

# **Promoting the use of Refrigerant Grade HC in Nigeria**

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# BACKGROUND

- ① The servicing sector for domestic refrigerators and air conditioning in Nigeria is using, in rapidly increasing amounts, hydrocarbons as replacement for HCFC-22 and HCFC blends.
- ① The feedstock is mostly imported cooking gas and no safety measures had been in place to cope with flammability and explosion hazards ,prior to the HPMP.
- ① Priority for substitutes and alternatives that minimize other impacts taking into account global warming potential, energy use and other relevant factors

# BACKGROUND

- ⦿ Outcome of Special Workshop organized for relevant manufactures of products which emphasised the following
  - ✓ Avoidance of High GWP alternatives
  - ✓ Local capacity to assure cost-effective availability of alternatives
  - ✓ Local production of refrigerant grade Hydrocarbons for the servicing sector
  - ✓ Inclusion of Training on the use of HC

# PILOT HYDROCARBON PRODUCTION PROJECT

## PROJECT DESCRIPTION

- ⦿ Design, Construction and Start-up of pilot distillation and bottling of HC Refrigerants
- ⦿ Distribution and marketing of products along with a good practice programme

# OBJECTIVES

- ① Develop cost-effective local/regional hydrocarbon supply for natural refrigerants to replace HCFCs in refrigeration manufacturing and servicing applications;
- ① Demonstrate the technology for commercial refrigeration manufacturers, ice makers and other commercial refrigeration manufacturers, and
- ① Assure through training and proper retrofit that the use of these hydrocarbons in the market will occur in a safe way.
- ① Demonstrate an innovative technology based on local expertise in distillation and purification of refrigerants

# PRODUCTS AND SOURCES

- ◎ Target Products

**Propane and Isobutane**

- ◎ Raw Material

**Liquified Petroleum Gas ( LPG)**

- ◎ Source of Supply

**Usually Refineries** (in Nigeria usually flared )

**Sometimes gas released from oil fields** (also flared)

# STATUS OF THE PROJECT

- ⦿ The construction and Installation of prototype distillation unit for the production of high grade refrigerant is successfully completed
- ⦿ Pilot production of new manufactured refrigerant achieved -PAMOZONE (R-290 and R-600)
- ⦿ Certification of Plant with Regulatory Agency in progress

# SAFETY, TRAINING AND AWARENESS

- ◎ Production of Safety Operational Manual
  - Safety Organisation and Responsibilities
  - Standard Operating Procedures for Work Activities
  - Emergency Response Plan
- ◎ First Safety Audit of Plant
  - Plant Access and General Security
  - Loading and Unloading Operations
  - LPG Storage
  - Equipment and Piping
  - Fire Protection



# SAFETY, TRAINING AND AWARENESS

- ⊙ Training for local technicians and indigenous manufacturers
  - Avoidance of venting
  - Retrofit to allow safe operation on hydrocarbon refrigerants.
  - Proper tooling
  - Training in safe practices.
- ⊙ Awareness Creation workshops for Refrigerant importer/distributors

# NEXT STEPS

- ⦿ Commissioning of HC Production Plant (Oct. 2015)
- ⦿ Full Commercialization of Plant during the second stage HPMP
- ⦿ Continuous Training of Technicians and Awareness Creation
- ⦿ Commencement of Certification Process
- ⦿ Training and Certification is according to AREA's Guidance on minimum requirements for training and certification.

# CONCLUSIONS

- ① The risks associated with this project can be minimised/eliminated by organised training and awareness creation programmes
- ① This process can be replicated anywhere in the world and may generate opportunities for similar projects in other developing countries
- ① Nigeria expects to realise environmental and economic benefits from this project

# THE PROTOTYPE PLANT PICTURE



# THE DISTILLATION COLUMN PAINTED FOR DIFFERENT SEPARATIONS





# Section showing part of the Refrigerant's Distillation Column



# THE SEMI AUTOMATIC FILLING EQUIPMENT.





# FILLED CANS OF R290 REFRIGERANT





# FIELD LAB (GAS CHROMATOGRAPHY)



# CONSTRUCTION OF CONCRETE ROADS AND KERBS FOR THE BEAUTIFICATION OF THE HC PLANT



27 04 2015

**THANK  
YOU**