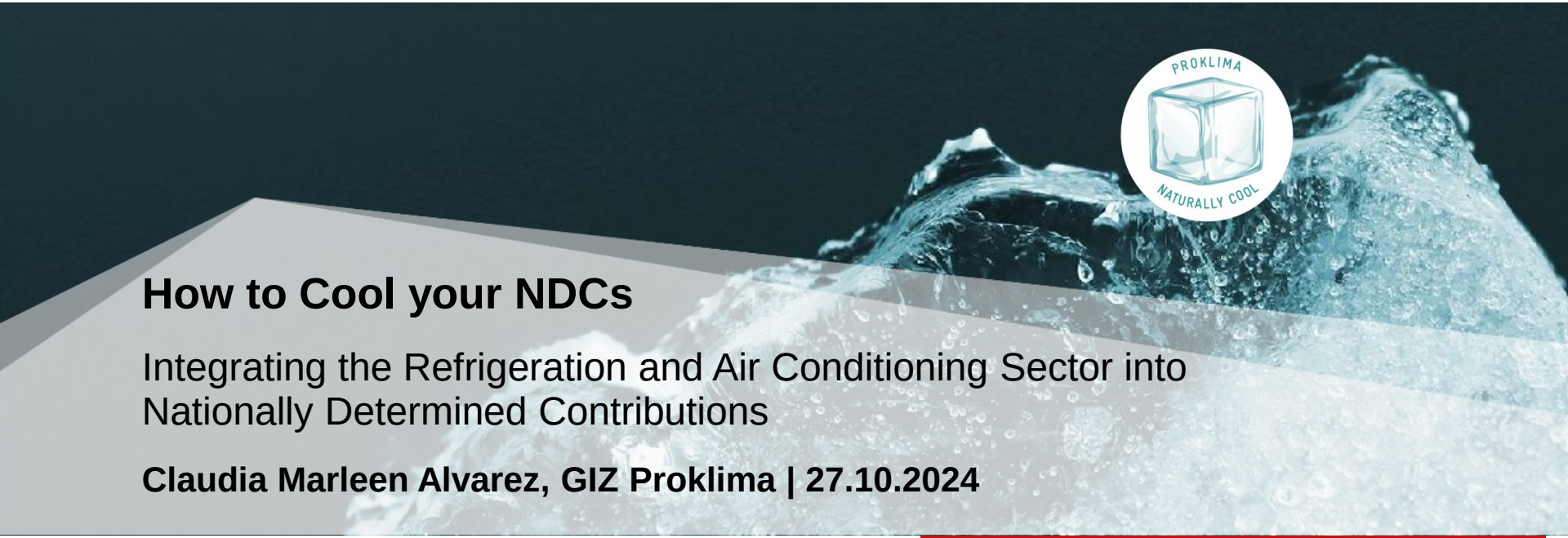


How to Cool your NDCs

Integrating the Refrigeration and Air Conditioning Sector into Nationally Determined Contributions

Claudia Marleen Alvarez, GIZ Proklima | 27.10.2024

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection

Federal Ministry for Economic Cooperation and Development

Supported by:

Federal Ministry for Economic Affairs and Climate Action

IKI INTERNATIONAL CLIMATE INITIATIVE

on the basis of a decision by the German Bundestag

Our **vision** is to create

a **future worth living** around the world.

GIZ are a service provider in the field of international cooperation for sustainable development and international education work

- We support the German Government in achieving its objectives in the field of **international cooperation for sustainable development**.
- We promote **international education work and human capacity development.**
- As a **public-benefit federal enterprise**, we uphold **German and European values**.
- We **are a company under private law** and have a taxable business area **GIZ International Services** alongside our **public-benefit** business area.

Proklima:

We are united on one goal: the **transformation of the cooling sector** – for the benefit of people, the environment, and our shared future.

GIZ Proklima: making cooling a hot topic since 1995

- Implement **ozone and climate protection** projects under the **Montreal Protocol** and the **Kigali Amendment**
- Support **cooling pledge** activities in the **Paris Agreement** and the **SDGs**
- Focus: introducing **natural refrigerants** and **energy-efficiency** in the refrigeration and air conditioning (RAC) sector

→ **Reducing GHG and ODS emissions*** globally

*GHG = Greenhouse gases
*ODS = Ozone depleting substances

What sets us apart

Innovation

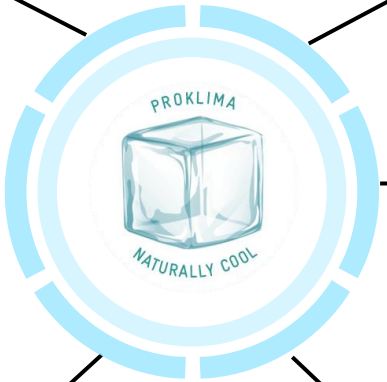
We only recommend sustainable solutions and a direct switch to **natural refrigerants**

International staff

More than **50 GIZ Proklima colleagues** are working around the world to promote Green Cooling solutions

Experience

25+ years experience in more than **40 countries**



A one-stop shop

Advisory services and **implementation**

Networking

Our well-established network and our multi-stakeholder alliances reach **more than 3000** political decision makers, businesses, academia and civil society actors worldwide

Hands-on technical expertise

In **climate-friendly** and **energy-efficient** cooling technologies

What is Proklima doing?

Avoiding emissions by "leapfrogging" to Green Cooling

Objectives of this session on the RAC sector in NDCs

This session seeks to

1. provide **guidance** on how to appropriately cover the cooling sector in a NDC;
2. address the question how the **ambition** of cooling sectors targets can be **increased** once the NDC is updated
3. provide **tools** and to explain how to use them

- Key elements for the development of holistic approaches to address RAC sector emissions
- Approaches how to select most relevant and effective policy instruments
- Overview of the latest technology trends and technical possibilities for key sub-sectors and appliances
- Design of an integrated cooling sector strategy in line with the Kigali Amendment and the Paris Agreement
- References to relevant publicly available information resources and best practice examples

Why cooling concerns us all

- Cooling sector responsible for 4,4 Gt CO2eq in 2020 (Dong et al. 2021)
- The number of air conditioners worldwide is expected to increase from **1.6 billion** in 2016 to **3.7 billion** by 2050. (IEA, 2018)
- If not addressed, HFC emissions could cause a global temperature increase of **0.35 to 0.5°** Celsius. (Velders et al. 2015, Xu et al. 2013)

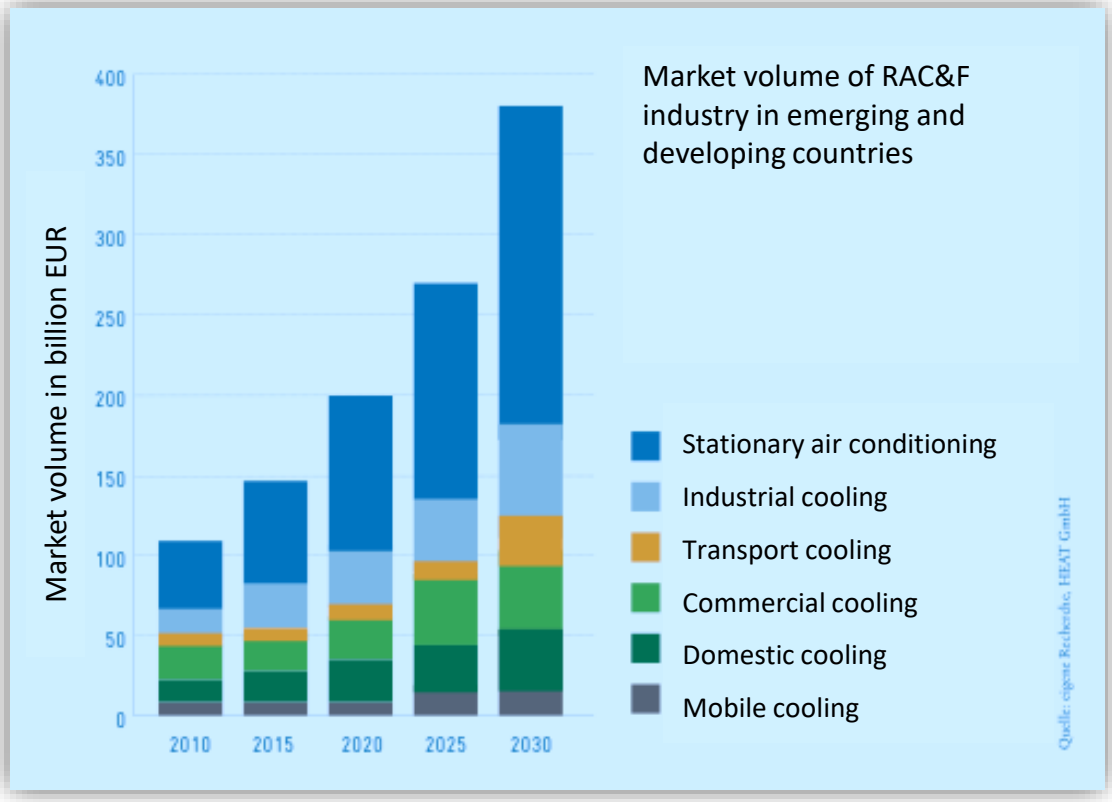
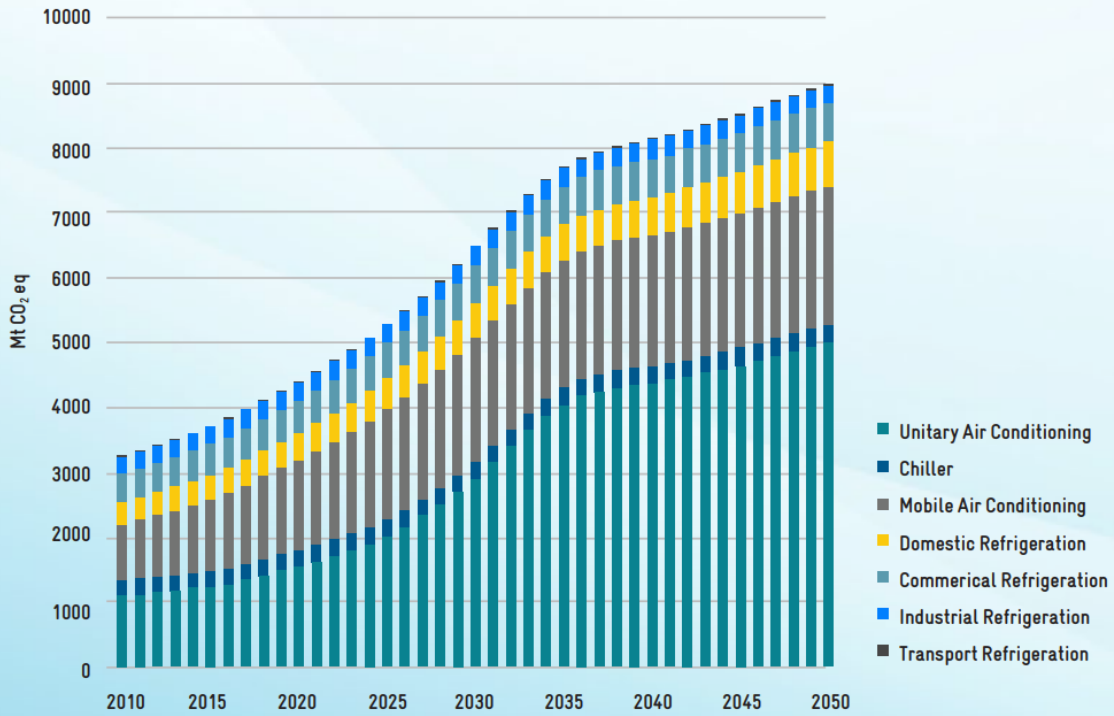


Figure 1: Projected GHG emissions from RAC sector



Source: GCI 2013a

Key measures and technology options

Key measures to reduce direct and indirect emissions include

- Reducing cooling load (long-term) through adequate housing (insulation, shading, cool roofs, other passive cooling options)
- Shifting to natural refrigerants
- Using efficient cooling appliances, electrified by an increasing share of renewable energy
- Improving the management of HCFC and HFC banks to reduce emission during servicing and at end-of-life

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Focus on mass-produced appliances for **room ACs, domestic refrigeration and commercial plug-in refrigerators**


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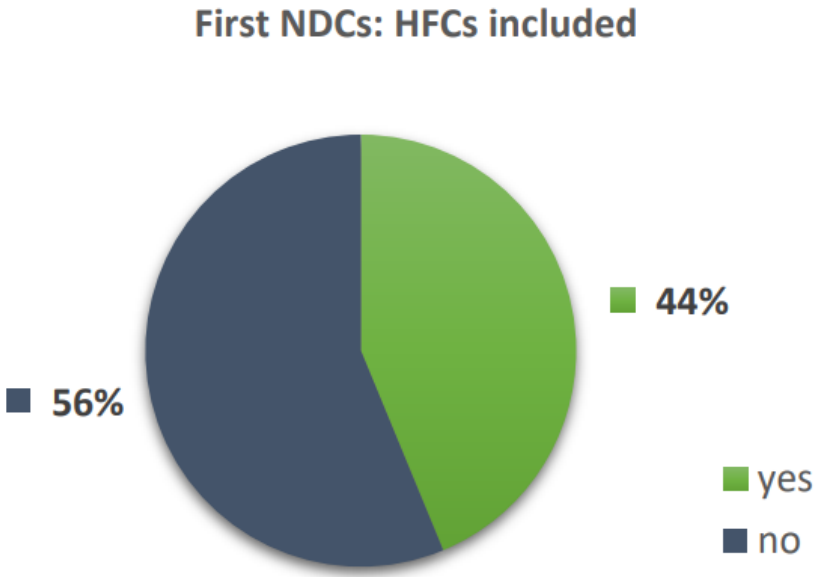
Background

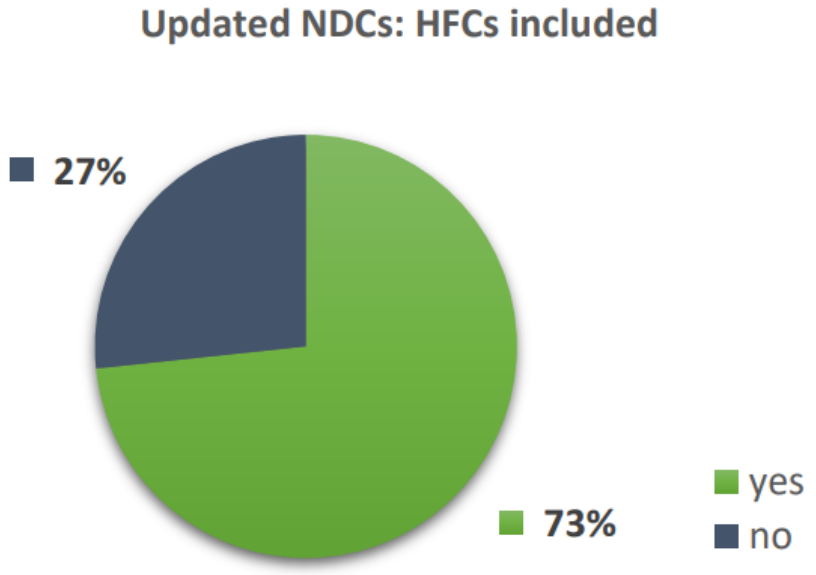
Integration of the RAC Sector in NDCs - Where do we stand?

1. Many countries have recognised the **importance of HFCs and the cooling sector** in the context of their climate targets.
2. **More than half of the enhanced NDCs** submitted to UNFCCC **mention the cooling sector**.
3. Still **few countries present detailed plans and measures** including holistic approaches in their climate targets.
4. There are **several good practice examples** that can be used as role models.
5. The **alignment of mitigation targets under the Paris Agreement and the Kigali Amendment is (still) not addressed** by most countries in their NDCs.

Source: GIZ 2018/ © nikomsolftwaer / adobe.stock.com

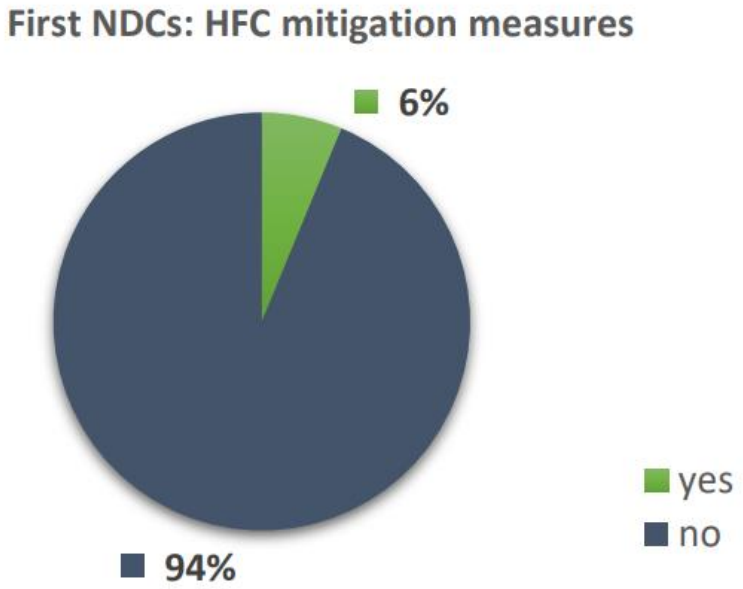
Integration of the RAC Sector in NDCs - Where do we stand?

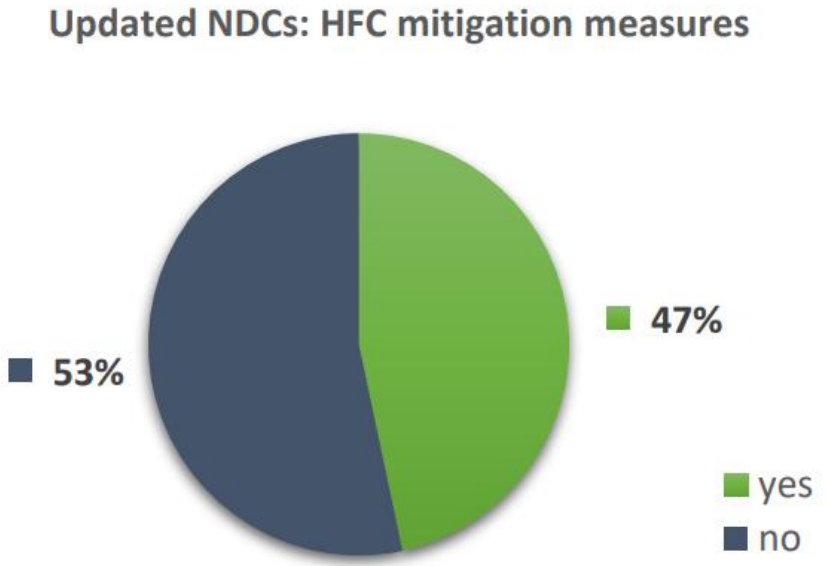




Source: GCI Publication

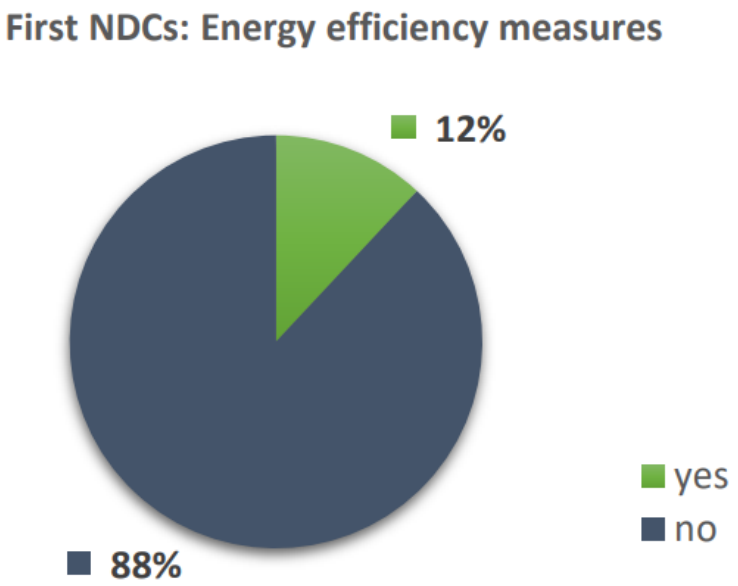
Integration of the RAC Sector in NDCs - Where do we stand?

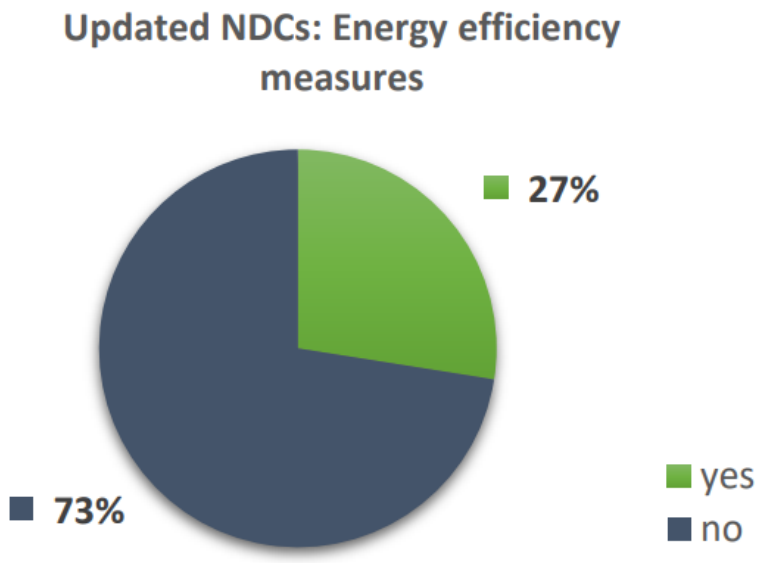




Source: GCI Publication

Integration of the RAC Sector in NDCs - Where do we stand?





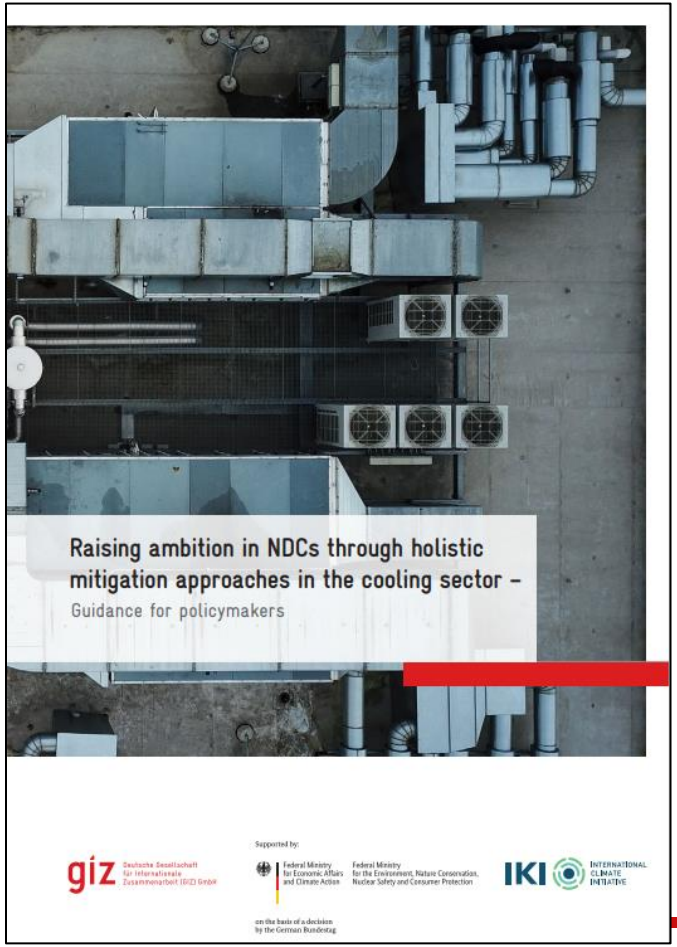
Source: GCI Publication

Guidance for policymakers

Get started with our guidance for policy makers

→5 steps for integrating the cooling sector into NDCs

→Find it via this link



Steps towards ambitious RAC sector NDC components

STEP 1

Solid data base, ideally in the form of a detailed RAC sector GHG inventory

STEP 2

Comprehensive cooling sector mitigation approach including long-term strategies and implementation plans

STEP 3

Anchoring of the cooling sector in the NDC update process, based on **specific NDC components** developed by cooling sector representatives

STEP 4

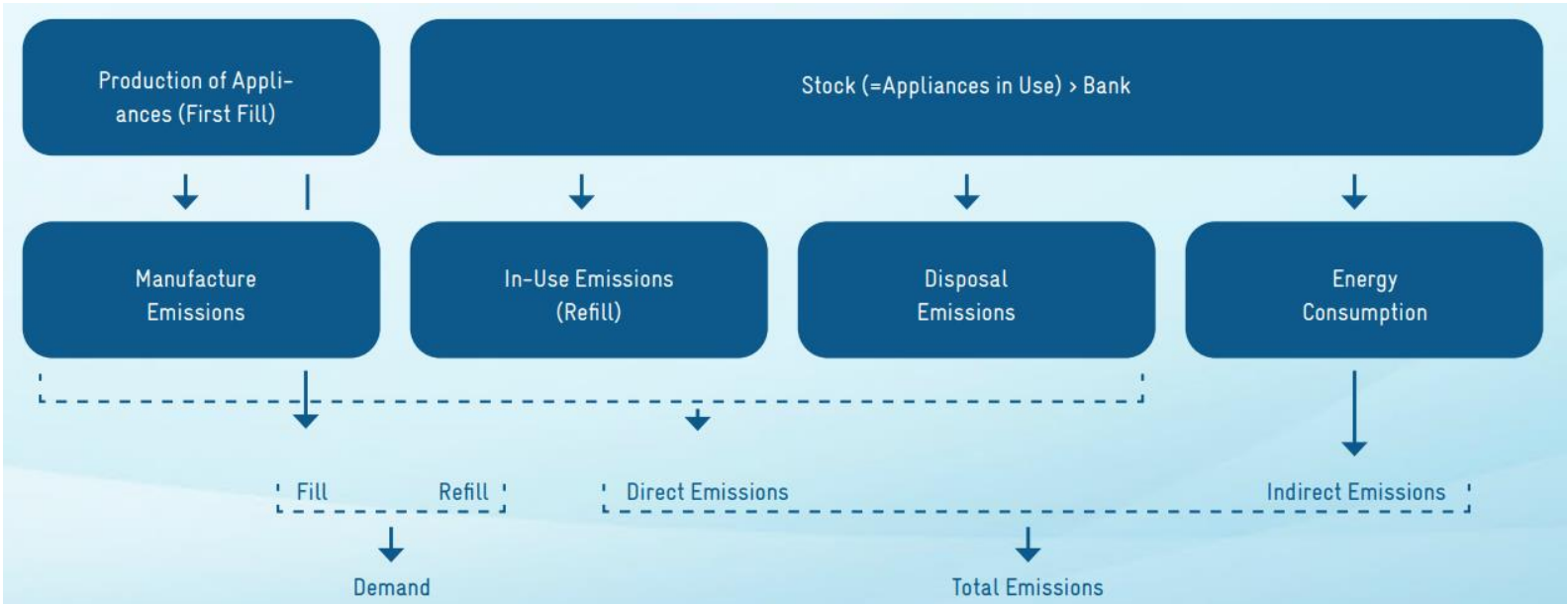
Linkage of cooling sector related mitigation measures and plans with other relevant sectors and targets and **coordination with the respective (govt.) actors.**

STEP 5

Development of a **tracking and MRV systems for HFC emissions** that is in line with the requirements of both agreements, the Montreal Protocol and the Paris Agreement

STEP 1

Solid data base, ideally in the form of a detailed RAC sector GHG inventory



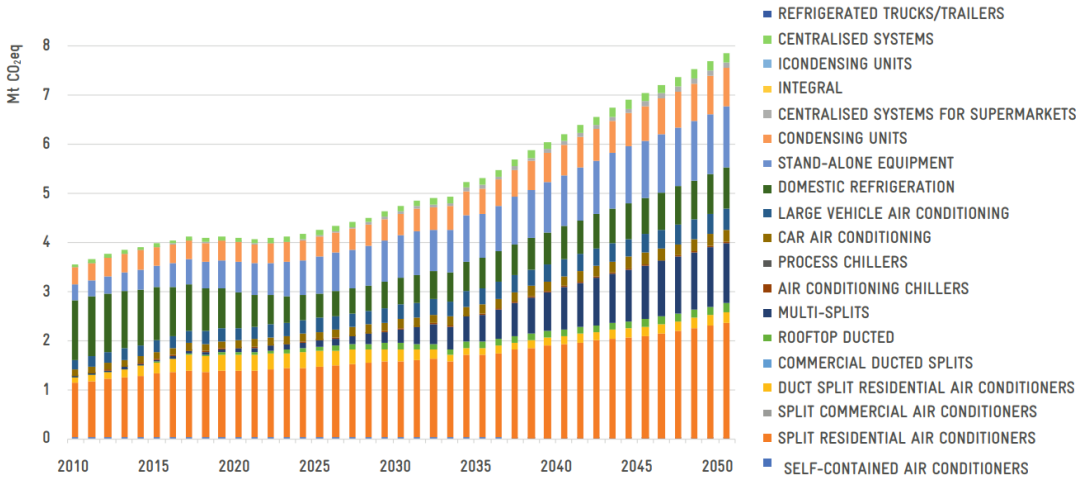
STEP 1

Solid data base, ideally in the form of a detailed RAC sector GHG inventory

Best Practice Kenya

- Detailed analysis of RAC unit sales for each sector and used refrigerants
- Estimation of direct and indirect emissions
- Projections of future sales and emission development

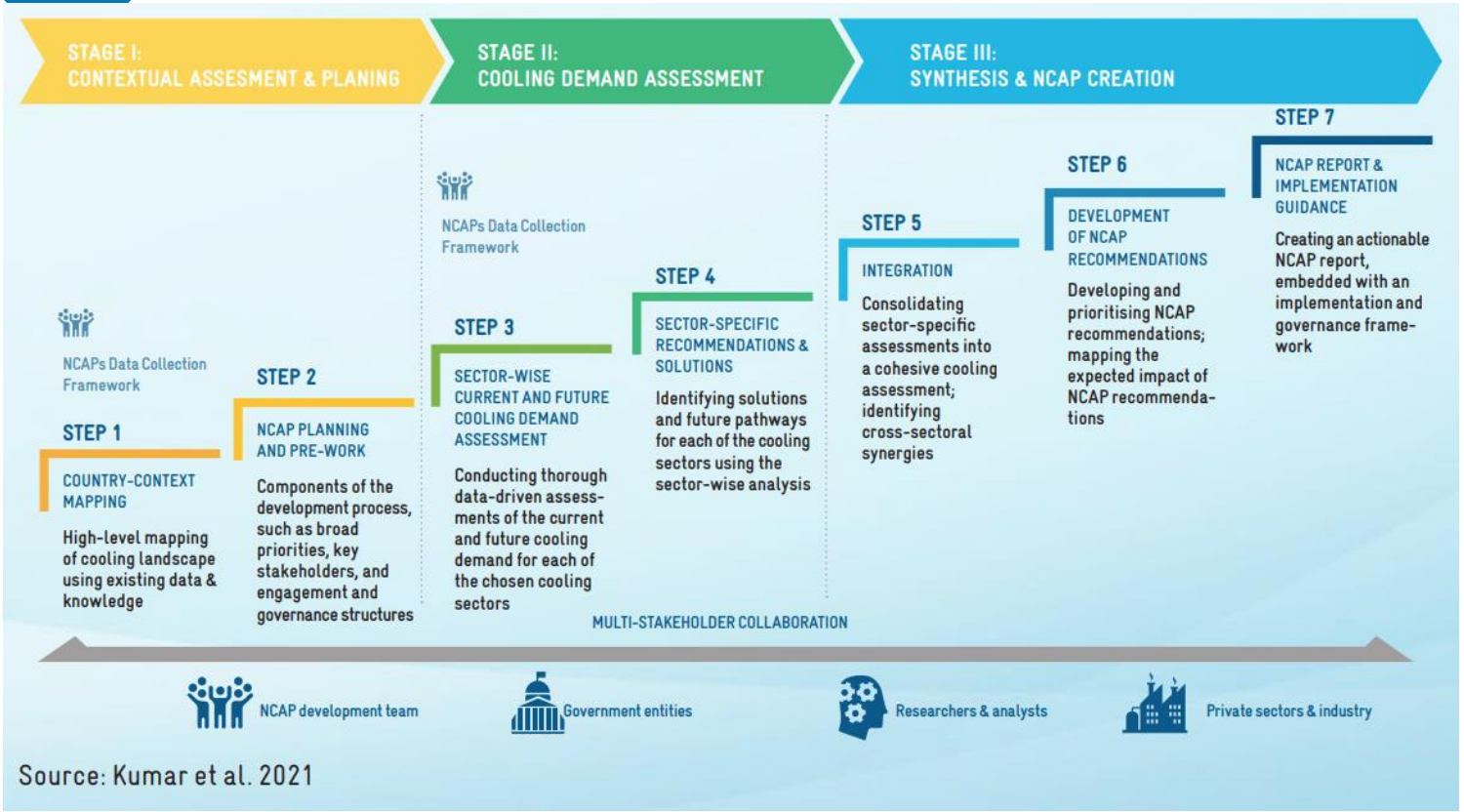
Methodologies explained in the GCI NDC Guidelines and self-analysis possible with our Benchmarking Tool



Source: GCI GHG Inventory Kenya

STEP 2

Comprehensive cooling sector mitigation approach including long-term strategies and implementation plans



STEP 2

Comprehensive cooling sector mitigation approach including long-term strategies and implementation plans

Best Practice Ghana

- Identification of involved stakeholders and key barriers
- Development of possible policy measures
- Long term strategies for different categories (ee, refrigerants, MRV)
- Estimation of GHG mitigation quantities
- Identification of financing options

Source: GCI RAC Roadmap Ghana

STEP 3

- **Anchoring of the cooling sector** in the NDC update process, based on **specific NDC components** developed by cooling sector representatives

Emphasize the importance of mitigation measures and link them with other strategies:

- Kigali Implementation Plan (KIP)
- National Action Cooling Plan (NCAP)
- Energy Efficiency strategy

Communication and a joint decision making by all key stakeholders is needed.

Affecting energy efficiency?	Reducing refrigerant emissions?	Conditional?
Cross-cutting action?	?	Unconditional?

STEP 3

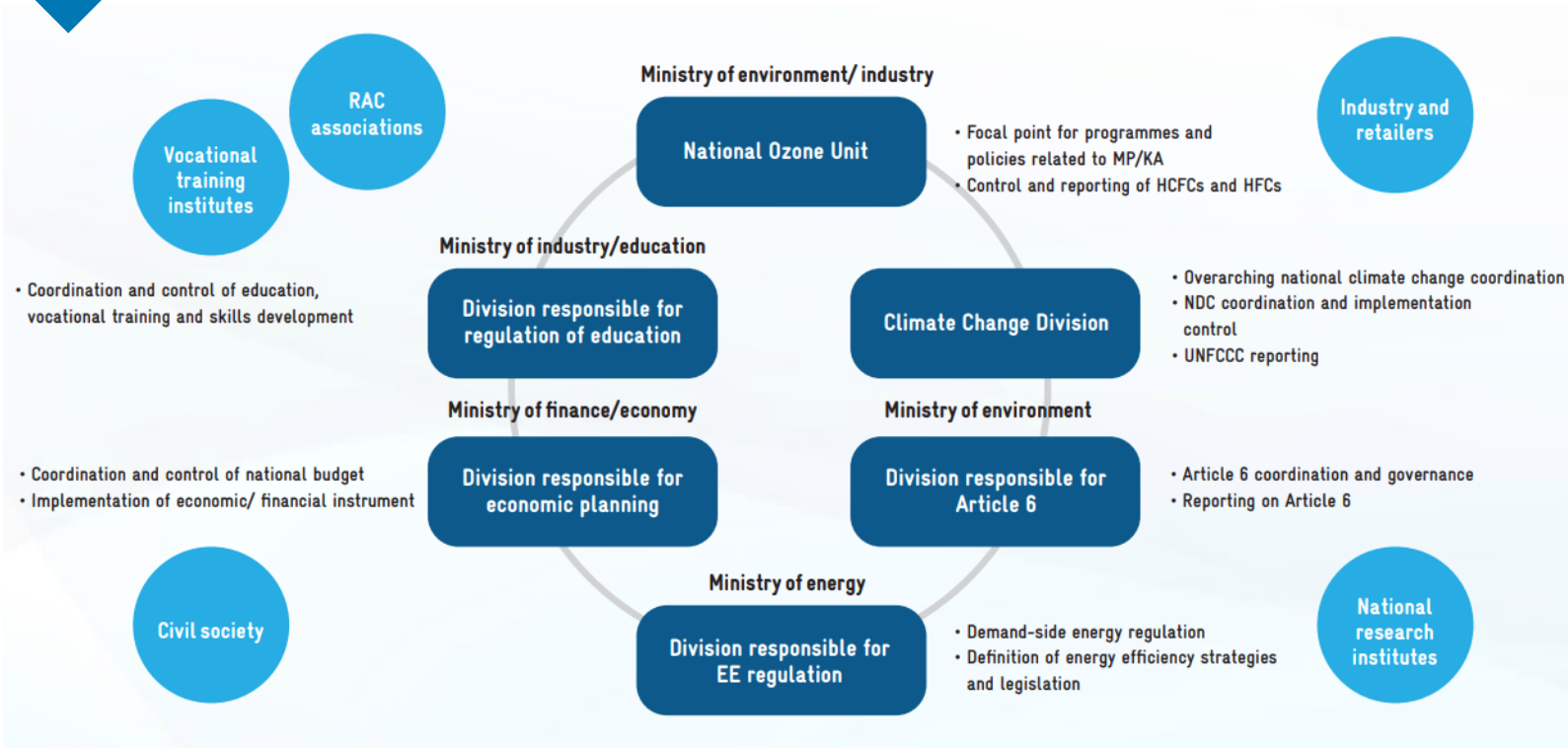
- **Anchoring of the cooling sector** in the NDC update process, based on **specific NDC components** developed by cooling sector representatives

Best Practice Namibia

Description of measures and actions		Year	Emissions reduction	Cost (M USD)
IPPU – Measure 3. Product Uses as Substitutes for Ozone Depleting Substances – Refrigeration and air conditioning – Reduced use of HFCs				
1. Recovery of refrigerant gas from 10% of retiring equipment and introduction of alternatives with low GWPs in new equipment		2030	0.066	6
Indicator/s	No. of new equipment with low GWP refrigerants; Quantity of refrigerants recovered at retirement of equipment			
Benefits	Lower emissions; Job creation			

STEP 4

- **Linkage of cooling sector related mitigation measures** and plans with other relevant sectors and targets and **coordination with the respective (govt.) actors.**



STEP 4

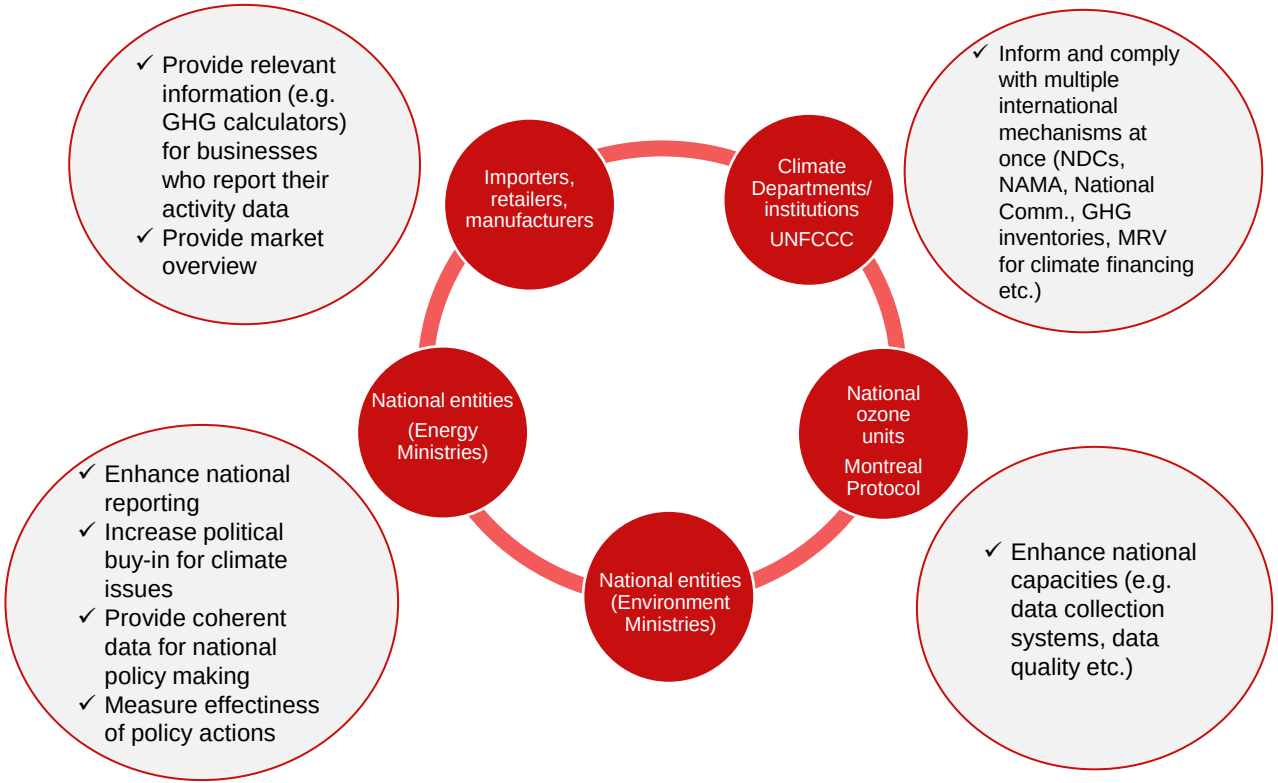
- **Linkage of cooling sector related mitigation measures** and plans with other relevant sectors and targets and **coordination with the respective (govt.) actors.**

The linkage of cooling sector-related mitigation measures and plans with other relevant sectors and targets set for them, especially the building sector and demand side energy efficiency, including the consideration of institutional structures and coordination with the respective (governmental) actors.

Power sector	•Decarbonisation •Energy efficiency
Housing policies	•Insulation requirements for efficient cooling •City planning to avoid heat island effects •Promotion of natural ventilation
Adaptation	•Reduce food losses due to improved cold chain •Protect health during heat-waves •Increase productivity by improving thermal comfort

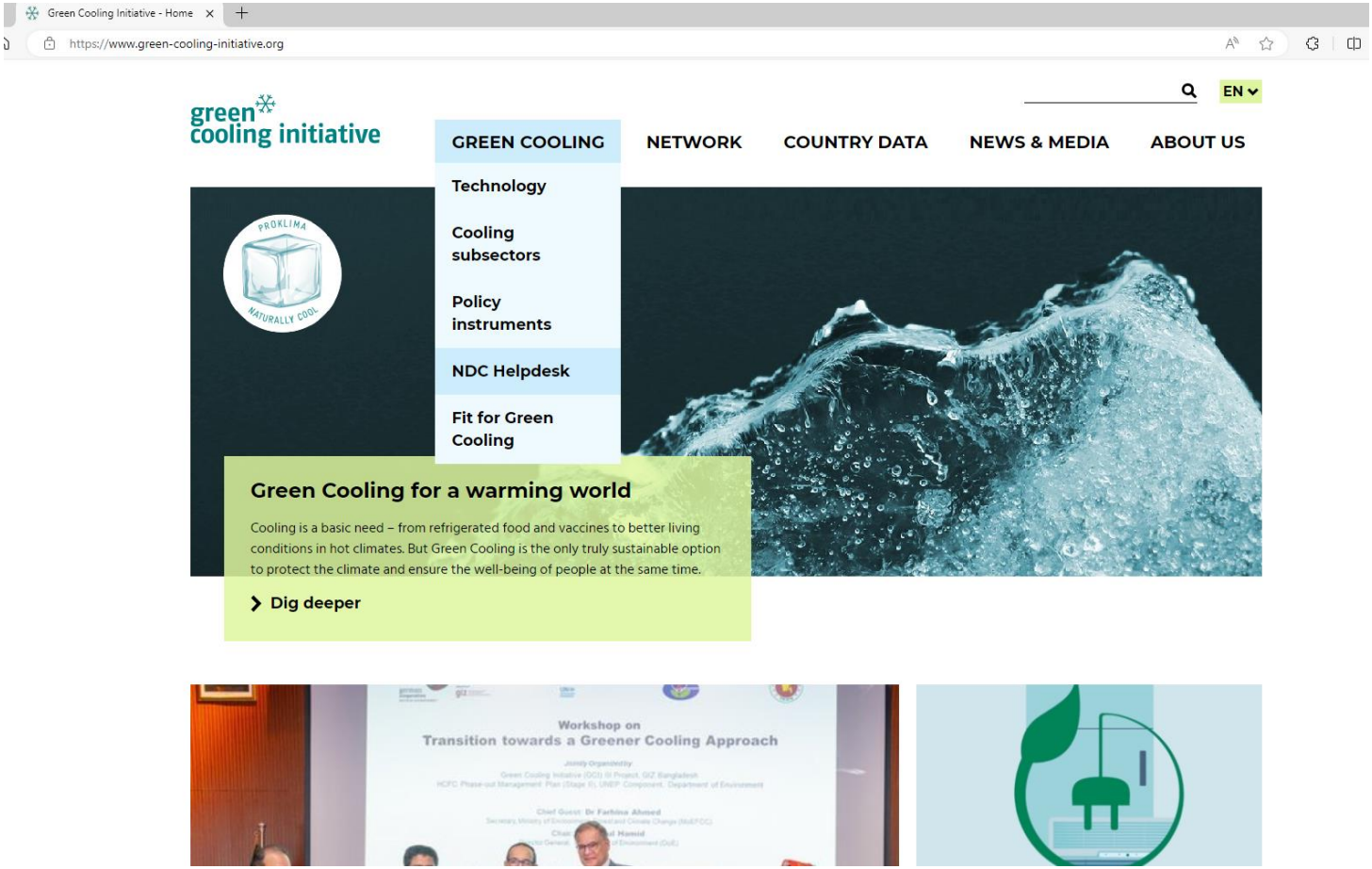
STEP 5

- Development of a **tracking and MRV systems for HFC emissions** that is in line with the requirements of both agreements, the Montreal Protocol and the Paris Agreement



NDC Helpdesk – provided by GCI

- Online tool for support of countries in case of questions concerning NDCs
- Professional advice for policymakers to assist and advice
- [NDC Helpdesk - Green Cooling Initiative (green-cooling-initiative.org)]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Technology
Cooling subsectors
Policy instruments
NDC Helpdesk
Fit for Green Cooling
PROKLIMA
NATURALLY COOL
Green Cooling for a warming world
Cooling is a basic need – from refrigerated food and vaccines to better living conditions in hot climates. But Green Cooling is the only truly sustainable option to protect the climate and ensure the well-being of people at the same time.
Dig deeper
Workshop on
Transition towards a Greener Cooling Approach

NDC FAQ

1. General / The RAC sector and its relevance

- What is the RAC sector?
- Why is the RAC sector important?
- Which refrigerants exist and how can they be clustered concerning their environmental impact?
- What is the “Green Cooling” approach?
- Which measures can be taken to shift to a sustainable cooling sector?

2. Integration of the refrigerant and air conditioning (RAC) sector in Nationally Determined Contributions (NDCs)

- Why should the RAC sector be included in NDCs?
- What kind of measures in the RAC sector could be included in a NDC?
- In which NDC chapter can cooling/the RAC-sector be incorporated?
- How can I measure the ambition level of the cooling-related measures I plan to implement in an NDC?
- I want to integrate the RAC sector in a NDC. Where do I begin / How do I proceed?
- Where can I find country examples for the RAC sectors’ implementation in a NDC?
- Which documents can help me to find a starting point for my country’s process?

NDC Helpdesk Contact Form

Name *

Email address *

Country *

Organisation/Institution *

Position

Request *

Excel-based Benchmarking Tool

- Self- analysis of measures related to the cooling sector
- Same structure as the NDC Guidelines, published by the Green Cooling Initiative
- Quickly find out, how high the ambition of your taken measures is

Excel based RAC sector NDC benchmarking tool

10/2022 | PUBLICATION

The objective is to enable decision-makers to do a self-analysis of the cooling sector-related measures included in the current NDC of a country or future updated NDCs. It follows the same logic and structure as presented in the guideline.

The ambition level resulting from the selected policy instruments provides an indication of whether the measures are going in the right direction.

Benchmarking Tool

Benchmarking of ambition

Toolbox of policy instruments to address RAC sector emissions

Policy instrument	Refrigerants	Energy efficiency
Regulatory instruments	Overall (economy-wide) declared HFC consumption reduction target	Regulatory instruments to promote higher energy efficiency of equipment
	Regulatory instruments to reduce HFC consumption	Enforcement of energy efficiency regulation
	Regulatory instruments to promote containment and re-use of HFC refrigerants	
	Regulatory instruments to manage end-of-life treatment of refrigerants (and appliances)	
Economic/ financial instruments	Financial instruments to reduce HFC consumption	Financial instruments to support higher energy efficiency of equipment
	Market-related instruments to reduce HFC consumption	
Enabling instruments	Capacity building for technicians	
	Tracking and MRV of HFC consumption and emissions	

Benchmarking of ambition

Country categories and corresponding levels of ambition (I)

Category A

- **Only imports refrigerants** and mainly
  - residential and commercial AC,
  - residential refrigeration and
  - few commercial refrigeration
- typically, but not limited to **low volume consuming (LVC) countries**

Category B

- **Only imports refrigerants** and
  - residential, commercial and industrial ACs and
  - residential, commercial and industrial refrigeration
- usually have a **higher refrigerant consumption than Category A countries**

Category C

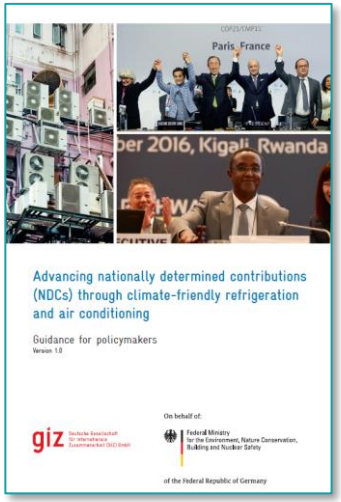
- **Equipment manufacture** and
  - residential AC and refrigeration and
  - more commercial/ industrial applications
- usually have a **higher refrigerant consumption than Category A and B countries**

Benchmarking of ambition

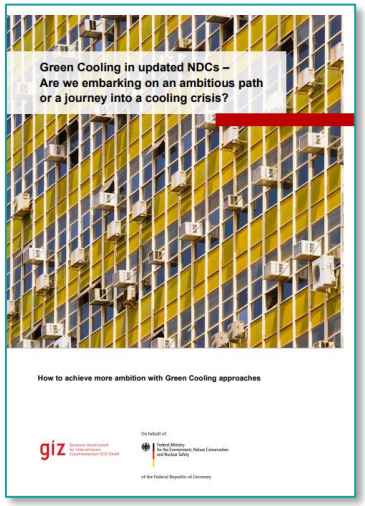
Country categories and corresponding levels of ambition (II)

Policy instrument	Ambition level		
	Category A	Category B	Category C
No financial regulation/ incentives to reduce HFCs and promote natural refrigerants	Low	Low	Low
Levy (e.g., tax, fee) on the use of high GWP HFCs	Medium	Medium	Medium
Financial incentives (e.g., import tax reduction, subsidy) to use natural refrigerants			
<20% of equipment cost	Medium	Medium	Medium
>20% of equipment cost	High	High	High
GWP weighted levy or carbon tax on all HFCs and HFOs (substances as defined in EU F-gas regulation)	High	High	High
Reduction of investment cost via bulk procurement programme	High	High	High

Enhancing NDCs with Green Cooling – Read our publications

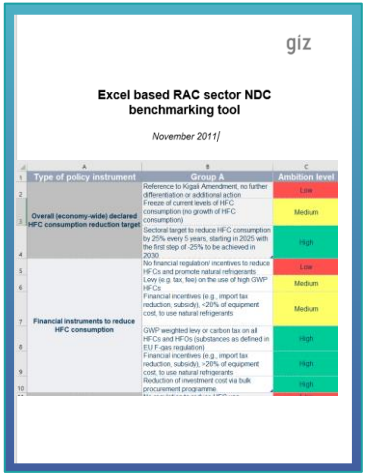


Guideance for policymakers on Advancing NDCs through climate friendly RAC (Download)



Green Cooling in updated NDCs – Are we embarking on an ambitious path or a journey into a cooling crisis? (Download)

Raising ambition in NDCs through holistic mitigation approaches in the cooling sector – Guidance for policymakers (Download)



Excel-/Online-based RAC sector NDC benchmarking tool (Download)

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