

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

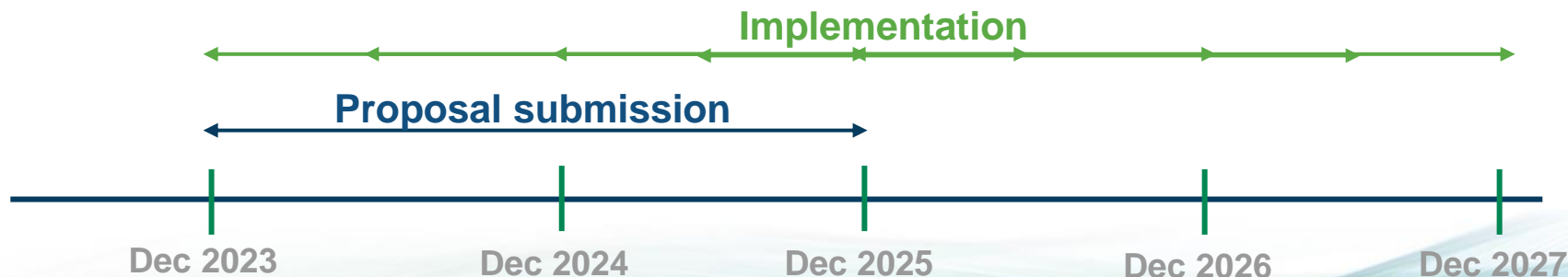
- Scope
- Criteria
- Funding levels
- Time line

for funding of an ODS/HFC banks inventory and an action plan for collection and treatment.



TIME LINE

- 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

HCFC baseline (ODP tonnes)	Funding level (US \$)	Number of Art. 5 countries
Below 1	70 000	21
Between 1 and 6	80 000	37
Above 6 and up to 100	90 000	62
Above 100	100 000	27

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)

SUMMARIZED GUIDANCE (DOC 91/66) (2)

Methods to be used

Transparent methodology

Coordinated with national phase out/down plans

Stakeholder engagement on objective of inventory and methodology and validation for results

Desk study on existing data to be used for ODS/HFC banks inventory

Additional data collection (depending on national circumstances), potentially focussing on

- waste sources
- collection practices (including informal sector)

SUMMARIZED GUIDANCE (DOC 91/66) (3)

Outcomes to be derived

Required policies and regulations incl. on transboundary movement if required for the export of ODS/HFCs (also in relation to policy development under KIP)

Action plan for effective collection, transport, storage and setting up the infrastructure for recycling and reclamation including a tracking system

Business plan for collection and treatment

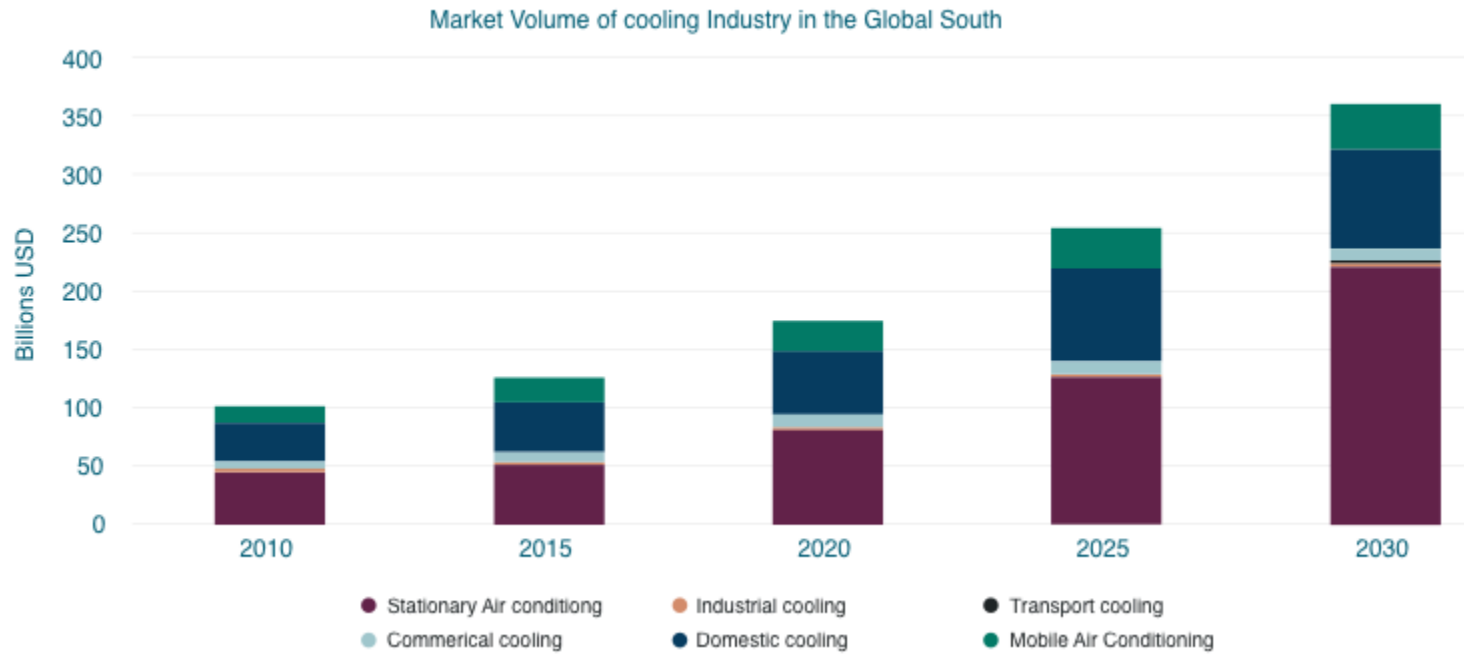
QUESTIONS?



4. Introduction to COPA

Ellen Michel, GIZ

THE CHALLENGE



Source: own research, HEAT GmbH

GHG EMISSIONS FROM GLOBAL ODS AND HFC BANKS

	Current	Through 2050	Through 2100
Global ODS & HFC Refrigerants banks (GtCO ₂ e)	24	61	91

„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.

Policy
Framework

Financing
Mechanism

Collection
Infrastructure

Recycling
and
Destruction
Infrastructure

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.

Implemented by:



In cooperation with:



Supported by:



on the basis of a decision
by the German Bundestag

COPA COOPERATION WITH MEMBER COUNTRIES

COPA

empowers member country to manage refrigerants and thereby substantially mitigate CO₂ 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

Year
1

Year
2

Year
3

Year
4

Year
5

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 MEMBERS



COPA SERVICES

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 ¹:

- Support in conceptualization of mitigation action
- Support in mobilizing finance
- Support in implementing action

COPA Tools

Working Groups

The core of **COPA's** work is driven by member-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

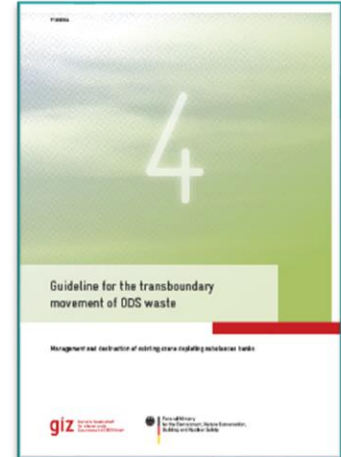
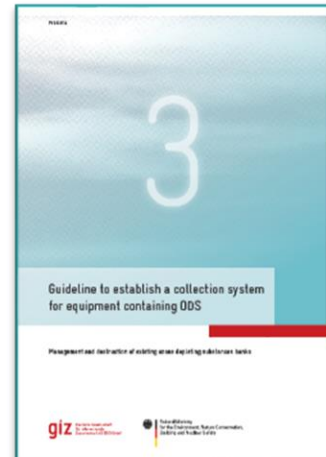
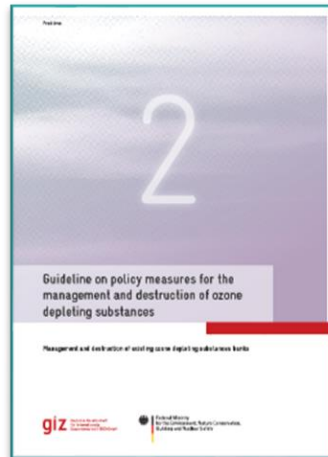
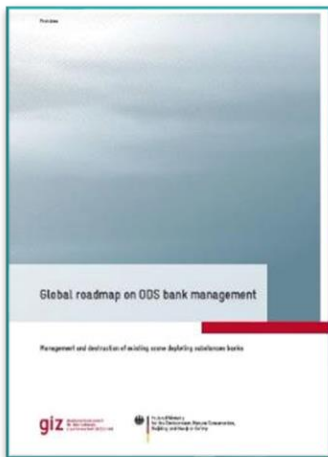
COPA member countries will be supported by:

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**

- 1) Establishing a collection system of ODS and HFC in a metropolitan area
- 2) Establish an electronic database or registry for monitoring leakage control of F-gases
- 3) Appliance recovery and recycling/reclaim of ODS and HFCs
- 4) Recycling or destruction of foam that contains ODS and HFC
- 5) Launching a reclamation center
- 6) Export of ODS and HFC for destruction abroad
- 7) Open a facility for domestic destruction of ODS and HFCs

RELEVANT PUBLICATIONS AND TOOLS



Global roadmap on ODS bank management ([Download](#))

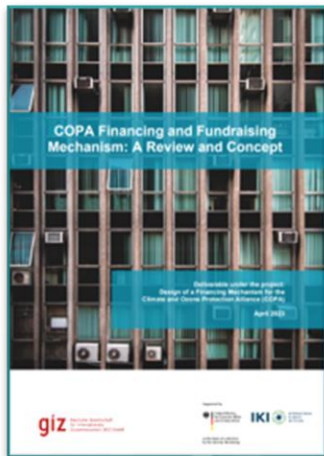
Updated Guideline to conduct an ODS bank inventory ([Download](#))

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

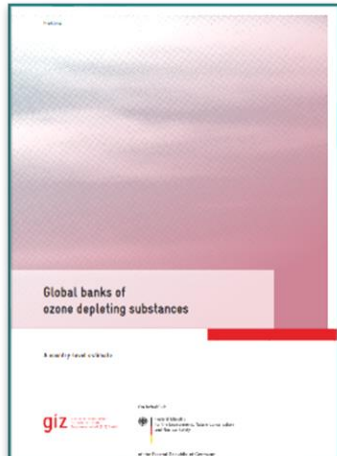
Guideline to establish a collection system for equipment containing ODS ([Download](#))

Guideline for the transboundary movement of ODS waste ([Download](#))

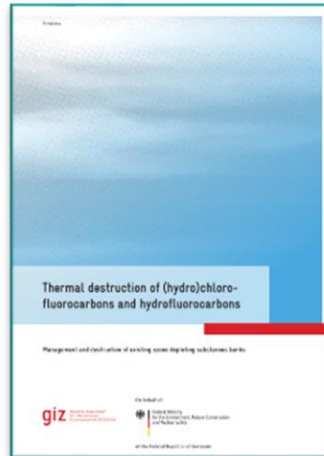
RELEVANT PUBLICATIONS AND TOOLS



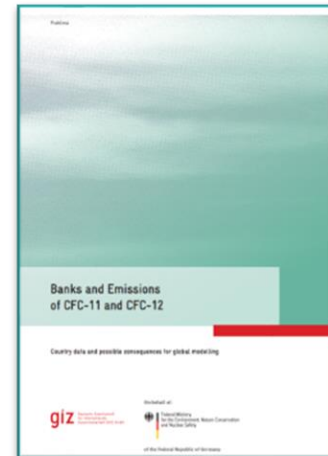
Design of a Financing Mechanism for the Climate and Ozone Protection Alliance
([Download](#))



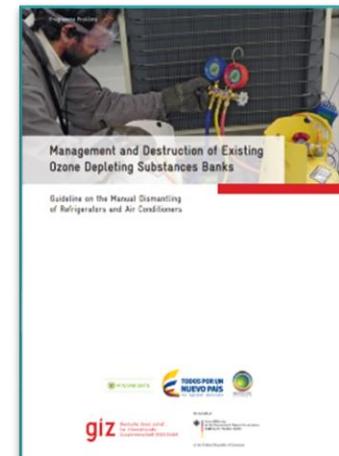
Global Banks of ozone depleting substances.
A country-level estimate ([Download](#))



Thermal destruction of (H)CFCs and HFCs
([Download](#))

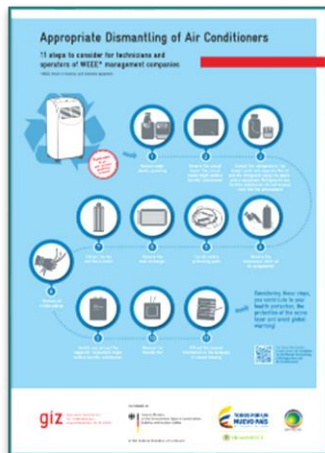
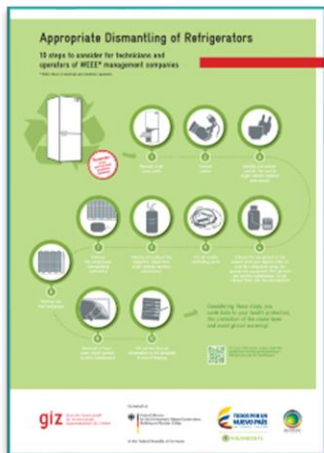


Banks and Emissions of CFC-11 and CFC-12
([Download](#))



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

Inventory guideline

- 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

Other guidelines

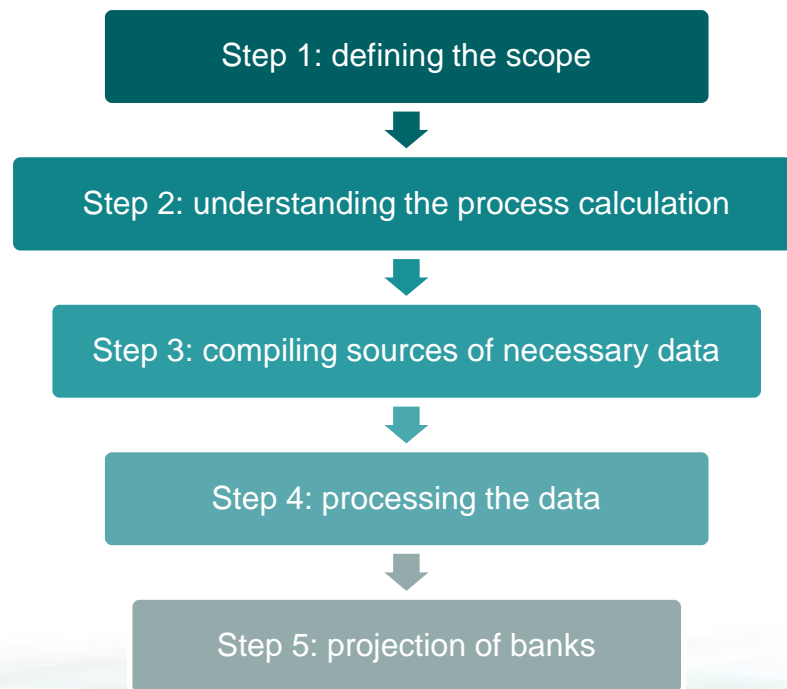
- Final report

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



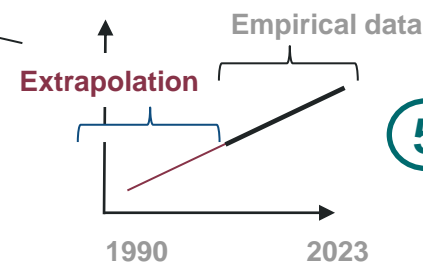
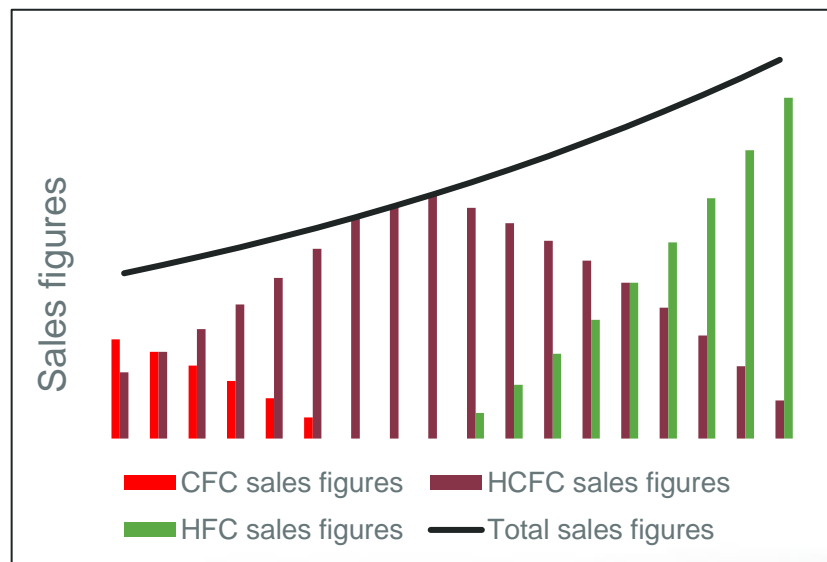
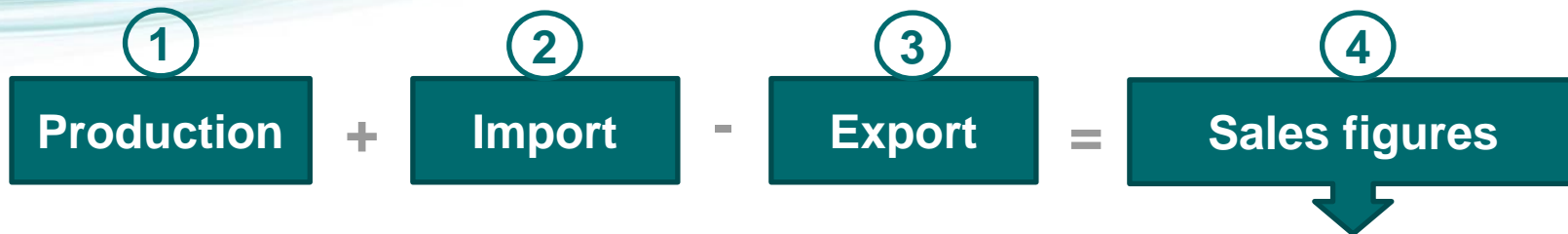
DEFINING THE SCOPE

- 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

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

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



⑤

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



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

Associations

BSRIA

Institutes

Manufactures

Importers

HPMPs

Distributors

JARN

Custom Dept.

Nat. Statistic

Ministries

...

PROCESSING THE DATA

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
	100	200	300	400	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500

$$\text{Stock} = \sum_{i=2009}^{2023} \text{Sales figures} = 12.000 \text{ units}$$

$$\begin{aligned} \text{ODS/HFC banks} &= \text{Stock} * \text{initial charge} \\ &= 12.000 \text{ units} * 1 \text{ kg} = 12.000 \text{ kg} \end{aligned}$$

$$\begin{aligned} \text{ODS/HFC potentially available for management} &= \text{Sales figures}_{i=2009} * \text{initial charge} \\ &= 100 \text{ units} * 1 \text{ kg} = 100 \text{ kg} \end{aligned}$$

$$\begin{aligned} \text{ODS/HFC effectively available for management} &= \text{ODS potentially available for} \\ &\quad \text{management} * \text{recovery rate} \\ &= 100 \text{ kg} * 5\% = 5 \text{ kg} \end{aligned}$$



PROJECTION OF BANKS

Year	2023	2024	2025	2030	2035	2040	2045	2050	
Sales	1500	$1500 \cdot (1+g)$	$1500 \cdot (1+g)^2$	$1500 \cdot (1+g)^7$	$1500 \cdot (1+g)^{12}$	$1500 \cdot (1+g)^{17}$	$1500 \cdot (1+g)^{22}$	$1500 \cdot (1+g)^{27}$	Estimate sales figures based on estimated annual growth g
Refrigerant share e.g. 410A in split ACs	80%	65%	50%	5%	0%	0%	0%	0%	Estimate share based on trends and KIP

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

$$= \text{Stock} * \text{initial charge}$$

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?

What cylinders are used for this recovery?

Are cylinder cleaning facilities available?

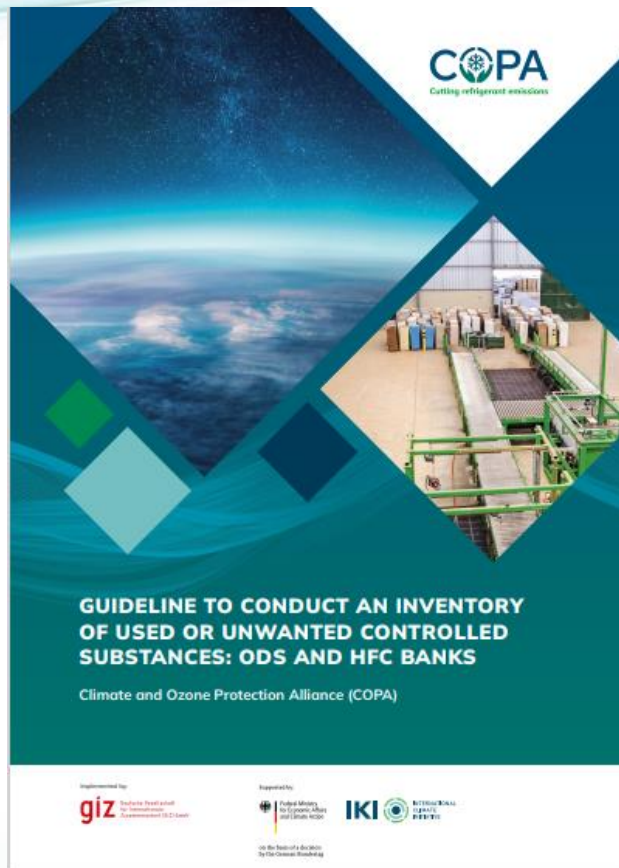
Who pays for your extra time that you need for recovery?

REQUIRED TIME AND EFFORT?

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

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

BECOME A MEMBER

Find more Information on our [Website](#)



CLIMATE & OZON PROTECTION

OUR WORK

NETWORK

RESSOURCES

NEWS & EVENTS



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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