

**Agenda**

**Stakeholder Consultation Meeting**

**on**

**Safe Replacement, Storage & Disposal of Refrigerants used in Air Conditioners**

Energy Efficiency Services Ltd., 7<sup>th</sup> Floor, SCOPE Complex, Lodhi Road, New Delhi – 110003

Date: 26<sup>th</sup> November 2019 (Tuesday)

Time	Title
10:00 – 10:30	Registration & Tea
10:30 – 10:35	Opening Remarks <i>Mr. S. P. Garnaik, Business Unit Head (Lighting), EESL</i>
10:35 – 10:45	International Best Practices & opportunities for India <i>Ms. Deepa Balakrishnan, Environmental Specialist, World Bank</i>
10:45 – 10:55	Super-efficient AC Program and its importance towards Indian Cooling Action Plan <i>Dr. Anant Shukla, Additional General Manager (Tech), EESL</i>
10:55 – 11:10	Policy Intervention and initiatives of MoEF&CC <i>Ms. Archana Walia, Director, CLASP</i>
11:10 – 12:50	Open House Discussion <i>Chair: MoEF&amp;CC, Co-Chair: EESL</i> <ul style="list-style-type: none"> <li>➤ Policy and Regulatory Aspects</li> <li>➤ Refrigerant Disposal Procedure</li> <li>➤ Storage and disposal of refrigerants</li> <li>➤ Green disposal Certification Process</li> <li>➤ Industrial Practices</li> <li>➤ Challenges faced &amp; way forward</li> </ul>
12:50 – 13:00	Closing Remarks <i>Mr. Bhawanjeet Singh, Chief General Manager (Tech), EESL</i>
13:00 – 14:00	Lunch

## **Stakeholder Consultation Report**

### **Safe storage, replacement and disposal of refrigerant used in Room Air Conditioners**

A stakeholder consultation on “Safe Storage, replacement and disposal of refrigerant used in Room Air Conditioners” were organized by EESL on 26<sup>th</sup> November 2019 at EESL corporate office, New Delhi. The objective of the consultation was to understand the storage, replacement and disposal of refrigerant and e-waste in the Air-Conditioning will facilitate the sector specific challenges and to find solutions as far as EESL's Super-Efficient Air-Conditioning programme is concerned. The stakeholder consultation meeting was participated by AC manufacturers, E-waste agencies, CLASP, ESCOs, the World Bank, ADB and EESL officials. A list of participants is enclosed at Annexure -1.

This stakeholder consultation was conducted as a part of the ongoing AC initiatives and also as a part of the DLI-4 requirement “EE AC Sustainability Action” under the World Bank Program-for-results loan.

Key points emanating from the consultation is given below:

**Mr. S.P. Garnaik, Executive Director, EESL** welcomed all the participants. He started the discussion explaining about EESL's past experience in super-efficient AC program. He highlighted the importance of safe disposal and informed the gathering that DLI-4 specifically captures this aspect. He also stressed that adopting the best practices safe disposal of ACs, particularly the refrigerants by EESL would further strengthens & mandates the existing EESL practices. He opined that EESL could not be involved completely in the management of old ACs in the first phase of the program due to the following points:

- The objective was to deploy the ACs having efficiencies higher than the best available product in the retail market, test the business model of EESL and bring manufacturing preparedness of such super-efficient ACs
- The program was covered under Building Energy Efficiency Program (BEEP) where the mandate was to retrofit the Govt. buildings with energy efficient appliance like LED lights, 5-Star fans and Super-efficient ACs. As per the agreement with clients (which are predominantly Government Institutions), the management of Old ACs was the responsibility of the building authorities. However, EESL advocates those building authorities to do the safe disposal of such old ACs in environmental-friendly manner as per Govt rules.
- About 60-70 % of these ACs were new installations, hence does not involve in disposal of old ACs.

However, he suggested that as the 1st phase of the Super-Efficient AC program has almost stabilized the program management system, the safe disposal of old ACs/refrigerants should be an integral part of the AC program in the future. He also recommended the following points for safe storage, replacement and disposal of refrigerant used in ACs:

- a) Type of protocol needs to be developed in line with HCFC Phase Out Management (HPMP) plan released by Ozone Cell of Ministry of Environment, Forest and Climate Change (MoEFCC), Govt. of India.

- b) Standard to be adhered to for the procurement of ACs by EESL i.e. use of refrigerants having low global warming potential (LGWP). EESL had already sought LGWP < 700 while procuring the ACs and this may be further tightened.
- c) The buy- back policy and providing Green Certificate (by the vendor) need to be a part of Section 4 of EESL's tender.

Subsequently the floor was opened for open discussions and suggestions:

1. **Ms. Archana Walia, Director, Collaborative Labeling and Appliance Standards Program (CLASP)** shared the efforts of CLASP, in the finalization of standardization & labelling programme of BEE. She also informed about the Eco-Friendly certification of Government of India. The Government of India has instituted a scheme for labelling of environment friendly products to be known as ECO Mark. The scheme is being administered by the Bureau of Indian Standards. She also requested EESL to come forward in widening the scope of Eco-friendly green certification in the field of EE appliances and e-waste management.

She also said that Customers, manufacturers have to be involved & equally responsible for e-waste disposal. For that a specific guideline need to be set. World Bank may take the initiative & work with finance ministry for sustainable procurement on LCC.

2. **Ms. Deepa Balakrishnan, Environment Specialist, the World Bank** highlighted the following points:
  - There is no particular buyback standard/policy is available in the country.
  - USEAP Regulations are being followed
  - Intentional Gas Venting Should be prohibited at time of disposal of old ACs.
  - Proper training & certification of Technicians for Installation, dismantling and charging/discharging of gases in ACs.
  - Proper guidelines on Safe Disposal of old ACs.
  - Detailed record of keeping documents of disposed ACs.
  - Uses of various organizations like TERI, CLASP etc. for providing training to technicians and support in framing the guidelines for safe disposal of refrigerants used in ACs.
  - Govt. of India may Issue notifications/orders on safe disposal of old ACs along with the service guidebook
3. **Mr. Karan Daryani, Namo Waste Agency** briefed the process of Safe storage, replacement and disposal of refrigerant used in Room Air Conditioners, which are as follows:
  - Segregating the type of AC,
  - Separating the material types. like fibres, metals, plastic etc.
  - Dismantling of old ACs using dry process.
  - Reclaiming the gas (after checking for impurity in the gas, segregation of the gas)
  - Filing of Form 6 for issuance of green certificates by CPCB

He also highlighted that almost 5796 metric tonne gets recycled per annum through their company. He also informed that R600 and R290 are more flammable than R32.

He also stressed that recycling of refrigerant needs special equipment & facility and hence cannot be dealt by all e-waste recycler. However, as the market demand for such activity grows, facilities would come up accordingly.

4. **Mr. Rishi Punia, Environment Specialist, ADB** highlighted the following points for safe storage and disposal of refrigerant used in ACs:
  - Environmental Safeguard Policy of ADB
  - Review Framework of ADB
  - IFC guidelines on hazardous management
  - List of activities to be covered for safe disposal of refrigerant.
5. **Dr. Anant Prakash Shukla, AGM (Technical), EESL** gave a presentation on the current status, challenges in the ongoing Super-efficient AC Program of EESL and briefly stated the following points;
  - An overview of the Super-Efficient Air-Conditioning programme
  - India's Cooling Action Plan and synergies with the SEAC programme
  - Shifting from HCFC to HFC; impacts on the environment and global warming Direct & Indirect Impact of use of old ACs and recycle and reuse procedure of refrigerants.
  - He elaborated that the EESL tender document (page 69 of 100) clearly mention the requirement of safe disposal of e-waste in accordance to the MoEFCC guidelines (2016) and producing of the Green Certificate (sample Green Certificate attached) after successful recycling to EESL
6. **Mr. R. Rajmohan, CEO, DESL** shared his experience in industrial cooling and highlighted the various process used in various countries for safe storage, replacement and disposal of refrigerant used in ACs. He also suggested the following for the EESL super-efficient AC program:
  - Producer Responsibility Organization (PRO) are working on End-to-end E-waste Recycle, Reuse or Disposal of refrigerants who are also responsible for e-waste management.
  - EESL should have an authorized or empanelled agency to collect the e-waste and disposal of the same safely.
  - International best practices framed by bilateral and multilateral agencies to be followed.
7. **Mr. Varun Mishra, Daikin** briefed about Sri Lanka - Colombo pilot project wherein a reclamation centre was created to collect the refrigerant from ACs. He highlighted the following issues:
  - Recyclers come with varying recycling costs. How to verify the quality of recycling?
  - Daikin works with their own dealers, buy back scheme. Most of the time, the recycler offers the buyback of Rs. 2500-3500
  - Training the technicians to be organized for Installation, dismantling, safe disposal of ACs and charging/discharging of gases in ACs.
8. **Mr. Vikash Bhan, Godrej** has expressed that training of the technicians is a challenge. He also suggested that any e-waste agency should follow BIS rules for green certification, standards of disposal, recycle and reuse and few reclamation centres for electronic goods should be developed in India. He also proposed to include BIS, MoEFCC and CPCP in next meeting.

9. Green Certificates: After the old and used product is picked from the market by the OEM, recycled by the e-waste recycling agency and the recycling process takes somewhere between 45 days to 60 days. The e-waste recycling agency then provides a green certificate to the OEM. The e-waste is recycled according to the norms laid down by the Government of India.
10. EESL will disseminate the information to its clusters and state offices to raise awareness regarding the e-waste generated through the SEAC programme and Its safe disposal. Follow-up discussion on the topic will be organised as a side event in continuation to this stakeholder consultation meeting.

EESL will utilise the platform of ISHRAE, associations (e.g. FICCI, CII) Ozone Cell of MoEFCC and BEE to further propagate the safe disposal of AC e-waste and refrigerants. EESL will conduct one Impact assessment review and present the outcome with relevant stakeholders.

EESL shall also provide the feedback to Ozone Cell, MoEFCC for the inclusion in the policy of safe disposal of refrigerant.
11. The meeting concluded with a vote of thanks to all the participants.



### **Attendance List**

The full list of participants is attached herewith. The signed attendance sheet by all the participants is not available due to the prevailing lock-down situation (may be submitted later).

<b>Sl. No.</b>	<b>Name</b>	<b>Organization</b>	<b>Remarks</b>
1	Mr. S. P. Garnaik	EESL	
2	Dr. Anant Prakash Shukla	EESL	
3	Mr. Manoj Kumar M	EESL	
4	Mr. Vineet Taneja	EESL	
5	Ms. Moumita Chandra	EESL	
6	Mr. Brijesh Gautam	EESL	
7	Mr. Manvendra Chandel	EESL	
8	Mr. Vijay Chauhan	EESL	
9	Ms. Niharika Khattar	EESL	
10	Ms. Archana Walia	CLASP	
11	Ms. Deepa Balakrishnan	World Bank	
12	Mr. Pankaj Gugnani	Voltas	OEM
13	Mr. Aman Duggal	Voltas	OEM
14	Mr. Karan Daryani	Namo Waste Agency	E-waste recycler
15	Mr. Akshay Jain	Namo Waste Agency	E-waste recycler
16	Mr. Bhagwati Prasad Suman	Grenew	E-waste recycler
17	Mr. Rishi Punia,	ADB	
18	Mr. R. Rajmohan	DESL	Consultant
19	Mr. Varun Mishra	Daikin	OEM
20	Mr. Gaurav Mehtani	Daikin	OEM
21	Mr. Vikash Bhan	Godrej	OEM
22	Ms. Sherin Anna Kurien	Blue Star	OEM
23	Mr Rahul Srivastava	Blue Star	OEM

**ATTERO RECYCLING**  
It's not waste, until it's wasted

An EMS ISO 14001:2004 & OHSAS 18001:2007 company

Date .....  
Invoice .....  
Sample .....  
Sample .....

Reference no: .....  
Certificate No: WASTE-A-12019472  
Reg: .....

*This is to certify that ATTERO RECYCLING has picked*

*xxx Kg of Air-conditioners picked  
from  
Sample*

*Sample address*

*All the material has been processed in an environment friendly manner, in accordance with the  
guidelines set by the authorised agency at our facility in Roorkee.*

*By Processing obsolete equipment, we are doing our duty to help keep our environment clean.*



**Rohan Gupta**  
Chief Operating Officer, Attero Recycling

#173, Village Bhagwanpur, Raipur Industrial Area,  
Roorkee - 241661, Uttarakhand

## Concept Note on Safe Replacement, Storage & Disposal of Refrigerants used in Air Conditioners

### **Background:**

Ozone depleting substances (ODS), such as chlorofluorocarbons (CFCs), hydro chlorofluorocarbons (HCFCs), etc, contribute to the depletion of the ozone layer. India also has a large informal, second-hand market where unlicensed decommissioning and undocumented resale of substances for ODS and GWP is common. It is imperative to push a market-based system that handles refrigerant disposal as per government norms.

Recovery of refrigerant, especially the fluorocarbon refrigerants like HCFCs and HFCs has become an integral part of servicing of refrigeration and air conditioning equipment. Pump-down process similar to recovery of refrigerant was already in practice in servicing of large cooling capacity refrigeration and air conditioning systems prior to the Montreal Protocol came in existence. The incentive for refrigerant recovery is the cost of refrigerant and environment protection. The regulatory framework is also a driving force for recovery of refrigerant especially in some non-Article 5 countries.

Refrigerant recovery equipment mainly comprises of recovery machine, storage cylinder, and hoses. The affordability of technicians except large servicing stations to procure such equipment is still weak. Moreover, the recycling and reclamation network is also non-existing in India and several other developing countries. In developing countries including India, although there is a good awareness among the service technicians but due to lack of infrastructure, the necessary recovery and recycling equipment and reclamation centres coupled with transportation costs the recovery, recycling and reclamation are not yet effectively used by servicing technicians. However, recovery of refrigerant especially from medium and large systems is an effective process to reduce HCFC consumption

### **Safe disposal old and used ACs under Super-Efficient Air-Conditioning Program:**

Since its inception in 2009, Energy Efficiency Services Ltd. (EESL), a JV of PSUs under Ministry of Power, Govt. of India has been addressing for environmentally safe disposal of replaced air conditioners and refrigerant as per e-Waste Management Rules promulgated by Ministry of Environment, Forest and Climate Change (MoEF&CC). In the Super-efficient Air Conditioning (SEAC) Program the safe disposal of ACs are being done through AC manufacturers. Consumers were offered a buy back value commensurate with the resale value of components extracted from old ACs. EESL's initiative is the one of the first concentrated efforts to integrate safe containment of refrigerants simultaneously with promoting EE appliances.

Refrigerant recycling conserves refrigerant during the service, maintenance, repair of refrigeration and air-conditioning equipment. Recycling reduces oil, acid, particulate, moisture, and non-condensable (air) contaminants from used refrigerants.



In the interest of conservation of refrigerant and protection of environment, Refrigerant recovery and recycling system should be established in the countries. Recover and recycling equipment should be made available to service technicians in every sector. The logistic process should be easy to understand and cover all players from point of sale to the customer, and back to point of return. It may be noted that due to incompatibility issues and the array of refrigerants used recovery/recycling equipment intended for use with one refrigerant and/or type of air-conditioning system may not be adequate to service other refrigerants or sectors. Recently recovery and recycling equipment with oil less compressors have been developed and available in the market which would enable the service technicians to handle variety of refrigerants.

Currently, the automotive air-conditioning industry typically reuses recycled refrigerant without reclamation in a different owner's system. Acceptance in other sectors is still in the initial stage.

Under the current e-Waste Management Rules, only e-recyclers registered with the Central Pollution Control Board can undertake extraction and disposal. Manufacturers also engage e-recyclers to recycle metals and non-metals from ACs in buy back schemes. Depending on the quality of recovered refrigerant, w.r.t. to contaminants like oil and water, it is either made reusable through recycling machines or else sent to a destruction facility.

### **Workshop Objective**

EESL has recently procured total of 50,000 5star 1.5TR Inverter ACs having ISEER 5.4 under Super-Efficient Air-conditioning program. Total installed capacity of room air conditioners in India was nearly 55 million TR in 2018 and population of RACs will be the fastest growing segment of HVAC market. About 90%<sup>1</sup> or more of the installed stock is running on R-22; supply of variants with low GWP and low ODS refrigerants started relatively recently.

The purpose of this workshop is to understand the present overall sectoral disposal rates, disposal procedures followed by the industry and existing infrastructure for recovery and disposal, safe replacement storage of refrigerants, green disposal Certification Process, challenges faced & way forward etc. This will also be an opportunity to assess the adequacy of AC manufacturing, servicing and recycling industry's capacity and consumer side demand for environmentally responsible disposal at end of life. Capacity building of the industry to enable more sustainable and efficient cooling technology programs like SEAC will also be highlighted.

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<sup>1</sup> India Cooling Action Plan