

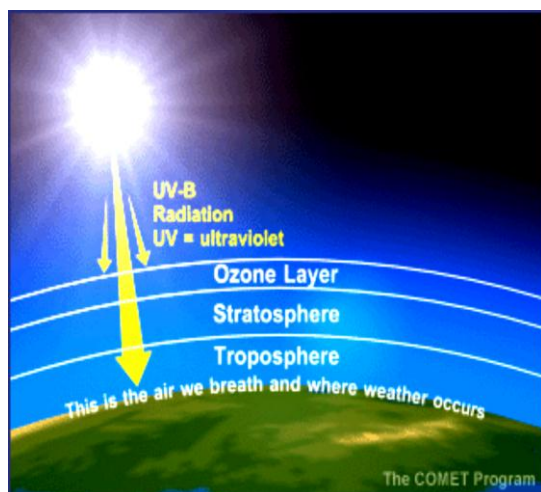
# THE STATUS OF IMPLEMENTATION OF THE VIENNA CONVENTION ON PROTECTION OF OZONE LAYER, AND THE MONTREAL PROTOCOL ON SUBSTANCES THAT DEplete THE OZONE LAYER

[ *Note: The write-up below covers period up to December, 2016* ]

## 1.0 OVERVIEW

### 1.1 The Vienna Convention on Protection of the Ozone Layer, and the Montreal Protocol on Substances That Deplete The Ozone Layer

Prior to the year 1997, under the guidance and coordination of the United Nations Environment Programme (UNEP), a number of interventions and actions were instituted aimed at phasing out the use of substances that deplete the Ozone Layer. Thereafter in 1997, the World Plan of Action on the Ozone Layer was put in place, to focus on cooperation in research on atmospheric conditions, health and environmental effects, and emission of ozone-depleting substances (ODSs). The Coordinating Committee on the Ozone Layer (CCOL) was created and reaffirmed that depletion of the Ozone Layer posed a real threat to the integrity of planet earth.



**The Ozone Layer** – Ozone is a gas that occurs naturally in the atmosphere, and is mainly found in two regions of the atmosphere. About 10% of total ozone gas is found in the region called troposphere which lies 10 to 16km above the earth's surface; and 90% of the total ozone gas is found in the region called the stratosphere that lies between 16 and 50km above the earth's surface. It is the stratosphere that is referred to as the "Ozone Layer" and it surrounds the whole earth (see *Figure*). The troposphere lies immediately above the earth's surface – the air we breathe and prevailing weather conditions.

The major effects of Ozone Layer depletions are highlighted below.

Category	Negative Effects
Human health	Damage to DNA and suppression of immune system resulting in increase in infectious diseases; Skin cancer; Eye cataract.
Vegetation (e.g., trees, crops)	Reduces crop yields, and damage to seeds; reduces quality of crops.
Aquatic (Water) organisms	Damage to plants in lakes, oceans, rivers, etc; degradation of fisheries resources.
Materials	Damage to certain types of plastics, rubber, paints especially in the tropical regions where atmospheric temperatures are high.

The **Vienna Convention on the Protection of the Ozone Layer** was adopted by participating countries and came into force in **September, 1985**. The Convention under-scores the urgency of taking appropriate measures to protect human health and the environment from the harmful effects of Ozone Layer depletion.

The **Montreal Protocol on Substances that Deplete the Ozone Layer** came into force in **January, 1989**. The provisions of the Protocol are intended to directly reduce and/or phase out completely the production, consumption, export, import and use of ODSs. The Protocol outlines a time-table (schedule) with target dates for phasing out ODSs and ODS-dependent technologies, of with the majority of ODSs and ODS-dependent equipment/technologies set to be phased out by the year 2010.

After 1989, amendments to the Montreal Protocol were made to impose controls on additional ODSs identified. That is: (a) **London Amendment of 1990** – controls the use of *Chlorofluorocarbons (CFCs)*, *Carbon tetrachloride (CTC)*, and *Methyl Chloroform*; (b) **Copenhagen Amendments of 1992** – includes 34 *Hydrochlorofluorocarbons (HCFCs)*, *Methyl bromide*, and 34 *Hydrobromofluorocarbons (HBFCs)* in the list of controlled substances; (c) **Montreal Amendment of 1999** – focuses on *establishment of import/export licensing systems for ODSs*; (d) **Beijing Amendment of 1999** – sets out control measures on use of *Bromochloromethane (BCM)*, as well as controls on *manufacture of HCFCs*, and *use of Methyl bromide for quarantine and pre-shipment purposes*; and, (e) **Kigali Amendment of 2016** – controls manufacture and use of *Hydrofluorocarbons (HFCs)*. The Kigali Amendment will enter into force on (globally) on 1<sup>st</sup> January, 2019.

## **1.2 Status of Ratification of the Vienna Convention and the Montreal Protocol by Uganda**

Uganda acceded to the Vienna Convention on 24<sup>th</sup> June, 1988, and ratified the Montreal Protocol on Substances that Deplete the Ozone Layer on 15<sup>th</sup> September, 1998. Thereafter, Uganda also became Party to four subsequent Amendments to the Montreal Protocol, that is: ratified the London Amendment on 20<sup>th</sup> January, 1994; acceded to the Copenhagen Amendment on 22<sup>nd</sup> November, 1999; acceded to the Montreal Amendment on 23<sup>rd</sup> November, 1999; and, acceded to the Beijing Amendment on 27<sup>th</sup> July, 2007.

The Amendment that has not yet been ratified by Government of Uganda is the Kigali Amendment to the Montreal Protocol, which was adopted by the Parties in October, 2016, in Kigali, Rwanda. It is envisaged that Government of Uganda will ratify this Amendment before end of the year 2017.

## **1.3 The Global and National Perspective**

As concerns regarding climate change are gaining momentum, the Parties to the Montreal Protocol have also in the recent past enhanced collaboration between the Kyoto Protocol Secretariat and the Ozone Secretariat. This is aimed at ensuring that climate change matters are addressed using a holistic approach. Since now control of (production and consumption of) HFCs is embedded in the Kigali Amendment, as the Kyoto Protocol is concerned with control of emissions of HFCs into the atmosphere. One other major challenge has been that some HFCs that do not deplete the Ozone Layer are not also listed under the Kyoto Protocol.

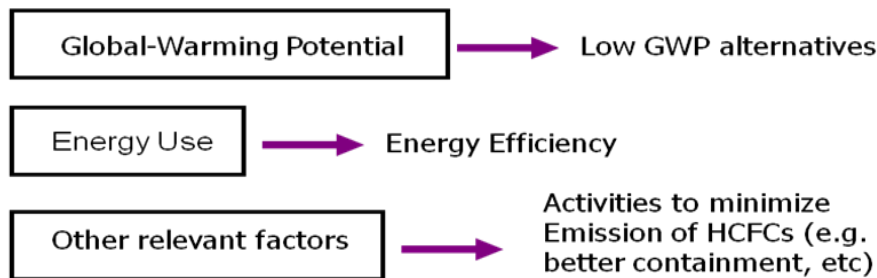
Hence, the Parties have continued to advocate for collaboration between the Secretariats of the two Protocols in order to work towards achieving the dual (two-fold) benefits of protecting and contributing to the recovery of the ozone layer, and mitigating the causes of global-warming (climate change). It is envisaged that two Protocols Secretariats working together in harmony can achieve far more, and much faster at a lower cost.

HCs are recommended alternatives to use of HCFCs and HFCs which are both ozone-friendly but have high global-warming potential. Restrictions on the manufacture of HCFCs worldwide took effect on 14<sup>th</sup> May, 2008, pursuant to Article 2(9) of the Montreal Protocol; meaning that HCFCs are supposed to be phased out earlier than was previously indicated in the phase out schedule contained in the Montreal Protocol. That is, instead of phase-out date of 2040, HCFCs are now to be phased out by 2030.

Overall, in prioritising alternatives for adoption both at global and national levels, all Parties have been urged to be mindful of and to consider three factors: (a) energy efficiency (b) cost of alternatives; and, (c) global warming potential (GWP) (*see illustration below – as recommended by the Parties*).

**19<sup>th</sup> Meeting Decision Of The Parties To The Montreal Protocol**

Decision XIX/6 (j) – when selecting substitutes and alternatives, the following should be taken into account:



In order to cater for the new requirement to accelerate the phase-out of HCFCs and phase-down of use of HFCs, there need to review the relevant national laws and standards including the National Environment ((Management of Ozone Depleting Substances and Products) Regulations, S.I. No. 63/2001. Controls on HCFC imports took effect world-wide in May, 2014.

It is believed that there are opportunities in Uganda to contribute to global efforts to mitigate causes of global-warming/climate change. For instance, the Ministry of Water and Environment spearheaded the development of the National Adaptation Programme of Action (NAPA) of 2007, which provides a channel for communicating the urgent need to adapt to and/or cope with impacts of climate change.

Presently Uganda does not manufacture ODSs or alternatives to ODSs; however, there is potential for Uganda to produce Hydrocarbons (HCs) once the oil refinery becomes operation in the near future. HCs, particularly Iso-butane (also known as refrigerant 600a – R-600a) do not deplete the Ozone Layer and do not contribute to global-warming/climate change when emitted into the atmosphere. There is great potential for citizens of Uganda to adopt use of HCs and HC-dependent equipment (*see section 2.0 below*).

## 2.0 STATUS OF IMPLEMENTATION OF THE MONTREAL PROTOCOL IN UGANDA: ACHIEVEMENTS AND OUTCOMES

The main sectors of Uganda which have over the years been associated with the phase-out of ozone depleting substances (ODSs) are the : **(a) Refrigeration and Air-Conditioning Sector** – dependent on Chlorofluorocarbons (CFCs) as refrigerants; **(b) Aerosols Sector** (*including asthma inhalers*) – containing CFCs as propellants; **(c) Solvents Sector** – Carbon tetrachloride used mainly as laboratory solvents in science laboratories, and dry-cleaning facilities; **(d) Halons Sector** – for fire-fighting; **(e) Floriculture** – Methyl bromide use in the cut-flower sector to control soil-borne pests; **(f) Foam Sector** – manufacture of flexible polyurethane foam (mattresses, among others).

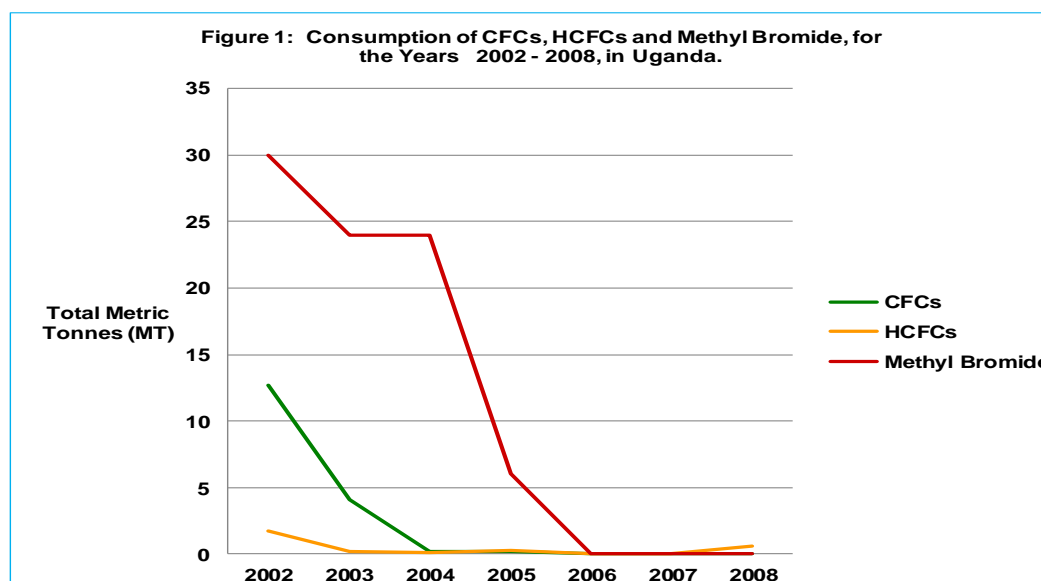
There many alternatives (*HCFCs, HFCs, HCs, Ammonia, Propane, Iso-butane, water as a blowing agent in manufacture of foam, among others*) now on the world market that are being used to replace the use of ODSs mentioned above.

CATEGORY	Refrigerant	TYPE OF EQUIPMENT	WHERE USED
Domestic	HCFC HFC HCs	Wall and split Room AC Units ,Refrigerators and Freezers, Incubators and Dispensing freezers	Homes, Offices, Residential Buildings and Government Offices
Commercial	HCFC HFC HCs	Display cages, cold Rooms, freezers,Milk Coolers, Ice Cream cabinets, Frozen Food Storage Cabinets and Mortuaries, Heat Pumps	Supermarkets, Hotels and Restaurants, Broadcasting and Mobile Telecommunications Companies, Research and Educational Institution,Banks,Flowers and Horticultural companies, Hospitals
Industrial	HCFC HFC Ammonia	Cold Rooms, Water Chillers, Ice Plants ,Blast Freezers, Plate Coolers, Air driers	Agro-processing plants, Industries, Abortoirs, Breweries and Soft Drinks Manufacturers, Foam Industries, Milk Processing Plants, fish processing plants.
Mobile (MAC) and Transport Containers	HCFC HFC	Motor Vehicle ACS, Insulated Transport Containers	Fish Processors, Cars, Flower and Horticultural Companies

Some of the key efforts made and notable achievements realised with the assistance by UNEP, GTZ Prokilma (now GIZ) and UNIDO, are summarised below.

### 2.2 Notable Achievements / Outcomes Covering The 2001 – 2017 Period

1. The National Environment ((Management of Ozone Depleting Substances and Products) Regulations, S.I. No. 63/2001, came into place in the year 2001, with the main objectives being, to: *(a) regulate the production, trade and use of ODSs; (b)provide a system of data collection that will facilitate compliance with the Protocol; (c) promote the use of ozone-friendly substances, products, equipment and technologies; and, ensure the elimination of substances and products that deplete the ozone layer.* These has resulted in successful phase-out of ODSs (*see graph below*), and trends in importation of alternatives to controlled substances.



#### Comparison of CFC and HCFC Imports (Consumption in metric tonnes) Trends, 2001 – 2016 Period

Annex	Anx Group Name	2009	2010	2011	2012	2013	2014	2015	2016	Baseline (MT)
A	CFC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.8
C	HCFC	0.11	5.2	2.24	0.89	0.0	0.0	0.0	0.0	0.2

*Note: HCFCs are also being recovered from equipment (e.g., fridges) and recycled. Recycling of HCFCs averts importation of HCFCs.*

- The Methyl Bromide Phase-Out Project ended in the year 2007 (eight years ahead of the global target date/year, 2015).** Since then Methyl bromide is no longer being used in the country for controlling soil-borne pests in the flower farms. The flower farms that benefitted from this Project and phase out of Methyl bromide successfully by the year 2007, are: *Aurum Roses; African Agro Industries; Belflowers; Fiduga; Jambo Roses ; Kajjansi Roses; Mairye Estates; Melissa Flowers; MK Flora; Pearl Flowers ; Rosebud I & II; Uganda Hortec; UgaRose; Van Zanten (U) Ltd.; Venus Farms (U) Ltd.; Victoria Flowers (U) Ltd.; Wagagai; Magic; ADC/IDEA Project; and, Fresh Handling.*

Methyl bromide is classified as a banned chemical under the Agrochemicals Board; hence, the Ministry of Agriculture, Animal Industry and Fisheries was responsible for approving and issuing permits for importing controlled amounts of Methyl bromide each year – without exceeding the quota for each year.

- The Project For CFC Phase-Out** was implemented from 2002 – 2007; and Uganda again achieved earlier **phase-out of CFCs by the year 2007 (three years ahead of the 2010 global target year/date)**. Since then CFCs are no longer being imported into the country. As provided for under the Regulations mentioned above, there are also authorised dealers in and importers of refrigerants and related equipment, as well as servicing companies, and include those below as at December, 2016.

Name Of Companies	Activity
1. Afrochili Tech. Services	Importation Instalation and Servicing
2. Airmac Ltd	Importation Installation and servicing
3. Appliance World	Importation Instalation and Servicing
4. Berick General Enterprises	Retailer
5. Bolton Ltd	Importation Installation and servicing
6. Bundu Thermal Services	Installation Servicing
7. Crown Beverages Ltd	Importation of Equipment
8. Elcold Technical Services	Installation Servicing
9. Frostcool Ltd	Installation Servicing
10. Gilfilian Air Conditioners (U)Ltd	Importation Installation and servicing
11. Gilo Refrigeration Services Ltd	Installation Servicing
12. Hisense Ltd	Importation Installation and servicing
13. K.K.Refrigeration Complex	Retailer
14. Kalege Enterprises Ltd	Importation Distribution
15. Kiyya Electrical Services	Installation Servicing
16. Linksoft Ltd	Installation Servicing
17. LM Engineering Ltd	Importation Servicing
18. Mineral Services Logistics Ltd	Installation Servicing
19. Mk Electrowatts	Importation Installation and servicing
20. Noor Ltd	Importation Installation and servicing
21. Franco General Merchandise	Importation Retailing
22. Premium Electrical Services	Installation Servicing
23. Sekka Refrigeration Clinic	Retailer
24. M&R Services Ltd	Installation Servicing
25. Snowmans(U)Ltd	Importation Installation
26. Super Freeze Iceline Services	Installation Servicing
27. T.A.L.E.E.R Works Ltd	Installation Servicing
28. Thermocool	Importation Intation Servicing
29. Thermol Solution	Installation Servicing
30. Transa Electrical Services	Importation Installation Servicing
31. Ugasung Company Ltd	Importation Installation Servicing
32. Chilly	Installation Servicing
33. GETS	Refrigerator Assembling
34. Shifa And Brothers	Retailer
35. Unikool Technical Services	Installation Servicing
36. Refrigeration & Electrical Bay	Installation Servicing

**The Main (Vehicle) Mobile Air-Conditioning Servicing (MAC) Companies in Uganda**

COMPANY NAME	ACTIVITY
Motor Care (U) Limited	Sell cars & Servicing MAC
Toyota (ug)Ltd'	Sell cars Servicing MAC
Spear Motors	Selling cars and servicing MAC
Cooper Motors	Selling cars and servicing MAC
Nis Uganda	Selling cars and Servicing MAC



Kitassimba	Servicing MAC
Kiya	Servicing MAC
Toyota Walusimbi's Garage	Servicing MAC
Transa	Servicing MAC

4. **Uganda received two Awards from the Ozone Secretariat/UNEP.** In the year 2006 the Award was for outstanding compliance with the Montreal Protocol. The second Certificate of Recognition was awarded by the Ozone Secretariat/UNEP in 2012 for contributing to the protection of the Ozone Layer.
5. **Government of Uganda (the Cabinet) banned the use of second-hand equipment** by 2006, as this kind of equipment are sources of emission of ozone-depleting substances into the atmosphere due to their old age, among other factors.
6. **Enhanced collaboration with the media house (electronic and print)**, and out of which Uganda's journalist (Mr. Gerald Tenywa) has already won two awards, in 2008 and 2010 from UNEP, on his role in publicising issues on ozone layer protection and efforts of Government of Uganda to implement the Montreal Protocol, respectively. The 2010 award was based on his story *"Ban on Old Fridges Starts Biting as NEMA Swoops in"*, focuses on the second life of archaic fridges in Kampala, which have been used by many people engaged in petty trade especially sale of beverages.
7. **A Memorandum of Understanding (MOU)** was signed between Kyambogo University (KYU), Kampala and NEMA in 2003 and has been implemented to-date. The MOU spelt out that KYU would: (a) integrate in their curriculum studies in RAC; (b) avail the facilities in their Department of Mechanical Engineering and Heat Transfer to train students enrolled in KYU in matters pertaining to RAC; (c) avail their facilities for training technicians in the RAC sector selected from industry and private sector (e.g., hotels, supermarkets, health centres, flower farms), with support from NEMA using funds provided by the Multilateral Fund Secretariat of the Montreal Protocol; (f) host the national refrigerants recycling and recovery centre to service RAC equipment; and, (d) be a reference point for any study tours by interested parties.

The said MOU has resulted in: (a) training of many students in KYU in RAC aspects; (b) over 300 technicians have been trained and at least 50% of these were awarded certificates by NEMA in collaboration with GTZ; (iii) six health centres under the Ministry of Health have had their refrigeration equipment retrofitted/converted to use ozone-friendly refrigerants (HCFCs) replacing use of CFCs that have been banned; (iv) both undergraduates and graduates from KYU who have studied RAC subject have been engaged from time in undertaking national surveys for Uganda to determine the trends in use of different refrigerants and RAC equipment, to enable monitoring of compliance with the Montreal Protocol across different sectors.
8. **NEMA in collaboration with UNEP have conducted trainings** for Customs Officers from Customs Department/Uganda Revenue Authority, Officers from the then Ministry of Tourism, Trade and Industry, and UNBS, on matters pertaining to the Vienna Convention and the Montreal Protocol – in particular regarding control and monitoring of trade including illegal trade in controlled substances and related equipment. Over 25 trained officers are still actively collaborating with NEMA.

9. At regional economic block level, namely the COMESA Region, NEMA on behalf of Government of Uganda, participated in the formulation and final drafting of the **Common (Harmonised) Policy And Action Plan, And Regulations – On Control Of Ozone Depleting Substances In The COMESA Region** to be used by the COMESA Member States to control and monitor trade in ODSs in the COMESA Region. These Regulations were approved in 2007 by the Council of Ministers representing the COMESA Member States.
10. **Four Vocational Training Schools have been identified** in the country, and with the assistance of UNIDO. The sets of RAC maintenance tool kits and training kits (equipment) is for training students in good refrigeration practices and handling of refrigeration equipment, and imparting knowledge on protection of the ozone layer. The said sets of equipment were handed over in December, 2015, at the Kyambogo University premises, to the Principals of the four Vocational Training Colleges, namely: Uganda Technical College Lira; Uganda Technical College Kichwamba; Uganda Technical College Elgon; and, Uganda Technical College Bushenyi. *(See below snap-shots of sorting and allocation of sets of equipment held at the Kyambogo University Department of Mechanical and Production Engineering, Refrigeration Section premises, in December, 2015.)*



**Plate 1:** In the middle is Dr. Titus Watmon, Head of Department of Mechanical and Production Engineering, Kyambogo University (KYU) receiving one of the tool kits being handed over by Ms. Margaret Aanyu from NEMA; and second from right is Mr. Paulo Odu the national RAC expert, and first and second from left are two other RAC lecturers/trainers based in KYU.

**Plates 2 – 5** show hand-over of sets of tool-kits to the four Principals from the said Colleges, and **Plate 6** shows a set being handed over to the two national RAC experts, Mr. Bernard Otim and Mr. Paulo Odu.

**Plate 2**



**Plate 3**



**Plate 4**





Plate 5



Plate 6



Training activities involving the four VTCs is set to take place during the 2017 – 2018 period. This has been organised by NEMA in conjunction with the United Nations Industrial Development Organisation (UNIDO). The training will focus on handling of refrigeration equipment using refrigerants (Hydrocarbons) that are not ozone depleting and do not contribute to global warming. Such equipment is currently being produced by GETS at Ndeeba, in Kampala.

11. **A local (Ugandan) entrepreneur and owner of Gayaza Electronics and TV Services (GETS) Company** located in Ndeeba, Kampala has since 2012 been making and selling RAC equipment that is dependent on refrigerants (hydrocarbons) that are both Ozone-friendly and climate-friendly. He is being supported by one of the national expert in RAC matters and is a staff member in KYU. The entrepreneur is a member of UNARA and is a trained technician. The company may begin exports to countries in the East Africa region and beyond in the very near future. (*See snap-shot of the GETS Facility at Ndeeba, Kampala*).

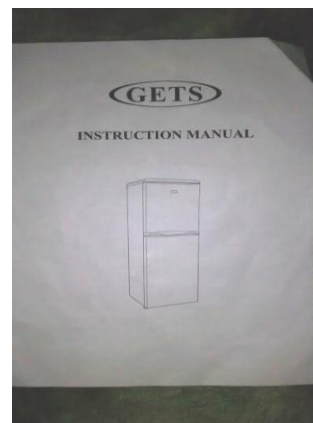
GETS Fridge Assembling  
Facility in Ndeeba, Kampala



Above: Final Checks on GETS Fridges before packaging



Packaging of GETS Fridges for sale



Below: One of the fridges with trade mark “GETS” bought and being used in a home for now two years.



- 12. Technical assistance to local entrepreneur** – With the assistance of UNBS plans are under way to assist GETS Company to develop branding of the RAC items, in order to gain credibility and standard to enable export to other countries. This will promote innovation in the RAC sector and diversify income-generating opportunities for those trained in RAC. Already UNIDO has provided some key start-up sets of equipment to build capacity of GETS operations during handling of the RAC equipment. The equipment was procured by UNIDO and delivered to GETS in September, 2016.

