Summary of information submitted by parties on national and regional initiatives supporting the implementation of the Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer

I. Introduction

1. The present summary has been prepared pursuant to paragraph 2 of decision XXXVII/5 adopted by the Thirty-Seventh Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer. In that decision, the Ozone Secretariat was requested to collate and summarize the information submitted pursuant to paragraph 1 of the decision and to make it available by the Thirty-Eighth Meeting of the Parties, taking into account the updated paper on centres of excellence for sustainable cooling and testing centres for energy efficiency requested in decision 95/87 of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol.

2. In paragraph 1 of the same decision, parties were invited to submit to the Ozone Secretariat, by 1 June 2026, information, including policies, activities and key lessons learned, in relation to centres of excellence for sustainable cooling and testing centres for energy efficiency related to the implementation of the Kigali Amendment to the Montreal Protocol. On 30 April 2026, the Secretariat sent a reminder letter to parties, including a reporting form which was suggested by the Secretariat, that parties could use to facilitate the submission of the requested information.

3. As at 22 October 2026, the Secretariat had received submissions from the following 23 parties: Armenia, Burkina Faso, China, Colombia, Ecuador, Georgia, Haiti, Jordan, Kenya, Liberia, Mali, Nigeria, Oman, Peru, Qatar, Slovak Republic, Somalia, South Africa, Türkiye, Tuvalu, United Kingdom of Great Britain and Northern Ireland, Vanuatu and Zimbabwe. The full submissions have been posted on the Secretariat's website.[1] The information provided by parties has been compiled separately, arranged thematically according to the questions set out in the reporting form, and made available on the Secretariat's website for ease of reference.

4. Pursuant to decision 95/87(e) of the Executive Committee of the Multilateral Fund, the secretariat of the Multilateral Fund had prepared, for consideration by the Executive Committee at its 97th meeting held in Montreal, Canada from 1 to 5 December 2025, two updated papers on: (i) the operationalization of centres of excellence for sustainable cooling (document UNEP/OzL.Pro/ExCom/97/85) and (ii) the operationalization of testing centres for energy efficiency (document UNEP/OzL.Pro/ExCom/97/86). The paper on centres of excellence describes possible functions including technical assessment and data management, market-driven policy support, capacity building and training, support for market uptake of low-global-warming-potential technologies, and mobilization of complementary financing. It also considers issues of governance, co-location with existing institutions, regional cooperation and financial sustainability.[2] The paper on testing centres describes their role in supporting the implementation of minimum energy performance standards through testing, conformity assessment and certification, as well as market surveillance and verification. It further identifies considerations for the establishment or upgrading of regional testing capacity, including market demand, recognition of testing results, accreditation, logistics, operating costs and co-financing.[3]

5. Section II of this document summarizes the functions, policies, activities and key lessons learned from the operation of the centres of excellence for sustainable cooling and testing centres for energy efficiency.

[1] https://ozone.unep.org/decision-xxxvii5-ka-intiatives?q=countries/additional-reported-information/national-and-regional-initiatives-support-implementation-kigali-amendment-decision-xxxvii5

[2] UNEP/OzL.Pro/ExCom/97/85

[3] UNEP/OzL.Pro/ExCom/97/86

II. Summary of the information submitted by parties

6. The information submitted by parties reflects a range of institutional models for supporting sustainable cooling and energy efficiency. The centres and facilities reported include dedicated centres established for training and certification, as well as laboratories and research institutions providing testing, conformity assessment, technology development and demonstration. In several cases, existing institutions are being considered for strengthening or expansion rather than establishing new standalone centres.

A. Centres of excellence for sustainable cooling

7. Existing centres or institutions reported as providing functions relevant to sustainable cooling include:

- The International Regional Centre of Excellence for Training and Certification under Shirakatsy Lyceum in Yerevan, Armenia;
- The Centro de Perfeccionamiento en el Uso de Refrigerantes at the Escuela Politécnica Nacional in Quito and the Refrigerant Regeneration Pilot Centre at the Escuela Superior Politécnica del Litoral in Guayaquil, Ecuador;
- The Royal Scientific Society training centre in Jordan;
- The National Industrial Training Authority (NITA) facility in Mombasa, Kenya;
- The National Engineering School (Abderhamane Baba Touré), the Central School of Industry, Commerce and Administration, and the University of Sciences, Techniques and Technologies of Bamako in Bamako, Mali.

8. The reported functions of these institutions include technician training, certification, practical instruction, refrigerant management, demonstration of alternative technologies and support for energy-efficient servicing practices.

9. The information submitted also included broader research, technology and demonstration institutions whose activities range from research and technology development to district cooling and specialized cooling services. These institutions include:

- The Centre for Research and Development in Air Conditioning and Refrigeration (CIDARE), Air Conditioning and Refrigeration Research and Development Centre (LPEA), Centre for Research, Development, and Quality in Refrigeration and Air Conditioning (CIRCLI) and System for Research, Innovation, and Technological Development (SENNOVA), in Colombia;
- Qatar Cool, the Gulf Organization for Research & Development Academy, the West Energy Centre, the EMCO District Cooling Plant and Qatar University in Qatar;
- The Council for Scientific and Industrial Research, the South African National Energy Development Institute and the University of Johannesburg in South Africa.

10. Some parties reported existing professional or technical infrastructure that perform functions relevant to sustainable cooling without being formally designated as a centre of excellence.

- In the Slovak Republic, the Slovak Association for Cooling, Air Conditioning and Heat Pumps and its associated certification body provide training, examinations and certification for persons and companies handling fluorinated greenhouse gases and support professional awareness of alternative refrigerants.
- In Türkiye, the reported facilities include the Turkish Standards Institution and private-sector research and testing laboratories operated by Martek Soğutma Sistemleri, Systemair Türkiye, Daikin and Friterm. These facilities cover, among other areas, performance testing, energy consumption, seasonal efficiency, thermal performance, leakage, safety and product validation.

11. Regional facilities and networks relevant to sustainable cooling reported include:

- The International Regional Centre of Excellence for Training and Certification in Armenia;
- The Africa Centre of Excellence for Sustainable Cooling and Cold Chain Systems (ACES) in Rwanda;
- The East African Centre of Excellence for Renewable Energy and Efficiency;
- The Pacific Centre for Renewable Energy and Energy Efficiency (PCREEE) in Tonga;
- A regional energy-efficiency technical centre in Jamaica.

12. Information provided by the United Kingdom includes the Sustainable Cooling and Cold Chain Solutions Programme and its hub-and-spoke model centred on ACES, with associated activities in Kenya and India.

13. One party, Colombia, expressed interest in establishing a regional thematic centre to bring together the functions of the four centres listed in paragraph 9 and coordinate their activities as service network for the entire region.

B. Testing centres for energy efficiency

14. The reported testing capacity is concentrated in institutions including laboratories, whose functions include product testing, conformity assessment, certification, labelling support, standards implementation and market surveillance.

- The Hefei General Machinery and Electrical Products Inspection Institute (GMPI) in China is identified as a national-level testing centre with capabilities covering residential, commercial and industrial refrigeration and air-conditioning products, including energy-efficiency testing and international certification services.
- The Standards Organization of Nigeria testing laboratory in Lagos undertakes pre-market and random market testing of Refrigeration and Air-conditioning appliances against minimum energy performance standards, provide data for monitoring and evaluation, and inform consumers on product energy performance.
- In Colombia, the Air Conditioning and Refrigeration Research and Development Center at the Universidad Tecnológica de Pereira conducts tests of cooling capacity, energy-efficiency ratio, power consumption and seasonal performance of air-conditioning equipment.
- In Jordan, the Energy Labelling Testing Laboratories at the Royal Scientific Society provide accredited testing services for household appliances, air conditioners and refrigerators, among other products, and support compliance verification, product performance evaluation and energy labelling.
- In South Africa, the Council for Scientific and Industrial Research, the South African National Energy Development Institute and the South African Bureau of Standards appliance laboratory provide appliance energy-efficiency testing.

15. The information submitted indicates that testing capacity may be distributed across several institutions rather than being concentrated in a single facility.

- Kenya reported that the NITA facility in Mombasa could be upgraded to provide energy-efficiency testing.
- In Mali, an energy-efficiency laboratory is housed within the National Agency for Renewable Energies and Bioenergies, although some of its equipment was indicated as not yet fully operational.
- Türkiye reported five testing and conformity-assessment infrastructure together with company-based laboratories. These facilities include the Turkish Standards Institution (TSE), Martek Soğutma Sistemleri, Systemair Türkiye, Daikin Isıtma ve Soğutma Sistemleri Sanayi Ticaret Anonim Şirketi and Friterm Termik Cihazlar Sanayi ve Ticaret Anonim Şirketi.

16. Several submissions refer to the possibility of developing or strengthening regional testing capacity. Nigeria proposed establishment of a regional energy-efficiency testing centre, and Tuvalu reported discussions concerning the potential development of regional testing capacity through PCREEE. Other submissions refer to the use of existing regional facilities or regional cooperation as an alternative to establishing national testing laboratories. This is particularly relevant for countries with limited domestic testing infrastructure.

C. Ongoing and planned initiatives

17. Several parties reported initiatives that are under development, planned or being considered. Burkina Faso reported two centres being established under Stage II of its Hydrochlorofluorocarbon (HCFC) phase-out management plan, in Ouagadougou and Bobo-Dioulasso. Ecuador reported the planned expansion and strengthening of the Refrigerant Regeneration Pilot Centre at the Escuela Superior Politécnica del Litoral (ESPOL). Türkiye reported that the establishment of a centre of excellence and/or related testing capacity is being considered under its Kigali implementation plan, with the institutional and operational model still under development.

18. Colombia reported an interest in establishing a regional thematic centre that would link the functions of existing institutions as a service network for the region. Somalia reported that it is exploring the establishment of centres of excellence and energy-efficiency testing capacity, while strengthening national training, certification and regulatory systems. Zimbabwe reported ongoing efforts involving relevant government institutions and implementing agencies to establish energy-efficiency testing centres. Kenya reported that the NITA facility could be upgraded to provide energy-efficiency testing. Liberia also reported that its Environmental Protection Agency has announced plans for regional environmental research and laboratory facilities as part of its 2025–2029 strategic plan. Those laboratories could potentially support future testing and certification activities related to energy efficiency and cooling technologies.

19. Other parties reported that they had no dedicated national centre at present and no specific near-term plan to establish one. However, they described policies, regional mechanisms, existing training infrastructure or other institutional capacities that could support future development of such facilities.

D. Policies and institutional frameworks

20. The policy and institutional frameworks reported by parties vary, with several common elements identified across the information provided. These include national cooling strategies or action plans, Kigali implementation plans, HCFC phase-out management plans, energy-efficiency strategies, minimum energy performance standards, energy labelling requirements, standards and conformity-assessment frameworks, technician certification systems and legislation governing refrigerants and energy efficiency.

21. Several parties reported that sustainable cooling and energy-efficiency initiatives are being integrated into existing national policy frameworks rather than addressed through stand-alone centre-specific policies. Jordan reported the development of a National Cooling Strategy and National Cooling Action Plan alongside energy labelling and minimum energy performance standards. Kenya reported the Energy Act, Energy Management Regulations and Appliance Energy Performance and Labelling Regulations, together with the National Cooling Action Plan. South Africa reported its National Cooling Plan, Kigali implementation plan and Energy Efficiency Strategy. Tuvalu reported the Energy Efficiency Act 2016 and National Energy Policy.

22. Regulatory and institutional frameworks for standards, accreditation and certification were also also highlighted across the information provided. China reported government support through its national quality infrastructure and authorization of GMPI for energy-efficiency labelling and energy-conservation certification. Colombia reported legal requirements for the establishment and recognition of research and development centres, including requirements concerning scientific capacity, infrastructure and financial stability. Türkiye reported roles for the Turkish Standards Institution and the Turkish Accreditation Agency in standards implementation, testing, certification, conformity assessment and laboratory accreditation. Tuvalu indicated that it relies on the Pacific Appliance Database for testing results from Australia, Fiji, and New Zealand, particularly when equipment is not registered in that database or in the Tuvalu Department of Energy database.

23. Training and certification frameworks were frequently identified as an important foundation for effective implementation. Burkina Faso described consultations with technicians' associations, the national ozone unit and technical experts to develop a provisional certification scheme. Ecuador reported nationally recognized occupational competency profiles for the refrigeration and air-conditioning sector and the institutionalization of training programmes within universities. The Slovak Republic reported a national system of training, examinations and certification for persons and companies handling fluorinated greenhouse gases.

E. Activities and functions

24. Training and capacity-building are among the functions commonly reported by parties. These activities include practical technician training, competency-based training, train-the-trainer programmes, certification, curriculum development and professional examinations. They are directed at technicians, engineers, trainers, policymakers and, in some cases, industry and other market actors.

25. Another group of activities relates to testing, verification and certification. Reported functions include product performance testing, energy-efficiency testing, conformity assessment, certification, labelling support, market surveillance and verification against minimum energy performance standards. Some facilities also provide technical support to manufacturers and technical input to regulators on standards and product performance.

26. Research, development, demonstration and technology transfer were also reported by several parties. The activities identified include the development and testing of low-global-warming-potential technologies, refrigerant recovery and regeneration, research on cooling systems, product development and validation, cold-chain demonstrations, technology transfer and applied research. The United Kingdom provided information on the use of demonstration facilities, modelling tools, business-model pilots and local deployment through a hub-and-spoke approach.

27. The information provided by parties also covers functions extending beyond individual facilities to support wider market transformation. These include the development or implementation of standards and labelling schemes, policy advice, market surveillance, consumer information, coordination among government, academia and industry, and regional knowledge-sharing. The existing national and regional institutions may combine several functions within their broader institutional mandates.

F. Lessons learned, best practices and challenges

28. The information provided by parties identifies several common lessons learned concerning the establishment and operation of centres and testing facilities. Collaboration among government, academia, industry, professional associations and international partners was frequently identified as important, including through the involvement of relevant stakeholders from the early stages of designing, establishing and developing such centres. Parties also reported benefits from institutionalizing activities related to sustainable cooling and energy efficiency within existing universities, public institutions or established training bodies, providing practical training on use of equipment and establishing clear institutional roles and coordination mechanisms.

29. Financial sustainability was identified as a recurring challenge. Parties referred to the following elements as key challenges: the costs of establishing and maintaining facilities, procuring, upgrading and calibrating equipment, staffing and providing ongoing training, and the difficulty of maintaining stable sources of revenue. The information provided indicates that the transition to low-global-warming-potential and energy-efficient technologies would require continuing investment as technologies, standards and safety requirements evolve.

30. Human and technical capacity was another recurring challenge. Parties reported shortages of qualified trainers, engineers and laboratory personnel, difficulties in recruiting and retaining specialized personnel, and the need for continuous updating of training content. The need to strengthen practical competence, including in the safe handling of alternative refrigerants, was also highlighted.

31. Accreditation of testing facilities, international recognition and harmonization of standards were identified as important for facilities intended to support certification, market surveillance or regional use. Challenges include recognition of test results across jurisdictions, differences in testing requirements and standards, and the need to establish and maintain appropriate quality management and obtain international accreditation for testing facilities.

32. Infrastructure and operational conditions can constrain testing capacity. Reported examples include high equipment and maintenance costs, limited availability of suitable equipment, calibration and software issues, and unreliable power supply. For facilities serving several countries, parties also highlighted logistical considerations and the importance of mechanisms that enable countries to recognize and make use of the services provided.

33. Effective coordination and avoidance of duplication were also identified as relevant considerations. The information provided highlighted the risk of duplication of research or efforts, weak links between research and implementation, and overlapping institutional mandates. Clear institutional roles, effective communication and coordination among relevant stakeholders were identified as means of addressing these challenges.

34. Regional cooperation and knowledge-sharing were also identified as approaches to addressing capacity constraints, including through South-South cooperation, participation in regional networks and the sharing of technical knowledge and experience. Such cooperation can help to complement national capacity and facilitate access to specialized expertise and testing services where these may not be available at the national level.