

newsTRAC

NEWSLETTER FOR TECHNICIANS IN REFRIGERATION AND AIRCONDITIONING (RAC) SECTOR

ISSUE 1 | SEPTEMBER 2017

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Ministry of Environment,
Forest & Climate Change
Government of India



United Nations
Environment Programme



The Energy and Resources Institute



Painting 1st Prize Winner, Divyanshu, OZONE DAY-2016

डॉ. हर्ष वर्धन
Dr. Harsh Vardhan



भारत सरकार
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्री
GOVERNMENT OF INDIA
MINISTER OF ENVIRONMENT, FOREST &
CLIMATE CHANGE



MESSAGE

I am glad to learn that the Ozone Cell Ministry of Environment, Forest and Climate Change, Government of India has decided to bring out a Newsletter for the Technicians in Refrigeration and Air-conditioning (RAC) sector- **newsTRAC**, for generating awareness among all stakeholders to the Montreal Protocol. The electronic version of the newsletter is also being made available through a mobile based application for reaching out to wider section of readers. This is a welcome initiative.

The use of refrigeration and air-conditioning is cross sectoral and is not restricted to comfort through space cooling of residential and commercial spaces but also has important uses in cold chain/ cold storages, safe keeping of vaccines/ stroke medicines etc. This makes air-conditioning and cooling solutions an essential resource for daily life. While the current penetration of room air-conditioners in India is a meager 6% in urban households, it contributes to a large demand for electricity from buildings.

Interventions in the servicing sector training and capacity building are an important component in the phase-out plans of Ozone Depleting Substances and also have role in enhancing energy efficiency of RAC equipment. Enabling activities with specific reference to awareness generation among technicians and RAC trade are an inextricable component in servicing sector training and capacity building. These enabling activities under HCFC Phase-out Management Plan (HPMP) of the country are being implemented by UN Environment (UNEP). Dedicated newsletter for service technicians is part of the enabling activities of UNEP.

I am told that there are about 2 lakh RAC service technicians in the country working in both formal and informal settings. In the HPMP Stage-II for India specific focus has been given to provide training to RAC technicians by synergizing with the skill India mission of the Government. Regular upgradation of knowledge of this workforce is a must with specific reference to new alternative refrigerants to HCFCs and other good practices in the trade.

The newsletter is aimed to bridging the information gap. It will keep the technicians and other stakeholders updated on the latest technology, servicing-related technical information and various activities / initiatives of the Government of India under its HPMP (HCFC phase-out management plan) including the training calendar, and awareness workshops, among others. The Energy and Resources Institute (TERI) has been taken on board as national knowledge and implementing partner for bringing out this newsletter.

I am sure that this newsletter and its electronic version will prove to be repository of information for its readers. I am sure it will pave the way for effective and impact-oriented implementation of India's commitment to the Montreal Protocol.

I congratulate UN Environment and The Energy and Resources Institute (TERI) for launching this newsletter with the intent to enhance the knowledge base of stakeholders.

My best wishes for the success of the newsletter.

Date: 12.09.2017


(Dr. Harsh Vardhan)

Dr. Mahesh Sharma



Minister of State (I/C) of Culture
Minister of State for
Environment, Forest and Climate Change
Government of India



MESSAGE

India has embarked on a trajectory of growth. Since, we have one of the lowest penetration of air-conditioners worldwide, the demand and production in the Refrigeration and Air-conditioning (RAC) sector are yet to reach their maximum potential. The role of servicing sector in phase out of Ozone Depleting Substances (ODS) is well recognized. Good servicing practices are directly related to energy efficiency of RAC equipment. Awareness generation and continued information sharing and knowledge upgradation is a key for a skilled service technician workforce. I am confident that the **newsTRAC** will contribute significantly to this endeavor.

The Ministry of Environment, Forest & Climate Change looks forward to working with all stakeholders including NGOs, Academics, States, Private Sector and Citizens to accelerate India's journey towards HFC phaseout.

I appreciate the Ozone Cell of the Ministry for bringing out a dedicated newsletter to generate awareness and enhance knowledge of stakeholders especially service technicians in the refrigeration and air-conditioning (RAC) sectors.

I congratulate the entire team behind this effort especially the UN Environment and The Energy and Resources Institute (TERI) for the launch of this newsletter.

My best wishes for the success of the newsletter.

(Dr. Mahesh Sharma)

अजय नारायण झा
AJAY NARAYAN JHA, IAS



सचिव
भारत सरकार
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
Secretary
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MESSAGE

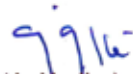
Vienna Convention for the protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer are one of the most successful global environment treaties. These two international agreements are the only multilateral treaties which have been ratified by all the 197 member countries of the United Nations. The implementation of the Montreal Protocol by the Parties has led to the phase out of production and consumption of around 98% of ODSs worldwide, along with a significant contribution towards protection of the global climate.

The phase out of ozone depleting substances is undertaken in a systematic manner under the Montreal protocol where due attention is given not only to the conversion of equipment manufacturing enterprises which use ODSs but also training of service technicians and awareness generation activities. This approach has yielded results since the time of the phase out of chlorofluorocarbons (CFCs).

Under the HCFC phase out Management Plan (HPMP) due emphasis has been given to training of RAC service technicians coupled with awareness generation and knowledge dissemination activities. The UN Environment is the cooperating agency under HPMP for enabling activities of awareness generation in the country. Given that the rapid growth is expected in the RAC sector in the country due to rapid urbanization in the future. The role of service technicians gains importance both with respect to reduced use of ozone depleting substances during service but also maintaining efficiency of the equipment's.

We trust this newsletter to be an important source of information. The refrigeration industry, servicing sector and other consumers will largely benefit from the newsletter.

I congratulate and thank UN Environment and The Energy and Resources Institute for the **newsTRAC** newsletter and wish the team all success in the future.


(A. N. Jha)

New Delhi
13th September, 2017



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MESSAGE

OzonAction of UN Environment along with the Ministry of Environment, Forests and Climate Change and its National Ozone Unit (NOU) has taken the lead in bringing out newsTRAC, a newsletter for technicians in Refrigeration and Air-conditioning (RAC) Sector. The newsletter would provide updated information to servicing technicians on alternatives to HCFCs, good servicing and installation practices and related issues. This would also fulfil the need for continuous information flow to servicing sector under HCFC phase-out management plan. This follows the successful dissemination of “EcoCool” during the CFC phase out. This newsletter will go a long way to assist India to phase out HCFCs by providing the relevant information to the servicing technicians and can also provide relevant information to the neighbouring countries under the south-south cooperation framework.

Installation, maintenance, and rectification of air conditioners are the three contact points where servicing technicians engage with consumers. With the introduction of flammable refrigerants as zero ODP and low GWP alternatives, this kind of newsletter assumes greater significance for the technicians. It is critical that a machine is installed properly or else it may be rendered inefficient. There is also a need to generate awareness among consumers about proper maintenance of air conditioners. At the time of installation, service technicians should inform the consumers about best practices for maintenance.

Proper information is crucial to make the desired impact. This newsletter is aimed at bridging the information gap. It will keep the technicians and other stakeholders updated on the latest technology, servicing-related technical information and various activities/initiatives of the Government of India under its HPMP (HCFC phase-out management plan) including the training calendar, and awareness workshops, among others. UN Environment is happy to be working on these issues with GIZ as well.

On the occasion of the World Ozone Day and the 30th Anniversary of the Montreal Protocol, on behalf of UN Environment, I wish all success to India in their efforts and assure all stakeholders of OzonAction's unflinching support to meeting the HCFC phase-out targets in India.



Building Capacity Through Focused Training

◆ Smita Vichare, Senior Project Advisor, GIZ-Proklima

India boasts of a significant population of service technicians in the refrigeration and air conditioning (RAC) sector. With a human-resource pool of almost 200,000 technicians in the country, there is a growing requirement for ongoing training cycles to build their capacity.

Additionally, attrition owing to the seasonal flow of work coupled with continuous addition of new technicians in the pool leads to ongoing turnover. Despite being trained, the technicians need to regularly upgrade their skills and understand Good Service Practices (GSP) to remain relevant in the business. Together, these factors highlight the need for sustained capacity building for RAC technicians.

India's HCFC Phaseout Management Plan (HPMP), which provides a strategy to phase out Hydrofluorocarbons (HCFCs) in the RAC servicing sector, outlines training of service technicians as an important aspect.

The first stage of HPMP was designed to train service technicians from the unorganised sector to enable them with the knowledge of GSP and new refrigerants. HFCs are widely used in the servicing sector as refrigerants in room ACs, package ACs, chillers and refrigeration applications such as coolers, milk chillers and cold storages. The quality of service hugely depends on the knowledge and skill-set of technicians who are primarily from the unorganized sector with no formal access to technology and training.

It is often seen that recovery of the refrigerant is not a common practice during servicing. Often, the refrigerant is vented out and the AC is subsequently recharged with fresh refrigerant. It is also found that the system is topped up with refrigerant without a proper leak detection. This leads to continued leakage. There is a huge potential for saving provided the technician properly recovers the refrigerant.

Under the first stage of HPMP, 11,000 service technicians were successfully trained in good practices in installation and servicing of room ACs. Among other things, they were trained to recover refrigerant from sealed systems; repair/replace inoperative spare parts; clean/polish and flush the system; brazing and/or flaring of tubes; and test leak and pressure.

Appliances with alternative refrigerants are already present in the Indian market. The consumption of refrigerants in the servicing sector can be reduced mainly through imparting training on good practices and leak prevention. However, service technicians also need to be prepared on the alternatives like HC-290, HFC-32 and blends of HFCs and HFO/HFCs.

Following the success of the first stage, India now plans to implement the second stage of HPMP to impart advanced training. Under this, a level playing field for alternative refrigerants and technologies will be addressed with emphasis on refrigerants with low or zero global warming potential (GWP).

The salient features of the training programme under the second stage of HPMP are given below:

Capacity Building

- The training programme for the technicians will be upscaled to match up to the global best practices.
- State-of-the-art RAC Training Centre: A centre for upgrading RAC trainers/technical staff from industries will be set up in association with industry and/or technical training institute.

Institutional Strengthening:

- Industrial Training Institutes (ITIs) will be provided support for RAC syllabus revision.
- Trainings of Trainers will be conducted for ITI instructors/trainers.
- Technical support will be given for development of their e-training material.
- The institutional training which is currently imparted to the technical staff of the Railways and Defence will be extended to other institutions.
- The training efforts will be aligned with other technician networks like equipment manufacturers.

Certification:

- A certification program will be introduced as a pilot in consultation with the RAC industry association/s for voluntary technicians.

Towards Environment Friendly Refrigerants

♦ **Karan Mangotra, Fellow, The Energy and Resources Institute (TERI) and Swati Agarwal, Associate Fellow, TERI**

The Kigali Amendment to the Montreal Protocol was historic in ways more than one. The significant global agreement, which was adopted on October 15, 2016, was finalised after years of negotiations, and brought together nearly 197 countries to reduce emissions of climate-warming hydrofluorocarbons (HFCs).

The countries, under both Article 5 and Non-Article 5, drew a set of differentiated baselines and freeze years demonstrating a commitment of the highest level towards mitigating climate change. The Decision XXVIII/2 of the Kigali Amendment outlined further flexibilities allowing developing countries to define sectors and select technologies to meet the agreed HFC phasedown obligations based on their specific needs and national circumstances.

India agreed to phase down its HFCs from the year 2028. Furthermore, the country set a stringent reduction target of 85% from its baseline as compared with the 80% reduction aimed by other developing countries which are party to the Kigali Amendment.

It is worthy to note here that India is on a growth trajectory with the demand and production in the refrigeration and air conditioning sector yet to reach the maximum potential. Realising the importance of energy efficiency in achieving the targeted reduction in HFC consumption, India took the view that energy efficiency must be addressed and supported at all costs if global climate change goal is to be met. India was the front runner at Kigali in drawing attention to energy efficiency along with HFC alternative transition.

The Decision XXVIII/3 in the Kigali Amendment requests the Technology and Economic Assessment Panel (TEAP) to review energy-efficiency opportunities in the refrigeration, air conditioning, and heat pump sectors. The development is expected to incentivise energy-efficiency technologies in these appliances. Additionally, the decisions adopted at Kigali seem to be a huge support in achieving an amplified climate impact considering the residential and commercial refrigeration systems contribute a significant portion of electricity demand. However, the modalities to work out the complementarities among the decisions need to be further streamlined.

Refrigeration and Air-Conditioning Sector in India

To achieve India's ambitious target towards HFC reduction, concerted efforts from all

stakeholders are required. The service technicians constitute a group of key stakeholders in this endeavour. The country's air conditioning sector is growing around 20% annually. The growth in the Indian economy and the resultant rise in purchasing power will further provide a boost to the sector. Hence, ensuring energy-efficiency becomes an imperative. Installation, maintenance, and rectification of air conditioners are the three contact points where service technicians engage with consumers.

Adequate attention to the following crucial servicing factors can enhance product efficiency significantly:

Installation: The service sector plays a prominent role from the first day of installation to the end of the product's life cycle. Proper installation ensures optimum performance of an air-conditioner. It is also important that appropriate capacity of the machine is selected before installation or else it will lead to longer operation time and higher power consumption. Also, short cycling can be avoided through adequate provision for fresh air, regular cleaning of filters, and arresting leakage of refrigerant.

Design: Ensuring proper design with ample space for future maintenance must be kept in mind during installation.

Maintenance: It is pertinent that leakage of refrigerant from the machine is arrested well in time. Improvement in the operation and maintenance protocols followed by AC manufacturers can significantly reduce the leakage rates by 5–7% per annum, thereby reducing emissions and aligning it with the best global practices.



Though simple, these highly beneficial factors will not only enhance energy-efficiency but also mitigate HFC emissions, thereby, accelerating the achievement of India's INDC (Intended Nationally Determined Contribution) with respect to the target of 33–35% reduction in emissions intensity.

The Kigali Amendment presents a huge opportunity for India to emerge as the global epicentre for manufacturing energy-efficient, environment-friendly appliances based on low-GWP (global warming potential) refrigerant gases. India can exploit this opportunity to the fullest by aligning these goals with the 'Make in India' programme. There is a need to explore green technologies in indigenous manufacturing of RAC appliances to remain competitive in the global market.

Financing the Transition

Another important aspect in HFC emission reduction is the requirement

of funds to support the transition. The Decision (XXVIII/3) of the Kigali Amendment requires the Montreal Protocol's Multilateral Fund to cover incremental costs related to production, consumption, servicing, and patents. However, unless the guidance document on calculating costs is prepared, it remains unclear as to how much of the total costs will get covered.

In the runup to the Kigali meeting, an \$ 80-million 'Kigali Cooling Efficiency Fund' was announced for developing countries to support them in improving energy efficiency of appliances while shifting to HFC alternatives. Although a welcome step, the quantum of the fund is estimated to be insufficient in meeting the actual cost of transition. Though the abovementioned funds are aimed at supporting developing countries in the transition towards energy-efficient appliances, further clarity on their nuances is still required to ensure a smooth transition to HFC alternatives.

Contributing Towards an Energy Efficient India

◆ Saurabh Diddi, Energy Economist, Bureau of Energy Efficiency

A journey of a thousand miles begins with a single step. As clichéd as this statement may sound, it holds water. Every step that India takes on the path to energy efficiency brings it closer to its goal of providing power to all by 2022. Improved energy efficiency alone can reduce our power demand over BaU (business as usual) scenario by 17% in 2040.¹

The refrigeration and air conditioning sector in India accounts for over 20% of the total electricity consumption in summers. The air conditioner market in the country is estimated to grow at a compounded annual rate of 10% till 2020,² projecting a further increase in the demand for electricity by this sector. Besides, the growth trajectory of the Indian economy has been providing a boost to people's purchasing power. This coupled with the hotter summers in the country are enough to determine the huge scope for growth of the RAC market.

The various energy efficiency initiatives undertaken by India have received global recognition. However, concerted efforts from all stakeholders are required to accelerate progression towards being completely energy efficient. Service technicians can play a significant role in this endeavour. It becomes pertinent to synergize the RAC servicing sector with the larger energy-efficiency goals to ensure the impact gets multiplied.

Installation, maintenance, and rectification of air conditioners are the three contact points where service technicians engage with consumers. It is critical that a machine is installed properly or else it may be rendered inefficient.

There is also a need to generate awareness among consumers about proper maintenance of air conditioners. At the time of installation, service technicians should inform the consumers about best practices for maintenance. For instance: Regular cleaning of AC filters, which enhances efficiency of the machine, could be easily done by consumers themselves.

It is pertinent that leakage of refrigerant is arrested well in time. There is a tendency among public to call a technician only when the AC conks off completely. However, a few signs are enough to ascertain leakage. For instance: lower cooling; or a rattling sound by the machine are signs that the AC is not performing to the optimum. These basic yet crucial bits of information need to be communicated to the customers.

It is a concern that often the technicians do not communicate basic information to the consumers. One of the reasons for this communication gap is the high attrition rate among the service technicians. Considering their work flow is seasonal, technicians opt for other jobs in the off season. There is a high possibility of them not returning to the RAC sector if they find stability and better remuneration at the other job.

Therefore, there is a need for hand-holding and capacity building of technicians to help them find alternative work during the off season to curb attrition. The Bureau of Energy Efficiency is in discussion with GIZ for a training programme that integrates the complementary aspects of energy efficiency and refrigeration. Additionally, certification of technicians is another idea that needs to be explored to further strengthen this pool of human resource.

¹ http://niti.gov.in/writereaddata/files/new_initiatives/NEP-ID_27.06.2017.pdf

² <https://www.techsciresearch.com/news/422-india-air-conditioners-market-to-witness-growth-of-over-10-until-2020.html>



Good Practices for Service Technicians: An Industry Perspective

◆ Ravinder Mehta, Secretary, Refrigeration & Airconditioning Manufacturers Association (RAMA)

Heat exchangers are one of the main determinants of performance for air-conditioners. It is observed that dirty and clogged heat exchangers diminish the efficiency of an AC by 25%. Apart from lowering the capacity of the AC, dirty heat exchangers stress the compressor which can result in premature failures. These factors make it necessary to regularly service air conditioners.

India is party to the Montreal Protocol and the Kigali Agreement which deal with phasing out HCFCs. Refrigerants used in the RAC industry have potential for global warming as well as ozone depletion. This warrants a responsible approach during installation, commissioning, repair, decommissioning, relocation, and end-of-life management. Service technicians play a major role in these aspects.

Besides, the system works under high pressure and has flammable refrigerants which pose safety concerns for the technicians as well as the property. Therefore, service technicians must possess relevant knowledge of the sector. Based on these requirements, the following operating practices should be followed:

A. Environment:

- Never release the refrigerant in the atmosphere, while repairing, decommissioning, or at the end of life of the AC.

- Ensure brazing is done using recommended practices and material.
- Ensure proper leak testing is done

B. Personal Safety:

- Ensure that Nitrogen is used only for pressure testing.
- The equipment used for brazing should have proper arrestors, proper pressure gauges, regulators, and hoses.
- Use the right quality of goggles.

C. Equipment:

- The electrical wiring should be done with proper termination, and no loose connections or improper joints should be made.
- During servicing, it should be ensured that the coils and filters are properly cleaned so that the air-conditioners operate efficiently.

D. General:

- Apart from the technical aspects, service technicians should respect customer expectations especially in case of residential applications. Their presentation and communication should be customer-friendly. They should ensure that minimum inconvenience is caused to the customer.
- Service technicians should have the necessary gadgets for diagnosing any failures in the modern electronic equipment.



Certified for Success

◆ Smita Vichare, Senior Project Advisor, GIZ-Proklima

To protect the environment and to safeguard societal/personal health, it is important that trading and handling of refrigerants be restricted to only qualified, certified, and registered technicians and/or companies. Learnings from developed countries teach us that personnel engaged within the RAC sector need to have competence certification. Only well-educated, trained, and certificated technicians can accelerate the process

to meet the obligations formulated by state-of-the-art technologies (including occupational and society health safety, environmental protection and energy conservation).

In India, it is still not mandatory to employ and/or get appliances serviced/ repaired by certified technicians. Newer appliances in the market that

come with new alternative refrigerants require careful handling keeping in mind their flammability, toxicity, high pressure systems and their environmental impacts. Thus, there is a need for qualified personnel to carefully handle refrigerants at every step of the value chain:

- Manufacturing
- Transport/Storage/Distribution
- Installation/Commissioning
- Operation
- Maintenance/Service/Recovery/Repair
- De-commissioning/Recycling/Disposal

The aforementioned value chain will function best if technicians have valid/authorized certificates indicating their education/ training to operate in the given sector.

For technicians to get certified, they will have to be assessed for their practical and theoretical knowledge, primarily testing his hands on working abilities.

There are international standards, regulations, guidelines and code of practices available to support the RAC sector that will help countries, public entities and organisations to facilitate the national restructuring and upgrading of qualification and certification processes.

Taking a lead from these established systems and relating them to (i) present requirement in India, (ii) profile of the technicians, and (iii) servicing requirements of the companies, GIZ will develop the general structure for qualification, certification and registration.

For the success and self-sustenance of the certification system, its acceptance in the market by technicians, companies and customers is important. The certification system will thus need to have credibility, which will be provided by a national authority, an independent accredited body, a certifying body and the connected Board of Examiners as well as an advisory board.

Not every employed RAC technician will have the same level of job competences. It is thus important to classify and distinguish technicians based on their skills and competence based on complexity levels for common activities and specialisations. Towards this, two different categories of personnel have been identified that need certification:

- Cat I: RAC semi-skilled technicians
- Cat II: RAC servicing/maintenance technician

Levels of certification will be defined vis-a-vis the qualifications / skill sets of the technicians, which will form the basis on which the training course/ contents and a general structure for qualification, certification and registration will be designed.

Training Programme

GIZ conducts regular training for capacity building of service technicians to ensure sustainability of business for them. Furthermore, they are trained in Good Servicing Practices (GSP) which could potentially lead to reduced consumption of HCFCs.

Duration: Two days

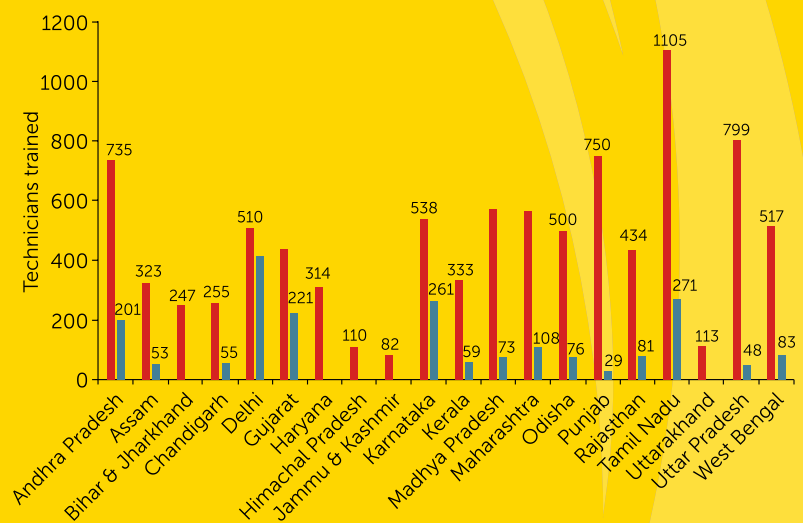
Theme: Servicing room air conditioners (AC) with a capacity up to two tonnes

Major Topics Covered:

- Principles of air conditioning
- Impact of refrigerants on environment
- Selection and proper application of the right equipment
- Installation and servicing of copper tubing
- Basics of proper AC installation
- Safety Measures
- GSP including recovery of refrigerant, and leak and pressure testing

Key Takeaways:

- Awareness about the impact of refrigerants on the environment
- Introduction to the new and alternative refrigerants available in the market
- Understanding of various hand tools and equipment along with their application
- The ten steps to be observed during servicing or repairing of air-conditioners
- Importance of good brazing on the performance of the AC



Sensitising Technicians to Ozone-friendly Refrigerants

◆ A.Balamurugan, Electronics Sector Skills Council of India (ESSCI)

The United Nations' major initiative on climate control has been the introduction of new refrigerants. Used in the refrigeration and air conditioning (RAC) Industry, the new refrigerants provide the necessary cooling while protecting the ozone layer from depletion. In the beginning, Chlorofluorocarbons (CFCs) were rarely used for refrigeration until the synthesis methods, developed in the 1950s, reduced their cost. However, the market dominance of CFCs was questioned in the 1980s when concerns were raised about their ozone depleting potential.

Following legislative regulations on ozone depleting CFCs and hydrochlorofluorocarbons (HCFCs), substitute refrigerants like perfluorocarbons (FCs) and hydrofluorocarbons (HFCs) also came under criticism. They are currently subject to prohibition discussions due to their harmful effect on the climate. In 1997, FCs and HFCs were included in the Kyoto Protocol to the Framework Convention on Climate Change. In 2006, the European Union adopted a regulation on fluorinated greenhouse gases, which stipulates the use of FCs and HFCs with the intention of reducing their emissions. The provisions do not affect climate-neutral refrigerants.

To support the initiative of reducing their emissions, the Electronics Sector Skills Council of India (ESSCI), a body under the Ministry of Skill Development and Entrepreneurship, participated in a workshop held in Agra in June for the United Nations Ozone officers from different countries.

ESSCI has always taken a keen interest in the HCFC Phase-out Management Plan (HPMP) to reduce the country's carbon foot print. To enhance its efforts, ESSCI participated in the 'Ozone2Climate Technology Road Show and Industry Round Table 2017' held in the Maldives from August 14-16 and shared its views on the subject.

In its way forward, ESSCI, which is an apex body for skill development and certification in the electronics sector, plans to interact with the stake holders of the UN HCFC phase out action plan and develop 'Qualification Packs in Air Conditioning' with a pan-India training ecosystem. The training will define the level of knowledge, skills and aptitude which a technician must possess. Additionally, the training will sensitise the technicians to ozone-friendly refrigerants to ensure usage.

The following 'Qualifications Packs in Air Conditioning' will be updated by ESSCI and made available with the relevant training and assessment content:

- Field Technician Air Conditioner
- Field Engineer-RACW
- Assembly Operator-RAC

To ensure industry participation, ESSCI recently conducted the first consultation meeting to quantify the need for additional NOS to cover the new refrigerant. The meeting, which was held on Sep 6, was attended by senior representatives from well-known air-conditioning and refrigeration companies including Bluestar, Godrej, Daikin, RAMA, ISHRAE, Haier Appliances. The industry members appreciated the effort and expressed their commitment to support the mission. The draft action plan has been prepared and will be shared in due time with all stake holders of the UN HCFC phase out action plan. The training of master trainers will begin in the Maldives from October 2017 after the identification of a centre with the required lab equipment.

Pre-Service Safety while handling flammable refrigerants – Do's



Prior to any service, maintenance or repair of the system the following assessment must be completed:

- Check the history of servicing repairs
- Identify the safety classification of the refrigerant in the system being serviced
- Confirm that no ignition sources are present and no flammable materials are stored in the work area
- Ensure that suitable fire extinguishing equipments (CO₂ or dry powder type) is available and functioning
- Section off the space around the work area and place appropriate and visible safety "work in Progress" signage
- Ensure that work area is adequately ventilated
- Ensure that suitable flammable refrigerant detectors are present, operating and able to warn of a leak
- Wear required personal protective equipment (PPE) or safety gear

Source: UNEP

Pre-Service Safety while handling flammable refrigerants – Don'ts



- Do not smoke, drink eat while in work area
- Do not store cylinder in basements and other enclosed rooms
- Do not keep flammable refrigerants in an area that has naked flames, gas cookers, gas water heaters, gas/wood – fire room or space heaters
- Do not allow any ignition source within 3 meters of cylinder
- Do not let flammable refrigerants accumulate
- Do not place cylinders lying on their side
- Do not work alone. At least two persons per site.

Source: UNEP

Ozone Heroes Campaign



SERVICING TECHNICIANS AS
#OZONEHEROES

WORLD OZONE DAY

16 SEPTEMBER 2017



Ministry of Environment,
Forest & Climate Change
Government of India

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