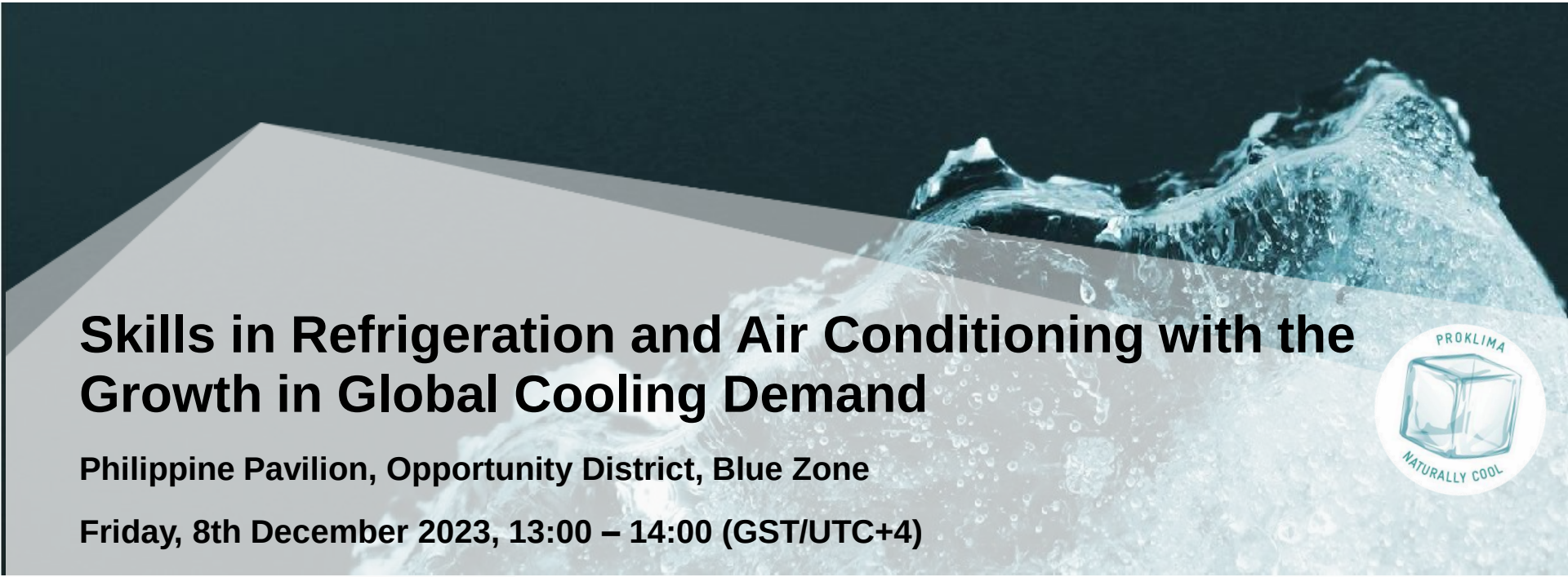


Skills in Refrigeration and Air Conditioning with the Growth in Global Cooling Demand

Philippine Pavilion, Opportunity District, Blue Zone

Friday, 8th December 2023, 13:00 – 14:00 (GST/UTC+4)

PROKLIMA
NATURALLY COOL

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

IKI INTERNATIONAL CLIMATE INITIATIVE

Agenda

Welcome Remarks	Hon. Analiza Rebuelta-Teh, DENR
Fit for the Future: Qualification programmes for refrigeration and air conditioning technicians	Philipp Denzinger, GIZ Proklima
Integrating Natural Refrigerants (R744, R717 and R290) as Competency Standard in the Philippine TVET System	Manuel Azucena, UNIDO (virtually)
Cold Chain Innovation Hub Philippines	Jan Dusek, ATMOsphere (virtually)
Questions & Answers	All participants
Conclusion and Closing Remarks	Philipp Denzinger, GIZ Proklima

Welcome Remarks

Hon. Analiza Rebuelta-Teh
Undersecretary for Finance, Information Systems and Climate Change
Department of Environment and Natural Resources
Republic of the Philippines

Fit for the Future

Qualification programmes for refrigeration and air conditioning technicians

Philipp Denzinger, GIZ Proklima

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

QCR system is essential – only certified technicians are permitted to work on flammable refrigerants!

(1) Qualification

- We provide 14 modules - freely accessible and free of charge for partner countries
- We check refrigeration curricula according to international standards
- We support training institutes in revising their curricula and, if necessary, integrating modules into their curricula
- We conduct trainings for teachers (Trainings of Trainers)

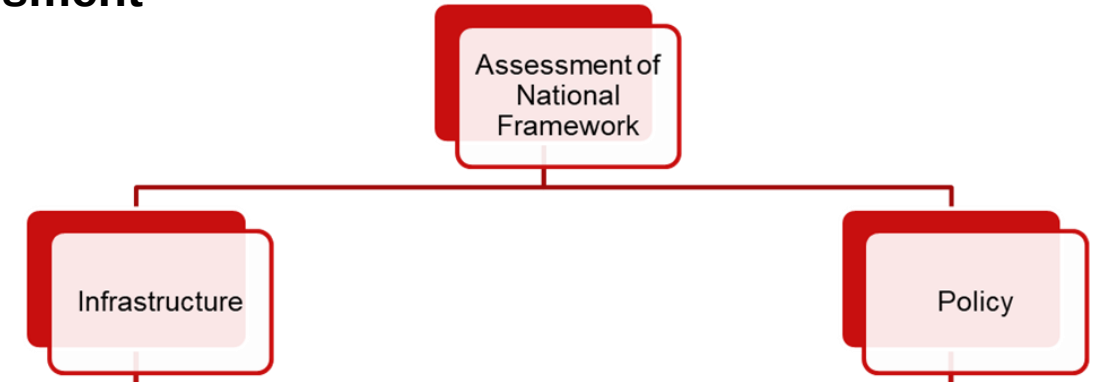
(2) Certification

- We develop certification systems together with the national authorities
- We provide exemplary examination questions and "Competencies to assess
- We cooperate with certification bodies and expand their capacities
- We develop systems to recognize prior learning experiences

(3) Registration

- We advise on national registration systems and identify needs
- We advise on licenses for technicians

Step 1: Assessment



Step 2: Implementation

No need to start from scratch…

The following sources of materials can support the process of setting up a QCR system in a country

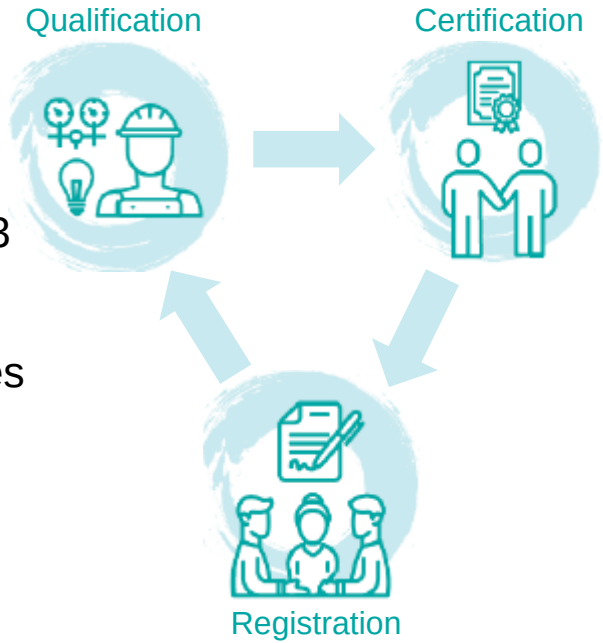
- **International standards and norms**
  - Technical standards, e.g., on product safety or environmental requirements from the International Standardisation Organisations (ISO) and the International Electrotechnical Commission (IEC).
- **National regulations and other existing structures** e.g. the national TVET framework as well as structures on safety and environmental protection in the RAC sector
- **Examples from the European Union**
  - EU F-Gas regulation introduces a standardised qualification and certification of personnel and companies who carry out installation, servicing, maintenance, repair or decommissioning of RAC equipment containing f-gases and introduces four levels of competence and defines minimum requirements for these
- **The GIZ "Fit for Green Cooling" material**

Characteristics and advantages of Fit for Green Cooling

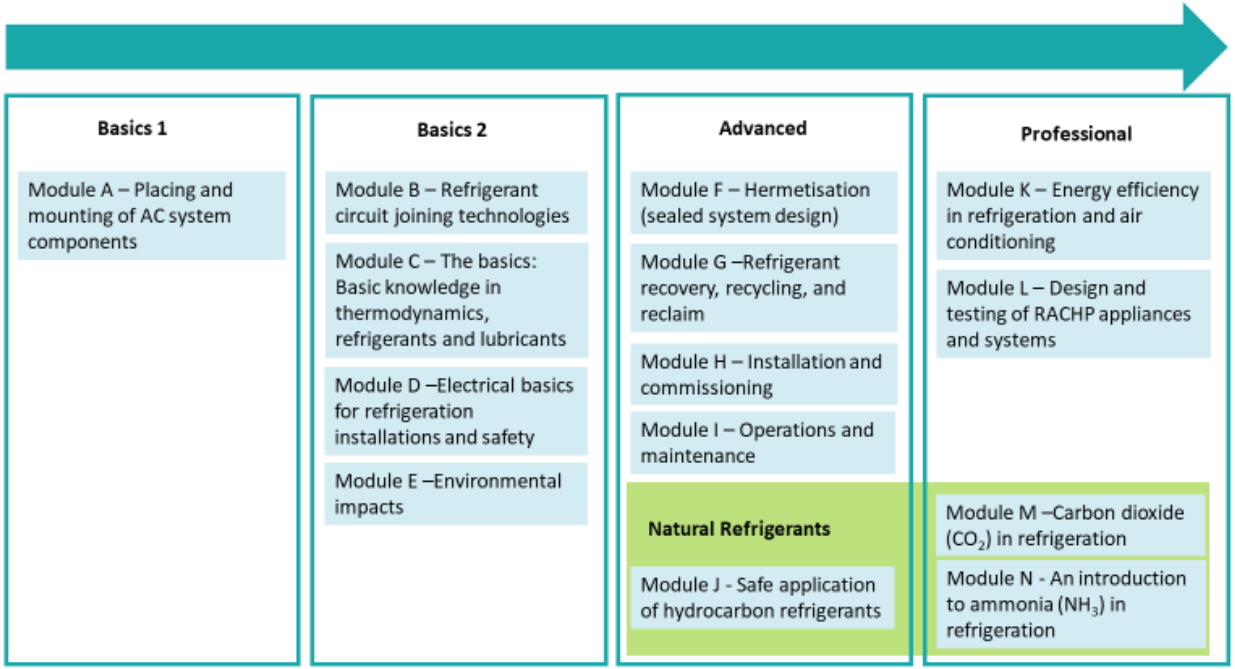
- Covers all required skills to work with Green Cooling technologies

- Compliance with international standards:
  - industry standards such as EN378, ISO 5149 and EN13313
  - makes the concept internationally viable and comparable

- Modular structure and high adaptability of the training courses
  - Can be integrated in existing, country-specific structures and curricula
  - Training levels in accordance to individual competences (e.g upskilling training)
  - Flexible usage (long or short term interventions)
  - makes it easier to include training on the job or upskilling technicians in the informal sector



Fit for Green Cooling - Module Overview



14 Modules each contain:

- The Handbook (theoretical basis)
- Trainer manual
- Handouts
- PPT Presentations
- Practical excercises
- Examination questions
- Skills to Assess for each level

Cool Training - Enabling the spread of **Green Cooling** technologies worldwide by providing training on the **safe handling of natural refrigerants** to technicians, trainers and decision-makers

Examples of Cool Trainings 2023 in Maintal, Germany

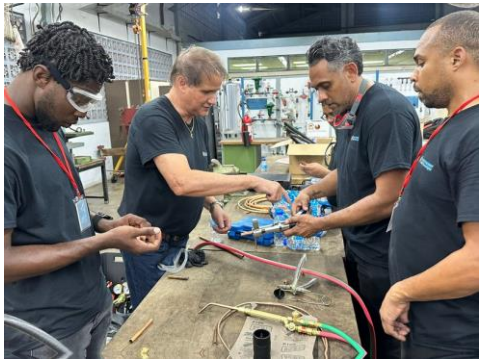
[French Cool Training for RAC technicians from Mali, Cameroon, Burkina Faso, Senegal and Mauritius (ROCA)]

[Portuguese Cool Training training for RAC technicians from Brazil (HPMP)]

[English Cool Training training for National Ozone Officers and Policymakers]

Cool Training - Enabling the spread of **Green Cooling** technologies worldwide by providing training on the **safe handling of natural refrigerants** to technicians, trainers and decision-makers

Examples of local Trainings

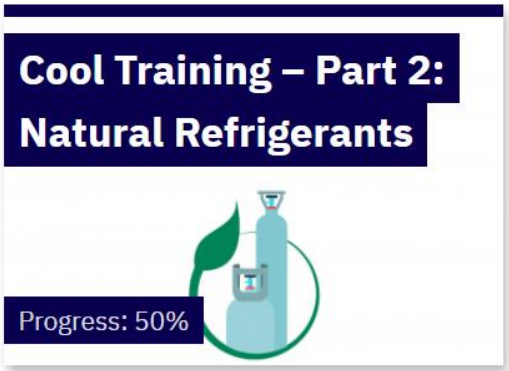


R290 training for RAC technicians from Trinidad, Barbados, Jamaica, St. Lucia and Dominica (GCI III)

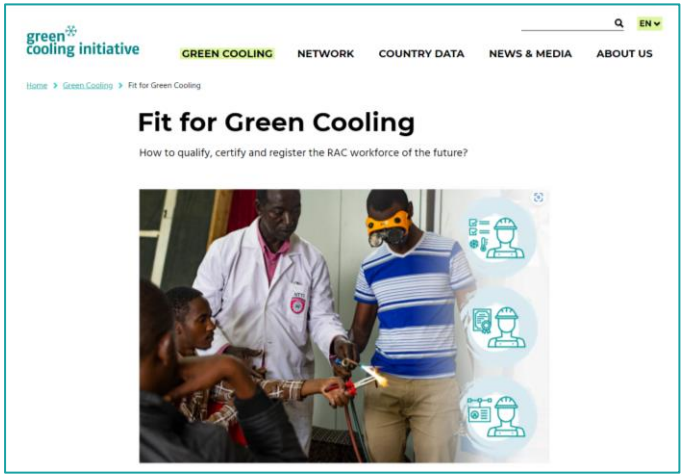
Natural refrigerants training for female RAC technicians from Senegal (ROCA)

R290 Training for RAC technicians in India, Sri Lanka and Timor Leste (HPMP)

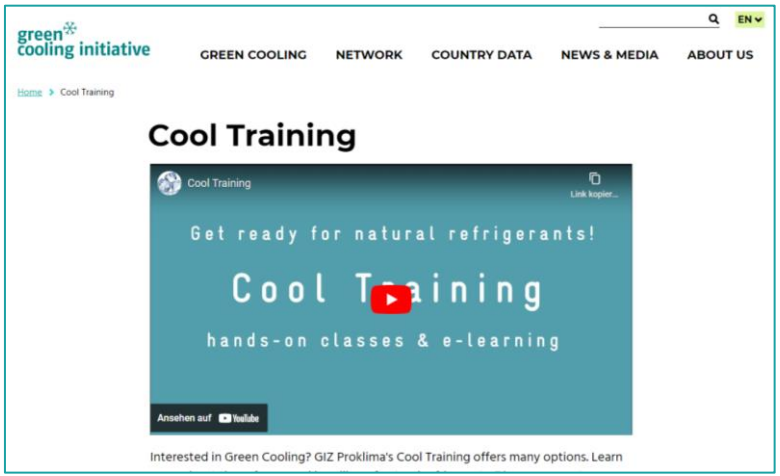
Online Cool Training on www.atingi.org



Find out more about QCR on our website



Fit for Green Cooling

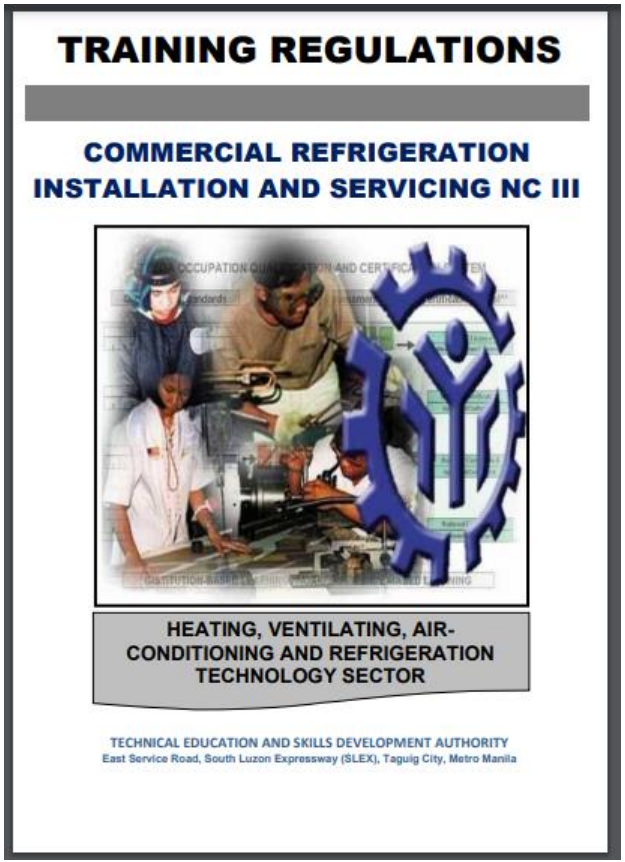


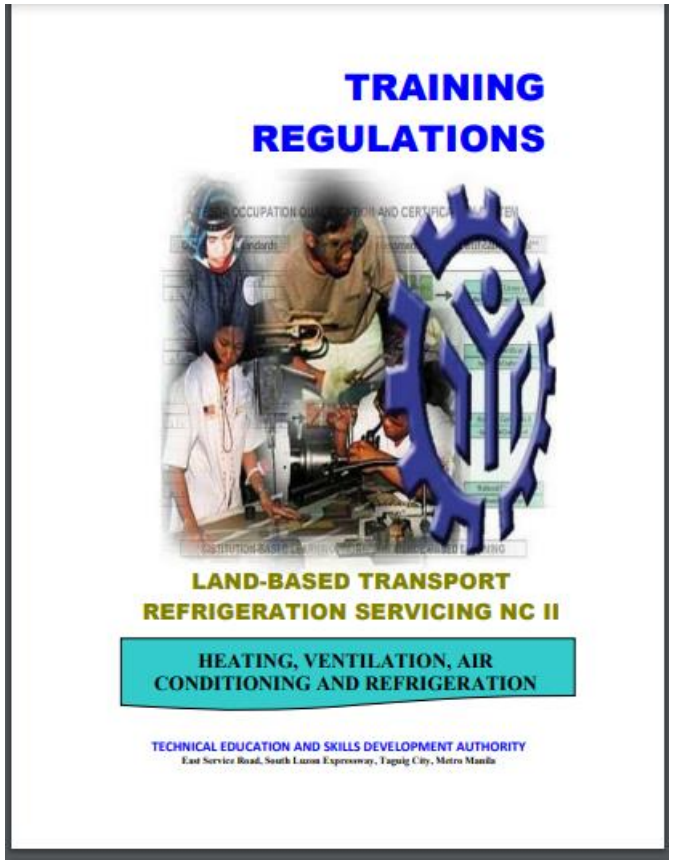
(Online) Cool Training

Integrating Natural Refrigerants (R744, R717 and R290) as Competency Standard in the Philippine TVET System

Manuel Azucena (virtually)
UNIDO

Future and Innovative Cold Chain Industry Technologies thru the Cold Chain Innovation Hub





Future and Innovative Cold Chain Industry Technologies thru the Cold Chain Innovation Hub

INDUSTRIAL REFRIGERATION ..?????????

As of November 2019, there are 151 Department of Agriculture (DA)-Accredited cold storage warehouses (CSWs), primarily located in the *NCR* (45), *Central Luzon* (30), *CALABARZON* (24), *Central Visayas* (13), and *Davao* (8). Most meat processors have cold storage facilities; other players are sardine canneries and banana exporters.

A large portion of cold storage demand is allocated for imported meat products, while local production usually goes directly to wet markets and supermarkets. In NCR, 40 percent of demand is occupied by meat, 30 percent by fish/aqua products, 20 percent by fruit and vegetables, and 10 percent by other products such as flour and other bakery products.

With the initiative of UNIDO through the CCI-Hub, TESDA-PO conducted an industry consultation was held for the development of the Competency Standard for Industrial Refrigeration

The Planning Office invited the following organization/agencies to the Industry Consultation:

- The Technical Education and Skills Development Authority (TESDA)
  - Planning Office (PO)
  - Qualifications and Standards Office (QSO)
  - National Institute for Technical Education and Skills Development (NITESD)
- Department of Trade and Industry - Philippine Trade Training Center
- Cold Chain Industry Hub (CCI Hub)
- Met's Logistics
- South Alps Cold Storage
- Koppel, Inc.
- Kilojoule Consultants Int'l. Co.
- San Miguel Integrated Logistics Services
- Maxicool

VALUE CHAIN SEGMENT	JOBS/SKILLS/ QUALIFICATIONS (TECHNICAL SKILLS)	JOBS/SKILLS IMMEDIATELY NEEDED (% Share)		ASSESS THE SHORTAGE OF WORKERS IN FILLING-UP THE SKILLS REQUIREMENTS (% Share)			REASONS/CONSTRAINTS IN FILLING-UP THE SKILLS REQUIREMENTS (e.g. no qualified applicants, prefer to work abroad, seek higher pay, work schedule)	RECOMMENDED ACTION (e.g. need for the conduct of training, standardization, certification)
		In the next 1-3 years	In the next 3-5 years	Low (below 100)	Medium (100-500)	High (above 500)		
							• Equipments • No Qualified Applicants	
	Refrigeration Technician (Ammonia System)	85.71	14.29	100.00	0.00	0.00	• Required to have experience to handle Ammonia Refrigerants and	Training and Certification
							• Equipments • No Qualified Applicants	
							• No Certifications • Most of the experienced refrigeration mechanics/technicians are working overseas	Training and Certification

Table 3. Summary of Identified Priorities by the Cold Chain Industry

Source: Result of research and collaboration between TESDA-PO and Cold Chain Industries

Future and Innovative Cold Chain Industry Technologies thru the Cold Chain Innovation Hub

Today, the country has over 250 cold storage facilities with a total capacity of 450,000 metric tons, with ammonia (R717) being used as a refrigerant in 90% of these facilities. Due to operational savings, breweries in the Philippines employ ammonia as their refrigerant of choice. Ammonia is the preferred refrigerant in large meat and poultry processing plants, abattoirs, and commissary facilities.

Despite the wide use of the ammonia refrigerant, there are currently no certified ammonia refrigeration operators and technicians in the Philippines. No BFP HAZMAT team can manage R-717 leaks/accidents. Most refrigeration facilities do not have at least two sets of SCADA for maintenance and operations employees.

With the lack of certified workers, the industry also mentioned of the enacted Republic Act No. 11285 also known as "Energy Efficiency and Conservation Act". In the said law, TESDA is instructed to implement skills training, assessment, and certification programs for mechanics, technicians, installers, as well as operators of energy efficient and renewable energy systems. Under these law, TESDA shall focus on preparing the talent supply for skills/jobs/qualification that deal with energy operation and maintenance.

COMPETENCY STANDARDS

INDUSTRIAL REFRIGERATION OPERATION & MAINTENANCE LEVEL III

HEATING, VENTILATING, AIR-CONDITIONING AND REFRIGERATION TECHNOLOGY SECTOR

TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY
East Service Road, South Luzon Expressway (SLEX), Taguig City, Metro Manila

COMPETENCY STANDARDS FOR
INDUSTRIAL REFRIGERATION OPERATION & MAINTENANCE LEVEL III

SECTION 1 INDUSTRIAL REFRIGERATION OPERATION & MAINTENANCE LEVEL III QUALIFICATION DESCRIPTION

The **Industrial Refrigeration Operation & Maintenance Level III** Qualification consists of competencies that a person must achieve to enable him/her to operate, maintain, troubleshoot and repair industrial refrigeration plant using natural refrigerant.

This Qualificat
shown in Annex A.

The Units of Co

CODE NO.
400311319
400311320
400311321
400311322
400311323
400311324
400311325
400311326
400311327

CODE NO.
HVC713201
HVC311202
HVC311201
HVC311203
HVC713202
HVC724201
HVC311204
HVC315201
HVC311205

CODE NO.	
HVC7233xx	
HVC7233xx	Operate indu
HVC7233xx	Maintain ind
HVC7233xx	Troubleshoot industrial refrigeration plant system

A person who has achieved these competencies is Qualified to be a:

- Industrial Refrigeration Plant Operator
- Industrial Refrigeration Plant Technician

CODE NO.	CORE COMPETENCIES
HVC7233xx	Perform start-up, test and commissioning for industrial refrigeration plant
HVC7233xx	Operate industrial refrigeration plant
HVC7233xx	Maintain industrial refrigeration plant
HVC7233xx	Troubleshoot industrial refrigeration plant system

A person who has achieved these competencies is Qualified to be a:
•Industrial Refrigeration Plant Operator
•Industrial Refrigeration Plant Technician

TESDA CIRCULAR

SUBJECT: Implementing Guidelines on the Deployment of Competency Standards for Industrial Refrigeration Operation and Maintenance Level III		Page 1 of 4 pages Number 033 series of 2023
Date Issued: 13 June 2023	**Effectivity:** Immediately	**Supersedes:**

In the interest of the service and to provide quality and uniform program delivery, the following Guidelines in the deployment of the Competency Standards (CS) for **Industrial Refrigeration Operation and Maintenance Level III** are hereby issued:

I. BACKGROUND/RATIONALE

1. The TESDA Act of 1994 (Republic Act No. 7796) defined TESDA as the authority in the "establishment and administration of National Trade Skills Standards (NTSS)." The NTSS eventually evolved into the present-day training regulations (TRs) following the reforms instituted by the agency for the country's TVET, particularly along competency-based, education and training. As such, TESDA is mandated by law to develop and update the competence of the country's industry workers to enhance their employability and ensure long-term economic development.

2. TESDA CY 2018 Planning Guidelines under B.1.3 "Adapt and adopt" policy shall be pursued in the development of competency standards/TRs, particularly for high-end technologies, higher level qualifications using the available off-the-

2. TESDA CY 2018 Planning Guidelines under B.1.3 "Adapt and adopt" policy shall be pursued in the development of competency standards/TRs, particularly for high-end technologies, higher level qualifications using the available off-the-shelf competency standards developed by industries, multi- bilateral agencies and international development partners.

3. In line with TESDA's efforts to continue perform its mandate and serve the people, the OPLAN TESDA Abot Lahat: TVET Towards a New Normal was formulated. TESDA the QSO shall prioritize developing and updating the TRs and CS in the priority sectors in providing skills to Filipinos and a job and livelihood after.

4. The abovementioned Competency Standards (CS) was developed through consultation meetings and workshops with the technical experts from the food cold chain industry and Refrigeration and Air-conditioning Technicians for Development of the Philippines (RACTAP) through the United National Industrial Development Organization (UNIDO) and was benchmarked with existing international standards and competencies.

II. OBJECTIVES

1. To immediately respond to industry skills requirement for industrial refrigeration operators and technicians with the goal to produce competent individuals equipped with 21st Century Skills and compliant to the existing industry standards and practices;

C. Institutional Assessment of Graduates

1. The education and training providers shall ensure the conduct of institutional assessment after the completion of the training program; and

2. The education and training providers (including the enterprises where trainings are conducted) shall issue the Training Certificate after completion of the training and passing the institutional assessment of graduates.

D. Scholarship Provision

1. A scholarship training subsidy shall be allocated/provided to enrollees of the registered training program; and

2. Training cost shall be computed based on the submitted curriculum where the training hours and list of tools, materials and equipment are indicated.

V. MONITORING AND FEEDBACK SYSTEM

1. The Regional and Provincial/District Offices (ROPO/DO) shall closely monitor the implementation of the registered programs under this CS; and

2. The ROPO/DO shall require the education and training providers with registered program under this CS to report the enrolled, graduates and employed in the T2MIS as part of the regular monitoring and feedback system.

VI. EFFECTIVITY

This Circular shall take effect as indicated and shall supersede all other issuances inconsistent hereof. Wide dissemination of this Circular by all concerned is hereby enjoined.

SEC. SUHARTO T. MANGUDADATU, Ph. D.
Director General

TESDA CIRCULAR

SUBJECT: Implementing Guidelines on the Deployment of Competency Standards for Industrial Refrigeration Operation and Maintenance Level III		Page 2 of 4 pages Number 033 series of 2023
Date Issued: 13 June 2023	**Effectivity:** Immediately	**Supersedes:**

2. To strengthen the industry-academe linkages addressing the "skills-jobs mismatch" in critical sectors; and

3. To ensure that the education and training providers shall deliver the programs in accordance with the above-mentioned CS as required for the development of industry workers in the HVAC-R sector.

III. SCOPE / COVERAGE

This CS shall be the basis for the development of the Competency-based Curriculum (CBC), which shall be submitted by the education and training providers registering the program at the TESDA Provincial/District Offices.

IV. IMPLEMENTATION MECHANICS

A. Utilization of the Developed CS

1. To ensure the utilization of this CS, all Regional/Provincial/District Directors shall immediately advocate/encourage the registration of the abovementioned program; and

2. The copy of the CS will be made available and can be downloaded from the TESDA website.

B. Program Registration

1. All Regional/Provincial Directors are hereby instructed to process applications for program registration as "No Training Regulations" (NTR) following the Omnibus Guidelines on Technical Vocational Education and Training (TVET) Program Registration (TESDA Circular No. 107 series of 2021) and within the allowable process cycle time (PCT) of three (3) working days indicated in the existing guidelines (TESDA Circular No. 073 s. 2019). Further, the education and training providers shall develop and submit the competency-based curriculum with number of training hours and appropriate lists of tools, materials, equipment and facilities for training and assessment.

2. To standardize the program implementation and ensure that they are in accordance with the CS, National Institute for Technical Education and Skills Development (NITESD) and Regional Offices/Provincial Offices (RO/POs) shall assist in the development of the Competency- Based Curriculum (CBC).

COMPETENCY-BASED CURRICULUM EXEMPLAR

Sector:

HEATING, VENTILATING, AIR-CONDITIONING AND REFRIGERATION TECHNOLOGY SECTOR

Qualification:

INDUSTRIAL REFRIGERATION OPERATION AND MAINTENANCE LEVEL III

TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY
East Service Road, South Superhighway, Taguig, Metro Manila

COURSE DESIGN

COURSE TITLE : **INDUSTRIAL REFRIGERATION OPERATION AND MAINTENANCE LEVEL III**

TRAINING DURATION :

40 hours Basic Competencies
83 hours Common Competencies
231 hours Core Competencies
(40 hrs. in-center training)
(191 hrs. in-plant training)
354 hours TOTAL

COURSE DESCRIPTION :

The **Industrial Refrigeration Operation & Maintenance Level III** qualification consists of competencies that a person must achieve to enable him/her to perform start-up, testing, and commissioning as well as operate, maintain, troubleshoot, and repair industrial refrigeration plants using natural refrigerants.

TRAINEE ENTRY REQUIREMENTS:

Trainees or students wishing to gain entry into this program must possess the following requirements:

- Must have **any** of the following:
  - Holder of RAC Servicing (DomRAC) NC II or higher NC in HVAC-R sector
  - At least two-years work experience in RAC servicing
  - B.S degree graduate with refrigeration and airconditioning subjects
  - Technology course graduate major in refrigeration and airconditioning subjects
- Can communicate both oral and written
- Can perform basic mathematical computation
- Physically fit (certified by a physician)

The institutions may opt to require other requirements such as educational attainment, appropriate work experience, and others that may be required of the trainees by the school or training center delivering the TVET program.

COMPETENCY BASED LEARNING MATERIAL

Sector	:	**HEATING, VENTILATION, AIR CONDITIONING AND REFRIGERATION (HVAC/R)**
Qualification Title	:	**AMMONIA REFRIGERATION SYSTEM SERVICING NC III**
UNIT OF COMPETENCY	:	**SERVICE AND MAINTAIN AMMONIA REFRIGERATION SYSTEM**
MODULE TITLE	:	**SERVICING AND MAINTAINING AMMONIA REFRIGERATION SYSTEM**

Technical Education and Skill Development Authority
TESDA Complex East Service Road, South SuperHiway, Taguig, Metro Manila

HOW TO USE THIS COMPETENCY–BASED LEARNING MATERIAL

Welcome to the module Service and Maintain Ammonia Refrigeration System

The unit of competency, "**Service and Maintain Ammonia Refrigeration System**", is a core competency of **Ammonia Refrigeration System Servicing NC III**, a course which comprises the knowledge, skills and attitudes required for TVET trainees to possess.

The module, "**Servicing and Maintaining Ammonia Refrigeration System**", contains training materials and activities related to identifying learner's requirements, instructional materials, organizing learning and teaching activities for you to complete.

In this module, you are required to go through a series of learning activities in order to complete each learning outcome. In each learning outcome are ***Information Sheets, Self-Checks***, ***Job Sheets*** *and* ***Task Sheet***. Follow and perform the activities on your own. If you have questions, do not hesitate to ask for assistance from your facilitator for assistance.

- Read the information sheets and complete the self-checks. Suggested references are included to supplement the materials provided in this module.
- Perform the Task Sheets and Job Sheets until you are confident that your outputs conform to the Performance Criteria Checklist that follows the sheets.
- Submit outputs of the Task Sheets and Job Sheets to your facilitator for evaluation and recording in the **Progress Chart and Achievement Chart.** Outputs shall serve as your portfolio during the Institutional Competency Evaluation. When you feel confident that you have had sufficient practice, ask your trainer to evaluate you. The results of your assessment will be recorded in your **Progress Chart and Achievement Chart.**

You must pass the Institutional Competency Evaluation for this competency before moving to another competency. You need to complete this module before you can perform the next module.

Trainers Training on the Safe Operation and Maintenance of R717 Ammonia-based Industrial Refrgeration System on 17-21 October 2022

Industry immersion for TESDA trainers in cold storage facilities of FAST Logistics in Consolacion, Cebu and Imus, Cavite, Philippines from 08-14 October 2023 on R717 Ammonia Refrigeration

Training of Trainers on R744 CO_2 refrigerant transcritical systems jointly implemented by GIZ and UNIDO from 20-24 November 2023

Sustainability and resilience through training and competence

- Manufactures should consider the design and production of climate friendly and energy efficient equipment
- Conduct energy efficiency testing and certification of cold chain equipment
- ***Operators should receive sufficient training on proper operation on the specific equipment***

In 2018, GIZ initiated the first R290 Hydrocarbon Training of Trainers on its Safe Use in Unitary Split-type Air Conditioners

COLD CHAIN INNOVATION HUB PHILIPPINES

Global Partnership for Improving the Food Cold Chain in the Philippines

Jan Dusek
COO & Head of APAC
ATMOsphere

CCI-Hub | COP28 | 8 December, 2023

Project Background

Global Partnership for Improving the Food Cold Chain in the Philippines

Funding: Global Environment Facility (GEF)

Funding amount: 2M USD + Co-financing (around 25M USD)

Government partner: Department of Environment and Natural Resources of the Philippines (DENR)

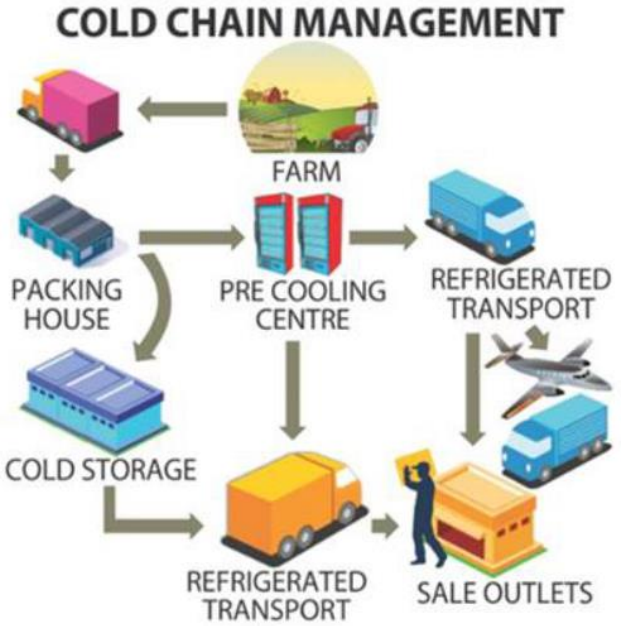
Implementing agency: United Nations Industrial Development Organization (UNIDO)

Key executing partners: TESDA, ATMOsphere, Cold Chain Innovation Hub

Global Partnership for Improving the Food Cold Chain in the Philippines

Goal:

Identify, develop and stimulate the development of **low-carbon, energy efficient refrigeration innovation technologies and business practices** in the Philippines for use throughout the food cold chain whilst increasing food safety and security.



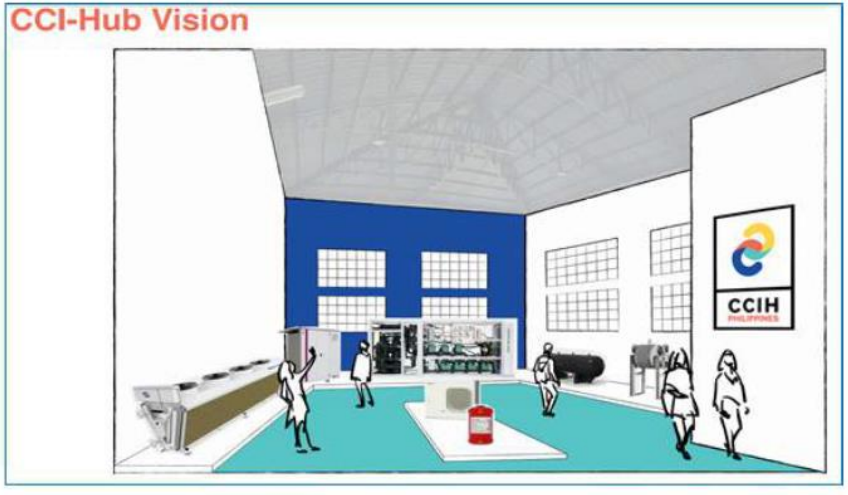
Global Partnership for Improving the Food Cold Chain in the Philippines

Project Components: Expected Outcomes	
Component 1. Policy and Regulatory Assessment	▪ Regulatory, legal and voluntary measures are adopted to support the use of low GWP and energy efficient technology within CC
Component 2. Awareness and Capacity Building	▪ Awareness, knowledge and capacity in the use of energy-efficient, climate-friendly and safe alternatives in the food cold chain industry is improved and demand has increased.
Component 3. Technology Transfer	▪ New technologies made available in the country and partnerships between key stakeholders established; financing scheme to develop bankable investment projects put into practice

Global Partnership for Improving the Food Cold Chain in the Philippines

Online platform

www.cci-hub.org



Physical Hub

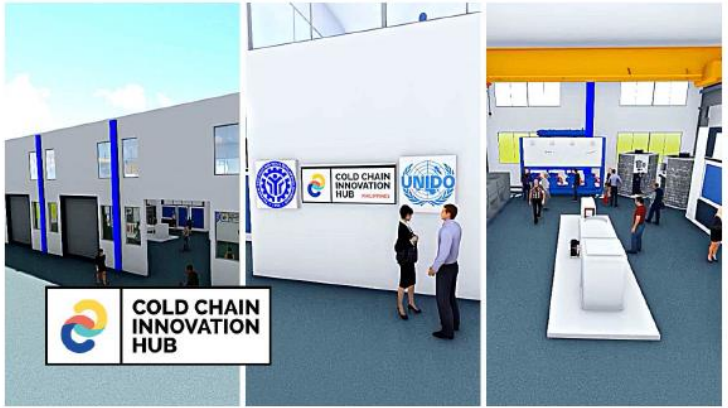
CCI-Hub facility

Central location near airport

500m² of available space

CCI-Hub facility

TESDA



CCI-Hub facility

CCI-Hub facility

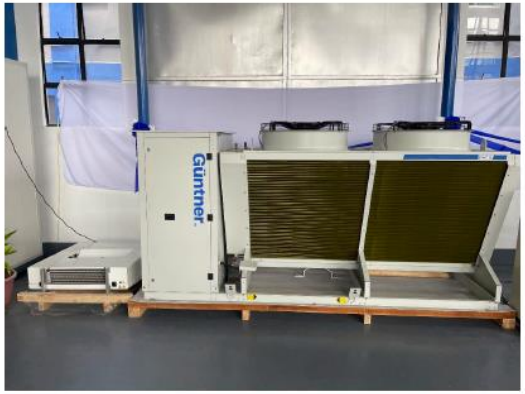
Installed R290 air conditioners by Godrej

Secured equipment, training and tools contributions

Total agreements secured: 30

Estimated value: $750,000+

Secured equipment



Completed installations at the CCI-Hub

Completed installations at the CCI-Hub

1000+ hours of training on NatRefs

Industry meeting place

CCI-Hub | COP28 | 8 December, 2023

Completed installations at the CCI-Hub

- CO2 TC refrigeration system / condensing unit for cold storage / food processing
- CO2 TC refrigeration system (condensing unit & showcase) for food retail
- R290 water loop refrigeration system (plug-in showcase & outdoor dry cooler)
- Refrigerated truck with R290 cooling unit & monitoring system for last mile delivery
- CO2 TC refrigerated container (reefer)
- Preassembled plug-in R290 walk-in cooler
- Solar powered chest freezer (206L) for off-grid applications (min 5-10 units) per application

Demonstration Projects

DEMO Projects

Co-financing Opportunity for Demonstration Projects

10 projects approved in 2023 with 630,000 USD funding

- CO2 TC for cold storage
- CO2 TC for blast freezing
- R290 walk-in coolers
- R290 refrigerated trucks
- CO2 reefer
- R600a solar freezers

Completed DEMO projects

Glacier Megafridge

The first CO2 TC refrigeration system for cold storage facility in Philippines has been successful completed and commissioned in September 2023.

Completed DEMO projects

Camp Backpackers

The first installation of R600a solar freezers (PV + battery) has been successful completed and commissioned in October 2023 at Palawan.

Results of the DEMO projects

Results of the selected demonstration projects will be presented at the international conference on sustainable food cold chain technologies, the **ATMOsphere APAC Summit 2024** in Tokyo (6-7th February).

CCIH
PHILIPPINES

Thank you for listening!

For more information contact:

Jan Dusek
jan.dusek@shecco.com

www.cci-hub.org

Q&A

Closing

Philipp Denzinger
GIZ Proklima

Philipp Denzinger
Project Manager, GIZ Proklima

philipp.denzinger@giz.de

Maraida Licerio
Senior Advisor, GIZ Philippines

maraida.licerio@giz.de

www.giz.de

https://twitter.com/giz_gmbh

https://www.facebook.com/gizprofile/