



**Subsidiary Body for Scientific and
Technological Advice**

Fifty-ninth session

United Arab Emirates, 30 November to 6 December 2023
Item 11 of the provisional agenda

**Development and transfer of technologies and
implementation of the Technology Mechanism: joint
annual report of the Technology Executive Committee
and the Climate Technology Centre and Network**

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**Joint annual report of the Technology Executive Committee
and the Climate Technology Centre and Network for 2023***

Summary

This report covers the activities and performance of the Technology Executive Committee and the Climate Technology Centre and Network since the publication of their joint annual report for 2022, including in their first year of implementing the joint work programme of the Technology Mechanism for 2023–2027 and in implementing the technology framework under the Paris Agreement. It contains information on the bodies' meetings and joint activities, as well as key messages and recommendations for the Conference of the Parties at its twenty-eighth session and the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement at its fifth session.

* This document was scheduled for publication after the standard publication date owing to circumstances beyond the submitter's control.



Abbreviations and acronyms

AC	Adaptation Committee
AFCIA	Adaptation Fund Climate Innovation Accelerator
AI	artificial intelligence
CMA	Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
COP	Conference of the Parties
CTCN	Climate Technology Centre and Network
FAO	Food and Agriculture Organization of the United Nations
GCF	Green Climate Fund
GEF	Global Environment Facility
ICT	information and communication technology
LDC	least developed country
NAP	national adaptation plan
NDA	national designated authority
NDC	nationally determined contribution
NDE	national designated entity
NGO	non-governmental organization
NSI	national system of innovation
PCCB	Paris Committee on Capacity-building
SB	sessions of the subsidiary bodies
SCF	Standing Committee on Finance
SDG	Sustainable Development Goal
SIDS	small island developing State(s)
TA	technical assistance
TEC	Technology Executive Committee
TNA	technology needs assessment
Transitional Committee	transitional committee on the operationalization of the new funding arrangements for responding to loss and damage and the fund established in paragraph 3 of decisions 2/CP.27 and 2/CMA.4
TT:CLEAR	technology information clearing house
UNDRR	United Nations Office for Disaster Risk Reduction
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
UNITAR	United Nations Institute for Training and Research

I. Background

A. Mandate

1. COP 16 established the Technology Mechanism, comprising the TEC and the CTCN, to facilitate implementation of enhanced action on technology development and transfer to support action on mitigation and adaptation to achieve full implementation of the Convention.¹
2. CMA 1 adopted the technology framework under Article 10, paragraph 4, of the Paris Agreement to provide overarching guidance to the work of the Technology Mechanism in promoting and facilitating enhanced action on technology development and transfer to support implementation of the Paris Agreement.²
3. In accordance with relevant COP³ and CMA⁴ decisions, the TEC and the CTCN prepare a joint annual report for consideration by the COP and the CMA through the subsidiary bodies.
4. Following guidance from the COP and the CMA,⁵ the TEC and the CTCN developed the first joint work programme of the Technology Mechanism for 2023–2027,⁶ which aims to facilitate coherence and synergy and ensure effective implementation of the work of both bodies. It is comprised of joint activities and common areas of work of the TEC and the CTCN, the rolling workplan of the TEC and the programme of work of the CTCN.

B. Scope of the report

5. This report summarizes the key activities and outcomes of the work of the TEC and the CTCN in their first year of implementing the joint work programme of the Technology Mechanism for 2023–2027, covering activities undertaken since the publication of their joint annual report for 2022. Chapter II below highlights and tracks progress in the bodies' collaborative and joint efforts. Chapters III and IV below describe the activities and results of the work of the TEC and the CTCN respectively during the reporting period, including information on common areas of work and challenges and lessons learned in implementing their mandates, and present key messages and recommendations for COP 28 and CMA 5.

C. Possible action by the subsidiary bodies

6. The subsidiary bodies may wish to consider this report and to recommend draft decisions for consideration and adoption at COP 28 and CMA 5.

II. Joint chapter of the Technology Executive Committee and the Climate Technology Centre and Network

7. The first joint work programme of the Technology Mechanism was launched at a high-level event at COP 27 and announced through a joint press release by UNEP and the UNFCCC secretariat.
8. The joint sessions⁷ of the TEC and the CTCN Advisory Board, held in 2023 on 24 March and 22 September in conjunction with the bodies' meetings, continued to provide

¹ Decision 1/CP.16, para. 117.

² Decision 15/CMA.1, para. 1.

³ Decisions 2/CP.17, paras. 142–143; 1/CP.21, para. 68; 12/CP.21, para. 2; 15/CP.22, para. 6; 15/CP.23, paras. 4–5; and 14/CP.25, para. 8.

⁴ Decisions 15/CMA.1, paras. 4–5, and 8/CMA.2, para. 4.

⁵ Decisions 9/CP.26, para. 2, and 15/CMA.3, para. 2.

⁶ Available at <https://unfccc.int/ttclear/tec/workplan>.

⁷ See <https://unfccc.int/ttclear/tec/meetings.html>.

a valuable opportunity for exchanging systematic feedback on the work of each body and taking stock of their joint work. During the joint sessions, the TEC and the CTCN:

(a) Adopted the modalities for implementing the joint work programme to ensure the coherence and complementarity of the bodies' work;⁸

(b) Hosted a round-table discussion with funding entities with a view to strengthening their collaboration with the Technology Mechanism;⁹

(c) Discussed the implementation of the joint work programme, including enhancing the monitoring and evaluation of the impact of the work and the joint communication and engagement with stakeholders.

9. The TEC, the CTCN and their secretariats engaged in regular exchanges and collaborated intersessionally to ensure coordination and coherence of work under the Technology Mechanism. For example, the TEC and the CTCN:

(a) Regularly participated in and contributed to each other's events and activities; in particular, the TEC presented highlights from its work on AI, NSIs and the water–energy–food systems at the Africa NDE forum while the CTCN participated in a TEC multi-stakeholder dialogue on the potential role of AI in climate action and in an event on NSIs¹⁰ at Africa Climate Week (see chap. III.B.1 below);

(b) Exchanged information across areas of work; for example, the TEC invited the CTCN to nominate representatives to join the TEC activity groups that support implementation of the TEC rolling workplan, and the TEC solicited inputs from the technical assistance of the CTCN to inform its work on TNAs, adaptation technologies, the ocean and gender-responsive urban mobility;

(c) Engaged with partners and in processes and initiatives, both within and outside the UNFCCC, with a view to raising awareness and visibility of the joint work programme and cultivating collaborative partnerships for its implementation;

(d) Submitted joint inputs to inform the update of the GCF Strategic Plan¹¹ and the second review of the functions of the SCF;¹²

(e) Launched the Technology Mechanism initiative on AI for climate action¹³ and agreed to hold a high-level event at COP 28 and jointly develop a workplan and terms of reference for an advisory group for the initiative.

10. With regard to joint activities of the joint work programme, the TEC and the CTCN closely collaborated on:

(a) Updating their joint publication on technology and NDCs¹⁴ and preparing a summary for policymakers in Arabic, English, French and Spanish and joint key messages and recommendations for Parties on the basis of this work (see the annex);

(b) Developing the roster of gender and climate technology experts, to be launched at COP 28;

(c) Preparing a scoping paper on technology road maps for scaled-up implementation of climate technologies in developing countries to inform further work in this area;

⁸ See TEC document TEC/2023/26/17 or CTCN Advisory Board document AB.2023.21.5.2.1.

⁹ See TEC document TEC/2023/26/19 or CTCN Advisory Board document AB.2023.21.6.1.

¹⁰ All web pages for events organized by the TEC referenced throughout the report are available at <https://unfccc.int/tclear/events/index.html>.

¹¹ Available at <https://www.greenclimate.fund/about/strategic-plan/update>.

¹² As per decision 15/CP.27, para. 3. Submissions are available at <https://www4.unfccc.int/sites/submissionsstaging/Pages/Home.aspx> (in the search field, type "Standing Committee on Finance").

¹³ See <https://www.ctc-n.org/news/artificial-intelligence-climate-action-gaining-momentum>.

¹⁴ UNFCCC. 2023. *Technology and Nationally Determined Contributions. Stimulating the Uptake of Technologies in Support of Nationally Determined Contribution Implementation*. Available at <https://unfccc.int/tclear/tec/techandndc.html>.

(d) Commencing work on distributed ledger technology and green technology databases and preparing concept notes thereon to guide further work in these areas;

(e) Continuing joint communication and outreach efforts, including through the CTCN newsletter and the UN Climate Change Technology group on LinkedIn, reaching over 11,000 subscribers and 1,400 followers respectively;

(f) Organizing joint events at COP 27 and SB 58 on technological innovation and NSIs respectively.¹⁵

11. With regard to the common areas of work outlined in the joint work programme – that is, NSIs, water–energy–food systems, energy systems, buildings and resilient infrastructure, business and industry, and TNAs – the TEC and the CTCN engaged with each other in accordance with the modalities referred to in paragraph 8(a) above. More details on the distinct, yet complementary, activities of each body under the common areas of work, as per their respective workplan and programme of work, are provided in the following chapters.

12. The TEC and the CTCN and their secretariats regularly interacted with the GCF and the GEF to seek opportunities for closer collaboration.¹⁶ The GCF invited the TEC and CTCN secretariats to attend its annual Private Investment for Climate Conference to present the work under the Technology Mechanism and discuss how the bodies under the Technology Mechanism and Financial Mechanism can further strengthen support for private investment in climate technologies.

13. The TEC and the CTCN issued¹⁷ a web document on TT:CLEAR¹⁸ that provides information on their individual and joint actions addressing various mandates and in response to invitations from the COP and the CMA.

III. Activities and performance of the Technology Executive Committee

A. Meetings and membership

14. The TEC convened its 26th meeting from 21 to 24 March 2023 in Songdo, Republic of Korea, and its 27th meeting from 19 to 22 September 2023 in Bonn.

15. At its 26th meeting, the TEC elected Stig Svenningsen (Norway) as its Chair and Ambrosio Yobánolo del Real (Chile) as its Vice-Chair for 2023.¹⁹ At the same meeting, the Chair and the Vice-Chair convened a strategy session to discuss among TEC members and observers approaches for effective implementation of the TEC rolling workplan.

16. The meetings of the TEC were webcast live and attended by observers, including representatives of Parties and accredited observer organizations who actively contributed to the discussions. All meeting documents, webcasts and reports are available on TT:CLEAR.²⁰

B. Implementation of the rolling workplan for 2023–2027

17. The TEC initiated implementation of its rolling workplan for 2023–2027 as part of the joint work programme. The rolling workplan is structured around four workstreams, defined to assist the TEC in delivering on its mandate by promoting science-based and systemic approaches to innovation and technology development and transfer, bolstering transformative technology solutions with a focus on high-impact sectors and high-potential

¹⁵ As footnote 10 above.

¹⁶ As per decisions 18/CP.27, para. 9, and 19/CMA.4, para. 9.

¹⁷ In response to decisions 18/CP.27, para. 13; 19/CMA.4, para. 12; and 20/CMA.4, para. 2.

¹⁸ Available at <https://unfccc.int/ttclear/tec/documents.html> (under “Annual reports” tab).

¹⁹ A list of the TEC members indicating their terms of office is available at <https://unfccc.int/process-and-meetings/bodies/election-and-membership>.

²⁰ As footnote 7 above.

actions, and leveraging collaborative partnerships. The guidance from the technology framework under the Paris Agreement is embedded across the four workstreams.

18. To support implementation of its rolling workplan, the TEC established 16 open-ended activity groups, co-led by TEC members and supported by the secretariat, for activities with outputs envisaged in 2023–2024.²¹ All UNFCCC observer constituencies were invited to nominate representatives to join the TEC activity groups, and more than 40 representatives of the constituencies of business and industry NGOs, farmers and agricultural NGOs, Indigenous Peoples organizations, research and independent NGOs, children and youth, and women and gender have since joined the groups.

19. The TEC expresses its appreciation for the financial contributions received from the European Union and Governments of Germany and Japan and the in-kind support provided by UNIDO, which will enable implementation of its workplan in 2023–2024.

20. The TEC extends its appreciation for the active participation and support of observer constituencies and partner organizations engaged in the work of the TEC activity groups and to the COP 28 incoming Presidency for its continued engagement.

1. Workstream 1: National systems of innovation, collaborative research, development and demonstration, and general-purpose technologies

21. The TEC prepared a compilation of good practices and lessons learned from setting up and implementing NSIs, which included a summary for policymakers,²² translated into Arabic, French and Spanish, and six country case studies (activity A.1.1). Related to the work on NSI, which is a common area of work under the joint work programme, the TEC co-organized with the CTCN an SB 58 side event and convened an event at Africa Climate Week²³ to introduce key findings from this work to various stakeholders and solicit their feedback thereon. A similar engagement is planned at Asia-Pacific Climate Week. On the basis of this work, the TEC prepared key messages and recommendations for COP 28 and CMA 5 (see chap. III.D below).

22. In collaboration with Future Cleantech Architects, the TEC conducted a global online survey, in English, French and Spanish, on needs for climate technology research, development and demonstration²⁴ (activity A.2.1) to establish a comprehensive overview of current and future global research, development and demonstration needs for high-impact emission-reduction technologies to help countries implement the Paris Agreement. Drawing from the survey results, the TEC considered energy storage as part of the scope of work in 2024, taking into consideration specific circumstances of countries such as the LDCs and SIDS.

23. Concerning emerging and transformational adaptation technologies (activity A.3.1), the TEC conducted in collaboration with the children and youth constituency a deep-dive session on early warning systems at the annual Global Sustainable Technology and Innovation Community Conference²⁵ as a scoping activity, engaged with stakeholders and potential partners, and gathered views on future work on the topic.

24. Subsequently, the TEC, through its secretariat, has become an implementing partner of the Early Warnings for All initiative,²⁶ supporting the work on disaster risk knowledge and management led by the UNDRR. In particular, the TEC is working closely with the Group on Earth Observations²⁷ to contribute to the delivery of an envisaged outcome on innovation for risk knowledge by developing a joint knowledge product to be released in 2024.

²¹ See the implementation plan for 2023–2024, available at <https://unfccc.int/ttclear/tec/workplan>.

²² TEC and UNFCCC. 2023. *Good practices and lessons learned on the setup and implementation of National Systems of Innovation. Summary for Policymakers*. UNFCCC. Available at <https://unfccc.int/ttclear/tec/NSI.html>.

²³ As footnote 10 above.

²⁴ For more information, see TEC document TEC/2023/27/05.

²⁵ The summary of the session is contained in TEC document TEC/2023/26/8, annex I.

²⁶ See <https://public.wmo.int/en/earlywarningsforall>.

²⁷ See TEC document TEC/2023/27/06.

25. On digital technologies, the TEC organized an introductory presentation on AI and machine learning and held events at Africa Climate Week to explore the use of AI for climate action (activity A.4.1). The TEC also held consultations with NDEs at the Africa NDE forum to inform the work of the Technology Mechanism initiative on AI for climate action and to solicit views from the region on opportunities and challenges regarding the use of AI-powered tools for low-emission climate-resilient development. A similar engagement is planned for Asia-Pacific Climate Week and the Asia-Pacific NDE forum. In addition, the TEC will lead the organization of a high-level event on AI for climate action at COP 28, prepare the launch of the AI Innovation Grand Challenge in collaboration with Enterprise Neurosystem, and develop a concept note for a technical paper on AI for climate action, including risks and challenges regarding the use of AI.

2. Workstream 2: Technology needs assessment and technology planning tools to support implementation of nationally determined contributions

26. Continuing its work on TNAs (activity B.1.1), which is a common area of work under the joint work programme, the TEC held an event with financial actors at SB 58 to raise awareness of TNA results among private sector and finance institutions.²⁸ In addition, it assessed the gaps in the existing TNA guidance with a view to updating the guidance.²⁹ The TEC will prepare in 2024 a new sectoral TNA guidebook on technologies for the energy sector, which will include aspects of just transition, and collaborate with UNEP Copenhagen Climate Centre to update the main TNA guidebook under the global TNA project.

3. Workstream 3: Transformative and innovative solutions

27. In water–energy–food systems, a common area of work under the joint work programme, the TEC collaborated with FAO on a thematic dialogue (activity C.1.1)³⁰ held on the margins of SB 58. Stakeholders discussed innovative technology practices and solutions related to water–energy–food systems. The TEC will continue this work with FAO and develop a knowledge product in 2024 to analyse knowledge gaps and identify relevant technologies, including Indigenous knowledge, innovations and digital technologies, that could strengthen NAP and NDC ambitions in the agriculture sector.

28. The TEC collaborated with UNIDO on transformative industry (activity C.3.1), which is a common area of work under the joint work programme, by undertaking a mapping of existing initiatives in hard-to-abate sectors (i.e. cement, steel, and chemical and petrochemicals). This exercise informs the work of the TEC on areas where it could add value, in producing a knowledge product and planning a thematic dialogue in 2024.

29. The TEC participated in the ocean and climate change dialogue at SB 58³¹ (activity C.4.1) and shared insights from work under the Technology Mechanism on coastal ecosystem restoration and findings from a 2022 joint policy brief on innovative approaches to strengthening coastal and ocean adaptation prepared by the TEC in collaboration with the International Union for Conservation of Nature and the Nairobi work programme on impacts, vulnerability and adaptation to climate change.³² Drawing on this work, the TEC prepared key messages and recommendations for COP 28 and CMA 5 (see chap. III.D below).

4. Workstream 4: Collaboration under and engagement with processes and constituted bodies under the UNFCCC and other United Nations agencies³³

30. As outlined in its rolling workplan, the TEC:

²⁸ As footnote 10 above.

²⁹ See TEC document TEC/2023/27/10.

³⁰ As footnote 10 above.

³¹ See <https://unfccc.int/topics/ocean/ocean-and-climate-change-dialogue>.

³² UNFCCC and IUCN. 2022. *Innovative Approaches for Strengthening Coastal and Ocean Adaptation - Integrating Technology and Nature-based Solutions*. Bonn: UNFCCC. Available at <https://unfccc.int/tclear/coastalzones/>.

³³ Information on meetings, dialogues and workshops of other bodies and processes in which the TEC participated, as referenced in this section, is available on TT:CLEAR at <https://unfccc.int/tclear/events/participation>.

(a) Provided inputs³⁴ to the SCF on the draft guidance to the operating entities of the Financial Mechanism for consideration at COP 28 and CMA 5;

(b) Participated in the annual meeting of the GCF with the constituted bodies, at COP 27;

(c) Invited representatives of the Adaptation Fund, the GCF and the GEF to attend its meetings and events to enhance exchange of information and collaboration with the entities;

(d) Contributed to activities of the AC NAP task force and invited representatives of the AC to enhance exchange of information and collaboration between the two committees;

(e) Contributed to activities of the informal coordination group for capacity-building under the Convention and the Paris Agreement, including its meetings held in conjunction with COP 27 and SB 58. Moreover, the TEC submitted its response³⁵ to the call for inputs on the 2023 focus area of the PCCB to present insights and elements of the TNA process that may be relevant to the formulation and implementation of NAPs;

(f) Participated in the dialogue at SB 58 among constituted bodies on progress in integrating a gender perspective into their processes. Moreover, in collaboration with the UNFCCC Gender team and the CTCN gender focal point, the TEC developed a policy brief on gender-responsive technology and infrastructure for sustainable urban mobility, to be finalized in 2024;

(g) Contributed to the UNEP Copenhagen Climate Centre series of climate technology progress reports. Several TEC members participated in their capacity as technology experts in the steering committee that guided the preparation of the reports in 2022 and 2023;³⁶

(h) Engaged with the Facilitative Working Group of the Local Communities and Indigenous Peoples Platform in developing the concept and design for the in-session multi-stakeholder dialogue to be held at COP 28 on Indigenous technologies and technologies from local communities. In addition, the TEC participated in a workshop for Parties and constituted bodies at SB 58 on transforming climate action by engaging Indigenous Peoples and local communities.

31. The TEC engaged with other bodies and in processes under the UNFCCC by presenting insights from its work at meetings, dialogues and workshops, including:

(a) The Nairobi work programme Focal Point Forum at COP 27;

(b) The first workshop on addressing loss and damage in the context of decisions 2/CP.27 and 2/CMA.4, convened by the Transitional Committee;

(c) The first global dialogue and investment-focused event under the Sharm el-Sheikh mitigation ambition and implementation work programme;

(d) A meeting convened by the Chair of the Subsidiary Body for Scientific and Technological Advice at SB 58 to enhance collaboration between the Glasgow Committee on Non-market Approaches and constituted bodies and institutional arrangements under or serving the Paris Agreement and/or the Convention.

32. In response to a request from the SBI,³⁷ the TEC established an ad hoc activity group to prepare the planning and organization of a workshop on linkages between the Technology Mechanism and Financial Mechanism, to be held at SBI 60.

³⁴ Available at <https://unfccc.int/scf/scf-meetings-and-documents> (under 32nd SCF meeting).

³⁵ Available at https://unfccc.int/topics/capacity-building/resources/submissions-to-the-paris-committee-on-capacity-building-pccb#_23-PCCB-focus-area-Capacity-building-support-for-adaptation.

³⁶ See <https://unepccc.org/the-climate-technology-progress-report-2022/>.

³⁷ FCCC/SBI/2023/10/Add.1, para. 14.

5. Monitoring and evaluating impacts

33. The TEC discussed possible revisions to its system for monitoring and evaluating impact of work, and for ensuring alignment with its rolling workplan as part of the joint work programme.

6. Communications and stakeholder engagement

34. The TEC continued enhancing its communications and developing outreach activities in the implementation of its workplan, aligned with the strategy adopted in 2020,³⁸ including by organizing global and regional events and using TT:CLEAR and UNFCCC communication channels. The TEC used the UN Climate Change Technology group on LinkedIn and other partner platforms to enhance its visibility and reach, such as the International Institute for Sustainable Development SDG Knowledge Hub and the communication channels of partner organizations.

35. With regard to engaging with NDEs and stakeholders and fostering partnerships³⁹, the TEC agreed on a strategy for strengthening its engagement with NDEs⁴⁰, adopted a strategy for collaborative partnerships and engagement in implementing its rolling workplan,⁴¹ and began to implement options contained therein, including through engagement at the Africa NDE forum.

7. Gender mainstreaming

36. The TEC continued mainstreaming gender in the implementation of its workplan and achieved gender balance among panellists at its events.

37. The TEC appointed Stephen Minas (Greece) and Ambrosio Yobánolo del Real as its gender focal points for 2023.

C. Challenges and lessons learned

38. In the first year of implementation of the rolling workplan, the open-ended activity groups have helped the TEC to integrate diverse views and contributions of different UNFCCC constituencies and partners in its thematic work, in a systemic, inclusive and cost-effective manner.

39. The TEC noted the following improvements:

(a) Interactions with NDEs through NDE regional forums, engaging them in TEC events and disseminating TEC products among NDEs, have enabled the TEC to enhance the visibility of its work and to solicit views on key challenges, priorities and lessons learned from technology stakeholders across different work areas;

(b) Translation of TEC knowledge products into multiple languages and their promotion at different events and through digital means have enhanced the reach of the TEC work among policymakers and practitioners in different regions;

(c) Collaborative partnerships have helped to mobilize in-kind resources and unique technical expertise and have contributed to the dissemination of its work. It also noted that managing partnerships has resource implications.

40. Despite successfully establishing partnerships and strategic engagement in relation to bodies, processes and initiatives under and outside the UNFCCC, the need remains for more awareness from Parties and stakeholders of the potential contribution of the work of the TEC to relevant UNFCCC processes, including ongoing work related to mitigation, adaptation and just transition.

³⁸ Available at <https://unfccc.int/ttclear/tec/documents.html> (under strategies and guidelines).

³⁹ Decisions 18/CP.27, para. 6, 18/CP.27, para. 5, and 19/CMA.4, para. 5.

⁴⁰ See TEC document TEC/2023/26/4.

⁴¹ As footnote 38 above.

41. The TEC notes with concern that activities of the UNFCCC Global Innovation Hub in 2023 have not adequately and meaningfully contributed to and supported the implementation of the joint work programme and innovation-related activities outlined therein, despite guidance from the CMA.⁴²

42. Gender-balanced membership of the TEC has not yet been achieved despite COP guidance⁴³ and the TEC drawing attention to the issue in the past. The TEC would benefit from full membership, and Parties are strongly encouraged to nominate female candidates.

43. In response to guidance from the COP and the CMA,⁴⁴ the TEC has increased coherence and synergy with the CTCN as both bodies and their secretariats coordinated to implement the joint work programme. However, the TEC notes the increased resources required for the coordination between the two bodies and their secretariats. The TEC recognizes that the vision of systematic feedback contained in the joint work programme requires further improvement.

44. The TEC notes that the current format of the annual report, including the limit on the word count of text for translation, has hindered the committee from adequately presenting the full scope of its activities and findings from its work, and will look into options for addressing this matter in future reporting.

D. Key messages and recommendations for the Conference of the Parties and the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement

45. On the basis of the work carried out since publication of the 2022 annual report, the TEC wishes to deliver the following key messages and recommendations to COP 28 and CMA 5.

1. National systems of innovation

46. The TEC compiled good practices and lessons learned on the set-up and implementation of NSIs for developing country policymakers aiming to strengthen NSIs in the context of climate action. The compilation and its summary for policymakers,⁴⁵ aimed at deepening understanding of selected parts of the systems, identifies measures and approaches that have improved their effectiveness.

47. The TEC highlights the following good practices presented in the summary for policymakers:

(a) Taking a systemic approach to establishing and/or strengthening the NSI, which is aligned with host country development objectives;

(b) Tailoring approaches to bridging gaps in the innovation process given that innovation needs vary by phase and sector;

(c) Understanding the local context so as to engage relevant actors, mobilizing the required resources, identifying and addressing gaps in the innovation process, and tapping into the complementary structures and processes of the overall innovation system to advance climate initiatives;

(d) Promoting participation of and interaction among local actors to facilitate innovation and alignment of NSI with country development objectives. Local actors have the best understanding of local context and institutions, as well as often having the largest stake in the outcome, and are therefore best placed to help to fill gaps in and advance the functions of the NSI;

⁴² Decision 19/CMA.4, para. 14.

⁴³ Decision 18/CP.27, para 17.

⁴⁴ Decisions 18/CP.27, para 2, and 19/CMA.4, para 2.

⁴⁵ As footnote 22 above.

(e) Engaging with international institutions to help to build local institutions and networks as they can play an important role, by introducing global best practices, assisting with the development, adaptation and diffusion of new technologies, helping to mobilize financial and technical resources and building the capacity of local actors and institutions in strengthening NSIs;

(f) Ensuring that innovation and organizations developing NSIs evolve and are able to adapt to new circumstances through continuous monitoring and review;

(g) Identifying a portfolio of solutions to strengthen functions across the innovation cycle and to build the capacity of a variety of actors to address the scale and complexity of climate change adaptation and mitigation challenges;

(h) Dealing with structural problems, since in some cases the underlying problems of poverty, lack of influence and voice, and environmental or social challenges are not acknowledged when designing and only become clear during the intervention of the NSI.

48. The TEC recommends that the COP and the CMA encourage Parties, in preparing, designing and implementing climate action plans in alignment with the NSI, to:⁴⁶

(a) Develop the climate action plan in alignment with the national long-term policy framework and socioeconomic priorities;

(b) Map the NSI before designing and implementing strategies;

(c) Look for win-win measures;

(d) Engage both public and private sectors;

(e) In situations where diverse stakeholders need to come together to make an intervention/innovation effective, the role of coordinating agencies or ‘system operators/integrators’ becomes important;

(f) Explore innovative, customized and flexible funding frameworks;

(g) Put together a suitable mix of actors and policies;

(h) Allow flexibility in how policy goals are met;

(i) Pay attention to market creation for climate technologies;

(j) Focus beyond hardware innovation;

(k) Strengthen local capabilities, while ensuring coordination;

(l) Create complementary knowledge and servicing infrastructure;

(m) Maximize productive engagement with international actors and opportunities;

(n) Ensure there is adequate and systematic monitoring, evaluation and revision;

(o) Evolve and improve through learning by doing and learning through analysis;

(p) Adapt to evolving contexts and needs.

2. Innovative technologies and integrated adaptation solutions in the ocean and coastal zones

49. Drawing on the joint policy brief on innovative approaches to strengthening coastal and ocean adaptation, and its participation in the ocean and climate change dialogue, the TEC highlights the following:

(a) Innovative climate adaptation approaches that integrate both technology and nature-based solutions offer the potential to be more robust, comprehensive and cost-effective than either type of solution alone;

(b) Despite the pressing adaptation needs of coastal and island communities, knowledge, capacity, and financing gaps and challenges prevent the widespread

⁴⁶ Elaborations are contained in the summary for policymakers, as footnote 22 above.

implementation and mainstreaming of integrated ocean-climate solutions. To overcome these challenges, there is a need to:

- (i) Co-produce localized solutions that combine scientific, local and Indigenous knowledge, engage diverse stakeholders, and distribute benefits equitably across and within communities;
- (ii) Collaborate on transdisciplinary research and encourage mutual learning through long-term monitoring and evaluation programmes;
- (iii) Address barriers to accessing financing, including perceptions of and risks associated with innovative and nature-based approaches;
- (iv) Foster enabling policy and regulatory frameworks in national climate strategies, local planning and regulations, and international standards;
- (v) Build cross-sectoral partnerships to exchange knowledge and ideas, develop innovative technologies, and bolster the business case for integrated adaptation solutions.

(c) The UNFCCC process presents opportunities to strengthen ocean-based climate action, including through relevant work programmes and constituted bodies and the ocean and climate change dialogue. In addition, the United Nations Decade of Ocean Science for Sustainable Development 2021–2030, the United Nations Decade on Ecosystem Restoration 2021–2030 and the implementation of the Sendai Framework for Disaster Risk Reduction 2015–2030 present opportunities to promote coherence of action within the United Nations.

50. To accelerate the implementation and scale-up of innovative technologies and integrated climate solutions for ocean ecosystems and coastal zones, the TEC recommends that:

- (a) Parties and stakeholders address the needs identified in paragraph 49 above;
- (b) Policymakers embed such solutions in climate-related policies and sectors (e.g. agriculture, fisheries, tourism, water security and disaster risk management); translate national policies into localized action; strengthen the governance and technical capacity of relevant institutions; and set policies that prioritize the most vulnerable communities, groups and ecosystems;
- (c) Public and private finance institutions strengthen enabling conditions by facilitating investment in such solutions; engage early on in risk reduction; commercialize promising integrated adaptation approaches; and improve accessibility to sustainable finance;
- (d) Non-governmental and community-based organizations actively pursue meaningful participation of and leadership by local communities and vulnerable groups, including youth, women and Indigenous Peoples, at all stages of adaptation interventions; develop and cultivate partnerships with one another as well as with other stakeholders; and provide resources for informing evidence-based targets for integrated adaptation solutions and their monitoring;
- (e) Academia and research institutes help to build a robust evidence base on the effectiveness, viability and multiple benefits of integrated adaptation approaches; and enhance collaboration between researchers, academia and local stakeholders in this regard;
- (f) Practitioners engage in cross-sectoral exchange of knowledge through communities of practice and innovative partnerships, and meaningfully engage diverse local stakeholders in integrated adaptation solutions.

IV. Activities and performance of the Climate Technology Centre and Network

A. Advisory Board meetings and membership

51. At its 21st meeting,⁴⁷ held in Songdo from 27 to 29 March 2023, the CTCN Advisory Board elected Erwin Rose (United States of America) as its Chair and Fred Onduri (Uganda) as its Vice-Chair. The Board thanked the outgoing Chair, Omedi Moses Jura (Kenya), for his service and the Secretary of the Board, Rose Mwebaza (Uganda), for her service as CTCN Director.

52. Key results of CTCN activities in 2022 were presented and its 2022 financial statement was endorsed by the Board. The Board provided guidance on the operationalization of the third CTCN programme of work, for 2023–2027, as part of the joint work programme.

53. At its 22nd meeting, held in Bonn from 22 to 27 September 2023, the Board approved the CTCN report to COP 28 and the CTCN annual operating plan and budget for 2024.⁴⁸ The Board endorsed the resource mobilization and partnership strategy and considered an initial draft of the updated eligibility and prioritization criteria for CTCN TA, a revised version of which will be presented at the next board meeting.

54. Further, the Board endorsed the updated gender policy and action plan for 2023–2025, developed with support from the women and gender constituency to strengthen mainstreaming of gender-responsive approaches across CTCN activities.

B. Activities of the Climate Technology Centre and Network

55. The CTCN new programme of work aims to enhance transformational impact and scale through two proven technology enablers (NSIs and digitalization) and a focus on five system transformation areas (water–energy–food nexus; buildings and infrastructure; sustainable mobility; energy; and business and industry), while continuing to deliver on its mandate.

1. Innovation

(a) Promoting innovative and emerging climate technologies

56. The CTCN widely disseminated its new programme of work in order to encourage countries to start framing their TA requests according to the two enablers for system transformation.

57. Table 1 provides examples of how TAs completed during the reporting period have leveraged the two enablers.

Table 1

Climate Technology Centre and Network technical assistance projects that supported strengthening national systems of innovation or included digital technologies

<i>Enabler</i>	<i>Example of TA</i>	<i>Objective of TA</i>
NSI	National circular economy strategy in Costa Rica	Designing a systematic approach to strengthening the national economy, its competitiveness and social well-being through circularity of the resources that feed the productive sectors
	TNA and technology action plan for NDC implementation in the	Several young entrepreneurs and small and medium-sized enterprises were invited to submit climate technology ideas to a jury of climate experts and

⁴⁷ See <https://www.ctc-n.org/advisory-board/meetings>.

⁴⁸ As footnote 47 above.

<i>Enabler</i>	<i>Example of TA</i>	<i>Objective of TA</i>
	Democratic Republic of the Congo	the TNA steering committee, which includes the NDA and the NDE. The concept most in line with the technology action plan received support from a CTCN Network member to formulate a concept note for financing
Digitalization	Drought risk modelling for climate change adaptation in Saint Kitts and Nevis	Designing and implementing a drought risk forecasting system as a planning tool for climate change adaptation measures
	Climate risk assessment and local climate information system for adaptation in Cambodia	Designing a web-based local climate information system for adaptation to support climate-informed decision-making at the subnational level
	Defining Uganda’s vulnerability index and national-level indicators for measuring resilience	Establish transparent and flexible systems for monitoring and evaluating resilience actions to strengthen the country’s capacity to address climatic vulnerabilities

58. Through the AFCIA programme the CTCN received over 500 requests for TA on innovative adaptation technology solutions from more than 105 countries. A total of 25 projects were selected in line with available resources.⁴⁹

59. The CTCN has launched a EUR 3 million programme funded by the European Commission to support up to 10 innovative community-based climate technology projects in communities at risk of climate-induced conflict.⁵⁰

60. The CTCN is collaborating with George Washington University and the National Institute of Green Technology to develop a digital readiness index to inform the development of TA projects for digital applications across the five areas of system transformation.

(b) Capacity-building

61. The CTCN programme for youth climate innovation for Middle East and North Africa took place as a three-day online event, bringing together 120 participants and climate technology experts from the region to explore innovative climate technology solutions. Subsequently, 12 of the start-up teams were selected to follow an eight-week academy programme to implement and scale up selected solutions, 3 of which were selected to pitch their solutions at COP 27.⁵¹

62. To facilitate twinning arrangements among institutions in the Global South, the CTCN is developing a collaborative research and development programme with support from the Korean Ministry of Science and ICT. Meetings between Korean Network members and NDEs resulted in five countries expressing interest in pursuing twinning agreements.

2. Implementation

(a) Supporting development and transfer of climate technologies

63. The CTCN had received 402 TA requests from 110 developing country Parties and 39 per cent of the projects had been completed as at August 2023.⁵²

⁴⁹ See <https://www.ctc-n.org/technical-assistance/adaptation-fund-climate-innovation-accelerator-afcia>.

⁵⁰ See <https://www.ctc-n.org/technical-assistance/climate-change-and-security>.

⁵¹ See <https://www.ctc-n.org/capacity-building/youth-climate-innovation>.

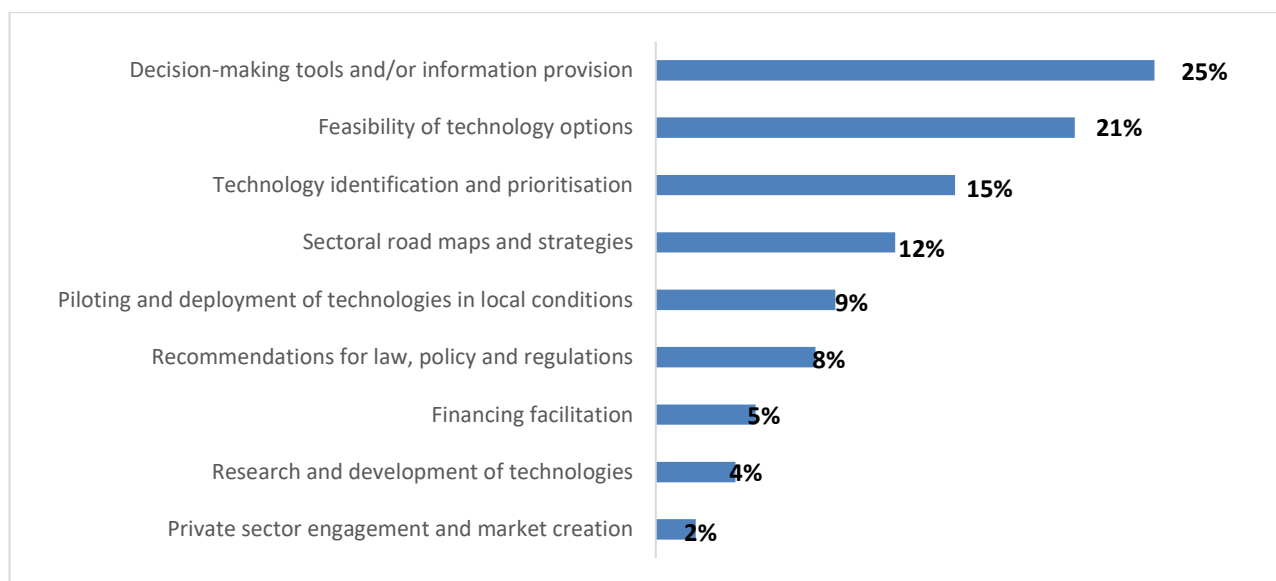
⁵² See <https://www.ctc-n.org/technical-assistance/request-visualizations>.

64. Of those requests, 45 per cent originate from Africa, 32 per cent from Asia and the Pacific, 22 per cent from Latin America and the Caribbean and 1 per cent from Europe. The LDCs account for 24 per cent of requests and SIDS 10 per cent.

65. The TA requests received relate to mitigation (44 per cent), adaptation (30 per cent) or increasingly both (26 per cent). Most mitigation-related requests concern energy efficiency, renewable energy or waste management, while adaptation-related requests concern mainly water, agriculture and forestry or infrastructure and urban planning.

66. In terms of type of assistance, requests for decision-making tools and/or information (25 per cent) have been received most frequently, followed by requests for technology feasibility studies (21 per cent) and technology identification and prioritization (15 per cent) (see figure 1).

Figure 1
Technical assistance by type of assistance (cumulative)



67. Figures 2–3 illustrate the distribution of TA projects completed during the reporting period according to the five areas and two enablers of system transformation. The CTCN received 13 new TA requests during the reporting period, mostly from the LDCs and SIDS, including the Comoros, Mali, the Sudan and Timor-Leste.

Figure 2
Number of Climate Technology Centre and Network technical assistance projects completed during the reporting period by area of system transformation

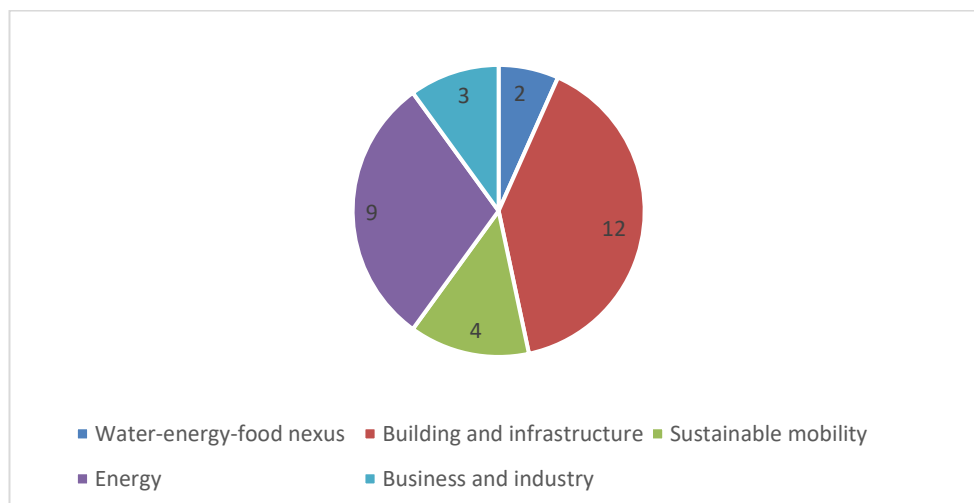
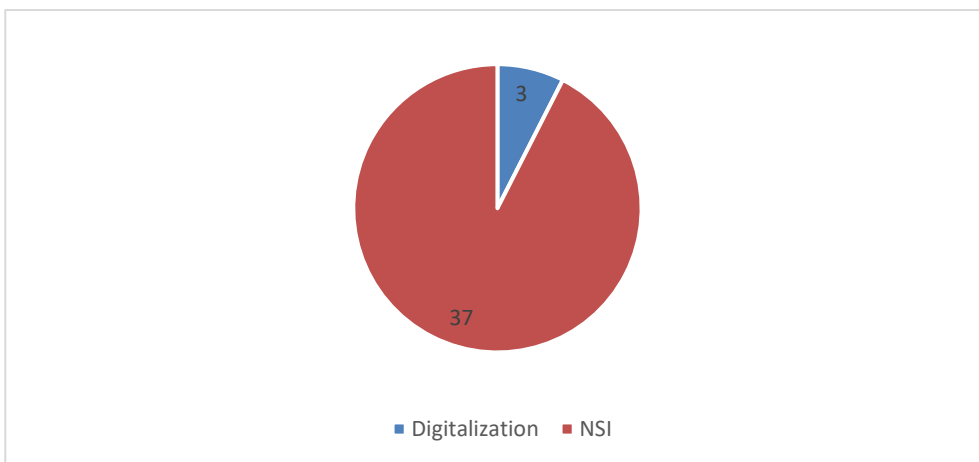


Figure 3
Number of Climate Technology Centre and Network technical assistance projects completed during the reporting period by technology enabler



68. Table 2 provides an example of a recently completed TA project for each area of system transformation.

Table 2
Climate Technology Centre and Network technical assistance projects completed during the reporting period for each area of system transformation

<i>System transformation area</i>	<i>Title of TA project</i>	<i>Objective of TA</i>
Water–energy–food nexus	Integration of water, energy and livestock for the dairy value chain in the municipalities of Pette and Wina in Cameroon	Developing sustainable and climate-resilient dairy value chains through use of low-carbon technologies
Buildings and infrastructure	Policy guidelines on building codes for enhancing energy efficiency and identification of viable technologies for public buildings in Kyrgyzstan	Updating the national building codes with improved energy performance parameters, including mandatory minimum energy performance requirements designed to regulate energy use in all public and residential buildings across five building types
Sustainable mobility	National policy for deploying and scaling up e-mobility and sustainable infrastructure in Papua New Guinea	Conducting market analysis, drafting policy and an implementation road map for introducing low-carbon transport through electric vehicles, and conducting feasibility studies of actions identified in the road map to support readiness to access financing
Energy	Enhancing Vanuatu’s market for energy-efficient appliances	Conducting a technical market and policy assessment to identify barriers to the effectiveness of the standards and labelling programme, and supporting the introduction of a comprehensive monitoring, evaluation and enforcement plan and targeted financial mechanism
Business and industry	Climate resilience and economic sustainability of livestock farming in a rural community of Mongolia	Developing a sustainable business model for a community-scale sustainable meat processing system to improve livelihoods from livestock farming

69. Recently there has been an increase in adaptation-related TA requests for supporting local climate decisions, applying digital technologies for information systems and integrating renewable energy into the national grid.

(b) Technology needs assessment and implementation of their results

70. The CTCN supported the completion of 10 TNAs, 9 of which used GCF readiness funding.

71. A total of 18 preliminary project concept notes were developed across the TNAs, which were based on project ideas identified in technology action plans. For example, Paraguay's first TNA resulted in the development of two concept notes for the submission to the GCF – one on integrated water resources management and the other on reducing emissions of sulfur hexafluoride.

72. The TNA projects have established national steering committees, which have helped to improve institutionalized coordination mechanisms in the countries.

73. The CTCN contributed to the draft gap assessment of TNA guidance carried out by the TEC and UNEP Copenhagen Climate Centre.⁵³

3. Enabling environments and capacity-building**(a) Creating enabling environments and favourable market conditions for climate technologies**

74. The CTCN provides support according to demand for developing sectoral technology road maps and conducting market assessments and feasibility studies that help to create enabling environments for climate technology development and transfer. During the reporting period, for example, it provided support to:

(a) The Bahamas for developing a methodology for assessing grid stability and facilitating integration of renewable energy into the national grid;

(b) Botswana, Eswatini, Malawi and Zambia for developing enabling policies and regulatory environments for minimum energy performance standards and an energy labelling scheme for refrigerators and distribution transformers;

(c) Solomon Islands for developing a policy road map for e-mobility and a market feasibility study for electric buses in the city of Honiara.

(b) Promoting endogenous and gender-responsive technologies and harnessing Indigenous People's knowledge

75. As part of TA projects, endogenous capacities and technologies are developed or promoted. For example, in the 10 TNA projects completed during the reporting period, technology ideation and selection involved using local knowledge and practices, especially for adaptation-related technologies. In Cambodia, the development of a locally suitable gravity-driven membrane technology for supplying safe drinking water included providing community-level capacity-building to sustainably manage the technology.

76. Furthermore, a gender perspective must be integrated into the design of all TA projects, including through a gender analysis and the appointment of a gender expert. For example, an assessment was carried out of the gender division in Mongolia, in relation to involvement in livestock farming, to prioritize necessary livestock interventions. However, data on the percentage of TAs supported by a gender analysis and expert, along with their resulting outcomes and impacts, is lacking. This gap will be addressed through the updated monitoring and evaluation framework and the updated gender policy and action plan.

(c) Capacity-building

77. The CTCN developed three global capacity-building programmes in line with its programme of work, involving the participation of 24 Network members:

(a) A series of webinars aimed at developing endogenous capacities through collaborative research and development – three webinars took place during the reporting

⁵³ As footnote 29 above.

period on the themes of the water–energy–food nexus, nature-based solutions and buildings, and energy systems;⁵⁴

(b) Training on digital technology applications – training on applications for the agriculture sector was conducted, attracting 30 NDEs and 15 government representatives;⁵⁵

(c) Regional training on green hydrogen for system transformation – a training session was organized jointly with Network member the Green Energy Institute for 15 NDEs from the Asia-Pacific region. Technological innovations on energy systems transformation are aligned with the new CTCN programme of work.

78. CTCN capacity-building programmes include field visits, bilateral meetings with Network members, and peer-to-peer learning workshops to foster the development of multi-country projects among those with similar technology innovation needs. Furthermore, efforts are made to organize capacity-building workshops in parallel with climate technology conferences, leveraging them as opportunities to engage NDEs.

79. Other capacity-building activities of the CTCN include:

(a) Online training provided in collaboration with the Jeju International Training Center affiliated with UNITAR to over 450 local government officers and technology experts in developing countries to develop their understanding of the Technology Mechanism and Financial Mechanism;

(b) A learning exchange event on technologies for decarbonizing electrical transmission and distribution grids through fluorinated gas regulations and policies, co-hosted by the German NDE and Network members Siemens and Nuventura,⁵⁶ where 11 stakeholders from ministries, energy utilities and power equipment manufacturers nominated by NDEs discussed project ideas.

80. In-country capacity-building is provided as part of TA projects through expert advice, policy-oriented training and peer-learning workshops. For example, in Saint Kitts and Nevis, training was provided to system administrators on using a drought predication model; in the Lao People's Democratic Republic, capacity-building focused on developing an administrative plan for urban public transport in Vientiane; and a South–South exchange with Republic of Korea transport institutions allowed for exchange of experience.

(d) Enhancing public awareness and information-sharing on climate technology development and transfer

81. The CTCN issued 22 news releases and composed 363 social media posts showcasing TA results and disseminating knowledge and best practices. A total of 12 newsletters were sent to over 11,000 subscribers, and information about learning opportunities and events was disseminated to over 10,583 social media followers. The CTCN achieved 22 million media impressions and appeared 872 times in national and global press.

82. Of the 50 countries from which users spent the most time on the CTCN website, 33 per cent are developing countries, including 10 per cent among the LDCs. Asia accounts for 32 per cent of those users, followed by Latin America and the Caribbean (15 per cent), Africa (5 per cent) and the Pacific (2 per cent).

83. The CTCN was invited to share knowledge on climate technologies at over 10 global conferences and partner events. Furthermore, during COP 27, the CTCN took part in 55 climate technology related events.

84. CTCN TA projects were showcased at several regional, national and local events to raise awareness of climate technologies and disseminate TA findings. For example, a public event was held in Costa Rica to present its finalized national circular economy strategy to

⁵⁴ See <https://www.ctc-n.org/calendar/events/developing-endogenous-capacity-climate-technology-through-collaborative-rdd>.

⁵⁵ See <https://www.ctc-n.org/news/ctcns-palo-now-hosting-3-day-capacity-building-programme-digital-technology-applications>.

⁵⁶ See <https://www.ctc-n.org/calendar/events/sf6-free-technologies-net-zero-energy-systems-learning-event>.

key actors and other institutional and private sector stakeholders to facilitate its implementation. In Cambodia, a meeting involving the municipality of Battambang, selected to pilot the system, and a number of key national and local stakeholders was held to launch the local climate information system for adaptation.

85. In collaboration with Network members, the CTCN hosted webinars on:

(a) Policies for introducing electric vehicles and expanding relevant infrastructure in developing countries, organized jointly with the Clean Energy Ministerial;⁵⁷

(b) Climate technology innovation for building and infrastructure resilience, co-hosted with the Asian and Pacific Centre for Transfer of Technology during the 7th Asia-Pacific Climate Change Adaptation Forum.

86. In addition, the CTCN developed several knowledge briefs, including on:

(a) Nature-based solutions to emerging water management challenges in the Asia-Pacific region, in collaboration with the UNEP–DHI Centre, which was launched at a webinar attended by 223 participants;⁵⁸

(b) Harnessing technology in the circular economy for climate action in Africa, in collaboration with the Kenya Climate Innovation Center, which was launched at a webinar with over 130 participants;⁵⁹

(c) Green hydrogen technology applications, jointly with the Green Energy Institute.⁶⁰

4. Collaboration and stakeholder engagement

(a) Engagement with local communities, authorities, civil society organizations and the private sector

87. The CTCN approach to TA project implementation emphasizes the involvement of and stewardship by regional, national and local stakeholders:

(a) The TA projects on minimum energy performance standards in Botswana, Eswatini, Malawi and Zambia included the constitution of policy working groups and technical committees to serve as steering committee for the design and future implementation of the national policy road maps and to provide a forum for the adoption of test standards and minimum energy performance standards;

(b) In Vanuatu, the CTCN facilitated engagement with the private sector (importers, retailers) to identify the challenges and bottlenecks limiting the effectiveness of the existing standards and labelling programme to propose a comprehensive monitoring, evaluation and enforcement plan;

(c) In Panama, a working group of 20 representatives of the health and environment ministries, the tourism authority, academia and the electricity transmission company was formed to inform key decisions on the direction of the TA project.

(b) Engagement with national designated entities

88. Aside from taking up the capacity-building opportunities provided by the CTCN, which included networking and matchmaking with the public and private sectors, NDEs participated in several events organized by the CTCN, including the Africa regional NDE

⁵⁷ See <https://www.cleanenergyministerial.org/webinars-cesc/new-paradigms-of-policies-for-electric-vehicles-evs-and-ev-infrastructure-expansion-for-developing-countries/>.

⁵⁸ See <https://www.ctc-n.org/calendar/events/recording-and-slides-available-nature-based-solutions-emerging-water-management>.

⁵⁹ See <https://www.ctc-n.org/calendar/webinars/harnessing-technology-circular-economy-climate-action-africa-knowledge-brief>.

⁶⁰ See <https://www.ctc-n.org/resources/green-hydrogen-technologies-systems-transformation-national-strategies-plans-and-projects>.

forum, at which 45 NDEs from the region were updated on the CTCN programme of work and invited to join a side event with the TEC on AI for climate action.

(c) Network members

89. The CTCN welcomed 70 new Network members, of which 47 from developing countries, bringing the total number of Network members to 810 as at August 2023.

90. Private sector organizations represent just over half of the members (51 per cent), followed by NGOs (14 per cent) and non-profit organizations (14 per cent). Parties not included in Annex I to the Convention represent 64 per cent of the members and Parties included in Annex I to the Convention 34 per cent.

(d) Collaboration with the children and youth and women and gender constituencies

91. The CTCN collaborated with academic institutions, including:

(a) The University of Southern Denmark as a partner in the Urban Resilience Intensive Training 2023,⁶¹ whereby the CTCN promoted the training among its Network;

(b) Incheon University, whereby the CTCN supported a global call for expressions of interest for junior trainees from developing countries to participate in a master programme on climate technology and governance, with scholarships provided by the Korea International Cooperation Agency. The CTCN will provide ongoing mentoring to the junior trainees on climate technology project design and development;

(c) The children and youth constituency and Network members Seedstars and the Swiss Association for Entrepreneurship in Emerging Markets to conduct the Youth Climate Innovation Labs between 2020 and 2022, which were supported by over 100 mentors and drew more than 400 youth participants selected from over 1,700 applicants globally. In total, 35 start-ups pitched their climate technology solutions to investors, partners and industry experts.

92. To inform the next CTCN youth innovation programme, an evaluation of the Youth Climate Innovation Labs was conducted through a participant survey. The results indicate that the Labs contributed to five company creations and supported start-up teams as they advanced, which indirectly contributed to fundraising, team hiring and attracting customers. The evaluation highlighted the short time allocated to the academy programme, which was considered insufficient to provide appropriate support for moving on to the acceleration phase. Discussions are under way on developing the next version of the programme with a view to supporting innovative ideas from ideation (lab) and incubation (academy) to acceleration.

93. As part of its collaboration with the women and gender constituency, the CTCN supported the 2022 Gender Just Climate Solutions Awards, disseminating information thereon through its Network and providing access to a year-long mentoring programme for the winners. The CTCN served again on the jury to select the award winners for 2023.

(e) Engagement with other constituted bodies

94. The CTCN collaborated with the PCCB by providing information on CTCN capacity-building activities undertaken in 2022 and contributing to an e-booklet on capacity-building for climate technology development, deployment and transfer.

95. The CTCN exchanged information with the AC and provided inputs to its work during the biannual meetings of the CTCN Advisory Board, on which the AC is represented, in addition to participating as an observer in the 23rd and 24th meetings of the AC.

96. UNEP exceptionally had a CTCN staff member contribute to relevant meetings of the technical support unit that supports the Transitional Committee on the operationalization of the new funding arrangement and fund for loss and damage.

⁶¹ See <https://event.sdu.dk/urit23/conference>.

97. The CTCN entered into a partnership arrangement with the Asia and Pacific Centre for Transfer of Technology⁶² towards supporting the development and transfer of climate technologies for energy-efficient, low-carbon and climate-resilient development in the Asia-Pacific region.

5. Support

(a) Enhancing collaboration with the operating entities of the Financial Mechanism

98. The CTCN has supported the implementation of 31 GCF readiness projects to date (worth USD 11 million), 3 of which were completed during the reporting period.

99. The CTCN co-developed two GCF Project Preparation Facility submissions:

(a) With the Kenyan Commercial Bank for a project entitled “Promoting the Adoption of Environmentally Sound Technologies by Small and Medium Sized Enterprises in Kenya to Enhance Production Efficiency and Business Value” for an estimated value of USD 250 million;

(b) With the West African Development Bank for a project entitled “West African Low Emissions and Climate Resilient Agriculture Financing Facility” for an estimated value of USD 210 million, including co-financing from the Bank. A stakeholder workshop brought together NDEs and government stakeholders from the seven countries involved.

100. The CTCN is supporting Cambodia in developing a concept note for a GCF project on agro-based enterprises.

101. The CTCN and the GCF attended several of each other’s events:

(a) The GCF participated in several CTCN capacity-building events held in Songdo;

(b) The CTCN participated in the GCF Regional Programming Dialogue with Asia and the Pacific and supported the participation of five NDEs. Sessions for introducing the CTCN to NDAs and bilateral meetings with NDEs, NDAs and GCF accredited entities were organized to enhance collaboration and for them to jointly articulate possible project proposals. The sessions included presentations on TNA outcomes and discussions on opportunities for scaling up CTCN TA.

102. Regarding collaboration with the GEF, NDEs participated in GEF national dialogues in Benin, Malaysia, Nicaragua, Togo and the United Republic of Tanzania. A positive correlation has been reported for some countries in terms of CTCN TA resulting in GEF proposals. The CTCN is on the steering committee for phase IV of the global TNA project, implemented by UNEP Copenhagen Climate Centre.

103. The CTCN submitted a USD 12 million proposal for phase II of AFCIA. The project will continue to support the testing and piloting of innovative climate adaptation technologies through locally led climate action while also focusing on the creation of digital public goods to be replicated and scaled up.

(b) Facilitating access to financing through technical assistance

104. The CTCN includes specific deliverables in its TA to empower stakeholders to mobilize finance:

(a) In Seychelles, through fast technical assistance, the CTCN supported the formulation of a USD 5 million Adaptation Fund pre-concept proposal for implementing an innovative water retention structure;

(b) As a result of the completed AFCIA-funded TA in Burundi, the CTCN supported the preparation of a USD 5 million project concept for enhancing resilience to flooding and drought through innovative climate adaptation technologies.

⁶² See <https://apctt.org/>.

105. The TA project for enhancing the climate resilience of livestock farming in rural communities in Mongolia resulted in leveraging USD 7.5 million from the Government of Canada and mobilizing USD 100,000 in co-funding from corporate contributions for scaling up a community-based intervention for enhancing food security through a refrigerated slaughterhouse.

106. The TA project in Solomon Islands on e-mobility leveraged scale-up funding from the Commonwealth for the country's first-ever fleet of electric buses.

(c) Enhancing mobilization of support

107. Five new TA projects were identified for implementation through pro bono support, including three from the Republic of Korea and two from Japan, representing a total of USD 582,100.

108. Several co-financing and in-kind contributions were made by Network members and partners for TA implementation or capacity-building activities, including approximately USD 100,000 in co-financing from the UNEP Finance Initiative for a circular economy TA project in Latin America and the Caribbean, USD 200,000 from UNEP for a building and infrastructure TA project in Africa, and expertise and facilities provided by UNITAR and the West Africa Development Bank for capacity-building.

109. The CTCN submitted a USD 2 million proposal for pro bono support from the IBM Sustainability Accelerator social impact programme for a project on innovative water technologies for climate adaptation through digital public goods.

110. The CTCN resource mobilization and partnership strategy, developed with input from the CTCN Advisory Board, serves as a dynamic document to guide the efforts of the CTCN and may be subject to updates. The strategy follows a three-step set of objectives based on diversifying sources of support: securing a minimum of USD 10 million annually for the third CTCN programme of work, aiming for USD 20 million annually through funding diversification and stakeholder engagement, with a potential future ambition of USD 30 million annually. The strategy was developed alongside a series of promotional materials illustrating the CTCN key technology enablers and areas for system transformation.

(d) Monitoring and tracking of actions and activities undertaken

111. The UNEP evaluation office is conducting an assessment of both the European Commission's contributions to the CTCN and the overall performance of the CTCN between its establishment and 2023.

C. Organizational structure of the Climate Technology Centre and Network

112. The CTCN secretariat is based in Copenhagen and its technical specialists work out of regional offices in Bangkok, Nairobi and Songdo. The CTCN Partnership and Liaison Office in Songdo, launched in July 2022, is now fully operational.

113. The CTCN is in the process of recruiting a new Director and a Regional Manager for the African region.

114. The CTCN includes an international network of 807 organizations and institutions that can respond to requests from developing countries related to climate technology development and transfer, and 165 NDEs nominated by their countries.

Funding overview

115. The CTCN has secured USD 112.6 million in financial contributions since its inception in 2014. As at August 2023, the CTCN had received USD 6.6 million in 2023 (see table 3).

Table 3
Cash receipts for the Climate Technology Centre and Network in 2023

<i>Donor</i>	<i>Amount (USD)</i>
European Commission	2 556 870
Republic of Korea	2 160 096
Canada	1 115 897
Japan	459 047
Sweden	186 783
Spain	110 011
Total	6 588 704

116. The CTCN carried over a fund balance of approximately USD 27.5 million into 2023. Its approved annual operating budget for 2023 is just over USD 10 million and its projected expenditure for the year is USD 9.3 million. The CTCN projected fund balance at the end of 2023 is approximately USD 17.7 million. This includes carry-over of USD 9.5 million and pending cash receipts of USD 4 million in 2024, USD 3.1 million in 2025 and USD 1.1 million in 2026 against signed agreements.

117. In 2023, the CTCN received renewed financial contributions from Canada, the European Commission, Japan, the Republic of Korea, Sweden and Spain.

118. A funding gap of approximately USD 22 million is a concern and a challenge to maintain continuity of CTCN operations. If the CTCN implements 100 per cent of its approved operating budget of USD 10 million in 2024, based on the secured income to date (signed donor agreements), the available fund balance for 2025–2027 is USD–7.7–million against the three-year approved operating budget of USD 30 million.

D. Challenges and lessons learned

119. On capacity-building:

(a) There is a continued need to build the capacity of NDEs to strengthen the ideation of TA projects that are aligned with the CTCN programme of work. The CTCN is building this into its global capacity-building programmes more systematically;

(b) As part of TA project ideation, coordination between the NDE and other key stakeholders in the country, including sector-specific representatives and other focal points, has shown to positively enhance the national capacity for endogenous innovation;

(c) Developing countries continue to require support for identifying and evaluating digitalization technologies and innovation, particularly the LDCs and SIDS, where data availability is limited and the transition to more advanced digital technologies is slower.

120. On Network engagement, more active engagement of Network members in CTCN activities and in designing TA projects, including through capacity-building programmes and webinars, has increased the exposure of NDEs to potential support.

121. On scaling up TA:

(a) CTCN technical support for GCF full-scale projects has benefited from increasing collaboration between the bodies. The coordination between NDE and NDA representatives should continue to be strengthened to support the design of CTCN TA projects that lead to GCF concept notes for scalable projects;

(b) While the TNA process allows for project ideas to be identified and prioritized in some sectors, TNA outputs are not immediately scalable and require further in-depth analysis to become bankable;

(c) Multi-country projects offer advantages programmatically and administratively, but owing to their scale consume a considerable portion of the CTCN

annual budget, leaving fewer funds for additional country-driven TA projects. Additionally, the CTCN has noticed that, in certain multi-country projects with constrained budgets allocated per country and involving numerous stakeholders, the risk of countries withdrawing from the project during its implementation is increased. The current CTCN budget limits its ability to undertake several multi-country TA projects while responding to additional country-driven TA requests.

122. A number of lessons learned can be derived from the first year of operation of the CTCN Partnership and Liaison Office, including:

(a) With its strategic location adjacent to the GCF headquarters, the Office has helped to enhance interaction between the CTCN and the GCF, as well as with accredited entities;

(b) Its mandate to be a centre of excellence for research, development and demonstration has provided the Office with a positive entry point for collaboration with governments and Network members;

(c) In its early stages, the Office has benefited from its regional influence, but the goal over the coming years is to develop a global profile.

123. Several operational challenges for the CTCN have been observed, including the following:

(a) The limited amount and flexibility of funding continues to be a major challenge when it comes to responding to the increasing number of TA requests;

(b) The large amount of donor reporting and project evaluations required annually, in addition to UNFCCC reporting requirements;

(c) In the course of transitioning to full operational management by UNEP in 2022–2023, challenges arose, particularly related to staff turnover and the transfer of contracts and grants from one system to another.

E. Key messages to the Conference of the Parties and the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement

124. The third CTCN programme of work aims to build on two proven technology enablers (NSI and digitalization) and five system transformation areas (water–energy–food nexus; buildings and infrastructure; sustainable mobility; energy; and business and industry) to strengthen the sustainable mechanism needed to accelerate systemic transformation.

125. Scaling up TA projects and transforming systems at country level are hampered by the challenge of coordination between the focal points of the Technology Mechanism and Financial Mechanism.

126. Countries should regularly update their TNAs in conjunction with their NDCs.

127. With a funding gap of approximately USD 22 million for the programme of work period, enhanced engagement is required to mobilize resources for the CTCN, including the Financial Mechanism, bilateral, multilateral and private sector channels, philanthropic sources and financial and in-kind contributions from UNEP as host organization and participants in the Network.

Annex

Draft joint key messages and recommendations of the Technology Executive Committee and the Climate Technology Centre and Network on technology and nationally determined contributions

[English only]

1. On the basis of an updated analysis carried out in 2022–2023 by the TEC and the CTCN of technology issues related to NDCs,¹ including an overview of technology issues identified in revised NDCs, integration of technology issues into NDCs, technology needs and challenges, success stories and lessons learned, and linkages between policy and implementation and linkages with NAPs, the TEC and the CTCN highlight the following:

(a) A growing number of developing countries are building on insights from TNAs and CTCN TA to inform the development and implementation of their NDCs and NAPs, with some countries also using their NDC and NAP processes to inform TNAs;

(b) The analysis of linkages between policy and implementation in the context of technology and NDCs found that strong linkages are needed for the effective uptake of climate technologies. In addition, fostering linkages between the technology-related aspects of the NDC and NAP processes can benefit both processes greatly, avoiding duplication of work and accelerating implementation. Effective NSIs are essential to enhancing the capacity of developing countries for the uptake of climate technologies and to incentivize innovation that can unlock potential transformative technological changes needed to meet the goals of the Paris Agreement;

(c) There are a variety of examples from different regions and country contexts where the uptake of technologies directly supports the implementation of NDCs. Examples include government-, private sector and community-driven technology solutions and showcase different approaches to overcoming technical, financial, institutional and social barriers to technology uptake, including through innovative policies and business models as well as gender-responsive and effective stakeholder engagement approaches;

(d) Lessons learned regarding the uptake of technologies include the importance of recognizing the crucial role that stakeholders play in technology planning and implementation to ensure that technology solutions are technically, economically, institutionally and socially viable. CTCN TA and bilateral assistance provided to developing country Parties can serve as an important catalyst for accessing larger amounts of climate finance to facilitate the uptake of climate technologies in support of NDC implementation.

2. The TEC and the CTCN recommend that the COP and the CMA encourage Parties to stimulate the uptake of technologies in support of NDC implementation by:

(a) Fostering gender-responsive, inclusive, participatory and equitable approaches that consider the needs, priorities, knowledge and capacities of all technology stakeholders; generate awareness of technology benefits; and foster stakeholder engagement and buy-in regarding processes and technologies. In particular, technology uptake needs to lead to a just transition, protect workers, communities, Indigenous Peoples and women, ensure a more socially equitable distribution of benefits and risks, and foster leapfrogging to near zero emission or low-emission climate technologies, which are in line with meeting the targets of the Paris Agreement;

(b) Creating local champions and disseminating success stories to showcase the local economic and social benefits of environmentally sound technologies and their contribution to NDC implementation with a view to leveraging broader financial, institutional and social support for replicating and scaling up the technologies;

¹ See <https://unfccc.int/tclear/tec/techandndc.html>.

(c) Supporting market creation and expansion for prioritized technologies by putting in place enabling legal and regulatory environments and enhancing absorptive capacities of technology stakeholders;

(d) Supporting academia and civil society, including women, youth and Indigenous Peoples organizations, that work with local and national governments on addressing barriers to technology uptake towards the achievement of NDC targets, including by strengthening NSIs;

(e) Systematically documenting and disseminating information on the policies, schemes and programmes that foster technology uptake, as well as on challenges and lessons learned in meeting NDC targets to inform future policymaking, technology prioritization and the preparation of revised NDCs and NAPs;

(f) Using the outcomes of TNA processes on the identification, prioritization and diffusion of climate technologies, not only to inform revised NDCs but also to facilitate NDC implementation as well as establish or strengthen linkages between NDC, NAP and TNA processes in support of the uptake of climate technologies, as appropriate;

(g) Including more detailed information on technology in NDCs, such as policies, targets, technology needs and support, to foster a clearer understanding among domestic technology stakeholders, facilitate international cooperation and enable more targeted provision of support by the TEC and the CTCN, according to their respective functions, and other support providers, as appropriate;

(h) Making more use of the Technology Mechanism to carry out the above recommendations, including by using technical documents and recommendations on climate technology policies prepared by the TEC, and, in addition for developing country Parties, by actively engaging with the CTCN to benefit from its provision of technology solutions, capacity-building and advice on policy, legal and regulatory frameworks, and support for the development of technology road maps, tailored to the needs of individual country contexts.
