

Lifecycle Refrigerant Management at the 36th Meeting of the Parties to the Montreal Protocol

27 October – 2 November 2024 – Bangkok, Thailand



Plenary Session at MOP #36 in Bangkok.

Image credit: The International Institute for Sustainable Development (IISD)

Introduction

Rising global temperatures are driving global demand for cooling equipment, particularly in developing countries. The refrigerant gases in existing equipment (known as the “installed refrigerant bank”) thus represent a growing stock of greenhouse gases that are hundreds to thousands of times more potent than CO₂ on a ton-for-ton basis if they leak or are released at equipment end-of-life. Hydrofluorocarbons (HFCs) and other refrigerants account for over 4 billion metric tons of CO₂ equivalent (MTCO₂e) emissions annually.

Lifecycle Refrigerant Management (LRM) describes the suite of actions that can prevent refrigerant gas emissions from cooling equipment, spanning production and use to leak reduction, recovery, reuse, and environmentally sound disposal. According to the TEAP, LRM has the potential to prevent at least 39 GtCO₂e refrigerant emissions globally between 2025 and 2050, the equivalent to a year’s worth of global energy sector emissions.¹

Each year, a decades-old ecosystem of private companies, government agencies, and technology providers in the refrigerant space convenes at the Meeting of the Parties (MOP) under the Montreal Protocol to negotiate phase-downs in the production and use of ozone-depleting substances (ODS) and their substitutes, including HFCs and other refrigerants. Expanding the scope of the Montreal Protocol to support LRM is an ongoing topic of discussion at the MOP.²

1. Negotiation Outcome

COP13/MOP36 negotiations in Bangkok concluded on November 1, 2024, with the adoption of 27 decisions, a larger than usual number underscoring efforts to expand the Montreal Protocol’s role in ozone and climate protection.

2. Lifecycle Refrigerant Management (LRM) Decision

A decision on LRM was reached by the parties. This decision signals a shift in the Montreal Protocol’s LRM work from information sharing and capacity-building (2023-2024) to policy recommendations and actions (2025-2026). This decision builds on last year’s LRM introduction (Decision XXXV/11) and the Technology and Economic Assessment Panel (TEAP) report (2024), which in turn builds upon the foundational 90 Billion Ton Opportunity report from 2022, advancing LRM beyond the learning phase by incorporating both continued assessments via TEAP and initial steps into policy.

¹ <https://carboncontainmentlab.org/updates/posts/takeaways-teap-lrm>

² <https://sdg.iisd.org/news/ozone-conference-adopts-record-number-of-decisions-to-aid-implementation/>

1. **Decision Title:** “Further Integrating the Lifecycle Refrigerant Management (LRM) approach into the Montreal Protocol and Building Capacity to Implement Effective LRM in Developing Countries (Decision XXXVI/—)”.
2. **Core Components:**
 - a. **TEAP and MLF Engagement:** The decision requests the TEAP to update LRM information in its reports and invites the Multilateral Fund (MLF)’s Executive Committee and Secretariat to explore ways to enhance LRM.
 - b. **National Policy Encouragement:** The decision encourages all Parties to incorporate LRM into national policies and submit any related activity information to the Ozone Secretariat by May 31, 2025.
 - c. **Article 5 Country Support:** Article 5 countries are encouraged to use LRM insights when implementing Kigali Implementation Plans and national inventories, and to leverage regional ozone networks to share knowledge and build capacity.

3. The LRM Workshop at MOP 36

The LRM Workshop was requested by MOP in Decision XXXV/11. It was held the day prior to the official MOP; organized by the Secretariat. Prior to the workshop, Briefing Notes were prepared and disseminated by the Ozone Secretariat.³

- **High Engagement and Expert Insights:** Over 400 participants and 34 speakers—including facilitators, policymakers, and subject matter experts—convened to discuss LRM best practices, challenges, and strategic opportunities.
- **Overview of LRM:** The workshop sessions explored critical elements of LRM, from production and equipment maintenance to recovery and environmentally sound disposal. Participants underscored the need to prevent leakage, promote reuse, and responsibly dispose of refrigerants, aligning with the Protocol’s broader goals for climate, ozone, and environmental health.
- **Country-Specific Experiences:** Countries such as Japan, Australia, the European Union, Ghana, India, and the United States presented case studies that highlighted their legislative frameworks, innovative recovery and disposal systems, and public awareness strategies for LRM.
 - Japan detailed its lifecycle-wide management under the Fluorocarbon Emissions Control Act and public outreach on compliance.

³ <https://ozone.unep.org/meetings/workshop-life-cycle-refrigerant-management/pre-session-documents>

- Australia showcased its co-regulatory framework and reverse supply chain initiatives, supported by an industry import levy and rebate scheme, as well as a comprehensive workforce training and certification program.
- Ghana discussed its efforts to develop recycling and destruction infrastructure with a continuous emission monitoring system for ODS and HFCs.
- **Technical Discussions:** In breakout sessions, participants examined key LRM components such as leak prevention, refrigerant recovery and reclamation, and end-of-life equipment management. This included:
 - *Advanced Leak Detection and Training:* Participants identified a need for cutting-edge leak detection technologies and thorough technician training to prevent emissions.
 - *Reverse Supply Chains:* Establishing centralized collection points and integrating reverse logistics emerged as crucial for efficient refrigerant recovery.
 - *Public-Private Partnerships:* Countries such as Japan and the United States illustrated the effectiveness of public-private partnerships in building destruction infrastructure.
- **Challenges and Financing Needs:** Throughout the sessions, participants consistently noted LRM's complex, cross-sectoral nature, which complicates policy development and implementation. Addressing these challenges requires adaptive and innovative financing models; and more investment across the board for both capital and operational expenditures. Participants emphasized the need for initial governmental and philanthropic support to develop sustainable and circular business models. Investors and the private sector are starting to invest in this sector, but not at the scale needed. Funding mechanisms discussed in the workshop included:
 - *Multilateral Fund and Development Finance:* Participants emphasized that initial support from the MLF to fund inventories, data management, capacity building and even some equipment purchases would be particularly helpful in Article 5 countries. While the MLF does not possess sufficient funding to support large-scale implementation of LRM activities; several recent decisions lay the path for LRM.⁴ Establishing a data collection system by parties could inform their decision-making and help assess the cost effectiveness of LRM and need for Policy and incentives.
 - *Carbon Finance:* Participants recommended exploring using carbon credits to generate revenue from verified refrigerant reclamation and emissions reductions, supported by rigorous monitoring, reporting and verification (MRV). Other participants expressed

⁴ Decision 91/66 provides a funding window for inventories and setting management plans. Decision 93/104 requests the Executive Committee to consider at its 97th meeting the establishment of a funding window supporting the implementation of LRM plans.

concerns around the use of voluntary carbon markets to support LRM given its mixed record in delivering environmental benefits and sharing of proceeds with local communities.

- *Deposit-Refund Systems*: Following Australia and Canada’s example, this model incentivizes proper refrigerant disposal by refunding an upfront deposit upon cylinder return. A comprehensive approach to these policies is needed for them to succeed, including strong enforcement, traceability systems, and workforce training and certification.
- *Tax Incentives and Extended Producer Responsibility (EPR)*: Participants discussed potential tax incentives to promote LRM investments and EPR programs to support responsible disposal and recovery. For example, Norway’s tax refund system provides incentives for reclamation and destruction, with the level of refund increasing by GWP of the gas.
- **LRM Workshop Outcomes and Outlook**: Participants underscored the workshop’s role in advancing the Montreal Protocol’s LRM agenda by providing education on LRM, emphasizing the need for integrated, cross-sectoral collaboration and consistent international standards. Additional funding from public and private sources will be needed to strengthen technical capacity and advance adoption.



International law and policy expert Ana Maria Kleymeyer giving a speech during MOP36.



Refrigeration, Air Conditioning and Heat Pump sector consultant Bassam Elassaad speaking at a panel on financing mechanisms alongside CC Lab Senior Managing Director Anastasia O’Rourke who moderated the Panel.

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