

Project acronym

INDEE+

Project full title:

Future Refrigeration in India

Deliverable 1.5:

Report on “**Socialising Research Findings towards Implementation**”

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Organisation name of lead beneficiary for this deliverable: **CEEW & NEA**

Author	Mr Aditya Garg, Mr Sonal Kumar & Mr Torgrim Asphjell
QA	Mr Sonal Kumar
Approval	Mr Sonal Kumar



Report on “Socialising Research Findings towards Implementation”

The team has undertaken several outreach activities to socialise the research findings and generate awareness among different stakeholder’s group. These outreach activities also helped in gathering inputs in developing the policy recommendations and disseminating the value propositions of these recommendations for the stakeholders. The outreach efforts were in the form of organising in-person events, targeted webinars, publishing articles and blogs, social media posts, and focused one-to-one or group meetings. A summary of these outreach activities is provided below. These activities are in addition to the outreach activities led by IIR or other partner organisations for organising various side events at ACREX and REFCOLD exhibitions and COP28, and other seminars and workshops.

Table 1: Summary of Outreach Activities undertaken for Socialisation of Research Findings

S. No.	Outreach Activities
1.	In Person Events:
1.1	Side Event at the 45 th OEWG 2023
1.2	Seminar in Delhi
1.3	Side event at the 36 th MOP 2024
2.	Webinars: (as part of CEEW-RATA Supr30 Sessions)
2.1	Episode 11: Concept of Circularity in the Cooling Sector (Link)
2.2	Episode 12: End-of-Life Management of Refrigerants (Link)
2.3	Episode 14: HFC Phasedown Strategy for India (Link)
2.4	Episode 16: Lifecycle Refrigerant Management - Underlying Business Opportunities (Link)
2.5	Episode 17: Minimising refrigerants emissions through leak-proofing (Link)
3.	Articles & Blogs in Newspapers and Industry Journals:
3.1	Article in national daily newspaper ‘Dainik Jagaran’ in Hindi on ‘Environment Friendly Cooling Systems’ published on world ozone day on 16 September 2023.
3.2	Article in national daily newspaper ‘Dainik Jagaran’ in Hindi on ‘Environment Conservation through E-Waste Management’ published on e-waste day on 14 October 2023.
3.3	Article in ISHRAE bimonthly journal on “Managing AC Gas in a Warming World” published in the July-August 2024 edition.
4.	Other Outreach Activities:
4.1	Research Dissemination through emails and social media
4.2	Meetings with government institutions, industry associations and other key stakeholders, and presentation of our work in external events

1 In-Person Events

1.1 Side Event at the 45th OEWG 45: Operationalising Lifecycle Refrigerant Management (LRM) in India and Other Developing Countries

Date: 03 July 2023

Venue: 45th meeting of the Open-Ended Working Group (OEWG) of the Parties of the Montreal Protocol, UNESCAP, Bangkok, Thailand

Event Activities: This event was organised on the side-lines of the annual meetings of the Open-Ended Working Group (OEWG) of the Parties of the Montreal Protocol, which was organised in Bangkok. CEEW and NEA organised a side event which also featured the launch of our research output titled "Activating Circular Economy for Sustainable Cooling: How Can India effectively manage the Lifecycle of Refrigerants?". The event began with an introductory presentation by Mr Torgrim Asphjell, Senior Adviser at the Norwegian Environmental Agency, outlining the INDEE+ project's objectives. Mr. Sonal Kumar, Programme Lead at CEEW, presented key findings and recommendations from the launched report. The event also featured a panel discussion moderated by Mr Sonal Kumar, which included experts such as Ms Andrea Voigt, Mr Charlie Mayhew, Mr Mike Armstrong, and Ms Kristen Taddonio. The panel stressed the importance of a multi-faceted approach for effective implementation of Lifecycle Refrigerant Management (LRM) practices. Key points included the need for waste management infrastructure, a reverse supply chain for gases, integration of LRM with circularity initiatives, upskilling of servicing technicians, and exploring the voluntary carbon market as a financing mechanism to incentivise and support refrigerant management practices.



1.2 Seminar on Lifecycle Refrigerant Management & Transition to Natural Refrigerants

Date: 06 October 2023

Venue: Royal Norwegian Embassy, New Delhi, India

Event Activities: This seminar, organised collaboratively by CEEW and the Royal Norwegian Embassy, aimed to disseminate the INDEE+ project's findings so far and gather inputs from stakeholders on India's refrigerant transition pathway. The event was attended by government representatives, industry leaders, civil society members and academia. It opened with welcome addresses by Mr Sonal Kumar, CEEW, and Ms Beate Langset, Norwegian Embassy. HE Ms May-Elin Stener, Ambassador of Norway to India and Sri Lanka, delivered the opening remarks, and Prof. Armin Hafner, NTNU, provided an overview of the INDEE+ project. A special address was given by Dr G V Raghunath Reddy, Scientist F from the Department of Science and Technology (DST), who outlined DST's initiatives with respect to cooling.

The seminar was divided into two sessions. The first session focused on operationalising LRM in India. A panel discussion moderated by Mr Sonal Kumar touched on policy approaches and business models for LRM, integrating them with e-waste/vehicle scrappage policies, reclaimed gas markets, and carbon markets for financing LRM practices.

The second session addressed the uptake of natural refrigerant technology aligned with India's refrigerant transition plan. Prof Armin Hafner, NTNU; Mr Dhruv Sawhney, Chairman, Triveni Turbines; and Mr Aadinath Harihar, Koshyma Engineering, presented and discussed drivers, measures and challenges for transitioning to climate-friendly refrigerants and measures that can support vendors to manufacture CO₂ systems for India and abroad. The status of INDEE+ demonstration and education sites using CO₂, ammonia and propane was also presented by Dr Sarun Kumar Kochunni, NTNU.







1.3 Side Event at the 36th Meeting of Parties (MOP 36): From idea to action – Creating a supportive ecosystem for effective implementation of Lifecycle Refrigerant Management in developing countries

Date: 30 October 2024

Venue: 36th Meeting of the Parties (MOP 36) of the Montreal Protocol, UNESCAP, Bangkok, Thailand

Event Activities: This event was organised on the side-lines of the annual meeting of the parties of the Montreal Protocol. This side event was focused at discussing some of the key practical challenges in initiating and sustaining lifecycle refrigerant management practices in the developing countries. The discussions were focused around:

- Sustainable business models for the stakeholders involved in implementation of various stages of LRM
- Training and capacity building of the key actors
- Appropriate policy measures to ensure coherence in policies and regulations
- Enhancing collaboration and knowledge sharing among various countries.

The session started with the opening remarks from Dr Yosr Allouche, Director General, International Institute of Refrigeration, followed by the context setting presentation from Mr Sonal Kumar, CEEW. It was followed by a moderated panel discussion moderated by Mr Sonal Kumar, CEEW. The panellists include Ms Denise San Valentin, CCAC, Ms Ellen Michel, Proklima International GIZ, Mr Laurent Guégan, Climalife, Ms Louise McCann, A-Gas, and Ms María José Gutiérrez Murray, Tradewater.



2 Webinars: As part of CEEW-RATA Supr30 Sessions in collaboration with Refrigeration and Air Conditioning Traders Association (RATA)

RATA is an association of around 2000 Micro, Small, and Medium-sized Enterprises (MSMEs) in the cooling sector providing air-conditioning equipments, ancillary components, and sales and after-sales service support in India. RATA plays a crucial role in fostering collaboration, disseminating industry knowledge, and addressing the unique challenges faced by MSMEs in the cooling sector.

CEEW, in collaboration with RATA, periodically organises a 30-minute power-packed webinar series, named “Supr 30”, specifically designed for its member enterprises. The objective of these sessions is to provide crucial insights on the policy changes and technological advancements happening or are expected to happen in India or globally, that can shape the cooling landscape in India. It also discusses the potential impacts on their businesses and ways to adapt.

Regarding the INDEE+ Project, CEEW has organised five webinars under the Supr30 series on the topics listed below. These webinars were live-streamed and the videos are available on YouTube at the respective links:

- 2.1 Episode 11: Concept of Circularity in the Cooling Sector ([Link](#))
- 2.2 Episode 12: End-of-Life Management of Refrigerants ([Link](#))
- 2.3 Episode 14: HFC Phasedown Strategy for India ([Link](#))
- 2.4 Episode 16: Lifecycle Refrigerant Management - Underlying Business Opportunities ([Link](#))
- 2.5 Episode 17: Minimising refrigerants emissions through leak-proofing ([Link](#))



Ajit Panicker - Imm Past President / Govt Liaison

Sonal Kumar - CEEW

Climate change

United Nations • Climate change refers to long-term shifts in temperatures and weather patterns. Human activities have been the main driver of climate change, primarily due to the burning of fossil fuels like coal, oil and gas.

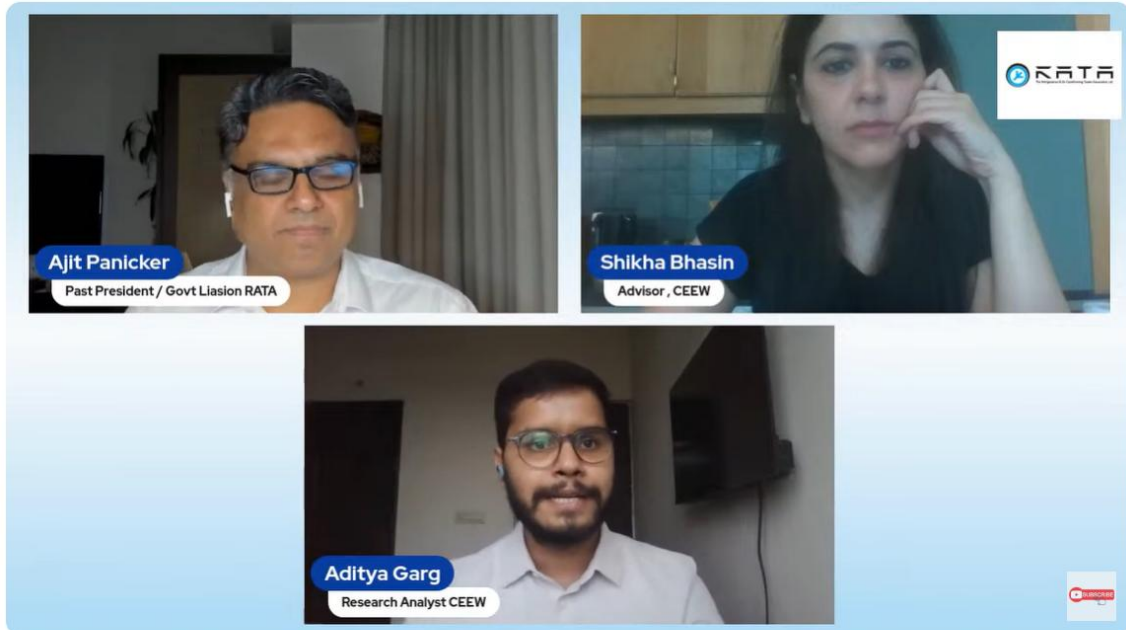
Supr 30 - Episode 11 - Circularity of Refrigerants in Cooling Sector



Supr 30 - Episode 12 - End of Life Management of Refrigerants



Supr30 - Ep 14 - Indias HFC Phase - Down Strategy



Supr 30 - Ep 16 - Lifecycle Refrigerant Management - Underlying Business Opportunities



Supr 30 - Ep 17 - Minimising Refrigerant emissions through leak proofing

3 Articles & Blogs in Newspapers and Industry Journals:

3.1 Article in national daily newspaper 'Dainik Jagaran' in Hindi on 'Environment Friendly Cooling Systems' published on world ozone day on 16 September 2023



पर्यावरण हितैषी कूलिंग व्यवस्था

निरंतर बढ़ रही गर्मी से राहत पाने, खाद्यान्न सुरक्षा सुनिश्चित करने और सभी नागरिकों के आर्थिक विकास जैसी चुनौती का सामना हम कैसे कर सकते हैं, इस समझना आवश्यक है

चाहे एसी, फ्रिज हो या कोई अन्य कूलिंग उपकरण, सभी में क्लोरोफ्लोरोकार्बन (सीएफसी) नाम की रेफ्रिजरेंट (प्रशीतक) गैस का उपयोग होता था। इसी गैस को ओजोन परत क्षरण के लिए एकमात्र जिम्मेदार कारण माना जाता है। ओजोन परत सूर्य की हानिकारक अल्ट्रावायलेट किरणों को पृथ्वी तक पहुंचने से रोकती है। सीएफसी के लुप्तभाव के कारण इसे पूरे विश्व में चरणबद्ध तरीके से हटाया जा चुका है। इसकी जगह पर हाइड्रोक्लोरोफ्लोरोकार्बन (एचसीएफसी) और हाइड्रोफ्लोरोकार्बन (एचएफसी) के विकल्प उभरे हैं, जिनकी ओजोन परत को नुकसान

पहुंचाने की क्षमता कम या नहीं के बराबर है। हालांकि अन्य ग्रीनहाउस गैसों की तुलना में ये वैश्विक तापमान बढ़ाने के लिए अधिक जिम्मेदार हैं। भारत के कूलिंग एक्सचेंज प्लान (आइसीएपी) के अनुसार, अगले दशकों में भारत में कूलिंग सुविधाओं की मांग में आठ गुना बढ़ोतरी होने का अनुमान है। इस मांग के एक बड़े हिस्से को पूर्ति केंद्रित और रेफ्रिजरेंट गैस आधारित एसी और फ्रिज होंगे। इस कारण प्राथमिक ऊर्जा की मांग में चार गुना और एचएफसी व एचसीएफसी जैसे रेफ्रिजरेंट की मांग में आठ गुना बढ़ी होगी। ये गैसों परीक्षा रूप से वैश्विक तापमान बढ़ाने का काम करेंगी। हम लोग प्रत्येक वर्ष ओजोन परत के संरक्षण के लिए 'विश्व ओजोन दिवस' मनाते हैं। परंतु कूलिंग को उभरती जरूरत ने एक दुविधाजनक स्थिति पैदा की है, जिसका समाधान किया जाना चाहिए। इसके लिए कूलिंग उपकरणों

को ऊर्जा कुशल बनाना होगा। लिहाजा इससे जुड़े सभी पक्षों को एक साथ पहल करनी होगी। इसके लिए मिन्स पांच कदम उठाए जा सकते हैं। सबसे पहले, सरकारों को कूलिंग उपकरणों की मांग घटाने पर ध्यान देना चाहिए। इसमें सतत भवन निर्माण, प्राकृतिक वातावरण और छाया के उपयोग को प्रोत्साहित करने वाले भवन संहिता (बिल्डिंग कोड) और विनियम शामिल हैं। इन्हें निष्क्रिय कूलिंग कहा जाता है। यह बिजली की अत्यधिक आवश्यकता वाले रेफ्रिजरेंट गैसों पर आधारित कूलिंग प्रणालियों को जरूरत घटा सकते हैं। इसके लिए नैतिगत प्रयास जरूरी है, ताकि वास्तुकारों, इंजीनियरों और भवन निर्माताओं को अपने निर्माणों में निष्क्रिय कूलिंग को प्राथमिकता देने के लिए प्रोत्साहित किया जा सके। दूसरा, कूलिंग सुविधाओं में सुधार के लिए ऊर्जा-कुशल कूलिंग प्रणालियों को बढ़ावा देना चाहिए। इससे कूलिंग

की मांग और परीक्षा उत्सर्जन को घटाने में मदद मिलेगी। इसके लिए सरकारें, सार्वजनिक खरीद कार्यक्रमों के माध्यम से ऊर्जा कुशल उपकरणों की थोक खरीद को प्राथमिकता दे सकती हैं। यह ऊर्जा कुशल कूलिंग प्रणालियों की कोमत घटाएगा। काउंसिल ऑन एनर्जी, इनवायर्समेंट एंड वाटर (सीईईडब्ल्यू) के अध्ययन के अनुसार, 71 प्रतिशत एसी उपभोक्ताओं ने ऊर्जा कुशल एसी खरीदने की इच्छा जताई, परंतु एकमुश्त ऊंचे निवेश के कारण केवल 14 प्रतिशत उपभोक्ता ने ही ऊर्जा कुशल एसी खरीदा। लिहाजा, उत्पादन से जुड़ी प्रोत्साहन योजना के माध्यम से प्राकृतिक रेफ्रिजरेंट-आधारित ऊर्जा कुशल कूलिंग उपकरणों का निर्माण करने वालों को बढ़ावा देना चाहिए। तीसरा, पर्यावरण-अनुकूल रेफ्रिजरेंट को अपनाने का प्रयास तेज करना चाहिए। ऐसी नीतियां लागू होने चाहिए, जो रेफ्रिजरेंट और उपकरण निर्माताओं



भवन निर्माण की प्रक्रिया में हरित व्यवस्था को प्रोत्साहन दिया जाना चाहिए।

को पर्यावरण हितैषी रेफ्रिजरेंट को अपनाने के लिए प्रेरित करें। वित्तीय सहायता, अनुदान, तकनीकी सहायता जैसे कदम इस दिशा में बढ़ावा की सुविधाजनक बना सकते हैं। चौथा, अपशिष्ट प्रबंधन को मजबूत करते हुए इसे औपचारिक बनाने पर ध्यान देना चाहिए। कूलिंग प्रणालियों और इसमें मौजूद रेफ्रिजरेंट को उचित रिसाइलिंग और निस्तारण हो, इसके लिए ई-वेस्ट प्रबंधन के सख्त नियम लागू करने चाहिए। रेफ्रिजरेंट प्रबंधन के उपयोग से 2050 तक दो अरब टन कार्बन डाइऑक्साइड के बराबर उत्सर्जन रोका जा सकता है। यह कनाडा, फ्रांस, जर्मनी, इटली और यूके के कूल सीओडू उत्सर्जन के बराबर पड़ता है।

पांचवां, कूलिंग क्षेत्र में संकुलर इकोनॉमी को लाने के लिए कोशल सुधार और प्रशिक्षण कार्यक्रमों में निवेश करना चाहिए। साथ ही, एसी की सर्विसिंग करने वाले तकनीशियनों के लिए प्रशिक्षण और सर्टिफिकेट कार्यक्रम चलाना जरूरी है। इसके तहत रेफ्रिजरेंट को सुरक्षित ढंग से संभालने, उनके उचित उपयोग व रखरखाव की विधियों और अच्छी सर्विसिंग के बारे में जानकारी देनी चाहिए।

उपरोक्त सभी उपाय गर्मी को राहत देने वाले पर्यावरण हितैषी कूलिंग क्षेत्र को तैयार करने के साथ-साथ ओजोन परत संरक्षण में भी मदद कर सकते हैं, जो जलवायु परिवर्तन में कमी लाने में सहायक होगा।

3.2 Article in national daily newspaper ‘Dainik Jagran’ in Hindi on ‘Environment Conservation through E-Waste Management’ published on e-waste day on 14 October 2023

राष्ट्रीय संस्करण

दैनिक जागरण

संस्करण 14 अक्टूबर, 2023

5.3 कच्चा घरेलूक टन ई-कचरा लुप्त होना पड़ेगा

ई-कचरा-वेस्ट मैनेजमेंट की एक रिपोर्ट और कच्चा 7.4 करोड़ घरेलूक टन के



अनिल कुमार
लिफ्टिंग ऑफिसर,
सीईईए



विक्रम सिंह
सीईईए

अंतरराष्ट्रीय ई-कचरा दिवस

आसान होगी पर्यावरण के संरक्षण की राह

सामान्य आवासों में लगाए जाने वाले वातानुकूलित संयंत्रों से लेकर अनेक प्रकार के उद्योग-धंधों में कुलिंग क्षेत्र का उपयोग निरंतर विस्तार लेता जा रहा है। इससे व्यापक मात्रा में इलेक्ट्रॉनिक कचरा पैदा होने लगा है। लिहाजा हमारे देश में हाल ही में ई-वेस्ट प्रबंधन से संबंधित नए नियम लागू किए गए हैं। नए नियमों के तहत निर्माताओं को ई-कचरे को रिसाइकिल करने योग्य बनाए जाने की अनिवार्य किया गया है, लिहाजा इस मामले में पर्यावरण अनुकूल सुधार देखने को मिल सकते हैं।

इलेक्ट्रॉनिक कचरा (ई-वेस्ट) उत्पादन में भारत का स्थान चीन और अमेरिका के बाद तीसरे नंबर पर है। इस कचरे को देखते हुए ई-कचरा प्रबंधन नियमों को लागू करा जा चुका है। इससे आसानी से ई-कचरे को रिसाइकिल करने के लिए धारा 15(1) के तहत आसानी से ई-कचरे को रिसाइकिल करने में मदद मिलेगी। ई-कचरे को रिसाइकिल करने के लिए धारा 15(1) के तहत आसानी से ई-कचरे को रिसाइकिल करने में मदद मिलेगी। ई-कचरे को रिसाइकिल करने के लिए धारा 15(1) के तहत आसानी से ई-कचरे को रिसाइकिल करने में मदद मिलेगी।

स्वास्थ्य




ई-कचरे को सही ढंग से संभालना न केवल पर्यावरण को संरक्षित करता है, बल्कि हमारे स्वास्थ्य को भी सुरक्षित रखता है। ई-कचरे में विषैले पदार्थ होते हैं, जो हमारे स्वास्थ्य को नुकसान पहुंचा सकते हैं। इसलिए, ई-कचरे को सही ढंग से संभालना और रिसाइकिल करना हमारे स्वास्थ्य के लिए बहुत जरूरी है।

3.3 Article in ISHRAE bimonthly journal on “Managing AC Gas in a Warming World” published in the July-August 2024 edition

V

iewpoint



Manage ‘AC Gas’ in a Warming World

By Aditya Garg and Sonal Kumar

Introduction

As cooling demand goes up in India and many parts of South Asia due to scorching heatwaves, managing refrigerants used in cooling systems is critical. Refrigerants, also referred to as ‘super greenhouse gases’ due to their ozone depletion and high global warming potential (GWP), are the coolants/working fluids used in cooling systems, including air conditioners, refrigerators, and vehicle air conditioners. Promoting refrigerant management, along with the commitment to end the use of coal power by 2035 and many other initiatives, was among the key pledges made by the G7 nations during the 2024 summit in Italy. Further, owing to the escalating temperatures and more frequent heatwaves, India’s aggregate cooling demand is expected to grow eightfold by 2037, per the *India Cooling Action Plan (ICAP) 2019*, which will increase the consumption of these refrigerants.

These gases require lifecycle management to mitigate their environmental impact, as increased cooling demand without proper management will further exacerbate climate change.

How are these refrigerants dangerous for the climate?

Refrigerants, particularly Chlorofluorocarbons (CFC), Hydrochlorofluorocarbons (HCFC), and Hydrofluorocarbon (HFC), which are predominantly used in our cooling systems, have several hundred times more global warming potential than carbon dioxide (CO₂). Moreover, CFCs were the prime contributors to ozone layer depletion, leading to their global ban on production and use under the Montreal Protocol in 1987. These gases are harmless inside the cooling system. However, as cooling devices get older, these gases start to leak out during their operational life and are vented out into the atmosphere when the cooling systems are decommissioned. This is true for all cooling applications, whether commercial or residential.

According to analysis by the Council on Energy, Environment and Water (CEEW), in the absence of any control measures, the leakage and venting of HFCs and HCFCs in India will account for up to 2 billion tons of CO₂ equivalent emissions by 2050. This issue is not unique to India; globally, emissions due to these refrigerants are projected to reach 61 billion tons. To put it into perspective, India’s contribution is part of a larger global challenge that requires collective action from all nations.

Isn’t the Montreal Protocol controlling refrigerant emissions?

The 1987 Montreal Protocol—an international treaty between 198 countries—and its Kigali Amendment in 2016 regulate ‘only’ the production and consumption of these synthetic refrigerants. Like the global phase-out of CFCs and HCFCs, it is also driving the phase-down of HFCs. The Kigali Amendment to the Montreal Protocol now requires all nations to phase down HFCs by 80-85 per cent by 2047 and transition towards natural refrigerants or low-GWP alternatives. India

is a party to the Montreal Protocol and has also ratified the Kigali Amendment in 2021.


However, the Montreal Protocol doesn’t specifically address the leakage or venting of these refrigerants contained in the cooling devices. This means that once the cooling devices based on these refrigerants are installed and placed on the market, their management doesn’t currently come under the purview of the Montreal Protocol.

How do we then tackle these super greenhouse gases?

Lifecycle refrigerant management (LRM) is an answer to it. It involves preventing refrigerant leakages from in-use and decommissioned cooling devices and their recovery, reclamation, reuse or destruction.


Last year, recognising the quantum of emissions due to leakage and venting of these potent gases, the Montreal Protocol took the initiative and formed a committee to investigate, identify, and propose solutions to control the emissions. Moreover, the Montreal Protocol requests the parties devise strategies and policies for implementing LRM.

As it faces unprecedented heat waves, it is crucial for India to put LRM at the forefront of its climate action efforts. Leading climate action efforts, India has already taken a step forward and has mandated refrigerant recovery and destruction in the new *E-waste (Management) Second Amendment Rules 2023* and the *Vehicle Scrappage Policy 2021*. These rules require waste recyclers to recover the gases before dismantling the decommissioned cooling devices/ vehicles and then further send them for destruction. Although these regulatory measures are necessary to set the foundation stone, to effectively implement LRM in India, it is crucial to take certain additional necessary measures.



Aditya Garg

Aditya Garg is a Research Analyst, and Sonal Kumar is a Programme Lead at the Council on Energy, Environment and Water (CEEW). Views are personal.



Sonal Kumar

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4 Other Outreach Activities

4.1 Research Dissemination through Emails and Social Media

In our commitment to ensuring widespread dissemination of research findings, we employed targeted communication strategies through email and social media platforms. Emails attached with the research outputs were sent to the relevant stakeholders at CEEW's database across the cooling industry. These emails provided concise yet comprehensive summaries of our research outputs, highlighting key insights, recommendations, and upcoming events.

Simultaneously, we leveraged the power of social media to amplify our outreach. Through strategically crafted posts on platforms such as LinkedIn and Twitter, we shared visually engaging content, research highlights, and links to the reports we published. This approach enabled us to reach a broader audience, fostering engagement and awareness around critical issues related to lifecycle refrigerant management and sustainable cooling practices.

4.2 Meetings with government institutions, industry associations and other key stakeholders, and presentation of our work in external events

CEEW's team also engaged in strategic one-on-one meetings with pivotal stakeholders, including government institutions and industry associations, to advance our research efforts towards its implementation. These targeted meetings included multiple engagements with the Ozone Cell, Ministry of Environment, Forest and Climate Change and the Department of Science and Technology (DST) to ensure alignment of our research outcomes with governmental priorities and to explore potential avenues for collaboration.

Additionally, we conducted meetings with industry associations, namely Indian Society of Heating, Refrigerating and Air Conditioning Engineers (ISHRAE), Refrigeration and Air-conditioning Manufacturers Association (RAMA), Refrigeration & Air-Conditioning Trades Association (RATA), Refrigeration & Air-conditioning Servicing Sector Society (RASSS), and Society of Indian Automobile Manufacturers (SIAM), to foster dialogue on the practical implementation of research findings within the private sector. These interactions allowed us to present our research outputs, gather valuable feedback, and establish collaborative frameworks that bridge the gap between research insights and industry application. The direct engagement with both government bodies and industry associations served as a crucial component of our strategy to socialise research findings, ensuring that our work is not only recognised but also actively contributes to policy formulation and industry practices. In addition, we have presented our work in several external events as invited speakers or panellists.