

Basel Convention Conference of the Parties 17th Meeting 2025

Side Event Report

Aligning the Basel Convention and Montreal Protocol to enable life-cycle refrigerant management and environmentally sound management of used and waste refrigerators, cooling, and heating equipment

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Background and Motivation for the Side Event



Hydrofluorocarbons (HFCs) and ozone-depleting substances (ODSs) are among the most potent greenhouse gases in the world, with global warming potentials (GWPs) hundreds to thousands of times greater than those of carbon dioxide. The international community has made substantial progress in phasing down these substances through the Montreal Protocol and its Kigali Amendment, which mandates non-Article 5 (developed) countries to achieve an 85% phasedown of HFCs by 2036, and Article 5 countries to phasedown by 2047. However, while the Protocol successfully addresses upstream controls on production and consumption, it does not comprehensively regulate downstream emissions from the use and disposal of these substances.

Lifecycle refrigerant management (LRM), the management of refrigerants from production and use to recovery and final disposal or reuse, is essential to achieving the climate mitigation goals of the Montreal Protocol. Yet, most countries lack the specialized infrastructure to undertake LRM domestically. As a result, the environmentally sound management (ESM) of used and waste refrigerants frequently depends on transboundary movement to countries with destruction or reclamation facilities. This necessity brings the Basel Convention into focus, as it governs the transboundary movement of hazardous wastes and other wastes, including many refrigerants, through its Prior Informed Consent (PIC) procedure and other regulatory safeguards.

Despite their shared environmental objectives, the existence of Basel Convention national prohibitions of transboundary movements (TBM) of hazardous and other wastes, as well as the long time necessary to complete the PIC procedure, create barriers in the implementation of LRM under the Montreal Protocol. Inconsistent national interpretations of what constitutes "hazardous waste," varying classifications of refrigerants based on use or disposal intent, and lengthy or unclear permitting processes hinder the timely and accountable movement of these substances across borders. As a result, refrigerants are increasingly stockpiled or illegally vented, and these outcomes directly undermine global climate and ozone protection efforts.

This side event was convened in response to the growing recognition that aligning the Basel Convention and the Montreal Protocol is critical to overcoming these regulatory bottlenecks and enabling safe and effective LRM at scale. By bringing together policymakers, technical experts, private sector leaders, and civil society; the session aimed to build a shared understanding of the regulatory landscape, discuss practical case studies of transboundary movement challenges, and identify opportunities for legal, procedural, and institutional coordination.

Objectives of the Side Event



The primary objective of the side event was to initiate a cross-sectoral dialogue on aligning the Basel Convention and the Montreal Protocol to enable more effective and environmentally sound lifecycle refrigerant management. With the growing urgency of mitigating short-lived climate pollutants such as HFCs

and ODS, the event aimed to spotlight the regulatory, procedural, and practical challenges associated with the transboundary movement of used and waste refrigerants, and to explore actionable solutions that uphold the integrity of both international agreements.

Specific objectives of the event included:

- **Clarify the Intersection of Basel Convention and Montreal Protocol:** Examine how the Basel Convention's requirements for environmentally sound repair and refurbishment of used and ESM of wastes refrigerators, cooling and heating equipment and the Montreal Protocol's phasedown schedules for HFCs intersect, particularly regarding the classification and transboundary movement of refrigerants for destruction or reclamation.
- Identify Operational Barriers: Highlight country-level and procedural barriers, including inconsistent definitions, complex permitting requirements, and administrative delays that prevent or delay the movement of refrigerants to facilities with adequate destruction or reclamation capacity.
- Share Practical Experiences and Case Studies: Present real-world examples, including case studies on transboundary movement of HFCs for destruction, to ground the discussion in lived experiences and operational realities.
- Identify Potential Solutions: Explore a range of practical and scalable solutions to enable the safe and efficient transboundary movement of refrigerants. This includes identifying regulatory flexibilities within the existing Basel and Montreal frameworks, developing model bilateral or regional arrangements, enhancing administrative processes such as the Prior Informed Consent (PIC) procedure, and leveraging data and capacity-building tools.

The Panelists of the Side Event

- **David Ogden**, Deputy Executive Secretary of the Basel-Rotterdam-Stockholm Conventions, gave the opening remarks for the event. Mr. Ogden emphasized the importance of HFC phasedowns under the Montreal Protocol and the role the Basel Convention plays in LRM, and the ESM of used and waste refrigerators, cooling, and heating equipment.
- Anastasia O'Rourke, Senior Managing Director at the CC Lab, explained why these cooling gases are warming the planet and the role of LRM as an effective mitigation strategy that can address this problem.
- **Gabe Plotkin**, Founder and Strategic Advisor of Tradewater. He shared some case studies of how the Basel Convention impacts the transboundary movement of these gases, based on his company's experiences in collecting, transporting, and destroying gases around the world.

- **Dana Lapesová**, Director of Basel Convention Regional Centre Slovakia and co-chair of PACEII, spoke about the mission and goals of Partnership for Action on Challenges relating to E-waste (PACEII).
- Hannah Wooldridge, Senior Advisor of the UK Environment Agency and co-chair of the PACEII, introduced the new guidance document on environmentally sound repair and refurbishment of used refrigerators, cooling and heating equipment, and ESM of their waste products.
- **Maas Goote**, Founder of Caraway Strategies, discussed six possible solutions to the transboundary movement challenges in support of both climate and environmental protection.

Summary of the Presentations & Discussions

Lifecycle Refrigerant Management and the need to link Basel Convention and Montreal Protocols - Dr. Anastasia O'Rourke, CC Lab



Dr. Anastasia O'Rourke opened the session by emphasizing the need to manage the climate risks posed by refrigerant gases. As global temperatures rise, demand for cooling is projected to triple by 2030, leading to the

rapid growth of HFCs, potent greenhouse gases used in air conditioning and refrigeration. The most common HFC used in AC units today is R-410a, which has 2,088 times the climate impact of CO_2 on a ton-for-ton basis.¹ It is estimated that over 90 billion tonnes of CO_2 -equivalent refrigerants will need to be managed by 2100 to avoid atmospheric leakage.² These gases are either in cylinders or in equipment such as air conditioners, refrigerators, or heating equipment. These gases should be removed, recovered, or destroyed in an environmentally sound way. Otherwise, stockpiles will keep growing, ultimately leading to leakages or illegal venting.

While the Kigali Amendment to the Montreal Protocol mandates a phasedown in HFC production and consumption, emissions from equipment use and disposal remain unaddressed. Therefore, LRM, the process of managing refrigerants from production and use to recovery and final disposal or reuse, is a critical mitigation strategy. Effective LRM relies on the availability of specialized infrastructure and trained personnel at every stage of the process. Facilities must be equipped to detect and repair leaks, recover and securely store refrigerant gases, and reprocess them to meet purity standards for reuse. For gases that cannot be reclaimed, destruction facilities must achieve destruction efficiencies of 99% or higher, typically through high-temperature incineration or plasma arc technologies. Equally important is the need for a well-trained workforce and appropriate financial incentives to ensure that these tasks are carried out safely and consistently.

Many countries, especially in the Global South, lack the reclamation and destruction capacity needed to close the refrigerant loop and face barriers to safely handling end-of-life refrigerants domestically. **Based on the draft research by the CC Lab and Tradewater, only 16 countries have certified HFC and ODS destruction facilities and accept hazardous waste imports from other countries.** An additional six countries have the necessary destruction capacity but do not allow the import of hazardous waste. The draft research could not find any evidence of destruction capacity in 152 countries. As a result, the ESM of used and waste refrigerants highly depends on transboundary movement to countries with destruction or reclamation facilities. Hence, the Basel Convention is crucial for LRM as it regulates the transboundary movement of hazardous waste, including refrigerants, through its Prior Informed Consent (PIC) procedure and other regulatory mechanisms.

Dr. O'Rourke identified the following key challenges to the transboundary movement of refrigerants:

¹ Carbon Containment Lab. (2022, December 21). Managing refrigerants in a warmer world.

https://carboncontainmentlab.org/updates/posts/managing-refrigerants-in-a-warmer-world

² Natural Resources Defense Council. (2022, October 20). The 90 billion ton opportunity: Lifecycle refrigerant management. https://www.nrdc.org/sites/default/files/lrm-90-billion-ton-opportunity-report-20221020.pdf



- Inconsistent import/export regulations: Rules vary significantly across countries and are often unclear.
- Inconsistent classifications:
 - Refrigerants destined for destruction are typically classified as hazardous waste, while refrigerants intended for reclamation are often not considered waste.
 - Classification may also depend on the form (e.g., gas in equipment vs. gas in cylinders), leading to regulatory ambiguity.
- Prior Informed Consent (PIC) procedure:
 - The PIC process is lengthy, complex, and burdensome for many Parties.
 - It often delays the timely and environmentally sound management of waste gases.
 - In some cases, it may act as a disincentive to proper recovery and destruction, undermining LRM goals.
- Lack of operational clarity and uneven national capacity:
 - Many countries lack clear procedures for handling transboundary shipments of refrigerants.
 - Varying levels of understanding and implementation of HFC-related requirements add further complexity.
- **Persistent illegal trade and venting:** Regulatory loopholes and enforcement challenges contribute to the continuation of illegal movement and venting of refrigerants.

While these challenges inhibit the effective global management of refrigerants, overcoming them and enabling LRM helps both the Basel Convention and the Montreal Protocol to make significant positive climate contributions. The reclamation component of LRM reduces the need for virgin gas and, therefore, leads to a decline in chemical production. Whereas, leak management and destruction prevent large amounts of atmospheric emissions. Aligning the Montreal Protocol and the Basel Convention objectives and procedures will make the whole LRM process work, as the Montreal Protocol focuses on phasing down the production and consumption of refrigerants, while the Basel Convention controls the movement needed for proper downstream management of these potent greenhouse gases.



Challenges in Transboundary Movement - Gabe Plotkin, Tradewater

Gabe Plotkin offered an in-depth, on-the-ground perspective on the operational realities of transboundary refrigerant movement and destruction. Tradewater focuses on mitigating climate change by collecting and permanently destroying non-CO₂ greenhouse gases, particularly legacy refrigerants such as chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), and hydrofluorocarbons (HFCs). These substances, though no longer produced in many countries, continue to leak from old equipment and sit in cylinders with the potential to leak in the future. These refrigerants pose a massive and under-addressed threat to the climate.

With operations in five continents, Tradewater has developed 97 projects accredited by the American Carbon Registry and two by the Verra Registry, collectively credited with mitigating more than 9 million tonnes of CO₂-equivalent emissions. The company has transported over 1.1 million kilograms of refrigerant globally and invested more than \$45 million in the communities where it operates. Yet despite this experience and global infrastructure, Plotkin emphasized that transboundary movement remains one of the most daunting and resource-intensive aspects of their work.

At the heart of his presentation was a clear message: refrigerants are not "waste" to Tradewater, they are a climate asset. These gases are rare, expensive to extract, and valuable from a climate mitigation standpoint. Their safe recovery and destruction involve complex logistics and high upfront costs. And Tradewater only recovers its investment after the gases are destroyed. This makes the reliability and

predictability of international shipping processes critical. If a shipment is delayed at a port, misclassified, or rejected due to inconsistent regulatory interpretation, not only are environmental benefits lost, but also the company risks financial loss.



Source: Tradewater, 2025

Plotkin illustrated the shipment challenges with detailed timeline examples. In one of the cases, Tradewater planned a shipment from South America to Europe, destined for destruction. In total, the process took 19 months, and 15 of it was due to PIC procedure delays under the Basel Convention. While the PIC system provides essential environmental safeguards, he noted, it can also create unintended barriers for climate-critical refrigerant destruction. The process is often slow, administratively complex, and varies by country, with some Parties interpreting rules differently or lacking the capacity to respond promptly.

Plotkin shared that repeat shipments between the same countries become smoother over time as familiarity and relationships build. However, he stressed that the climate crisis demands broader geographic engagement and scaling the work requires the use of new transboundary routes all the time. To be effective, the PIC process needs to work efficiently at all times, including when a route is needed for the first time. Any delays increase the risk of refrigerant leakage and make scaling refrigerant destruction nearly impossible in regions without domestic treatment capacity. He emphasized that even though the Basel Convention was set to prevent waste dumping to developing countries, in Tradewater's experience, it inadvertently traps the refrigerant gases in countries that lack the necessary infrastructure to destroy them, which are often in the Global South, by creating barriers to the transboundary movement.



Why does the transboundary refrigerant movement take so long? According to Plotkin, there is:

- **Process confusion:** A major cause of delay was uncertainty around the procedural steps required under the Basel Convention. There was no clear guidance on who should initiate the process, which party is responsible for sending the designated movement documents (DMRs), or how to effectively communicate with the relevant Basel focal points in each country. This lack of clarity created inefficiencies and prolonged decision-making timelines.
- Lack of enforcement mechanisms: The current system offers no way to ensure timely responses or follow-through. "Silence does not mean consent." Even when there is no objection, a shipment can be stalled indefinitely. Moreover, any participating country, exporting, importing, or transit, can unilaterally halt the entire process; adding unpredictability and risk to time-sensitive shipments.
- Role confusion: Another barrier came from unfamiliarity with non-state actors like Tradewater. Authorities receiving DMRs often questioned the sender's legitimacy, asking questions like, "Who is Tradewater?" or "Why are you sending us these documents?" This underscores the need for better awareness, trust-building, and role definition when private organizations support transboundary movements of refrigerants.

Partnership for Action on Challenges relating to E-waste (PACEII) and the PACE II Guidance Document - Dana Lapesová and Hannah Wooldridge

This session highlighted how the growing stream of e-waste, particularly used and waste refrigerators, cooling, and heating equipment, has significant implications for lifecycle refrigerant management (LRM), given the refrigerants and other hazardous materials they contain. Dana Lapesová introduced the goals and the work of the Partnership for Action on Challenges relating to E-waste (PACEII), and Hannah Wooldridge presented the guidance document on ESM of used and waste refrigerators, cooling and heating equipment, emphasizing its relevance to LRM and ESM of used and waste refrigerators, cooling, and heating equipment. Their presentation underscored how the Basel Convention evolved to address new streams of e-waste, including those containing refrigerants, and is fostering regional coordination and practical guidance across diverse country contexts.

PACEII, a public-private platform under the Basel Convention, brings together a diverse and expanding membership which currently includes 76 members, including 23 Parties, ten intergovernmental organizations, 21 regional centres, two development agencies/funds, three non-governmental organizations, 19 industries or industry associations, and nine Observers. The revised mandate of the partnership, as per Decisions BC15/22 Part I and BC16/18 Part I, expands its scope to include additional categories of used and

waste electronic equipment, such as televisions, audio-video systems, and most notably, refrigeration and cooling/heating appliances, also those containing high-GWP refrigerants.

A key contribution of PACEII to the side event was the presentation of the new general guidance document under development for the used and waste refrigerators, cooling, and heating equipment. This resource aims to guide Parties and stakeholders in implementing ESM practices aligned with both Basel Convention obligations and the goals of the Montreal Protocol.

The speakers also highlighted the partnership's structure and ongoing activities. Coordination is driven regionally by Basel Convention Regional Centres (BCRCs and BCCCs), including Indonesia, Nigeria, Slovakia, Argentina, Trinidad & Tobago, and South Africa. PACEII operates through four main project groups:

- Dissemination and training activities on e-waste
- ESM guidance on televisions and audio-visual equipment
- ESM guidance on refrigerators and cooling equipment
- Pilot projects to test and scale effective practices

Examples of completed projects in 2025 included:

- Africa: BCRC Senegal and BCCC Nigeria led repair, recycling, and training projects.
- Asia: BCRC Indonesia implemented ESM assessments in Cambodia, Indonesia, and Pakistan; BCRC China conducted regional recycling pilots based on PACE guidance.
- **Central and Eastern Europe:** BCRC Slovakia implemented extended producer responsibility (EPR) initiatives in Moldova and Belarus.
- **Group of Latin American and Caribbean Countries:** BCRC Trinidad and Tobago advanced national collection and policy frameworks for mobile phones, while BCRC Argentina delivered training packages and waste laboratory activities on ESM of waste lead-acid batteries.

For more information, the audience was directed to the PACEII portal.³

³ Basel Convention. (n.d.). Partnership for Action on Challenges relating to E-waste (PACE II): Overview. Retrieved June 4, 2025, from https://www.basel.int/Implementation/TechnicalAssistance/Partnerships/PACEII/Overview/tabid/9284/Default.aspx

Recommendations and Next Steps - Maas Goote, Caraway Strategies

The overarching question that remains is how to phase down climate-warming refrigerants under the Montreal Protocol, while ensuring their environmentally sound cross-border movement under the Basel Convention. In his concluding remarks, Maas Goote shifted to identifying solutions and possible ways forward. He emphasized the need to focus on practical options and solutions, taking a pragmatic, bottom-up approach. There is no "one size fits all" solution; instead, specific problems must be identified and addressed with tailor-made measures, as much as possible within the current regulatory framework.

Goote presented and elaborated on six main categories of solutions:

- Information Exchange: A key step is to strengthen connections between the Basel and Montreal communities. Ongoing information exchange is needed between the Secretariats of both conventions, as well as between national competent authorities. Bilateral and regional exchanges between the involved Parties should be encouraged, alongside the collection and sharing of best practices.
- 2. Closing the Data Gap: Accurate data is essential for effective policy and action. This includes obtaining a clear picture of cross-border refrigerant waste streams, as well as the capacity and availability of relevant reclamation and destruction facilities. Regular updates and data sharing within and across the Basel and Montreal Protocol communities are necessary. National reports should also include information on final disposal and recovery options for refrigerants.
- 3. **Building Capacities:** Capacity building is critical and should be included in technical assistance plans and in relevant support or development programmes. The Basel Regional Centres play an important role in this process. Workshops can facilitate mutual learning and the dissemination of best practices. The Basel Export & Import Control Tool could be utilized, and pilot or project funding can be sought through various financial mechanisms.
- 4. Article 11 Arrangements: Countries would benefit from specific bilateral or regional arrangements for the transboundary movement of refrigerants, including transit countries as partners. Developing model arrangements can provide a useful basis for these agreements.
- 5. **Including Transit Countries:** Transit countries are an essential part of the solution and should be actively involved, including through proactive communications by the Parties of export or in regional arrangements.
- 6. **The PIC Procedure:** There are opportunities to make more targeted use of the existing PIC procedure. Practical improvements currently under consideration, such as updated contact information, electronic processing, and adjustments to forms, would further facilitate the transboundary movement of refrigerants.

The event concluded with a call for questions and ideas, underlining the intention to learn from all participants and to develop practical next steps collectively. By elaborating on these six themes, the aim is to create a concrete solutions agenda to enable progress. The Carbon Containment Lab is planning to carry this conversation forward by conducting a session on the transboundary movement during the Climate and Clean Air Coalition (CCAC) LRM Workshop at the upcoming Montreal Protocol Open Ended Working Group, as well as continuing research to close the data gap.