

Cool MRV: Combining emissions reporting with enforcement of standards and labelling for cooling products

NDC4 Webinar #3

11 May 2023 | 09:30 – 10:30 am CEST

giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

Supported by:



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



based on a decision of
the German Bundestag

Agenda

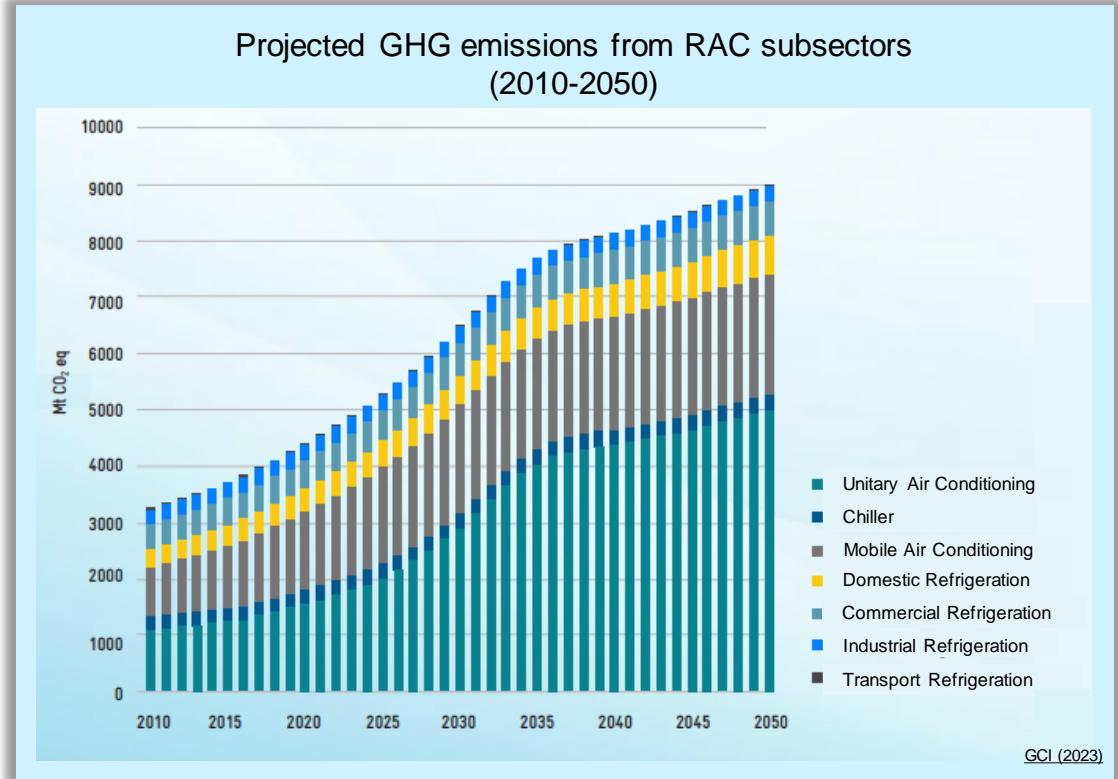
| Topic | Speaker |
|---|--|
| Welcome Remarks | GIZ Proklima |
| NDCs, national inventories and the Montreal Protocol: Understanding MRV in the cooling sector | Irene Papst, Heat GmbH |
| Philippine Energy Labeling Program (PELP) | Aaron Premacio Science Research Specialist II Department of Energy |
| Making use of product registration databases for RAC MRV | Maraida Licerio, GIZ Proklima |
| Questions & Answers | All participants |

Introduction

GIZ Proklima

Why cooling concerns us all

- Cooling accounts for **more than 10%** of global GHG emissions ([CAIT/GCI, 2016](#)).
- The number of air conditioners worldwide is expected to increase from **1.6 billion** in 2016 to **5.5 billion** by 2050 ([IEA, 2018](#)).
- Globally, more than **1.2 billion** people are at high-risk of heat-related threats to their lives and welfare ([SEforALL, 2022](#)).



Emissions from the RAC sector



© GIZ Proklima / Green Cooling Initiative



GIZ Proklima – Making cooling a hot topic since 1995



© GIZ Proklima / Green Cooling Initiative

- Programme established in 1995 in the context of implementing technical projects for **ozone protection** under the Montreal Protocol. In 2016, the Kigali Amendment broadened the focus from ozone to **climate protection**.
- Goal: promoting and introducing **Green Cooling = natural refrigerants and energy-efficient appliances** in the **RAC sector**.
- Proklima is working on behalf of **BMZ, BMUV** and other donors, e.g. EU, AFD, NAMA.



NDCs, National Inventories and the Montreal Protocol: Understanding MRV in the cooling sector

Irene Papst
Consultant, HEAT GmbH



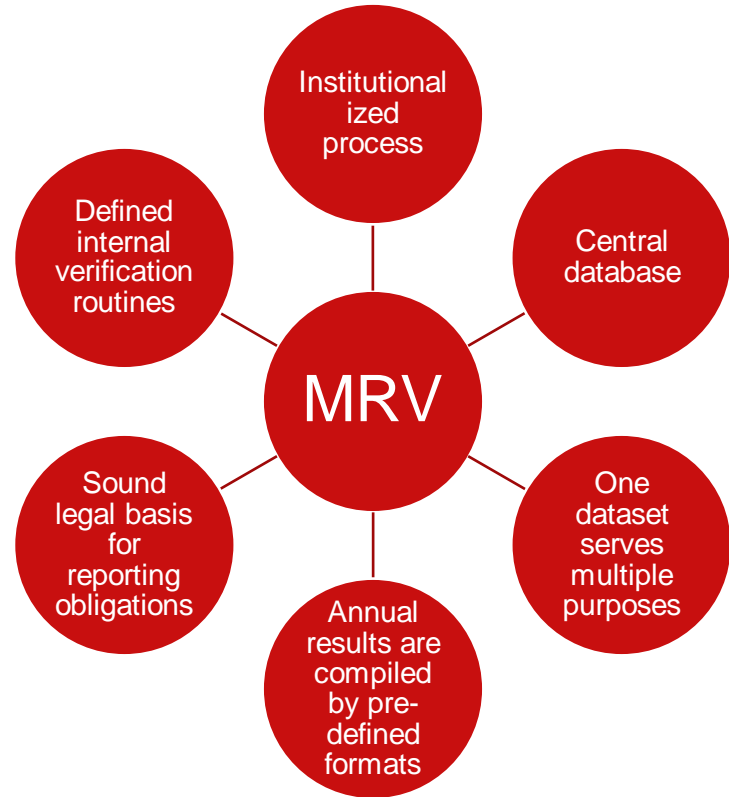
Agenda

RAC Sector MRV system

- Purpose of MRV
- Level of detail
- Data sources
- Product registration system

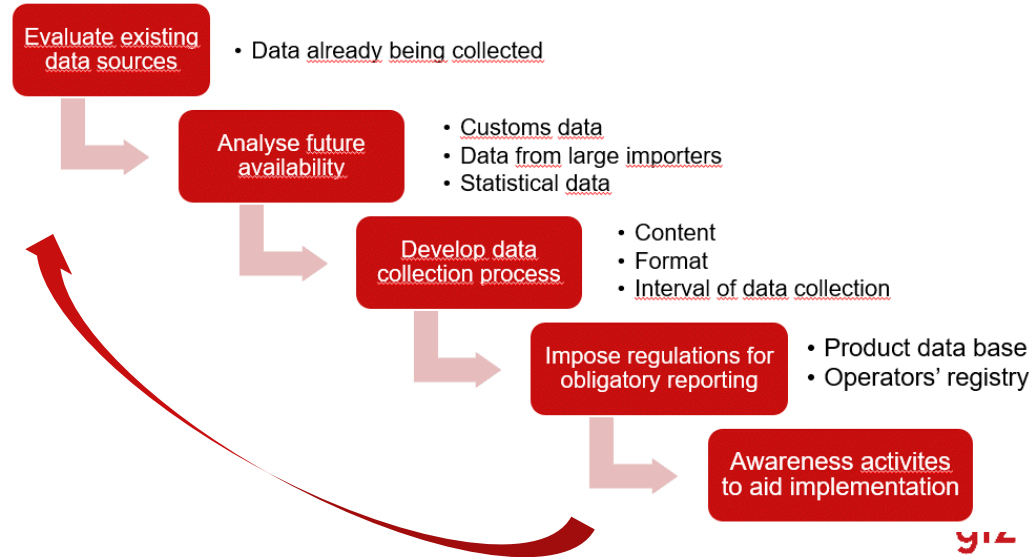
What can an MRV system do for you?

- Mandatory collection of relevant market data for several purposes
- Stored at a single location
- Available to several government entities

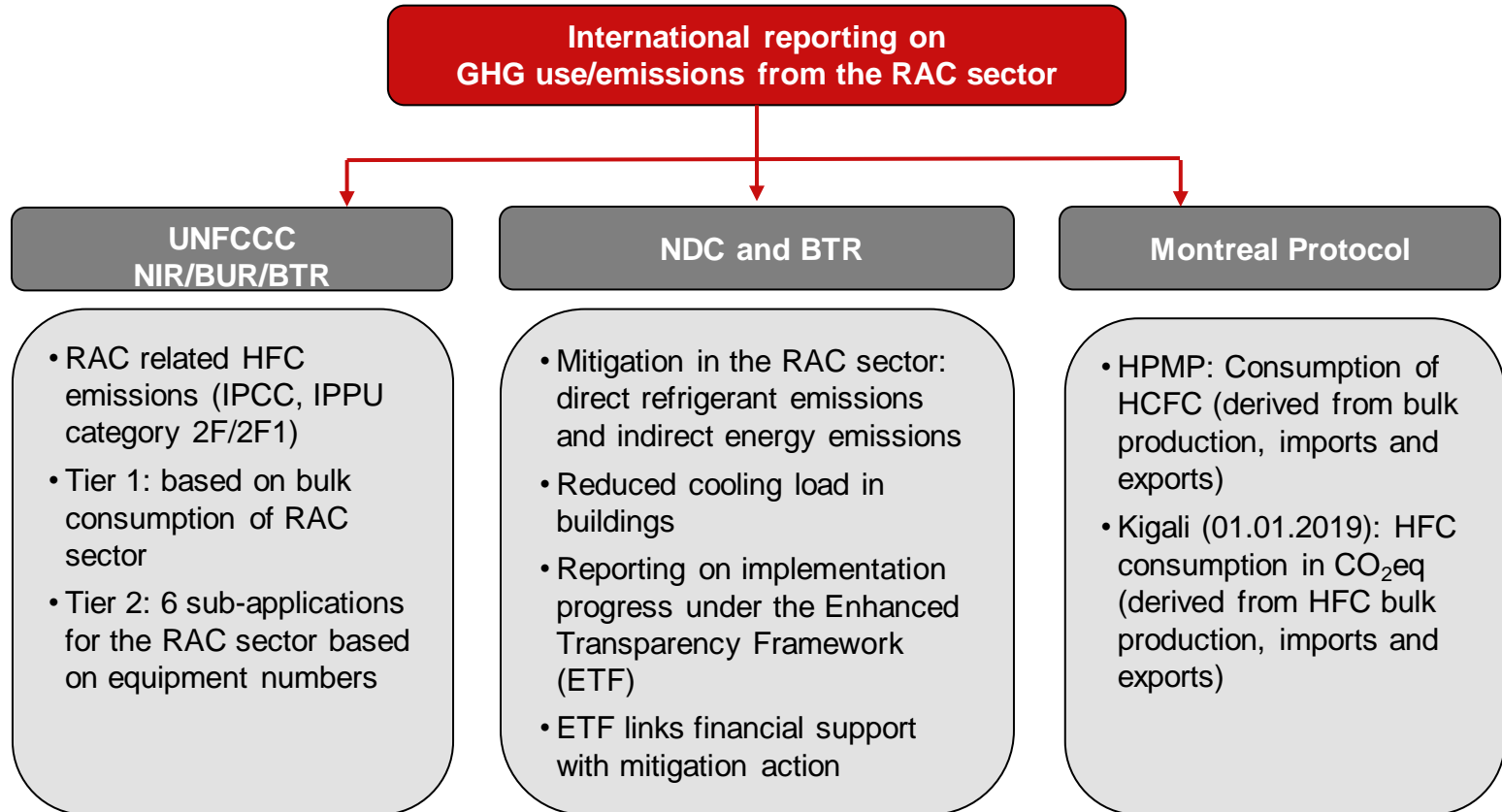


MRV system – Measure, Report, Verify

1. More than a single inventory...
2. The MRV system includes the institutionalized data collection and calculation necessary for a continuous tracking of RAC sector related emissions
3. The MRV system sets the basis for the accounting of mitigation effects in the sector as result of domestic or internationally supported mitigation measures.
4. Scope is informed by reporting needs and policy targets
 - GHG inventory
 - Montreal Protocol Art 7 Reporting
 - Phase-out (and Phase-down) plans for HCFCs and HFCs
 - Leakage prevention
 - Design of energy efficiency measures
 - Promotion of natural refrigerants
 - ...



The need for reporting within multilateral agreements



Data disaggregation: Tier 2 is the goal

Tier 1: Top-down approach looking at the RAC sector as a whole with no further disaggregation. Tier 1 has two emission calculation approaches:

1a) Emissions-based approach:
annual substance sales * composite emission factor + bank of substances * bank emission factor (default: 15%)

1b) Mass balance approach:
annual substance sales - amount of substance filled into new equipment (1/3 in a mature market) + amount of substance in retiring equipment - amount of substance destroyed

Tier 2: Tier 2 emissions are calculated based on a disaggregated unit-based level, divided into six RAC sub-applications, using country specific RAC sector characteristics:

Unitary air conditioning

Mobile air conditioners

Domestic refrigeration

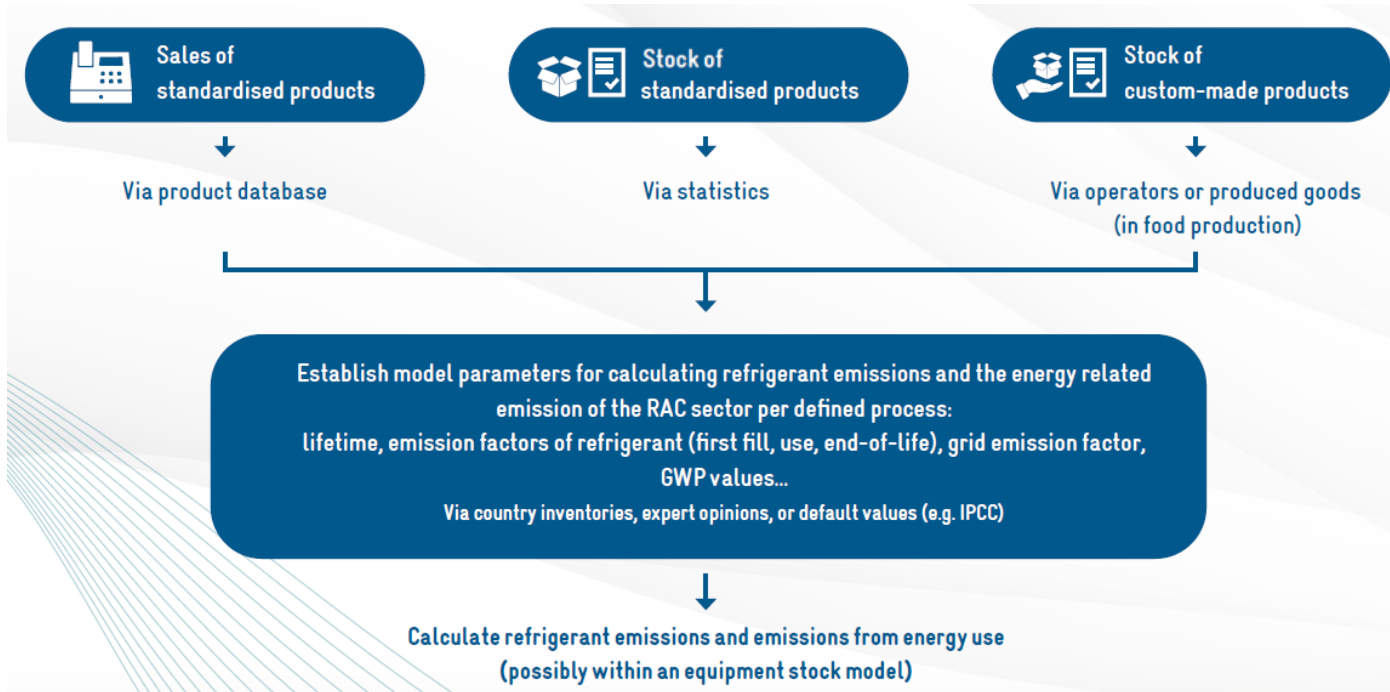
Commercial refrigeration

Industrial refrigeration

Transport refrigeration

- New appliances
- Appliances in use
- Manufacture emissions
- Service emissions
- EOL emissions

Data needs and proposed data flow in a RAC sector MRV-System



Standardized products

- Commercial stand-alone units
- Refrigerators and freezers
- Refrigerated trucks
- Cars
- Self contained units (Single) Split AC

Custom-made products

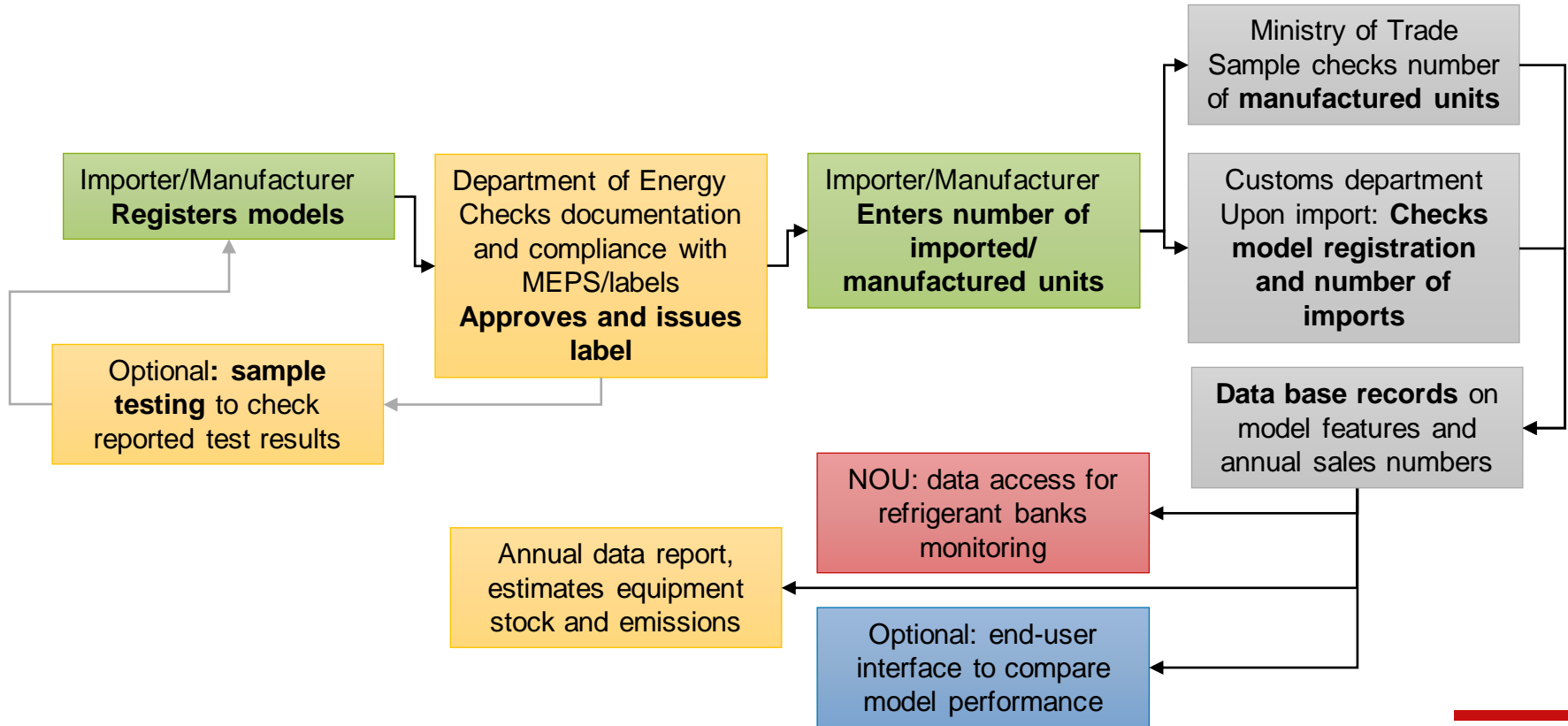
- Commercial condensing units, Centralized supermarket systems
- Industrial integral systems, condensing units and centralized systems
- Refrigerated trucks
- Larger vehicles
- Ducted AC, Rooftop (packaged) systems, Multi-split and variable refrigerant flow (VRF) systems, AC Chiller

Product registration system

- Suitable for mass produced equipment,
- Equipment that is usually targeted by energy efficiency labeling schemes or Minimum energy performance standards
- Possibility to combine it with
- Manufactures register the equipment that they want to sell, providing documentation of energy testing and other key features
 - Cooling Capacity
 - Energy efficiency rating
 - Annual energy use
 - Refrigerant type and content
- Links the registered products to the number of imported and locally produced equipment
- Sound legal basis of reporting obligations for stakeholders is established



Possible work flow



Product Registration System

- Perfect solution for an institutionalized MRV system for mass-produced systems
- Implement minimum energy performance standard
- Track pull-effect of energy labeling system
 - Data to support future MEPS and label class updates
- Track refrigerant choice in appliances
 - Data to support possibly ban on high GWP refrigerants
- Track sales of equipment
- Follow stock development
- Used for calculation of energy-related and refrigerant emissions
- Provide end-users with market overview

Resources from United for Efficiency

Extensive guidance material on different topics

- What is a PRS and why use one?
- Planning to build: Foundation
- Planning to build: Details
- Implementation

<https://united4efficiency.org/resources/>

Prototype open-source application

<https://u4e-prs.net/>



Philippine Energy Labeling Program (PELP)

Aaron Premacio

Science Research Specialist II

Department of Energy

Overview of the

Philippine Energy Labeling Program

EE&C Performance Regulation and Enforcement Division
Energy Utilization Management Bureau
Department of Energy

PELP

S. No. 1531
H. No. 8629

Republic of the Philippines
Congress of the Philippines
Metro Manila

Seventeenth Congress

Third Regular Session

Begun and held in Metro Manila, on Monday, the twenty-third day of July, two thousand eighteen.

[REPUBLIC ACT NO. 11285]

AN ACT INSTITUTIONALIZING ENERGY EFFICIENCY AND CONSERVATION, ENHANCING THE EFFICIENT USE OF ENERGY, AND GRANTING INCENTIVES TO ENERGY EFFICIENCY AND CONSERVATION PROJECTS

Be it enacted by the Senate and House of Representatives of the Philippines in Congress assembled:

CHAPTER I


GENERAL PROVISIONS

SECTION 1. *Short Title.* – This Act shall be known as the “Energy Efficiency and Conservation Act”.

SEC. 2. *Declaration of Policy.* – It is hereby declared the policy of the State to:

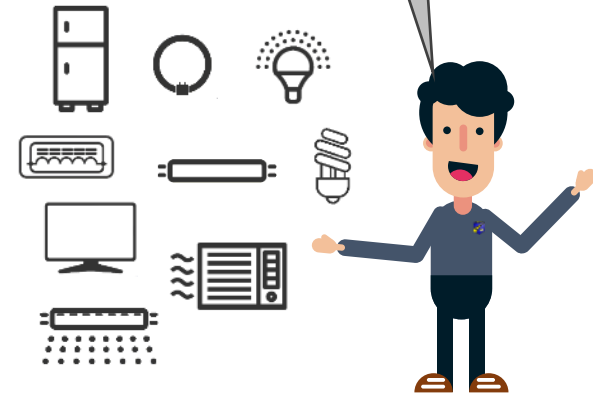
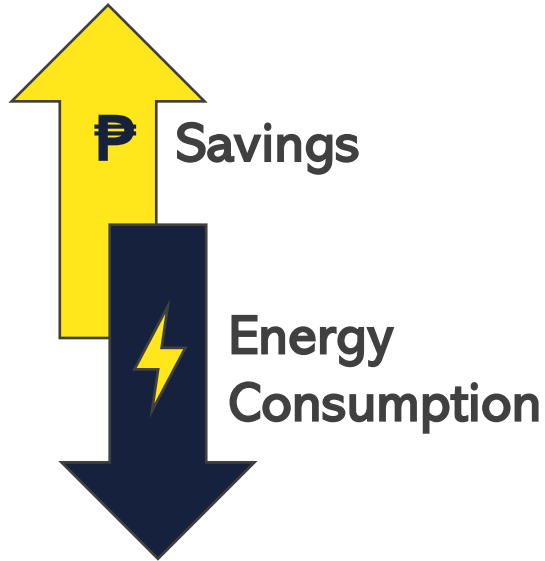
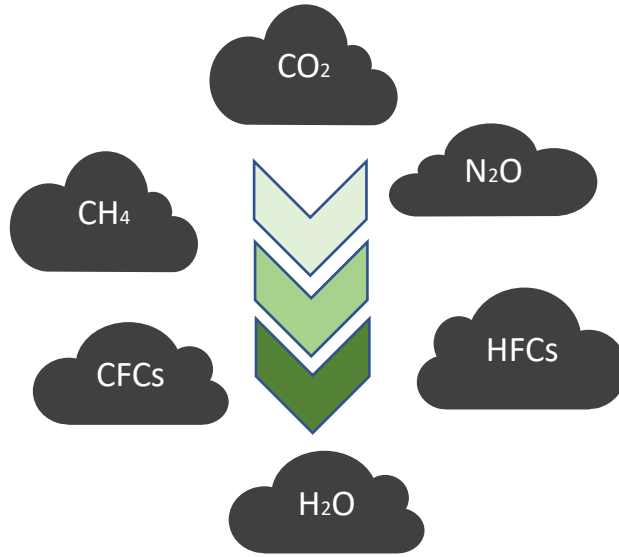
(a) Institutionalize energy efficiency and conservation as a national way of life geared towards the efficient and judicious utilization of energy by formulating, developing, and

Republic Act 11285

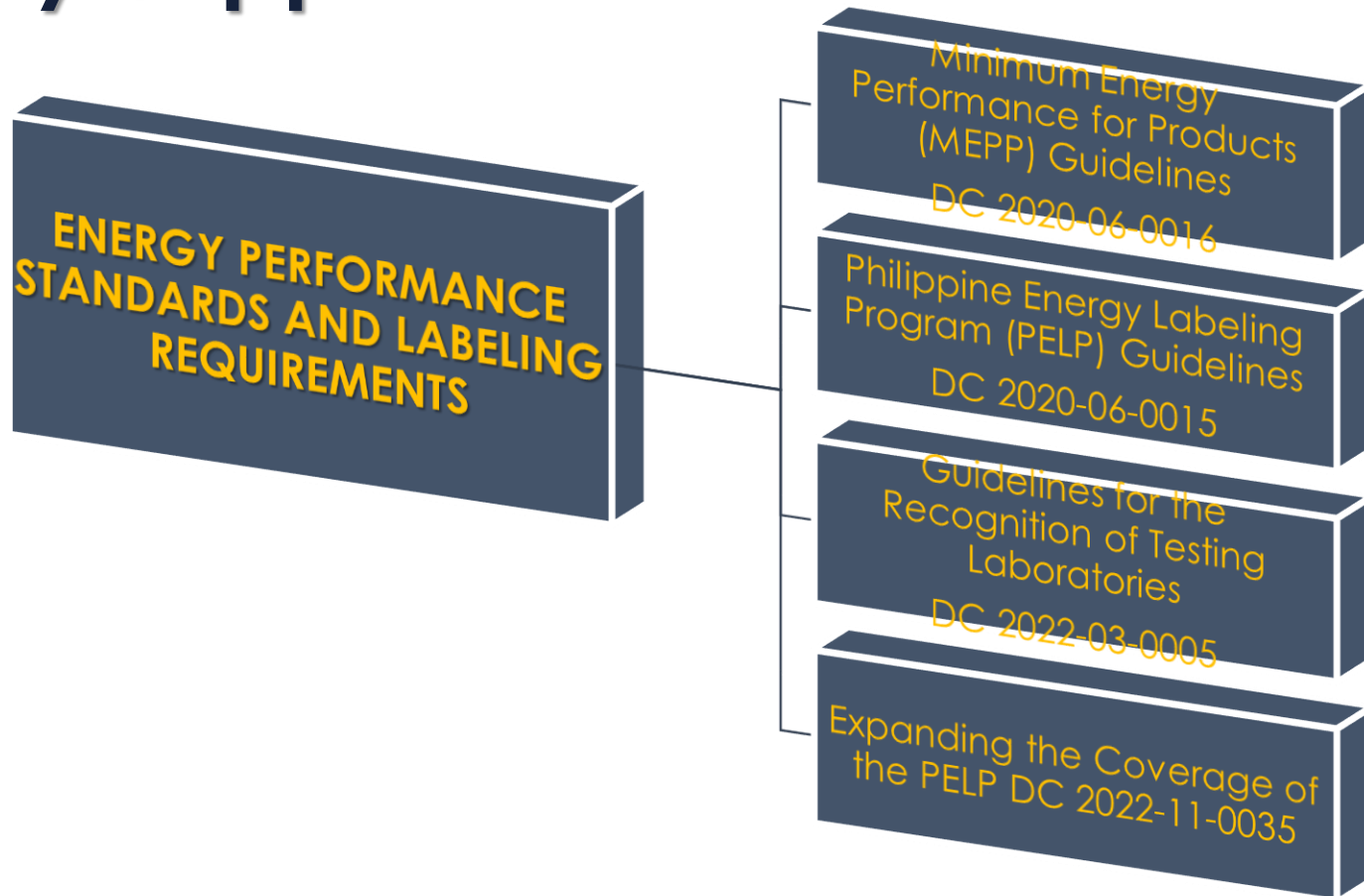


Chapter V.
Energy Performance and
Labeling Requirements

Objectives



Policy Support



PELP Implementing Guidelines

- Air Conditioners
- Refrigerating Appliances
- Television Sets
- Lighting Products
- Registration, Enforcement, Monitoring, Verification and Compliance Mechanism (REMVCM)
- Specification, Dimension and Presentation of Energy Labels

ENERGY LABEL

Air Conditioner

Energy Efficiency Rating:

4.01

under test conditions



★★★★★

“More stars and higher rating means more savings”

Issuance Year of Energy Rating:
Monthly Energy Consumption*:
Brand Name:
Product Model:

Cooling Capacity (kW):
Refrigerant: Rxxxx (GWP xxx):
Power Input (W):

*based on a 9-hour daily usage

For more information:



www.doe.gov.ph

Energy Label issued under Section 15 of Republic Act No. 11285. Non-compliance, removal, defacing, or altering of the Energy Label is a violation under Section 30 and will be subject to the fines, penalties and criminal liability under Sections 32 and 33 of Republic Act No. 11285.

CN: PPP-CCCC-XXXXXX-MMYY

Air Conditioner



Air Conditioner

- ✓ ACU - Cooling capacity: up to 50,000 kJ/hr or 14kW

- Window-type
- Split-type
 - Wall-Mounted
 - Floor-Standing type
 - Cassette-type
 - Ceiling-Suspended type

Refrigerators



* **Refrigerators**

- ✓ Net volume capacity of 113 liters up to 600 liters

- Refrigerator
 - Manual Defrost
 - Frost Free
- Refrigerator-Freezer
 - Manual Defrost
 - Frost Free

**PELP
Coverage**



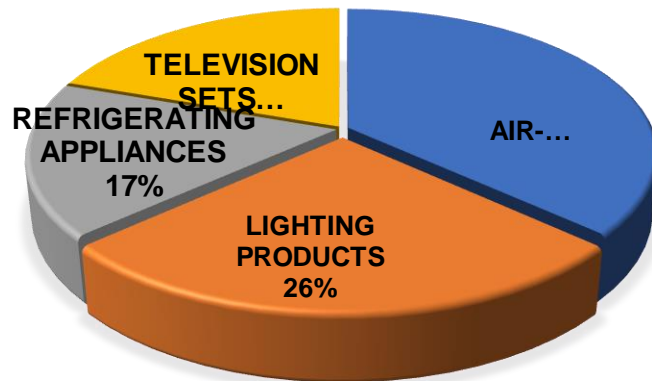
Energy Labeling Process



PELP Registration Updates

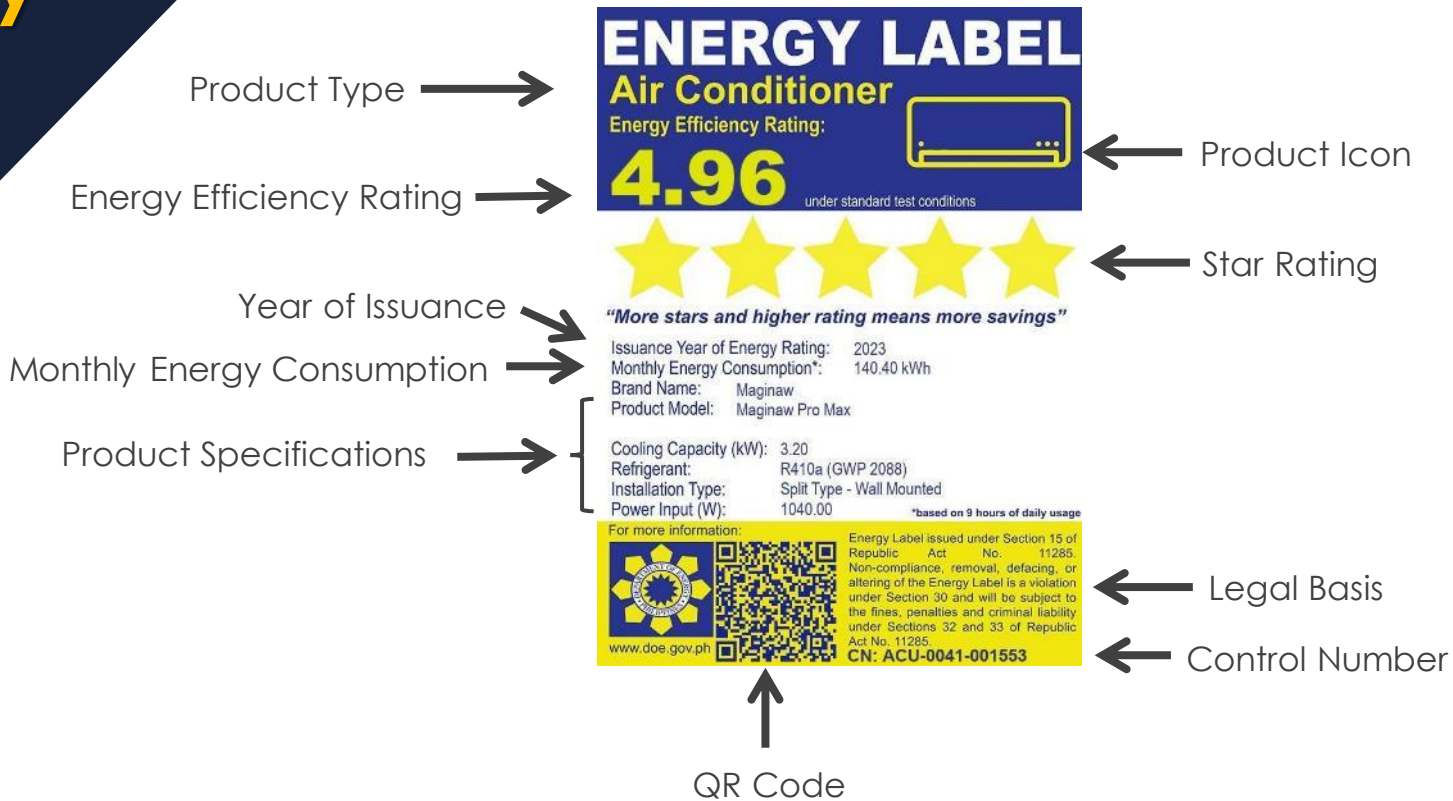
as of May 5, 2023

SUMMARY OF PELP ISSUED ENERGY LABELS



| TYPE OF ECPS | NO. OF APPLICATION | APPROVED PRODUCT REGISTRATION | ISSUED ENERGY LABEL |
|--------------------------|--------------------|-------------------------------|---------------------|
| AIR-CONDITIONERS | 1786 | 1697 | 1398 |
| LIGHTING PRODUCTS | 2563 | 2210 | 1011 |
| REFRIGERATING APPLIANCES | 816 | 787 | 648 |
| TELEVISION SETS | 1053 | 999 | 747 |
| TOTAL | 6218 | 5693 | 3804 |

Sample Energy Label



HOW TO USE THE ENERGY LABEL

ENERGY LABEL

Frost-Free Refrigerating Appliance

Energy Efficiency Rating:

500

under standard test conditions



“More stars and higher rating means more savings”

Issuance Year of Energy Rating: 2023
Monthly Energy Consumption*: 30.00 kWh
Brand Name: Malamig
Product Model: Malamig Pro Max

Volume (liters): 550.0

Coldness Star Rating: **X*****

Refrigerant: R449a (GWP 1396)

*based on kWh/24 hrs x 30 days

For more information:



www.doe.gov.ph



Energy Label issued under Section 15 of Republic Act No. 11285. Non-compliance, removal, defacing, or altering of the Energy Label is a violation under Section 30 and will be subject to the fines, penalties and criminal liability under Sections 32 and 33 of Republic Act No. 11285.

CN: REF-0041-000788





Star Rating:



Energy Label Issued:

ACU-0015-000353-0522

(25 May 2022 - 25 May 2023)

| | |
|--|--|
| Product Type: | AC Variable (ACV) |
| Control Number: | ACU-0015-000353 |
| Brand Name: | Panasonic |
| Product Name: | Inverter Split Type Air Conditioner |
| Model Number/Code: | CS-PU9WKQ / CU-PU9WKQ |
| BO/Manufacturer/Importer: | PANASONIC MANUFACTURING PHILIPPINES CORPORATION - HOUSEHOLD APPLIANCES |
| Refrigerant Used | R32 |
| Global Warming Potential (GWP) of the Refrigerant | 675 |
| Cooling Capacity (kW): | 2.54 |
| Cooling Seasonal Performance Factor (CSPF) | 5.04 |
| Power Input (Watts): | 670.00 |
| Voltage (V): | 230.00 |
| Frequency (Hz): | 60.00 |
| Monthly Energy Consumption (kWh): | 90.45 |

Sample Electricity Consumption:

| Power Input (Watts) | Hours | Days | F | Monthly Energy Consumption (kWh) | Peso/kWh | Peso/Month |
|---------------------|-------|------|------|----------------------------------|----------|----------------|
| 670.00 | 9 | 30 | 0.50 | 90.45 | 10.00 | 904.50* |

*(Wattage / 1000) x (Hours) x (Days) x (F) x (Peso/kWh) = (Peso/ Month)

Electricity Consumption Calculator:

| Power Input (Watts) | Hours | Days | F | Monthly Energy Consumption (kWh) | Peso/kWh | Peso/Month |
|---------------------|--------------------------------|--------------------------------|------|----------------------------------|--------------------------------|------------|
| 670.00 | <input type="text" value="0"/> | <input type="text" value="0"/> | 0.50 | 0.00 | <input type="text" value="0"/> | 0.00 |

| | |
|--|--|
| Product Type: | AC Variable (ACV) |
| Control Number: | ACU-0015-000353 |
| Brand Name: | Panasonic |
| Product Name: | Inverter Split Type Air Conditioner |
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| Cooling Seasonal Performance Factor (CSPF) | 5.04 |
| Power Input (Watts): | 670.00 |
| Voltage (V): | 230.00 |
| Frequency (Hz): | 60.00 |
| Monthly Energy Consumption (kWh): | 90.45 |

Monthly Greenhouse Gas (GHG) Emission:

Monthly (GHG) Emission = Monthly Energy Consumption (kWh) x Emission Factor

Where;
Emission Factor (EF) – refers to the Simple Operating Margin (OM) Emission Factor equivalent to 0.7122 t-CO₂/MWh (based on the 2015-2017 National Grid Emission Factor, DOE Website)

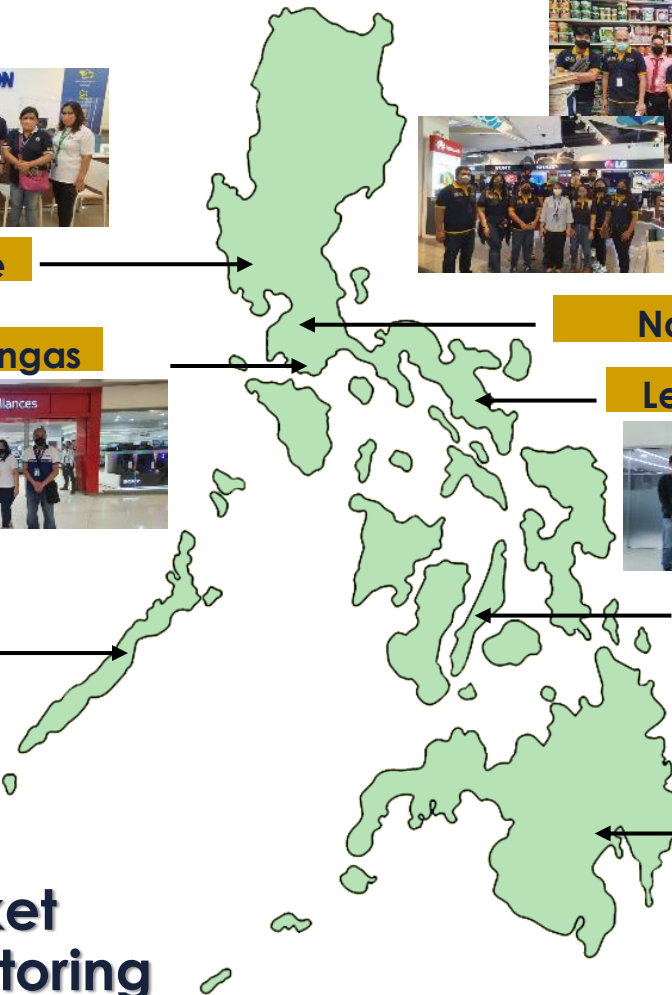
Enforcement



Start of Enforcement:
1st Quarter of 2024

Market Monitoring





Zamboanga

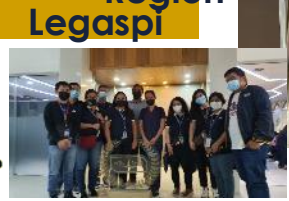
Batangas

**National Capital Region
Legaspi**

Cebu

Palawan

Davao



Nationwide Post-Market Assessment and Monitoring

Way Forward

- **Enforcement Activities**
 - Starting 1st Quarter of 2024
 - Scheduled Market surveillance
- **Updating of Minimum Energy Performance Requirement for Air Conditioners**

Way Forward

- **Expansion of Coverage**

- Inclusion of additional products for labeling
 - Electric Fans
 - Clothes Washing Machines
 - Energy Saving Devices*
 - Rice Cooker*
 - Electric Flat Iron*
 - Display Monitors*
 - Solar Lighting Products*

*For PPR Development

Way Forward

- **Enhancement of the PELP System**

- Digitalization of PELP application process for easier data-collection and handling
- Integration of verification and enforcement modules in the current PELP System
- Addition of an automated GHG emission computation field

Thank you



Contact us.



eumb.epred@doe.gov.ph
doe.eumb@gmail.com (Alternate)



<https://doe.gov.ph>



(02) 8-479-2900 Loc 272
(02) 8-840-2243

Making use of product registration databases for RAC MRV

Maraida Licerio
GIZ Proklima

Before...we would gather data through surveys and actual visits to the data sources



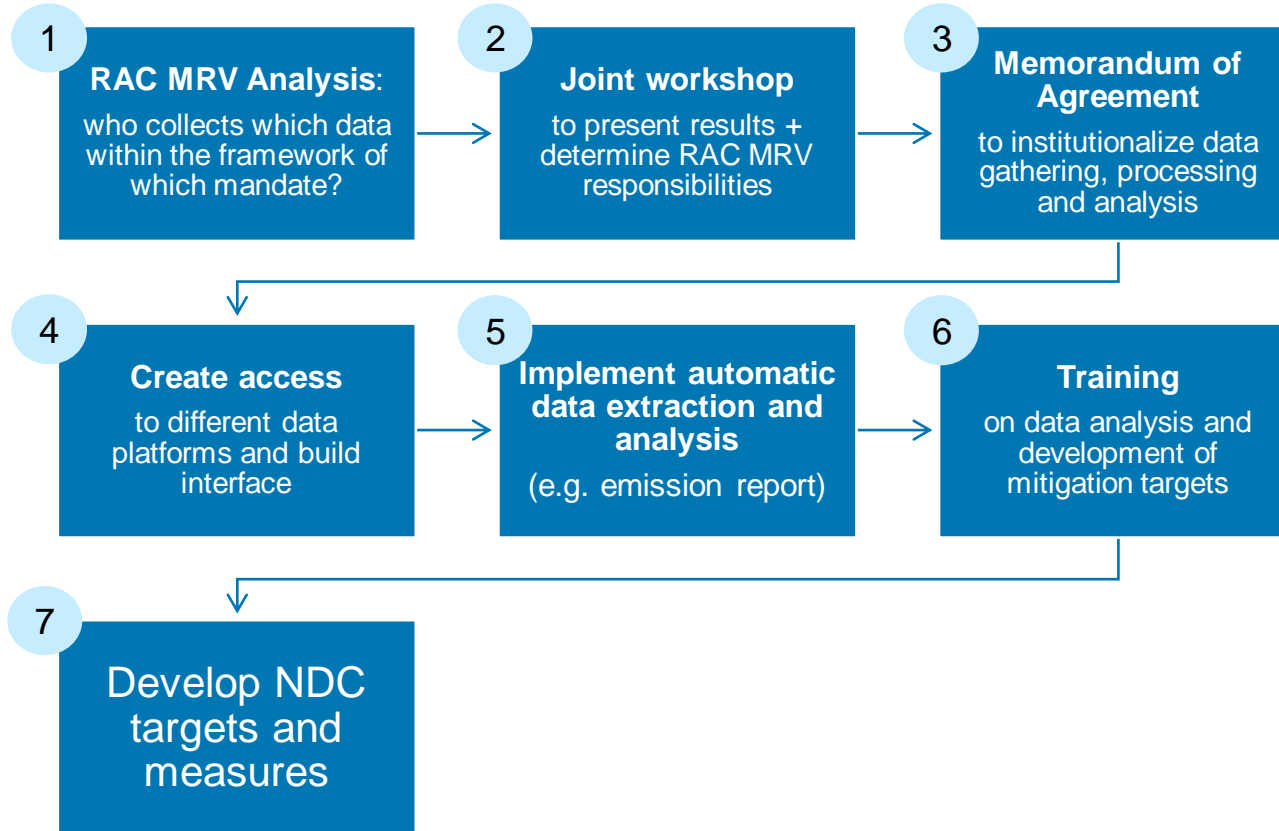
- Primary data collection from Manufacturers and Distributors for the Philippines with enforcement support from the **DENR EMB Regional Offices** since the mandate is on refrigerants but not on the products
- Surveys were completed by manufacturers; partial data was provided since it was perceived that **non-ODS products were not covered by the inventory**
- **Some confusion** with commissioned surveys under the **Montreal Protocol**

Stakeholder Workshops among RAC Manufacturers and Distributors



- Workshops on the inventory methodology were undertaken
 - Differentiated the IPCC methodology used for actual emissions estimates and the potential emissions estimates which is the method recommended by the Montreal Protocol
-
- The workshops and consultations were done simultaneous with energy efficiency initiatives in preparation for the anticipated enforcement of the **Energy Efficiency and Conservation Act of 2019** which brought together relevant stakeholders in terms of energy, climate and ozone issues
 - **Common understanding of RAC emissions was achieved.** Stakeholders voiced the need to streamline the RAC compliance and enforcement process through better coordination among energy, climate and ozone units.

Steps to enhance Philippines RAC MRV System



Why product registries and database?

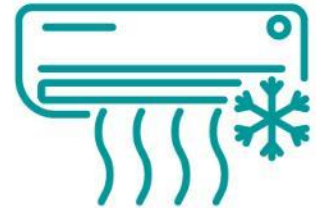
- The PELP was designed to integrate information on refrigerants as requested by the ozone unit (DENR-EMB) for coordinated enforcement
- The PELP requires stakeholders to provide **mandatory information** necessary to calculate RAC emissions relevant for climate reporting
- Given the stringency of the energy regulation, all units entering the market with cooling capacities of up to 14 KW for UACs and 113 L to 600 L for domestic refrigerators have complete information to calculate accurate and transparent baseline emissions.
- Stakeholders are required to report actual **sales data**
- Around 60%++ of RAC emissions might be covered

Unitary Air Conditioner Parameters

- ● Sales for each air conditioner model
 - Country of Origin
- Cooling Capacity in KW of each model;
- Cooling Seasonal Performance Factor (CSPF) and other Coefficient of Performance (COP) deemed necessary;
 - Classification as Fixed Speed or Inverter (Variable Speed Drive);
- Installation type (Window-Type, Split-Type (Wall-mounted, Floor-standing, Cassette-type, Ceiling-suspended));
- Chemical used as Refrigerant;
- Refrigerant Charge Volume;

● Needed to calculate indirect emissions

● Needed to calculate direct emissions



Domestic Refrigerator Parameters

- Volume of Refrigerators in Liters
- Energy Efficiency Factor (EEF)
- Tested Daily Electricity Consumption in KWh/24hours
- Chemical used as Refrigerant
- Refrigerant Charge in Mass
- Sales for each refrigerator model
 - Country of origin

● Needed to calculate indirect emissions

● Needed to calculate direct emissions



Challenges and ways forward

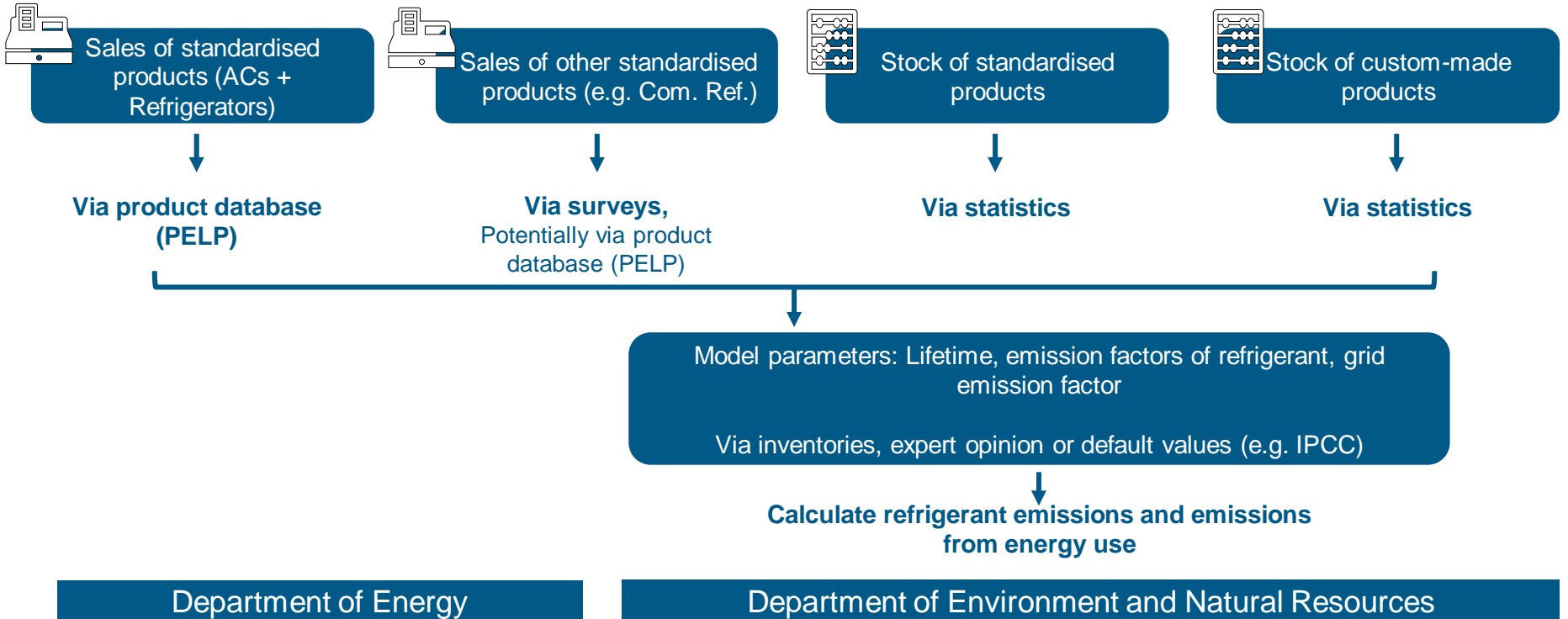
1. The data is still in the process of extraction, cleaning and validation
2. Cross checks with **bulk refrigerant imports** maintained by the Ozone Unit is yet to be undertaken. This relevant information is needed to determine entry of pre-charged units in the market and emissions from other subsectors
3. Tier 1 inventory is on-going with the DENR Climate Unit and a **quality check with the higher tier approach** is expected.
4. There were errors and inconsistencies in the use of emission factors and global warming potential values from stakeholders
5. Project developers are already proposing emission reduction projects under this sectoral scope making their own baselines and assumptions in the **absence of regulations and robust MRV system for overall climate reporting**

Options to expand...

- The approach to regulate custom-made RAC equipment is yet to be agreed (i.e, air conditioning chillers, mobile AC) but there are plans and initiatives to **expand the database for commercial products**
- PELP database can be expanded to other standardized RAC products such as commercial stand alone units (e.g bottle coolers, ice makers...)



Overview of the Philippine MRV System



Questions & Answers

Cool MRV – Read our publications!



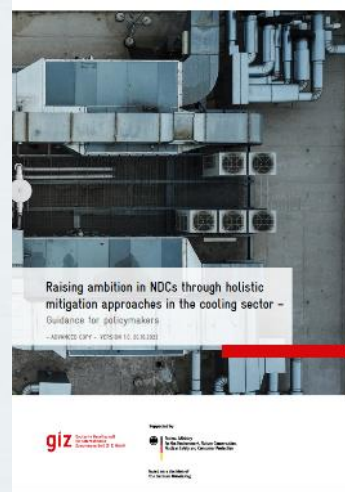
Measurement,
Reporting &
Verification (MRV)
Handbook

Understanding
MRV in the
cooling sector





Advancing NDCs with Green Cooling – Read our publications!



Excel based RAC sector NDC benchmarking tool
November 2019

| Type of policy instrument | Group A | Group B | Ambition level |
|---------------------------|--|---------|----------------|
| 1 | Provision of legal framework to support a ban on or restriction of use of fossil fuel based air conditioning, HVAC cooling or heating of B+C buildings | | High |
| 2 | Overall recovery/avoidance of RAC consumption reduction target | 30% | Medium |
| 3 | Overall recovery/avoidance of RAC consumption reduction target | 20% | High |
| 4 | Overall recovery/avoidance of RAC consumption reduction target | 10% | High |
| 5 | Overall recovery/avoidance of RAC consumption reduction target | 5% | Medium |
| 6 | Overall recovery/avoidance of RAC consumption reduction target | 0% | Medium |
| 7 | Overall recovery/avoidance of RAC consumption reduction target | 0% | Medium |
| 8 | Overall recovery/avoidance of RAC consumption reduction target | 0% | Medium |
| 9 | Overall recovery/avoidance of RAC consumption reduction target | 0% | Medium |
| 10 | Overall recovery/avoidance of RAC consumption reduction target | 0% | Medium |
| 11 | Overall recovery/avoidance of RAC consumption reduction target | 0% | Medium |
| 12 | Overall recovery/avoidance of RAC consumption reduction target | 0% | Medium |

Advancing nationally determined contributions (NDCs) through climate-friendly refrigeration and air conditioning

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

Raising ambition in NDCs through holistic Mitigation approaches in the cooling sector

Excel based RAC sector NDC benchmarking tool & Quick self-analysis to evaluate cooling sector-related targets and measures included in NDCs



Join our Alliances

Join the Green Cooling Network



The members of the
Green Cooling Network
are all committed to energy-efficient and climate-friendly
refrigeration & air conditioning.

Join the network and become part of the Green Cooling
community today!

www.green-cooling-initiative.org/network

Become a COPA member



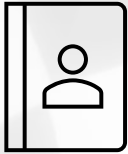
The **Climate and Ozone Protection Alliance (COPA)**
is open to all countries and organisations willing to support
the global shift to sustainable refrigerant management and
closing the loop to a circular economy in the cooling sector.

Find more information on the COPA Website:

**[Climate and Ozone Protection Alliance - Become a
Member \(copalliance.org\)](http://copalliance.org)**

Contact

Please do not hesitate to contact us with any concerns, questions or requests.



GIZ Proklima

NDC4 service desk

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www.giz.de

www.green-cooling-initiative.org



https://twitter.com/giz_gmbh

<https://twitter.com/GCIGreenCooling>