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Item 15 of the provisional agenda[1]

UPDATE ON THE OPERATIONALIZATION OF REGIONAL THEMATIC CENTRES FOR SUSTAINABLE COOLING (DECISION 97/87(b))

Introduction

1. At its 95th meeting, the Executive Committee requested the Secretariat to prepare for its 97th meeting, an updated paper elaborating on the specific functions for both the centres of excellence for sustainable cooling and testing centres for energy efficiency, assessing sustainable business models for regional centres and potential duplication with activities funded under HCFC phase-out management plans (HPMPs) and Kigali HFC implementation plans (KIPs), as well as with existing centres, and identifying potential opportunities to use existing centres and mechanisms (decision 95/87(e)).

2. In response, the Secretariat submitted document UNEP/OzL.Pro/ExCom/97/85,[2] which proposed to replace the concept of centres of excellence with the more functional concept of regional thematic centres for sustainable cooling. The document also provided background on the rationale and advantages for establishing regional thematic centres and suggested an indicative list of the specific functions such centres could perform and guidelines for developing them, covering co-location, planning, governance and operation, cost estimates, co-financing and business model.

3. The Executive Committee, following an ensuing discussion and decision, *inter alia*, requested the Secretariat and the UNEP Compliance Assistance Programme (CAP), through its networks of national ozone units (NOUs) and the energy efficiency twinning project, to facilitate regional or subregional consultations, including with interested bilateral and implementing agencies, to collect information from interested regions and subregions on: (i) existing centres of excellence providing services in the refrigeration, air-conditioning and heat pump (RACHP) sector, including the services they provide, their mode of operation and financing, whether and how they generate revenue, and their potential to serve as regional thematic centres; and (ii) the interest of subregions in hosting a thematic regional centre, including the themes of interest and the possibility of Governments providing counterpart support for the long-term operation of the centres. The Executive Committee also requested the Secretariat to prepare for its 99th meeting an update to

[1] UNEP/OzL.Pro/ExCom/99/1
[2] Update on the operationalization of centres of excellence for sustainable cooling (decision 95/87(e)).

Pre-session documents of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol are without prejudice to any decision that the Executive Committee might take following issuance of the document.

document UNEP/OzL.Pro/ExCom/97/85, including information on existing relevant regional centres, the countries interested in hosting them, any outcome of the consultations, the information prepared by the Ozone Secretariat pursuant to decision XXXVII/5 of the Thirty-Seventh Meeting of the Parties on national and regional incentives to support the implementation of the Kigali Amendment, if available, and options for securing long-term support after project completion, taking into account the discussion at the 97th meeting (decision 97/87).[3]

4. In response to decision 97/87, this document was prepared based on consultations with regional and subregional networks of NOUs, technical experts, bilateral and implementing agencies, and information submitted pursuant to decision XXXVII/5. Annex I to the present document includes a comparison of the existing centres identified by the Secretariat during the preparation of this paper.

Data collection and consultations

5. The Secretariat and CAP, circulated a short questionnaire to NOUs ahead of regional network meetings held in 2026 and received submissions from 90 Article 5 countries.[4] Preliminary results were discussed with NOUs, implementing agencies and regional partners at dedicated sessions during the regional network meetings,[5] in the margins of the 48th meeting of the Open-Ended Working Group, and at the UNIDO Sustainable Cooling Forum.[6] Information on international and regional centres was compiled through interviews, a feedback form, and desk research covering six elements: mandate and scope; governance; services and activities; business model; funding and sustainability; and linkage to the Montreal Protocol. The Secretariat consulted the Ozone Secretariat to ensure consistency with the process under decision XXXVII/5, through which parties were invited to submit, by 1 June 2026, information on policies, activities, and lessons learned, and reviewed the 23 submissions received from the countries which responded to the Ozone Secretariat.[7]

Information collected on existing centres of excellence and their models of operation

Types of existing centres

6. Information was compiled on 42 entities, grouped into four categories: 15 centres operating in Article 5 countries; nine centres based outside Article 5 countries; eight technology provider centres established by equipment manufacturers; and ten regional sustainable energy centres of the Global Network of Regional Sustainable Energy Centers (GN-SEC) network, established under an intergovernmental mandate. The Africa Centre of Excellence for Sustainable Cooling and Cold-Chain (ACES) and its Specialized Outreach and Knowledge Establishment (SPOKE) in Kenya are treated as one entity. By legal status, six are governmental, 10 are intergovernmental, 16 are not-for-profit and 10 are private centres. Cooling is the main mandate of 22 entities and an explicit service line of 14 others; no cooling activity was identified for the remaining six. A comparison of these centres against the six elements of the feedback form is provided in annex I. The information in this section and in annex I is not an exhaustive list of relevant centres; it reflects the best information available to the Secretariat from various sources at the time of finalization of this paper.

[3] UNEP/OzL.Pro/ExCom/97/91.
[4] The analysis is based on the consolidated dataset as of 19 October 2026.
[5] Eight sessions, attended by the Secretariat online, in the margins of the regional network meetings of Pacific Island Countries, Caribbean and Haiti, Africa (Anglophone), Africa (Francophone), Europe and Central Asia, Latin (Central and South) America, and West Asia.
[6] UNIDO's Sustainable Cooling Forum, 8–10 April 2026 https://www.unido.org/events/unido-sustainable-cooling-forum-rising-global-challenge.
[7] 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, Vanuatu and Zimbabwe.

7. Training is the most common service (28 entities), followed by certification and testing (25), studies and market analysis (21), cold-chain (13), support to small and medium-sized enterprises (SMEs) (7) and data centres (6); only two entities address fisheries and marine refrigeration. Accredited product testing capacity is established in several Article 5 countries, especially those with manufacturing capacities, but remains absent in many regions that lack such capacity, where the GN-SEC centres offer harmonization channels but nascent testing capacity. Technician certification, which is distinct from training, is offered by few entities. Strong experience with Multilateral Fund projects or implementing agencies is limited to a few centres, though several others have participated in one or more Multilateral Fund-related activities. The main models of operation are summarized in table 1.

Table 1. Main models of operation of existing centres

Model	Examples	Governance and financing
Donor-anchored hub	ACES (Rwanda) with SPOKEs in Kenya and India	Independent NGO board; bilateral donor anchor funding and host-government contribution (funds, land and campus)
Intergovernmental regional centre	GN-SEC centres (e.g., ECREEE, EACREEE, SACREEE, RCREEE, PCREEE, CCREEE)[8]	Ministerial steering committee and executive board; host and member-state contributions; donor and UNIDO-managed programmes
Industry association or professional society	AHRI MENA, ASHRAE, Eurovent Middle East, CIDARE[9]	Parent-organization governance; membership fees, certification, training and events
Public or statutory institute	GMPI (China), RSS (Jordan), CSIR (South Africa), CIPET (India), SENAI (Brazil)[10]	Government or statutory boards; a government grant or a compulsory industry levy, plus testing, certification and consultancy fees
Private service provider	Centro Studi Galileo, OTS R&D, PhotonX	Company governance; fee-for-service and contracts with implementing agencies
Manufacturer centre	BITZER, Carrier, Daikin, Danfoss, Trane	Corporate mainly with training related to products and research and development support to new technology
University-based laboratory or institute	IER-UNAM (Mexico)	University governance; institutional budget and competitive research grants, plus fee-based testing and consultancy

Information submitted pursuant to decision XXXVII/5

8. Information submitted by 23 parties and the summary generated by the Ozone Secretariat[11] identified around 30 national institutions and five regional centres or networks. Few are dedicated centres of excellence; most are existing universities, training authorities, standards bodies, research councils or private companies with cooling-related functions, mainly national in scope, and only some combine more than two of the functions envisaged in document UNEP/OzL.Pro/ExCom/97/85. Several of the reported entities are included in annex I.

[8] ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE), EAC Centre for Renewable Energy and Energy Efficiency (EACREEE), SADC Centre for Renewable Energy and Energy Efficiency (SACREEE), Regional Centre for Renewable Energy and Energy Efficiency (RCREEE), Pacific Centre for Renewable Energy and Energy Efficiency (PCREEE), Caribbean Centre for Renewable Energy and Energy Efficiency (CCREEE).

[9] Air-Conditioning, Heating, and Refrigeration Institute–Middle East and North Africa (AHRI MENA), American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), Center for Research and Development in Air Conditioning and Refrigeration (CIDARE) in Colombia.

[10] Hefei General Machinery and Electrical Products Inspection Institute (GMPI), Royal Scientific Society (RSS), Council for Scientific and Industrial Research (CSIR), Central Institute of Petrochemicals Engineering and Technology (CIPET), Serviço Nacional de Aprendizagem Industrial (SENAI).

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

9. The entities can be categorized into four types. Training and certification centres, hosted by universities, vocational training authorities, scientific institutions or a professional association, are the most widely reported and the most directly linked to compliance, covering technician training, train-the-trainer programmes, certification and the safe handling of alternative refrigerants. Energy-efficiency testing laboratories, mainly national standards bodies, authorized inspection institutes and manufacturers' laboratories, provide performance testing, conformity assessment, labelling support and market surveillance, and depend on the existence of MEPS and labelling standards. Research, technology and demonstration institutions work on low-GWP technologies, cold-chain demonstration and district cooling. Five regional centres and networks provide training and certification, cold-chain solutions and energy-efficiency support, one of them through a hub-and-spoke programme.

Potential of existing centres to serve as regional thematic centres

10. The existing centres illustrate that no single institutional model combines official regional recognition, cooling-specific technical depth and financial sustainability. Intergovernmental centres provide legitimacy and policy channels; associations, statutory institutes and private providers provide strong technical capacity and fee-based services; and donor-anchored hubs provide comprehensive services but depend on long-term funding. This supports building thematic centres on existing set-ups through partnership, rather than establishing new stand-alone institutions.

Interest in hosting regional thematic centres and priorities identified by regions

Feedback from the regional networks

11. The servicing sector (78 per cent of respondents), cold-chain (70 per cent) and life-cycle refrigerant management (LRM) (53 per cent) are the common priority themes identified in the responses by the regions, whereas technicians and service providers (94 per cent), end users (83 per cent) and government institutions (78 per cent) are the main target groups identified. The results by regional network are summarized in table 2.

Table 2. Summary of feedback by regional network

Regional network (submissions)	Leading priority themes	Distinctive service emphasis	Preferred coverage and model
Africa (29: 16 French speaking, 13 English speaking)	Servicing; cold chain; lifecycle refrigerant management (LRM) (62 per cent)	End-of-life refrigerant services; access to co-financing	Subregional arrangements (ECOWAS/UEMOA, SADC, EAC, CEMAC)[12]
South Asia and Southeast Asia (15)	Servicing; LRM (67 per cent); data centres (47 per cent)	Standards, conformity assessment and digitalization of technical and vocational education and training (TVET)	One hub with ASEAN[13] and South Asia nodes
Pacific Island Countries (13)	Servicing; marine and fisheries (54 per cent)	Harmonized regional registration of refrigeration and air-conditioning (RAC) products; regional competency-based technician certification	Single regional hub
Caribbean (11)	Servicing; marine and fisheries (45 per cent)	Standards and certification (most oriented network)	CARICOM[14]-wide

[12] Economic Community of West African States (ECOWAS), West African Economic and Monetary Union (UEMOA), Southern African Development Community (SADC), East African Community (EAC), and the Economic and Monetary Community of Central Africa (CEMAC).
[13] Association of Southeast Asian Nations (ASEAN).
[14] Caribbean Community (CARICOM).

Regional network (submissions)	Leading priority themes	Distinctive service emphasis	Preferred coverage and model
Central and South America (9)	Cold chain (all respondents); servicing	Certification; building on HPMP and KIP investments; SMEs as a target group (89 per cent)	Networked or virtual model of national nodes
Europe and Central Asia (9)	Servicing; comfort cooling (44 per cent)	Market intelligence, regional datasets, technology assessment under local climatic conditions, investment opportunities; SMEs as a target group (89 per cent)	Networked or virtual model of regional or sub-regional focus
West Asia (4)	Servicing; LRM (75 per cent); comfort cooling	Market intelligence, regional datasets and technology assessment	Divided between GCC[15] and wider West Asia & North Africa coverage

12. The majority of respondents had a preference for three indicative service areas[16] (technical assessment, data management, and market-driven policies; market uptake and interventions for faster adoption of low-global-warming-potential (GWP) technologies; and attract and mobilize co-financing on sustainable cooling) and added a consistent set of practical requests: harmonized or regionally recognized technician certification and TVET curricula, including the safe handling of flammable and low-GWP refrigerants; standards, labelling, market surveillance and green public procurement; end-of-life refrigerant management delivered as a physical regional service (collection, storage, reclamation and destruction), including its interface with the Basel Convention.

13. Specialized themes, such as marine and fisheries, and comfort cooling using not-in-kind technologies, emerge as priorities for specific regions or countries. For cooling technologies in fisheries, interest was expressed from several countries from different network meetings.

14. Preferred coverage follows the regional networks and regional economic communities, ranging from a single regional hub to networked or virtual models of national nodes. Host support offered is largely cofinancing in kind with staff costs (68 per cent of respondents) and venue costs (59 per cent) or a combination of the two; and 12 countries offered programmatic funding, without specific commitments at this point.

Specific interest expressed by the Pacific Island Countries

15. The Pacific Island Countries (PICs)[17] identified two priorities not delivered through HPMPs, KIPs or CAP services, namely:

(a) Harmonized regional registration of RAC products, and

(b) Regional competency-based certification of technicians.

16. With the support of UNEP CAP, a concept proposal was developed for these two priority areas, covering all 14 countries of the network. The concept would aim to sustain the results of stage II of the regional HPMP, stage I of the KIP and energy-efficiency (decision 89/6) projects, and to address functions with a clear regional dimension that are directly linked to Kigali Amendment compliance, namely permits to handle refrigerants and trade control. The two priorities are considered further in paragraphs 28 to 34 below.

[15] Gulf Cooperation Council (GCC).
[16] As included in paragraphs 11-12 of UNEP/OzL.Pro/ExCom/97/85.
[17] Cook Islands, Kiribati, the Marshall Islands, Federated States of Micronesia, Fiji, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu.

Options for securing long-term support after project completion

Business models

17. An optimal business model for a thematic centre would combine a slim organizational structure with a clear operating model that together ensure regional ownership, clear decision-making, accountability for Multilateral Fund resources and a progressive shift to self-financing. The structure would comprise a regional steering committee of NOUs or designated senior officials of the participating countries, the host entity, the lead implementing agency and co-financing partners, meeting annually, and where possible, back-to-back with the regional network meetings to approve the multi-year strategy, annual work plan and budget, the service catalogue and fee policy, to review performance and to endorse the plan for phasing out Multilateral Fund support; a programme management unit at the host, comprising a coordinator and one to three thematic technical leads, with finance, administration and outreach provided in-kind by the host; a delivery network of NOUs as national focal points, national nodes (TVET institutions, standards bureaux, relevant bodies), partner centres, industry and financial institutions; and, only where the services so require, a technical advisory panel of experts.

18. The operating model would distinguish core regional services (such as certification, harmonized registration, regional data and market intelligence) from fee-based services (such as testing, specialized training and consultancy), with fees differentiated by type of client; align planning with the regional NOU networks; deliver services regionally, in-country and virtually, so that all participating countries benefit regardless of the location of the host; channel Multilateral Fund resources through an implementing agency and keep them separate from the host's other resources, with co-financing recorded and revenues retained for reinvestment; and report annually against key performance indicators. The information compiled in annex I confirms that revenue is most reliable where a service is required by regulation or purchased repeatedly by industry, for example product testing, certification, refrigerant quality verification and accredited training; that the experience in managing funds of United Nations agencies is limited to a few entities, mostly as contractors to implementing agencies and so channelling Multilateral Fund resources through an implementing agency under milestone-based agreements would provide the necessary fiduciary assurance; and that the centres which have operated sustainably over several decades share a diversified revenue mix of government, industry, donor and fee income rather than reliance on a single anchor.

19. Taking into account information collected on existing relevant centres, there are two business models that show the most promise for a Multilateral Fund funded thematic centre for sustainable cooling. Both models build on an existing institutional set-up and are presented below in terms of their possible governance route:[18]

(a) *Model A — Cooling programme at existing technical centre*: Partnering with an existing centre, which has a core cooling mandate, to extend or add services of a regional need to a wider group of countries and/or stakeholders. The partner centre should demonstrate access to the markets or sectors of Article 5 countries in the interested region. A dedicated programme would be established within the partner centre, with its own steering arrangements and ring-fenced budget, building on the centre's technical capacity, facilities and existing revenue streams. Examples include extending a hub-and-spoke cold-chain centre to additional countries, or engaging an accredited testing or certification institution as a regional reference service;

(b) *Model B — Cooling hub at existing intergovernmental setup*: Capitalizing on an existing regionally recognized set-up, such as the CAP regional networks or a regional sustainable energy centre of the GN-SEC network, to offer the specific services needed by a region or subregion. The hub would rely on the existing intergovernmental governance and

[18] This section updates paragraphs 13 to 24 of document UNEP/OzL.Pro/ExCom/97/85.

administrative systems of the host and would embed Montreal Protocol and Kigali Amendment expertise through dedicated technical staff and partnerships with relevant regional partners of relevant expertise or mandate.

20. Table 3 below provides more information on the two business models.

Table 3. Features of the two business models

Feature	Model A-Cooling programme at existing technical centre	Model B-Cooling hub at existing intergovernmental setup
Host	Existing specialized centre (Article 5 or non-Article 5) with access to Article 5 markets	Regionally recognized setup (CAP network, GN-SEC centre or similar regional body)
Main strength	Technical depth, facilities and an existing business model; quick start	Intergovernmental legitimacy, regional reach and established policy channels (e.g., regional minimum energy performance standards (MEPS))
Main gap to address	Regional ownership and equitable access for all participating countries	Montreal Protocol and RACHP-specific technical expertise
Governance	Programme steering committee with participating NOUs, embedded in the partner centre's governance	Montreal Protocol/NOU steering committee with agreed arrangement to the host's existing intergovernmental bodies
Revenue potential	Higher: fees for certification, testing, training and consultancy	Moderate: member contributions, donor programmes, fees for regional services
Key risks	Benefits concentrated in the host country; Multilateral Fund resources supporting non-programme activities	Slower decision-making; programme priorities subordinated to the host's broader mandate
Best suited to	Specialized themes (e.g., cold-chain, testing, fisheries, data centres)	Regulatory and harmonization functions (e.g., certification, product registration, policy/strategy development)

Sustainability of thematic centres

21. Sustainability is more achievable when a host or partner is identified at the outset. More predictable revenue streams appear when services respond to a regulatory requirement, such as mandatory technician certification, product registration, MEPS testing or refrigerant quality verification, or where centres act as service providers to programmes funded by other sources. Business models should be built around such recurring demand and supported by a credible, time-bound plan for phasing out any Multilateral Fund support.

Inter-regional programme or hub

22. An inter-regional programme or hub could serve interested Article 5 countries across regions on specialized themes (for example, fisheries or marine applications) and advance both the objectives of sustainable cooling and the sustainability of the Kigali targets. Such an approach would pool dispersed demand and allow economies of scale and cross-regional knowledge exchange. Consideration should be given to language and time-zone differences, more complex coordination, potential uneven access across regions, and less tailored services to a given region.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

Regional interest and services

23. The regional consultations confirmed a broad interest in regional thematic centres, but the main priorities expressed (servicing sector, cold-chain and LRM) are very similar to activities already funded under HPMPs and KIPs. The added value of a regional thematic centre therefore lies in functions that are regional by nature or beyond the reach of a single country, such as regional recognition of technician certification, harmonized MEPS and product registration, regional end-of-life refrigerant services, market and data intelligence, regionally recognized training centres, and access to co-financing. More specialized themes (for example, fisheries) emerged as a priority only for specific countries in different regions.

Regional focus

24. Preferred delivery models range from a single regional hub (PICs or the Caribbean) to a hub with subregional nodes (Asia, Africa or Latin and Central America). A clear regional focus is critical for building common interest, momentum and commitment towards any proposed set-up and the proposed services.

Complementarity and readiness

25. Distinguishing the services of a thematic centre from activities already funded under KIPs, HPMPs, and projects under decisions 89/6 and 91/65 is critical. Thus, possible support by the Multilateral Fund should be based on identification of very specific needs that can further compliance and sustainability of the implementation of the Montreal Protocol. Any consideration therefore should not add to the numerous existing centres but should identify a niche need, hosted by an existing institution and based on the readiness of the regional network group that has put forward a more comprehensive idea.

26. Feasibility for a regional thematic centre relies on a foundation of solid cooperation in a region and a history of successful regional joint ventures. Among the networks consulted, the PICs show strong consensus and readiness for a single regional hub rather than national centres, given geographic dispersion, small technical workforces and the high cost of training and equipment. They have a clear history of demonstrating regional cooperation (e.g., Regional PIC KIP[19]) combined with political consensus (including agreement from all related bodies involved in the regional registration system) which provides a stable and enabling environment to assure the feasibility and sustainability of a regional thematic centre.

Regional consultation

27. The consultations also underlined the value of drawing on the capacities that already exist in the regions. These capacities can be used during the implementation of approved projects, where implementing agencies may contract existing centres as service providers on the same basis as other providers, and through the services delivered by CAP and its regional networks of NOUs, without the need for a new institutional set-up. The regional networks can continue to discuss the potential of regional thematic centres and the needs of their members, as required and in response to emerging compliance needs, and bring proposals forward once a regional consensus has been reached.

Possible pilot for a regional thematic centre in the Pacific Island Countries

28. As outlined in paragraphs 15 and 16 above, the PICs have taken the initiative to elaborate on a concept, developed with the support of UNEP CAP, covering two priorities with a clear regional dimension that the ongoing regional projects do not provide and that are directly linked to furthering Montreal Protocol compliance obligations. Both priorities are described below, on the understanding that a pilot would address

[19] Decision 95/70.

only one of them in the first instance, and that the experience gained would inform any further consideration of thematic centres in other regions.

Priority 1: Regional registration of RAC products

29. The registration system would respond to an outdated Pacific Appliance Database (PAD) hosted by the Pacific Community (SPC[20]), which cannot track refrigerant data and whose update is not covered by the project under decision 89/6, and to the absence of minimum energy performance standards (MEPS) and labelling in the four North Pacific countries outside the Pacific Appliance Labelling and Standards programme. The centre would update, operate and maintain the system for domestic refrigerators and air-conditioners, drawing on products already registered on the Energy Rating database and allowing approval by one country to facilitate approval in others; support its national adoption; train energy authorities, NOUs, importers and enforcement agencies on registration, border control and post-market surveillance; and analyze registration data to monitor the market penetration of energy-efficient and low-GWP equipment. These needs were identified at a regional workshop of NOUs, energy and customs authorities held in Port Moresby in March 2026, and the updating of the regional registration system was endorsed by the Senior Energy Officials Meeting held in the margins of the 6th Pacific Regional Energy and Transport Ministers' Meeting in May 2026.

30. UNEP CAP consulted with the regional partners and stakeholders and preliminarily identified a host entity for the harmonized regional registration of RAC products to be either the Pacific Community (SPC)[21] or the University of South Pacific (USP)[22]. Early discussions have also begun on a governance setup anchored in the regional network of NOUs, in coordination with regional energy efficiency authorities. Early discussions have likewise begun on a sustainable business model. In the start-up years, the centre would rely mainly on Multilateral Fund support to review and update the existing system; support national adoption of the updated registration system; operationalize and maintain it; and train energy efficiency authorities, NOUs and importers. After a few years of sustained operation, the centre could add complementary services, such as market studies and analysis, and market surveillance programmes, alongside possible product registration fees. These would generate the revenue needed for effective, sustained operation. Beyond the start-up capital cost, recurring costs are expected to be limited to a small number of personnel and minimal operating costs, as hosting is expected to be provided in-kind by the host entity.

Priority 2: Regional competency-based certification of technicians

31. The need for a regional certification service in the PICs region is acute. Of the 13 countries[23] implementing the regional HPMP stage II, KIP stage I and decision 89/6 projects, only six—Fiji, Micronesia (Federated States of), Samoa, Solomon Islands, Tonga and Vanuatu—have the TVET structures and qualified assessors required to conduct competency-based assessment; the remaining seven—Cook Islands, Kiribati, Marshall Islands, Nauru, Niue, Palau and Tuvalu—have neither the institutional structure nor the professional assessors to examine candidates, and would require external support to enforce any assessment requirement. Even in the six countries that do have a TVET system, the national qualification framework covers competencies well beyond the scope of the Montreal Protocol and is designed for long-term formal education; working technicians are assessed through recognition of prior learning on a limited set of refrigerant-management modules, as an additional session that depends on the availability of school assessors. At the same time, the high mobility of technicians across the region means that certified technicians may move to another country at any time, which creates a continuous demand for assessment. Without a regional service, the requirement that only competent technicians be permitted to handle

[20] Formerly the South Pacific Commission or the Secretariat of the Pacific Community.

[21] SPC regional hub in Suva, Fiji is already hosting the first model of the regional product registration which is outdated and not operational for several years.

[22] USP is the premier public research university owned by 12 PICs countries, with headquarters in Suva, Fiji, with technical capacity and infrastructure to host such a centre.

[23] Papua New Guinea is a member of the PICs regional network and SPC but is not part of the regional HPMP or KIP.

refrigerants, the basis of the national refrigerant-handling permits that underpin Kigali Amendment compliance in the region, cannot be enforced in more than half of the countries concerned.

32. These gaps cannot be accommodated under the KIP. The regional component of KIP stage I is confined to the development of competency-based assessment modules and the training of master trainers for refrigeration and cold storage and for mobile air-conditioning applications; it contains no activity for assessment at the national level, which was deferred to a later stage of the KIP, while the national components are confined to good servicing practices training. Nor can a national component deliver a qualification that other countries recognize, which is an essential feature of the proposed service: mutual recognition requires a single assessment body acting on behalf of all participating countries, an arrangement that no individual KIP can establish. Conversely, once the service is operational and mature, future stages of the regional KIP offer the natural route to its sustainability, since the recurrent assessment of technicians is a continuing compliance activity for which the subsequent KIP stages of the participating countries would provide predictable demand and a stable revenue base, to be complemented by enrolment or assessment fees and by the certification of technicians outside the cohorts funded by the Multilateral Fund.

33. The centre would conduct virtual theory and practical assessments in the technician's country of residence, supported by local assistants and dedicated video equipment; issue certificates of competency on good servicing practices, to be recognized by all participating countries as a qualification for national refrigerant-handling permits; and maintain an electronic platform with a database of certified technicians accessible to NOUs. NOUs and the RAC industry would be trained to promote enrolment, with periodic refresher training given the frequent rotation of officers. Consensus has been reached on all PICs recognizing the Australian certification scheme as a strong starting point for building a regionally accepted certification scheme. However, discussions on the possible governance set-up, operational model, cost estimate and sustainability beyond Multilateral Fund support have not yet started; these would be undertaken if the concept is accepted and preparatory funding is secured through the Multilateral Fund.

34. UNEP CAP is currently conducting a thorough assessment of both proposed centres to identify the most feasible, cost-effective, and sustainable one. Subject to approval by the Executive Committee, a project preparation request will be submitted for its consideration accordingly.

Indicative costing and phased implementation

35. For a pilot addressing a single priority in one region, an investment by the Multilateral Fund can be built on the regional technical assistance models that the Fund has supported over the years, such as CAP and its regional networks of NOUs,[24] the project of promoting low-GWP refrigerants for air-conditioning sectors in high-ambient-temperature countries (PRAHA) and the project of twinning of national ozone officers and national energy-efficiency policymakers. Table 4 provides an example of a potential cost structure including indicative phases, deliverables, costing and tiered financing parameters, where detailed estimates could be established during project preparation.

[24] Excluding CAP cost of personnel

Table 4. Indicative phases of implementation, costing and financing

Phase	Period	Main deliverables	Indicative cost to MLF (US $) / year	Tiered financing
Start-up	Year 1	Host agreement; constitution of the steering committee; recruitment; service catalogue; validated business plan, regional consultation, setting up the backbone product (registration or certification) including software/hardware documentation, etc. as well as training of core national teams.	300,000 - 400,000	MLF [95] [90] per cent and host partner [5] [10] per cent (in-kind contribution)
Build-up	Years 2–3	Core regional services operational; fee-based services piloted; partnerships with specialized centres and financial institutions including slim operation (1-2 personnel)	200,000-300,000	Cost sharing between Multilateral Fund and host partners [80/20] with condition that revenue or in-kind contribution needs to cover at least 20 per cent of operating costs
Consolidation	Years 4–5	Fee-based services scaled up; diversified funding; independent review completed; business catalogue of additional services offered	100,000-150,000	Cost sharing between Multilateral Fund and host partners [40/60] with condition that revenue needs to generate at least 60 per cent of operating costs
Self-sustained operation	After year 5	Services financed by own revenues, member contributions and other partners	0	No support from Multilateral Fund

Note: the figures in square brackets are indicative only and are to be confirmed on the basis of the cost analysis to be submitted with a full project proposal.

36. Once the project reaches the self-sustaining phase, the centre could continue to provide services to Multilateral Fund-funded projects in the region, contracted by implementing agencies on the same basis as other service providers, where relevant.

Guidelines for piloting the establishment of a thematic centre for the Pacific Island Countries

37. The guidelines contained in document UNEP/OzL.Pro/ExCom/97/85 have been adapted below for the purpose of piloting the establishment of a thematic centre in the PICs region, and are presented in two stages, to ensure that preparatory funding is provided only where the regional consensus referred to in paragraphs 15 and 16 above is confirmed, and that the project proposal contains the information necessary for the Executive Committee to assess its viability.

Prerequisites for requesting preparatory funding

38. A request for preparatory funding should be supported by evidence, such as the report of the regional consultation of the PICs network together with the endorsement letters of the participating countries, that consultations have concluded on: the priority theme selected and the specific services required, in line with the regional priorities set out in paragraphs 15 and 16 above and confirming that those services are not readily available in the region or under the ongoing HPMP, KIP and decision 89/6 projects; the identification of a host entity, confirmed by a letter of interest from the host and, where relevant, the host Government; an outline of the governance set-up, including the participating countries and entities; the projected business model and the prospects for sustainability, including potential co-financing sources; and the distinction of

the proposed centre from other Multilateral Fund funding options, together with its relevance to the objectives of the Kigali Amendment and the compliance targets of the participating countries.

Prerequisites for submitting a project proposal

39. A project proposal should include at a minimum: the specific services to be provided, the targeted groups and the delivery modes; the regional scope of coverage, the list of participating countries and the agreed governance set-up, with letters of endorsement from the participating Governments; the arrangements with the host entity, including confirmation of the host's commitment and the facilities and staff to be provided and, the programme agreement with the partner centre; the projected growth in services and roles over time to support additional relevant functions for the beneficiary countries and stakeholders; a clear cost analysis distinguishing the initial cost of establishing the centre, the operational running costs and the programmatic costs, consistent with the indicative phases set out in table 4 above; the co-financing offered by the host and other supporting partners, with confirmation of commitments; the revenues expected to be generated over the years and the timeline and financial plan for phasing out Multilateral Fund support, including the role of the future stages of the regional KIP referred to in paragraph 32 above; and an assessment of risks and sustainability, with the corresponding mitigation measures.

Recommendation

40. The Executive Committee may wish:

(a) To note the update on the operationalization of regional thematic centres for sustainable cooling (decision 97/87) contained in document UNEP/OzL.Pro/ExCom/99/84;

(b) To consider whether to provide funding, for the preparation of one of the two priorities identified in paragraph 15 of document UNEP/OzL.Pro/ExCom/99/84 for the pilot thematic centre for sustainable cooling in the Pacific Island Countries, of no more than US $50,000, on the understanding that UNEP will submit no later than:

(i) The 101st meeting, the project preparation request, and

(ii) The 103rd meeting, the full project proposal, taking into consideration the indicative costing, the phased implementation, and the submission guidelines contained in paragraphs 35 to 39 of the document UNEP/OzL.Pro/ExCom/99/84.

Annex I
COMPARISON OF EXAMPLES FROM EXISTING CENTRES OF EXCELLENCE [1]

Entity	I. Mandate and scope	II. Governance	III. Services and activities	IV. Business model	V. Funding and sustainability	VI. Linkage to Montreal Protocol	Type of entity	Cooling related
A. Centres operating in Article 5 countries (15)								
A.1 Africa								
Africa Centre of Excellence for Sustainable Cooling and Cold-chain (ACES) and its SPOKE in Kenya Kigali, Rwanda; SPOKE in Kiambu and Nyeri Counties, Kenya; replication in Haryana, India	• Sustainable cooling and cold chains to cut food and vaccine loss • Kenya SPOKE tests community cold-chain business models; reference for Senegal, Lesotho, Rwanda • Africa and India; farmers, cooperatives, industry, governments	• UNEP (U4E) programme manager; University of Birmingham academic lead • Delivery by ACES Institute (international NGO); SPOKE led by ACTS • Hub-and-spoke model	• Research tools (needs assessment, cold-chain and ROI models) • Training (refrigeration, solar, F-gas, customs) and ToT • Community Cooling Hubs; SPOKE pilots and farmer forums	• Donor funds channelled through UNEP • Quarterly UNEP reporting; UNEP evaluation rated "Highly Satisfactory"	• UK (Defra) anchor funding to 2028; Rwanda provides funds, campus and land • Self-financing targeted by 2027/28 (accreditation, testing, franchise) • SPOKE: pay-as-you-store, blended finance	• Supports Rwanda HPMP stage II and KIP stage I • Decision 91/65 project in preparation • Works with the four IAs and CAP	**Not-for-profit** International NGO; SPOKE led by ACTS	**Yes (core)** Cooling and food/vaccine cold chain
Council for Scientific and Industrial Research (CSIR) Pretoria, South Africa; Africa	• Statutory science council • Energy modelling and thermal systems (heat pumps, process cooling, storage) • Government, state-owned enterprises, industry	• Board under the CSIR Act, reporting to the Minister • Hosts NCPC-SA (UNIDO–UNEP RECP network)	• Energy-transition modelling • Thermal-systems R&D incl. cold storage • Heat-pump test facility planned	• Mostly in-house; partners SANEDI, SABS, industry • Clean audit; reports to Parliament	• Parliamentary grant • Contract R&D, royalties, licences; donor partnerships	• No direct MLF services • Potential: HFC and cooling-demand modelling for SADC; heat-pump and cold-chain testing	**Government** Statutory public entity	**Yes** Thermal-systems R&D in a broad remit
A.2 Asia and the Pacific								
Hefei General Machinery & Electrical Products Inspection Institute (GMPI) Hefei, China; Asia-Pacific	• National testing, certification and standards for RAC, heat pumps, compressors • New area: data-centre liquid cooling • Manufacturers, regulators	• State-owned (SINOMACH) • Authorized lab for ENERGY STAR, AHRI, Keymark, SASO, China EE labels	• Testing to ~50 standards; national inspections • Hosted Mongolia MEPS study tour (OzonAction/MLF, 2026) • Expanding low-GWP and liquid-cooling labs	• In-house; fee-for-service • Partners: manufacturers, certification bodies, China NOU	• Testing and certification fees • Government-assigned inspections	• No direct MLF role • Potential: regional MEPS reference lab; round-robin and high-ambient testing; lab-technician training	**Government** State-owned	**Yes (core)** National RAC testing and certification

[1] The list of entities included in this annex is not exhaustive. It is based on the best information available to the Secretariat, collected through interviews, communication, and from publicly available sources during the preparation of the present document.

Entity	I. Mandate and scope	II. Governance	III. Services and activities	IV. Business model	V. Funding and sustainability	VI. Linkage to Montreal Protocol	Type of entity	Cooling related
Central Institute of Petrochemicals Engineering & Technology (CIPET) Chennai HQ; 45 centres across India	• Polymer and petrochemical skills, research and testing • Lead technical institution for PU foam under India's HPMP stage II • MSMEs, foam manufacturers	• Autonomous institute under a ministry; 45 centres • Accredited labs (NABL, BIS, ISO 9001)	• HCFC-free foam trials; methyl formate validation • HPMP II workshops for foam SMEs	• In-house labs and trainers • Reports through UNDP tranche reports	• Government funds • Training, testing and academic fees; UNDP/MLF project funds	• Direct MLF experience: HCFC-141b foam phase-out (HPMP II, UNDP) • Potential: low-GWP blowing agents; cold-chain insulation testing	**Government** Autonomous institute	**No** PU foam; insulation an input only
National Centre for Cold-chain Development (NCCD) New Delhi, India	• National cold-chain centre and think tank • Standards, certification, ratings, R&D, training	• Under the Ministry of Agriculture • Structure not reviewed	• Applied R&D and training • Standards, certification, ratings	• Not reviewed	• Not reviewed	• Potential: cold-chain standards, certification and training for India's HFC phase-down	**Government** Under a national ministry	**Yes (core)** National cold-chain body
Sustainable Tropical Data Centre Testbed (STDCT / STDCT 2.0) NUS and NTU, Singapore	• First tropical data-centre testbed • Cooling in hot, humid conditions • Operators, technology providers	• Run by NUS and NTU • Government and industry backing (to verify)	• Cooling R&D; live operational data • Industry test-bedding	• In-house university teams; industry partners • No UN experience	• Public and industry co-funding (to verify)	• No MLF or UN link • Potential: data on cooling and refrigerant options in high heat and humidity	**Not-for-profit** University-based testbed	**Yes (core)** Data-centre cooling in the tropics
A.3 Middle East and North Africa								
Royal Scientific Society (RSS) Amman, Jordan; Middle East	• Not-for-profit science institution (Royal Decree) • Applied research, accredited testing, consultancy • Energy-labelling labs; Sustainable Cooling Training Centre	• Board of Trustees; hosts National Metrology Institute • Partners: MoEnv, UNDP, IKI, JSMO	• National Cooling Strategy (UNDP) and COOL UP studies • Natural-refrigerant technician training • MEPS and eco-design with JSMO	• In-house accredited AC and refrigerator labs • Implemented a UNDP/GEF labelling project	• Testing, calibration, certification and consultancy revenue • Government and donor projects	• No direct MLF role; complements HPMP/KIP • Potential: MENA high-ambient testing hub; flammable-refrigerant ToT; refrigerant purity testing	**Not-for-profit** Independent (Royal Decree)	**Yes** Cooling training centre; labelling labs
Gulf Organisation for Research & Development (GORD) Doha, Qatar; GCC/MENA	• Low-carbon built environment and industry • GSAS certification, hot-climate cooling R&D, appliance testing	• Specialized units (GSAS Trust, Academy, Labs, Global Carbon Council)	• QCOOL hot-climate R&D (~50% savings) • GORD Academy (>5,000 trained) • Carbon-offset programme	• In-house AC test chambers • No UN funds	• Certification, testing, training, advisory and carbon-registry fees	• No MLF, CAP or IA link • Potential: high-ambient testing of low-GWP ACs; MEPS	**Not-for-profit** Independent	**Yes** Hot-climate cooling R&D; AC testing

Entity	I. Mandate and scope	II. Governance	III. Services and activities	IV. Business model	V. Funding and sustainability	VI. Linkage to Montreal Protocol	Type of entity	Cooling related
	• Regulators, developers, manufacturers, banks	• Chairs GSO green-building committee; ISO/IEC 17025 labs			• Research grants	verification; carbon finance for HFC phase-down		
Air-Conditioning, Heating, and Refrigeration Institute – MENA Office (AHRI MENA) Dubai, UAE; MENA region	• Efficient HVACR market in MENA • Harmonized standards, certification, low-GWP transition • Manufacturers, regulators, NOUs, labs, technicians	• Regional office of AHRI (United States) • Managing Director with headquarters support	• AREP-3 low-GWP and high-ambient testing • A2L safety training • Refrigerant Driving License (with OzonAction)	• Proposes a hub linked to existing labs • Testing by independent labs; not fund-disbursing	• Industry-funded; not donor-dependent • Research, events, certification revenue	• Standards, certification, refrigerant quality (AHRI 700) • RDL an MLF-supported example; annual UNEP/AHRI NOU workshop	**Not-for-profit** Industry association (regional office)	**Yes (core)** HVACR standards, certification, testing
ASHRAE – Dubai Office / ASHRAE Global Training (AGT) Dubai, UAE; Africa, West Asia, South Asia	• HVAC&R training adapted to developing economies (low-GWP, cold chain, HAT, district cooling, data centres) • >5,000 participants from 83 countries	• Part of ASHRAE with operational autonomy • No formal centre-of-excellence designation	• Training through approved instructors • HAT Symposium and webinars (UNEP, UNIDO) • District cooling guides	• Local partners provide venues • UNEP funds managed centrally under ASHRAE audit	• ASHRAE blended model (training, conferences, grants, sponsorship, membership)	• Low-GWP, EE, HAT and cold-chain training with OzonAction and UNIDO • Potential: ToT for NOUs; certification-aligned learning	**Not-for-profit** Professional society (regional office)	**Yes (core)** HVAC&R and cooling training
Eurovent Middle East Middle East (West Asia, Egypt)	• Non-profit HVACR industry association • Advocacy, regulation, education, awareness	• Board reporting to members • MoUs with GSO and SASO	• HVACR Leadership Academy incl. F-gas certification • Conferences; GCC refrigerant-transition paper	• In-house, with academy partners • No UN fund experience; annual audit	• Membership fees, sponsorship, academy revenue • No donors	• Supports UNEP West Asia meetings • Potential: industry–government dialogue; training	**Not-for-profit** Industry association (regional office)	**Yes (core)** Refrigerant transition; technician training
A.4 Latin America and the Caribbean								
Center for Research and Development in Air Conditioning and Refrigeration (CIDARE) Bogotá, Colombia; hosted by ACAIRE	• Knowledge-transfer centre of ACAIRE • Training, competency certification, technology transfer (RAC, thermal districts) • Colombia; regional reach via ACAIRE	• Operates under ACAIRE; no separate board • Partners: UTO, UNDP, GIZ Proklima, SENA	• Labour-market and skills-gap studies • Training incl. mobile transcritical CO_2 unit • Competency certification schemes	• In-house coordination and certification schemes • Cost, reporting and audit not documented	• Fees for training, certification, consulting (irregular demand) • UNDP and GIZ Proklima support	• Natural-refrigerant training under the HPMP (UNDP, UTO) • Potential: regional training hub; node for Colombia's proposed centre	**Not-for-profit** Centre of a sector association	**Yes (core)** RAC and thermal districts

Entity	I. Mandate and scope	II. Governance	III. Services and activities	IV. Business model	V. Funding and sustainability	VI. Linkage to Montreal Protocol	Type of entity	Cooling related
Serviço Nacional de Aprendizagem Industrial (SENAI) Brasília (National Department), Rio de Janeiro, São Paulo and Paraná, Brazil	• Statutory industrial vocational education (1942); RAC one of 28 areas • Helped set up centres in 11 countries • No cooling-specific regional mandate	• National Council chaired by industry confederation • Partners: ABC, JICA, GIZ	• Largest accredited lab network in Brazil • CO_2/R-290 model lab (2025) with free course and ToT; propane AC lab	• HPMP training partner (GIZ component) • In-house labs and instructors; no direct UN contracting	• Compulsory industry levy (stable base) • Fees and cooperation projects	• HPMP training for CO_2, R-290 and flammable refrigerants • Potential: regional ToT hub; Portuguese-language delivery	**Not-for-profit** Statutory training institution	**Yes** Natural-refrigerant training labs
Instituto de Energías Renovables (IER-UNAM), Universidad Nacional Autónoma de México Temixco, Morelos, Mexico	• University renewable-energy institute • Thermally driven and solar cooling for food and agro-industry • No servicing or testing mandate	• Part of UNAM; Internal Council • No regional recognition	• Solar absorption AC prototype; radiative cooling panel • Postgraduate education	• Research projects with universities and industry • No UN agreements	• University budget and competitive grants • Funding volatility reported	• No MLF participation • Potential: not-in-kind cooling assessment; food cold-chain studies; Spanish-language postgraduate training	**Not-for-profit** University institute	**Yes** Solar and thermal cooling research
A.5 East Europe and Central Asia								
International Regional Centre of Excellence for Training and Certification Yerevan, Armenia; Europe and Central Asia	• RAC technician training and certification; good servicing practice • Established 2019 with UNIDO under a regional remit • Regional delivery not yet evidenced	• Hosted in an independent educational complex; no settled governing body • REAL Alternatives certified • Partners: UNIDO, Ministry of Environment, NOU	• Training on UNIDO simulation units; ToT • 46 specialists trained (2022) • Visits to pilot R-290 installation	• Administration by host; no testing capacity • Cost, reporting and audit not documented	• No recurrent funding; fees and host support • Mandatory certification under the KIP to create demand	• MLF-financed delivery vehicle for servicing training and certification • Potential: regional ToT; Russian-language delivery	**Not-for-profit** Unit of an educational institution	**Yes (core)** RAC training and certification
B. Centres based outside Article 5 countries (9)								
B.1 Europe								
Danish Technological Institute – Refrigeration & Heat Pump Technology (DTI) Aarhus, Denmark	• Refrigeration and heat-pump development, testing, training since 1975 • Natural refrigerants; heat-pump, CO_2/NH_3 and EE labs	• Independent technological institute • ISO/IEC 17025; WHO PQS accreditation	• Ammonia, high-temperature heat pumps, water as refrigerant • Accredited testing; CO_2 courses	• In-house specialists; five labs • Fee-based	• Fees; public and EU project funds (to verify)	• No MLF or UN link • Potential: natural-refrigerant expertise; accredited	**Not-for-profit** Independent institute (to verify)	**Yes (core)** Refrigeration and heat pumps

Entity	I. Mandate and scope	II. Governance	III. Services and activities	IV. Business model	V. Funding and sustainability	VI. Linkage to Montreal Protocol	Type of entity	Cooling related
						testing; CO_2/NH_3 ToT		
GIZ Proklima / Green Cooling Initiative Eschborn, Germany; 60+ countries	• Green Cooling: natural refrigerants, EE, passive cooling • >340 RAC projects in 60+ countries	• GIZ project cluster under German Government mandate • Works mainly with NOUs; partners incl. Cool Coalition, UNIDO	• Data and inventory methodology; ODS bank management and destruction • Cool Training for trainers; certification and standards advice	• Delivery through NOUs, UN partners and training institutions • IKI complaint mechanism	• German Government (BMZ, IKI) • EU and other donors	• Germany is an MLF bilateral agency, with GIZ as implementer • Potential: certification, natural-refrigerant training, data	**Government** Federal development agency	**Yes (core)** Green Cooling in RAC
Centro Studi Galileo (CSG) Casale Monferrato, Italy; 15 locations in Italy.	• RACHP training since 1975; 24 trainers in four languages • Builds training and certification capacity in Article 5 countries • Helped set up centres in Tunis, Dubai, Ouagadougou, Bangkok	• Private company; ISO 9001; EU F-gas qualified • Partners: OzonAction, UNIDO, UNDP, European Commission, IIR	• Technician training, ToT, assessors; flammable refrigerants • Monthly magazine; biennial conference with UNEP/IIR	• Local partners provide facilities • Long-Term Agreement with UNIDO; UNEP and UNDP contracts	• Diversified: training, consultancy, certification, events	• HPMP training in many countries; OzonAction F-gas certification in Africa • Potential: competency systems, cold chain, licensing	**Private** Limited company	**Yes (core)** RACHP training and certification
SINTEF Ocean – CoolFish / Maritime Refrigeration Technology Hub Trondheim, Norway	• Natural-refrigerant cooling on fishing vessels • Fishing industry	• SINTEF Ocean with SINTEF Energy and NTNU • Industry partners; IIR in reference group	• Applied research and knowledge transfer on onboard refrigeration	• In-house research with industry • No UN experience	• Research funding with industry participation	• No MLF or UN link • Potential: HFC-free fisheries cold chains through training and demonstration	**Not-for-profit** Research institute	**Yes (core)** Onboard refrigeration
ICE Datacenter, RISE Research Institutes of Sweden Luleå, Sweden	• Data-centre test facility (2016): heat re-use, liquid cooling, climate chamber • Companies and researchers worldwide	• Unit of state-owned RISE • Partner programme with technology and energy firms	• Testing of IT and plant systems; sensor data since 2016 • LCA and EE services	• In-house facility; partner members • No UN experience	• Partner contributions, contract testing, RISE funding (implied)	• No MLF or UN link • Potential: data on air, liquid and immersion cooling and heat re-use	**Government** State-owned research institute	**Yes** Data-centre cooling testing
B.2 North America								
OTS R&D, Inc. Beltsville, Maryland, USA; international	• HVAC&R R&D consultancy: heat exchangers, refrigerant selection, LCCP	• Employee-owned worker cooperative	• Modelling, design, software	• Project fees and federal grants; mostly in-house	• Project fees and licensed software	• Supported AHRI on a UN high-ambient AC project	**Private** Worker cooperative	**Yes (core)** HVAC&R R&D

Entity	I. Mandate and scope	II. Governance	III. Services and activities	IV. Business model	V. Funding and sustainability	VI. Linkage to Montreal Protocol	Type of entity	Cooling related
projects in 14 countries *Source: questionnaire completed by the entity*	• Clients: OEMs, US agencies, AHRI, ASHRAE; 14 countries	• Exclusive SAE licence for LCCP tool	• A2L/A3 lab and field testing; OEM workshops (incl. India)	• No direct UN funds; US federal reporting		• Potential: LCCP analysis, A2L/A3 testing, leak reduction		
ASHRAE Center of Excellence for Building Decarbonization (CEBD) Peachtree Corners, USA; global (incl. Global South)	• ASHRAE knowledge hub on building decarbonization • Standards, education, tools, incl. the Global South	• Standing committee of ASHRAE • Global Advisory Panel; joint work with GlobalABC	• Whole-life-carbon methodology • Refrigerant leakage-rate tracking; code workshops	• Within ASHRAE administrative and financial systems	• ASHRAE blended model	• No MLF services; leakage tracking relevant to HFC emissions • Offers its Advisory Panel to explore a regional model	**Not-for-profit** Professional society committee	**Yes** Building decarbonization incl. leakage
Eric and Wendy Schmidt Center for Data Science & Environment (DSE), UC Berkeley Berkeley, USA; global *Source: questionnaire compiled from public information*	• Data science and open-source tools for the environment, incl. HFCs • Policymakers; Kigali Sim used in >12 countries	• Part of UC Berkeley; Kigali Sim peer-reviewed (2026) • Partners: MLF Secretariat, Chile MoEnv, Anthropic	• Kigali Sim modelling and user support • Presented at the 97th meeting	• Free open-source tools • No UN funds; UC Berkeley controls	• Philanthropic gift; possible project funding	• Kigali Sim co-designed with the MLF Secretariat for KIP preparation • Potential: EE, servicing and bank modules; NOU training	**Not-for-profit** University centre	**Yes** HFC and cooling-sector modelling
Global Cold Chain Foundation (GCCF, formerly WFLO) Arlington, Virginia, USA; global	• Cold-chain research and development • Industry expertise for emerging markets (Cambodia, Mauritania, West Africa)	• Board of Governors; Scientific Advisors • Foundation of GCCA	• Cold-chain tools (storage manual, Cold Chain Index) • Cold Chain Institute training; country projects	• Country partners • US-funded West Africa programme	• US Government (USDA) programme funds	• No MLF or UN link • Potential: link cold-chain assessments and training to HPMP/KIP	**Not-for-profit** Industry foundation	**Yes (core)** Temperature-controlled logistics
C. Technology Providers Centres (8)								
C.1 Middle East and North Africa (Article 5 country)								
PhotonX Egypt; Middle East, Africa and international markets. Technology arm of Elaraby Group *Source: questionnaire completed by the entity*	• R&D and engineering from research to production • Manufacturers and start-ups in the Middle East and Africa	• Technology arm of Elaraby Group • No separate board	• Simulation (CFD/FEA), prototyping • Performance, safety and EMC testing	• Full in-house lab suite • Handled UNIDO and UNDP project funds	• Engineering and testing fees • Industry-sponsored R&D	• Direct MLF experience: HCFC-22 to R-32 conversion; EE project for ACs and refrigerators • Potential: EE redesign; compliance testing	**Private** Manufacturer's technology arm	**Yes** RAC testing and redesign

Entity	I. Mandate and scope	II. Governance	III. Services and activities	IV. Business model	V. Funding and sustainability	VI. Linkage to Montreal Protocol	Type of entity	Cooling related
C.2 Asia and the Pacific								
Daikin Technology and Innovation Center (TIC) Settsu, Osaka, Japan	• Corporate R&D (>1,000 engineers) • Compressors, cycles, refrigerant recovery and reuse, natural-refrigerant heat pumps	• Corporate centre; no external governing body	• Applied R&D with universities and industry	• Not reviewed	• Corporate funding (expected)	• Potential: recovery/reuse and natural-refrigerant R&D for KIP servicing and end-of-life	**Private** Manufacturer centre	**Yes (core)** Compressors; refrigerant reuse
C.3 Europe								
Danfoss Application Development Centers (ADCs) Nordborg (DK), Haiyan (CN) and other sites	• Corporate test and training centres • Heat-pump and chiller chambers incl. A3 and CO_2	• Corporate centre; no external governing body	• Mobile CO_2 Training Unit	• Not reviewed	• Corporate funding (expected)	• Potential: A3/CO_2 testing; mobile training in Article 5 countries	**Private** Manufacturer centre	**Yes (core)** Heat-pump and chiller testing, training
BITZER SCHAUFLER Academy Rottenburg-Ergenzingen, Germany	• Corporate training: CO_2, ammonia, A2L, hydrocarbons, inverters	• Corporate centre; no external governing body	• Courses and webinars	• Not reviewed	• Corporate funding (expected)	• Potential: natural-refrigerant and A2L ToT	**Private** Manufacturer centre	**Yes (core)** Refrigerant training
C.4 North America								
Carrier University Charlotte, NC, USA	• Corporate training: service, controls, HVAC design • In-person and virtual	• Corporate centre; no external governing body	• In-person and virtual courses	• Not reviewed	• Corporate funding (expected)	• Potential: virtual A2L and low-GWP technician training	**Private** Manufacturer centre	**Yes (core)** HVAC training
Johnson Controls Ducted Systems Academy Oklahoma City, OK, USA	• Corporate training: ~40 courses incl. heat pumps and low-GWP refrigerants	• Corporate centre; no external governing body	• Remote and hands-on courses	• Not reviewed	• Corporate funding (expected)	• Potential: low-GWP courses for KIP servicing training	**Private** Manufacturer centre	**Yes (core)** HVAC training
Copeland Helix Innovation Center University of Dayton, OH, USA	• Innovation centre with full-scale simulated environments (kitchen, home, grocery, data centre)	• Corporate centre at the University of Dayton	• Not reviewed	• Not reviewed	• Corporate funding (expected)	• Potential: demonstration of low-GWP refrigeration and cooling	**Private** Manufacturer centre	**Yes (core)** Refrigeration test environments
Trane Advanced Technology Training Center (ATTC)	• Corporate HVAC technician training centre, billed as the world's largest	• Corporate centre; no external governing body	• Technician training	• Not reviewed	• Corporate funding (expected)	• Potential: hands-on model for technician certification	**Private** Manufacturer centre	**Yes (core)** HVAC technician training

Entity	I. Mandate and scope	II. Governance	III. Services and activities	IV. Business model	V. Funding and sustainability	VI. Linkage to Montreal Protocol	Type of entity	Cooling related
Davidson, NC, USA								
D. Centres established with an intergovernmental structure and mandate – regional sustainable energy centres of the GN-SEC network (UNIDO) (10) GN-SEC network model: governance through ministerial steering committees and executive boards; financing from host and member-state contributions, donors and UNIDO-managed programmes.								
D.1 Africa								
ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) Praia, Cabo Verde; 12 ECOWAS Member States	• ECOWAS sustainable-energy markets (2010); MEPS, labels, testing • Heating and cooling a new focus • Proposed by UNIDO as phase 1 host of a decision 97/87 programme (cold chain, servicing, comfort-cooling EE)	• ECOWAS centre reporting to Energy Ministers • Proposed ring-fenced thematic steering committee and unit • Partners: AECID, EELA, UNIDO, ISA	• SOLTRAIN; STAR-C certification; EELA e-learning; AGRI-COOL • AC MEPS harmonization; appliance registration in development • Proposed: cold-chain assessments; flammable-refrigerant ToT; competency framework (EN/FR/PT)	• Implements UNIDO and GEF programmes • Proposed: MLF funds via UNIDO, milestone-based; unit of 4–5 staff; outsourced testing, reclamation, TVET	• Host, ECOWAS and member contributions; Sida, AECID • Planned fees; MLF share declining over five years	• No MLF services to date; AC MEPS (decision 94/60 prerequisite) • Proposed phase 1 role: KIP training backstopping, certification recognition, decisions 91/66, 91/65 and 97/88 support	**Intergovernmental** ECOWAS institution	**Yes** AGRI-COOL; AC MEPS; proposed cooling programme
Centre for Renewable Energy and Energy Efficiency in Central Africa (CEREEAC) Luanda, Angola; 11 ECCAS countries	• ECCAS sustainable-energy markets (2023) • Developing regional MEPS and testing	• ECCAS Ministerial Steering Committee • Interim Director	• MEPS baseline and compliance framework (2025–2026) • Central Africa RE Forum	• GN-SEC network model	• GN-SEC network model	• No MLF services • Potential: MEPS and testing for low-GWP cooling; proposed phase 2 host	**Intergovernmental** ECCAS institution	**No** No centre-specific cooling activity
EAC Centre for Renewable Energy and Energy Efficiency (EACREEE) Kampala, Uganda; 6 EAC Partner States	• EAC sustainable-energy markets • MEPS, RAC network, EELA testing centres, STAR-C	• Executive Director • Partners: UNIDO, UNEP U4E, EELA	• SOLTRAIN Pure; EELA e-learning • EAC cooling-appliance MEPS adopted (2025)	• GN-SEC network model; EELA partner	• GN-SEC network model; Sida via EELA	• No MLF services; clearest GN-SEC link to Kigali in EAC • Proposed phase 2 host	**Intergovernmental** EAC institution	**Yes** EAC cooling MEPS; U4E work
SADC Centre for Renewable Energy and Energy Efficiency (SACREEE) Windhoek, Namibia; 16 SADC countries	• SADC sustainable-energy markets (2015); RAC MEPS, labels, EELA testing, STAR-C • Proposed by UNIDO as phase 1 host of a decision 97/87 programme (servicing, LRM, cooling EE)	• SADC subsidiary; Steering Committee • Hosting discussed at SADC NOU/RACASA meeting (August 2026)	• RAC market assessments; SADC MEPS with GWP limits; SADC label • EELA e-learning incl. recovery and reclamation • Proposed: competency framework; mutual recognition of certification	• UNIDO a founding partner • Proposed: MLF funds via UNIDO, milestone-based; unit of 4–5 staff; licensed recovery and reclamation operators	• Host, SADC and member contributions; Austria, Sida • Planned fees; self-financing by year 5	• No MLF services to date; SADC MEPS (decision 94/60 prerequisite) • Proposed phase 1 role as for ECREEE	**Intergovernmental** SADC institution	**Yes** MEPS with GWP limits; recovery e-learning

Entity	I. Mandate and scope	II. Governance	III. Services and activities	IV. Business model	V. Funding and sustainability	VI. Linkage to Montreal Protocol	Type of entity	Cooling related
		• Partners: Namibia, Austria, UNIDO, RACASA, A-Gas						
D.2 Arab States								
Regional Centre for Renewable Energy and Energy Efficiency (RCREEE) Cairo, Egypt; 17 Arab states	• League of Arab States (2008) • MEPS harmonization, cooling plans, certification (PA-CEMP)	• Executive Director • Partner: IRENA	• Cooling plans and certification schemes • Limited recent information	• GN-SEC network model	• GN-SEC network model	• No MLF services • Potential: align cooling plans and MEPS with KIP; proposed phase 2 host	**Intergovernmental** League of Arab States	**Yes** Cooling plans; MEPS harmonization
D.3 Asia and the Pacific								
Renewable Energy and Energy Efficiency Capability for the Hindu Kush-Himalaya (REEECH) Kathmandu, Nepal (hosted by ICIMOD); 8 HKH countries	• SE4ALL centre for decentralized energy in mountain communities (2018–2022)	• Hosted by ICIMOD • Established with UNIDO	• Not stated	• GN-SEC network model	• GN-SEC network model; Austrian support	• No MLF services or cooling activity • Kigali role to be explored with ICIMOD	**Intergovernmental** Hosted by ICIMOD	**No** Energy access
Pacific Centre for Renewable Energy and Energy Efficiency (PCREEE) Nuku'alofa, Tonga; 22 Pacific countries and territories	• SPC and SIDS DOCK (2017) • Regional MEPS (PALS), e-mobility, investment	• Steering Committee; Manager • Partners: SPC, SIDS DOCK, UNIDO, ISA	• E-mobility training; national energy certificates (Tonga) • Pacific Energy Investment Forum (2026)	• GN-SEC network model	• GN-SEC network model	• No MLF services • Potential: extend PALS and certification to low-GWP cooling and technicians; proposed phase 2 host	**Intergovernmental** SPC and SIDS DOCK	**Yes** PALS appliance MEPS (to verify)
D.4 Europe and Central Asia								
Clean Energy Centre for the ECO region (CECECO) Baku, Azerbaijan; 10 ECO members	• Newest GN-SEC centre (2025) • Objectives not stated	• GN-SEC network model	• Not stated	• GN-SEC network model	• GN-SEC network model	• No MLF services or cooling activity • Proposed phase 2 host	**Intergovernmental** ECO institution	**No** Clean energy

Entity	I. Mandate and scope	II. Governance	III. Services and activities	IV. Business model	V. Funding and sustainability	VI. Linkage to Montreal Protocol	Type of entity	Cooling related
D.5 Latin America and the Caribbean								
Caribbean Centre for Renewable Energy and Energy Efficiency (CCREEE) Bridgetown, Barbados; 15 Caribbean states	• CARICOM and SIDS DOCK (2015) • MEPS, building codes, testing, labelling	• Executive Director • Partners: CARICOM, SIDS DOCK, IRENA, GIZ	• Energy data internship; women's fellowship • CARICOM Energy Month	• GN-SEC network model	• GN-SEC network model	• No MLF services • Potential: MEPS, testing and labelling for low-GWP cooling; proposed phase 2 host	**Intergovernmental** CARICOM institution	**No** No centre-specific cooling activity
SICA Centre for Renewable Energy and Energy Efficiency (SICREEE) San Salvador, El Salvador; 8 SICA countries	• SICA (2015) • MEPS, codes, testing, labelling; energy strategy MRV	• Hosted by SICA Energy Unit	• Training-needs survey • Regional course (2026)	• GN-SEC network model	• GN-SEC network model	• No MLF services • Potential: cooling indicators and refrigerant requirements in MEPS and MRV	**Intergovernmental** SICA institution	**No** No centre-specific cooling activity

Statistical summary of the entities reviewed

Breakdown	A. Operating in Article 5 countries	B. Based outside Article 5 countries	C. Technology providers	D. Intergovernmental (GN-SEC)	Total
Cooling relevance					
Cooling as the main mandate	9	6	7	0	**22**
Cooling as an explicit service line	5	3	1	5	**14**
No cooling activity identified	1	0	0	5	**6**
Total entities	**15**	**9**	**8**	**10**	**42**
Type of entity					
Government	4	2	0	0	**6**
Intergovernmental	0	0	0	10	**10**
Not-for-profit NGO/association	11	5	0	0	**16**
Private	0	2	8	0	**10**
Total entities	**15**	**9**	**8**	**10**	**42**

Breakdown	A. Operating in Article 5 countries	B. Based outside Article 5 countries	C. Technology providers	D. Intergovernmental (GN-SEC)	Total
Entities offering each service*					
Training	11	6	6	5	**28**
Certification and testing	10	5	2	8	**25**
Studies and market analysis	7	7	1	6	**21**
Cold chain	6	5	1	1	**13**
Support to SMEs	4	1	1	1	**7**
Data centres	3	2	1	0	**6**
Fisheries and marine	0	1	0	1	**2**

** Entities are counted where the annex records the service, including stated potential. An entity may offer more than one service, so the service rows do not sum to the number of entities.*

Acronyms of entities and programmes referred to in this annex

Acronym	Entity or programme
ACAIRE	Colombian Association of Air Conditioning and Refrigeration (host of CIDARE)
ACTS	African Centre for Technology Studies, Kenya (lead of the ACES SPOKE)
AGRI-COOL	ECREEE programme on cooling in agri-food systems
ASHRAE AGT	ASHRAE Global Training, Dubai Office
ASHRAE CEBD	ASHRAE Center of Excellence for Building Decarbonization, United States
CCREEE	Caribbean Centre for Renewable Energy and Energy Efficiency, Barbados
CECECO	Clean Energy Centre for the ECO region, Azerbaijan
CEREEAC	Centre for Renewable Energy and Energy Efficiency in Central Africa, Angola
CIDARE	Center for Research and Development in Air Conditioning and Refrigeration, Colombia
CIPET	Central Institute of Petrochemicals Engineering & Technology, India
CSG	Centro Studi Galileo, Italy
CSIR	Council for Scientific and Industrial Research, South Africa
DSE	Eric and Wendy Schmidt Center for Data Science & Environment, University of California, Berkeley
DTI	Danish Technological Institute – Refrigeration & Heat Pump Technology, Denmark
EACREEE	East African Community Centre for Renewable Energy and Energy Efficiency, Uganda
ECREEE	ECOWAS Centre for Renewable Energy and Energy Efficiency, Cabo Verde
EELA	Energy Efficiency in Lighting and Appliances programme (GN-SEC centres)
GCCF	Global Cold Chain Foundation, United States
GIZ Proklima	Green Cooling Initiative of the Deutsche Gesellschaft für Internationale Zusammenarbeit, Germany
GMPI	Hefei General Machinery & Electrical Products Inspection Institute, China
GORD	Gulf Organisation for Research & Development, Qatar
IER-UNAM	Instituto de Energías Renovables, Universidad Nacional Autónoma de México, Mexico
JCI	Johnson Controls Ducted Systems Academy, United States
MLF	Multilateral Fund for the Implementation of the Montreal Protocol
NCCD	National Centre for Cold-chain Development, India
OTS R&D	OTS R&D, Inc., United States
PALS	Pacific Appliance Labelling and Standards programme
PA-CEMP	Pan-Arab Clean Energy and Mitigation Programme certification scheme (RCREEE)
PCREEE	Pacific Centre for Renewable Energy and Energy Efficiency, Tonga

Acronym	Entity or programme
RCREEE	Regional Centre for Renewable Energy and Energy Efficiency, Egypt
REAL Alternatives	European blended-learning and certification scheme for RACHP technicians working with low-GWP alternatives
REEECH	Renewable Energy and Energy Efficiency Capability for the Hindu Kush-Himalaya, Nepal
RISE ICE	ICE Datacenter, RISE Research Institutes of Sweden
RSS	Royal Scientific Society, Jordan
SACREEE	Southern African Development Community Centre for Renewable Energy and Energy Efficiency, Namibia
SENA	Servicio Nacional de Aprendizaje, Colombia (national vocational training agency)
SENAI	Serviço Nacional de Aprendizagem Industrial, Brazil
SICA	The Central American Integration System
SICREEE	Central American Integration System Centre for Renewable Energy and Energy Efficiency, El Salvador
SINTEF CoolFish	SINTEF Ocean – CoolFish maritime refrigeration technology hub, Norway
SOLTRAIN	Southern African Solar Thermal Training and Demonstration Initiative (GN-SEC centres)
SPOKE	Specialised Outreach and Knowledge Establishment of ACES, Kenya
STAR-C	Sustainable Energy Training and Replication Centres initiative (UNIDO and the International Solar Alliance)
STDCT	Sustainable Tropical Data Centre Testbed, Singapore
Trane ATTC	Trane Advanced Technology Training Center, United States
UTO	Ozone Technical Unit of the Ministry of Environment and Sustainable Development, Colombia
U4E	United for Efficiency initiative of UNEP