



Technology Executive Committee

22 December 2020

Twenty-first meeting

Virtual meeting, 17–20 November 2020

Report on the 21st meeting of the Technology Executive Committee

I. Opening of the meeting

1. The Chair of the TEC for 2020, Mareer Husny, opened TEC 21 at 1 p.m. Central European Time on Tuesday, 17 November 2020.¹
2. The table below lists the TEC members who attended TEC 21. Observers present at the meeting are listed in annex I.

| Members attending TEC 21 | |
|---------------------------------|----------------------------|
| AKM Rafique Ahammed | Imran Khan |
| Robert Berloznik | Ladislaus Kyaruzi |
| Pedro Borges | Clifford Mahlun |
| Jorge Castro | Hamza Merabet |
| Kinga Csontos | Stephen Minas (Vice-Chair) |
| Maheshwar Dhakal | Naoki Mori |
| Dinara Gershinkova | Monique Motty |
| Mareer Husny (Chair) | Igor Onopchuk |
| Suil Kang | Stig Svenningsen |

II. Organizational matters

1. Adoption of the agenda

3. The TEC adopted the agenda for TEC 21 as contained in document TEC/2020/21/1.

2. Organization of work

4. The Chair presented, and the TEC took note of, the proposed organization of work for TEC 21 as contained in document TEC/2020/21/3.
5. The TEC noted that a pre-meeting consultation took place on 29 October 2020 to discuss draft key messages and recommendations referred to in chapter IV, subsections 2(a), 2(b) and 4 below.

¹ Owing to the circumstances related to the coronavirus disease 2019, the TEC agreed to hold TEC 21 virtually.

III. Matters relating to the Climate Technology Centre and Network

6. The TEC took note of the update provided by the Chair of the CTCN Advisory Board, Zhong Ping, and the Director of the CTCN, Rose Mwebaza, on the outcomes of the 16th meeting of the Advisory Board and on the operations and progress of work of the CTCN in the areas of technical assistance, capacity-building and knowledge-sharing, including the impact of the coronavirus disease 2019 on the operations of the CTCN. The TEC noted the initial findings from the implementation of the monitoring and evaluation system of the CTCN.

IV. Implementation of the rolling workplan of the Technology Executive Committee for 2019–2022²

1. Innovation

(a) Compilation of good practices and lessons learned on countries' research, development and demonstration

7. The task force on innovation, with the support of a consultant, presented a draft compilation of good practices and lessons learned on countries' RD&D.

8. The TEC welcomed the draft compilation and provided suggestions for improvement, including on the role of universities for RD&D and the ability of some RD&D initiatives to mobilize green investments.

9. The TEC requested the task force to finalize the compilation, taking into account the comments and guidance provided by the TEC at the meeting.

(b) Mapping of emerging climate technologies

10. The task force on innovation presented a background note that included information on elements and features that characterize key emerging climate technologies, a mapping of key emerging climate technologies, examples of mappings of emerging climate technologies produced by other organizations and guiding questions for consideration by the TEC on possible further work on this matter.

11. The TEC welcomed the background note and provided guidance on further work of the TEC on this matter, including on the social acceptability of emerging technologies and possible overlapping with the work of the Katowice Committee of Experts on the Impacts of the Implementation of Response Measures.

12. The TEC requested the task force to elaborate a proposal for future work of the TEC on this matter for consideration at its first meeting in 2021, taking into account the comments and guidance provided by the TEC at this meeting.

2. Implementation

(a) Key messages and recommendations to Parties on good practices in conducting technology needs assessments

13. The Chair presented the draft key messages and recommendations of the TEC for COP 26 and CMA 3 on analysing experience, lessons learned and good practices in conducting TNAs and implementing their results.

14. The TEC agreed on the key messages and recommendations and will include them in its annual report for 2020 (see annex II).

² Available on TT:CLEAR at <https://unfccc.int/ttclear/tec/documents.html>.

- (b) Recommendations to Parties on ways forward and actions to be taken based on the outcomes of the technical expert meetings on mitigation in 2020

15. The Chair presented the draft recommendations of the TEC to COP 26 on ways forward and actions to be taken based on the outcomes of the regional technical expert meetings on mitigation organized virtually in 2020.

16. The TEC agreed on the recommendations, which will be submitted to the high-level champions, the Chairs of the subsidiary bodies, the Co-Chairs of the Adaptation Committee and the Director of the CTCN, and included in its annual report for 2020 (see annex III).

3. Enabling environment and capacity-building

- (a) Results from survey on endogenous capacities and technologies

17. The task force on enabling environment and capacity-building presented preliminary findings of the surveys on needs, challenges, and gaps and measures to develop and enhance endogenous capacities and technologies, conducted between May and August 2020.

18. The TEC provided guidance on other cross-cutting areas for inclusion in the final report that will be submitted for consideration by the TEC at its first meeting in 2021.

- (b) Paper on enabling environments and challenges, including barriers

19. The task force on enabling environments and capacity-building, assisted by a consultant, presented a draft paper on examining enabling environments and challenges, including barriers, on the basis of TNAs, NDCs, CTCN technical assistance and relevant TEC briefs.

20. The TEC considered the findings contained in the draft paper and provided guidance to continue working on the paper, with a view to finalizing it by its 23rd meeting and incorporating relevant information from NDCs submitted in 2020.

4. Collaboration and stakeholder engagement

Key messages and recommendations to Parties on technologies for averting, minimizing and addressing loss and damage in coastal zones

21. The TEC Chair presented draft key messages and recommendations of the TEC for COP 26 and CMA 3 on technologies for averting, minimizing and addressing loss and damage in coastal zones, prepared on the basis of the joint policy brief on the same topic, produced in collaboration with the Executive Committee of the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts and launched in June 2020.³

22. The TEC agreed on the key messages and recommendations and will include them in its annual report for 2020 (see annex IV).

5. Support

Possible follow-up actions by the Technology Executive Committee in relation to climate technology incubators and accelerators

23. A representative of the GCF secretariat presented on the support provided by the GCF for climate technologies, including climate technology incubators and accelerators. The TEC noted that the GCF is in the process of operationalizing support for climate technology incubators and accelerators and would welcome inputs from the TEC and the CTCN in this area.

24. The TEC requested the task force on innovation to:

- (a) Include support for climate technology incubators and accelerators as part of the scope of work of the compilation of good practices and lessons learned in relation to the setup and implementation of national systems of innovation scheduled for 2021;

³ Available at <https://unfccc.int/ttclear/coastalzones/>.

(b) Identify possible follow-up actions by the TEC in relation to climate technology incubators and accelerators for consideration at TEC 22.

V. Gender mainstreaming

25. The gender focal points for the TEC, Kinga Csontos (Hungary) and Monique Motty (Democratic Republic of the Congo), reported on their initial work on gender mainstreaming in the work of the TEC, including identifying activities in the TEC rolling workplan for 2019–2022 that could provide opportunities for integrating gender considerations and information on possible joint activities with the CTCN.

26. The TEC welcomed the report of the focal points and provided guidance for further work of the TEC on this matter, including preparing a policy brief and elaborating methodological approaches to gender mainstreaming.

VI. Monitoring and evaluation of the impacts of the work of the Technology Executive Committee

27. The secretariat presented a report on experience and lessons learned from implementing the monitoring and evaluation system of the TEC, including recommendations for its revision.

28. The TEC took note of the report and provided guidance for revising the monitoring and evaluation system, including adding indicators for monitoring gender mainstreaming and communication and outreach activities.

VII. Joint activities of the Technology Executive Committee and the Climate Technology Centre and Network

29. At TEC 21, the Chair and Vice-Chair of the TEC presented the revised proposed joint activities of the TEC and the CTCN for consideration by the TEC.

30. The TEC provided inputs to the proposed activities and requested the Chair and Vice-Chair of the TEC to finalize the joint activities of the TEC and the CTCN to be undertaken in 2021–2022, taking into account comments provided by the TEC and the CTCN Advisory Board at the 16th meeting of the Advisory Board. The TEC also noted that the agreed joint activities will be included in the joint annual report of the TEC and the CTCN for 2020.

VIII. Joint annual report of the Technology Executive Committee and the Climate Technology Centre and Network for 2020

1. Joint chapter of the joint annual report

31. The TEC considered the draft joint chapter of the joint annual report of the TEC and the CTCN for 2020 prepared by the Chairs and Vice-Chairs of the TEC and the CTCN Advisory Board, as well as the conclusions from the 16th meeting of the Advisory Board on the joint chapter. The TEC requested its Chair and Vice-Chair to finalize the chapter in accordance with the relevant procedure.⁴

2. Report on activities and performance of the Technology Executive Committee in 2020

32. The TEC considered the draft annual report of the TEC for 2020, presented by its Chair, and requested its Chair and Vice-Chair to finalize the report following the conclusion of TEC 21.

⁴ See the joint annual report of the TEC and the CTCN for 2018, available in document FCCC/SB/2018/2, annex I.

IX. Other matters

33. On matters related to the global stocktake, the TEC took note of decision 19/CMA.1, paragraph 24, that invites constituted bodies to provide synthesis reports on the information relevant to their areas of expertise, as an input to the technical phase of the global stocktake process. Taking into consideration that the technical phase is approaching, the TEC agreed to discuss at TEC 22 the preparation of its inputs.

34. The TEC requested its Chair and Vice-Chair, with the support of the secretariat, to undertake intersessional work to elaborate the scope and sources of input for TEC reports to the global stocktake process and present it for consideration at TEC 22.

35. The TEC took note of the invitation from the co-facilitators of the SED to the TEC to participate in the 1st meeting of the SED organized in the context of the second periodic review of the long-term global goal under the Convention during the UNFCCC Climate Dialogues 2020. The TEC agreed to participate in the SED and requested its Chair and Vice-Chair, with support from the secretariat, to present on work undertaken by the TEC that is relevant for the SED in the context of assessing the effect of steps taken by Parties on the provision of means of implementation.

X. Closure of the meeting

36. The Chair reminded members about the information note circulated by the secretariat containing information on membership matters, events organized by the TEC in 2020, and communication and outreach activities of the TEC in 2020.⁵

37. The Chair informed members of the date of the next meeting of the TEC, tentatively scheduled for 19–23 April 2021.

38. The Chair summarized the key outcomes of the meeting and closed it at 3:30 p.m. Central European Time on Friday, 20 November 2020.

⁵ See document TEC/2020/21/INF, available at <https://unfccc.int/ttclear/tec/meetings.html>.

Annex I

Observers attending the 21st meeting of the Technology Executive Committee

Party observers

Nicole Makowski (Argentina)
Michael Buckley (Australia)
Janet Selato (Botswana)
Sonia Regina Mudrovitsch de Bittencourt (Brazil)
Ambrosio Yobánolo del Real (Chile)
Daniela Sifontes (Dominican Republic)
Karla Anguiano (Guatemala)
Crista Villatoro (Guatemala)
Fausto David Diaz Mejia (Honduras)
Kazumasa Okao (Japan)
Taisei Takeda (Japan)
Kenichi Wada (Japan)
Yahya AlHadhdhan (Kuwait)
Bibi Aisha Golamaully (Mauritius)
Tuba Demir Dogan (Turkey)
Siir Kilkis (Turkey)
Mergen Kepbanov (Turkmenistan)
Bahadur Yuldashov (Turkmenistan)
Juliet Meridith (United Kingdom of Great Britain and Northern Ireland)
Ian Lloyd (United States of America)

United Nations organizations and specialized agencies

Rose Mwebaza (CTCN)
Zhong Ping (Chair, CTCN Advisory Board)
Moa Forstorp (Vice-Chair, CTCN Advisory Board)
Katya Kuang (Global Environment Facility)
Victor Owade (World Intellectual Property Organization)

Non-governmental organizations

Eve Tamme (Global Carbon Capture and Storage Institute – BINGO)
Arthur Lee (Chevron – BINGO)
Robert Sakic Trogrlic (Practical Action – ENGO)
Heidi Maree White (College of the Atlantic – ENGO)
Gunnar Boye Olesen (International Network for Sustainable Energy – ENGO)

Resource persons

Marilyn Averill (University of Colorado at Boulder)
Heleen de Coninck (Eindhoven University of Technology)
Abhishek Malhotra (Indian Institute of Technology Delhi)
Gerardina Phylipsen (SQ Consult)
Emerson Resende (GCF)
Ambuj Sagar (Indian Institute of Technology Delhi)
Sara Trærup (UNEP DTU Partnership)

Annex II

Key messages and recommendations on analysing experience, lessons learned and good practices in conducting technology needs assessments and implementing their results

1. On the basis of its analysis of experience, lessons learned and good practices in conducting TNAs and implementing their results, the TEC highlights the following:

(a) Developing countries may wish to consider promoting their TNA results domestically with a view to enhancing their implementation. The TNA results may be shared with stakeholders involved in mitigation- and adaptation-related processes and activities, including NDCs and NAPs. Experts from relevant bodies, such as ministries of finance, representatives of regional development and energy and economy sectors, NDEs and national designated authorities, could be introduced to domestic TNA results as an opportunity to build on them and hence leverage their implementation potential;

(b) Governments may have a major role to play in creating an enabling environment for technology development and transfer by strengthening legal and regulatory frameworks, including by introducing inter alia market-based development instruments for market development;

(c) Enabling environments for technology development and transfer are often supported by effective coordination and communication among government departments and agencies and between government and private sector stakeholders, with the goal of streamlining and facilitating investment in technologies and presenting an integrated approach to international technology development and transfer efforts at the national and subnational level;

(d) Well-selected project development teams and identified relevant decision makers are key actors for successful TNA preparation and implementation of results;

(e) The latest guidance for preparing a technology action plan includes a step for tracking implementation of results after TNA completion, but incentivizing country stakeholders to allow institutions to keep track of their implementation results remains challenging.¹ The TEC will further consider this challenge during future work on TNAs;

(f) Tracking the implementation of TNA results is included not only as a final step in TAP development, but also as an issue to be discussed at the start of the TNA process. Country stakeholders can consider existing monitoring systems in which tracking TNA results could be included (e.g. NDC monitoring requirements under the Paris Agreement, NAPs and national communications) or identify the need for capacity-building for tracking. Another argument for tracking implementation results is that it can help to streamline the process of iterative TNAs, in which a country decides to review or repeat the TNA process;

(g) Regional promotion of success stories, challenges and lessons learned in implementing climate technologies could be beneficial for countries in the same region with similar enabling environments and capacity levels, as it could enable replication of good practices when piloting and deploying technology-related activities and thus support enhanced implementation of climate technologies. Countries are encouraged to engage with regional collaboration centres and regional organizations to support such promotion;

(h) Under the global TNA project, dozens of countries have completed or are currently working on a TNA. This presents a great opportunity for exchanging experience of the TNA process and post-TNA implementation. In the current set-up, TNA coordinators and consultants meet each other at regional TNA workshops. A programme in which TNA coordinators or working groups learn from a country that undertook a TNA in a previous phase, for example through site visits, could be supplementary to the above;

¹ See <https://unfccc.int/ttclear/tna>.

(i) TNA experts involved in previous phases have already been involved in workshops and training in phase III of the global TNA project, which has enabled enhanced cooperation and learning from experience;

(j) International cooperation on meeting technology needs could enhance implementation of TNA results. Countries' technology needs may be addressed with the support of international funding and investment stakeholders with extensive experience in financing climate mitigation and adaptation action;

(k) Access to financial resources are among the main identified challenges to technology development and transfer in developing countries, including the least developed countries and small island developing states. Simplified approaches, where applicable, which will facilitate access to financial tools can accelerate the technology development and transfer in developing countries. Further promotion of implementation plans, and activities may stimulate the interest of financial institutions and stakeholders in investing in climate technologies;

(l) In their TNAs, developing countries identified the need for a combination of market stimulation and human capacity development for advancing the transition to improved enabling environments for technology development and transfer. Supporting programmes aimed at strengthening the institutional and scientific capacity of developing countries, in particular the least developed countries, is critical for creating the long-term enabling frameworks required for technology development and transfer;

(m) In addition to actively involving donors and financial experts in the TNA process, a 'donor conference' could be organized as a final step in the TNA process, which is now planned for phases III–IV of the global TNA project. In this context, it is recommended to demonstrate actual TNA results and success stories, as this builds trust and confidence among potential public and private sector funders. Keeping track of implementation results in relation to TNA-prioritized technologies would support this;

(n) In developing countries, the markets for climate technologies are rapidly expanding hence creating new opportunities for international imports, for domestic production and joint ventures across borders. Familiarizing the private sector with TNA implementation plans and engaging it in project preparation teams may enhance interest in the country's implementation activities. Private sector efforts may also be stimulated by the availability of national support mechanisms and instruments focusing on both mitigation and adaptation action.

2. Based on the above the TEC recommends that the COP and CMA encourages:

(a) Developing countries to engage well-selected project development teams and relevant decision makers for successful TNA preparation and implementation of results;

(b) Developing countries to promote their TNA results regionally with a view to enhancing their implementation;

(c) To further engage the public and private sectors with TNA implementation plans and in project preparation teams;

(d) Relevant stakeholders to promote lessons learned, success stories and challenges in relation to implementation of climate technologies;

(e) International cooperation and support on meeting technology needs to enhance implementation of TNA results.

Annex III

Recommendations of the Technology Executive Committee on ways forward and actions to be taken based on the outcomes of the regional virtual technical expert meetings on mitigation organized in 2020

1. Building on the outcomes of discussions during the four virtual regional TEM-Ms in 2020 on climate-smart cooling solutions for sustainable buildings, the TEC highlights the following:

(a) The buildings sector represents one of the largest energy consuming sector in most of the regional economies, it often consumes over one third of final energy in countries, which results in significant greenhouse gas (GHG) emissions. A wide and accelerated implementation of climate smart cooling solutions for sustainable buildings can achieve significant GHG emission reductions and contribute to meeting the 1.5°C target of the Paris Agreement as well as provide additional economic, social and environmental benefits to the regions and their communities, such as affordable and reliable access to energy efficient cooling, increased investment opportunities, additional sources of income and improved quality of life.

(b) The benefits of climate smart cooling solutions for sustainable buildings go beyond the emission reductions from fossil-fuel consumption, as demonstrated in some regions applying local knowledge and techniques. They also produce other benefits, such as usage of locally produced green building materials, reducing electricity loads on often fragile grid systems, transforming the roles of small and medium enterprises, and ensuring sustainable cooling production;

(c) Governments roles may range from leading in policy making, planning and consultation processes – creating action plans, setting policies, regulations and standards that may incentivise sustainable financing, to supporting R&D of promising cooling technologies through partnership and collaboration. Governments can develop and put in place minimum energy performance standards and labelling schemes for cooling equipment. Appropriate policies and efficient governance tools often drive the required change on the ground. Policy tools and incentives may address broader issues such as urban planning, building design and interest in using energy efficient appliances, which often leads to more demand for high quality cooling systems and less use of energy for cooling.

(d) Access to finance was identified as one of the main challenges to implementation of climate technologies, including smart cooling. Support for smart cooling technologies can play a vital role in the implementation and success of climate technologies. The building sector could have a significant return on investment due to its potential role in offering energy efficient solutions. Enhanced access to financial tools can accelerate the implementation of sustainable cooling solutions and strengthen the markets. A wide variety of financial instruments is readily available to support climate smart cooling, such as green loans and sustainable bonds. A noteworthy development from the regions is the emergence of sustainable finance taxonomies which apply not only in the energy sector, but also in other sectors beyond the production and use of energy.

(e) Awareness raising, capacity building and technical field support are essential to ensure the successful replication of climate smart cooling solutions for sustainable buildings as well as their long-term operation and maintenance. Awareness raising and capacity building programmes on a long-term basis may stimulate actions on both supply and demand side leading to enhanced cooling efficiency by producers, and consumers including industrial and household.

(f) Climate cooling innovations that build on local knowledge and techniques can, in addition to GHG emission reductions, deliver multiple benefits including enhancing the usage of locally produced green building materials, reducing electricity loads on often fragile grids, and reduce amount of cooling production by usage of taking advantage of materials

that prevent collar heat gains. A significant progress was reached in all four regions in terms of implementation, not only by employing the technological solutions, but also by addressing broader issues such as job creation, building indigenous and endogenous capacities, collaboration among stakeholders, and access to cooling equality.

(g) The private sector is becoming more actively engaged to support climate smart cooling solutions for sustainable buildings. However, additional incentives may be required for private investors to engage in this sector, specifically in rural areas where local communities have limited ability to pay for cooling products.

2. On the basis of the above, the TEC recommends that the COP encourage Parties:

(a) To introduce policies, schemes and programmes that promote climate smart cooling solutions for sustainable buildings;

(b) To introduce financial incentives schemes that encourage and facilitate stakeholders to shift to innovative climate smart cooling solutions for sustainable buildings;

(c) To promote initiatives on capacity building and awareness raising on climate smart cooling solutions for sustainable buildings for both the supply and the demand side - covering producers and consumers of cooling services;

(d) To stimulate usage of climate smart cooling innovations that build on local knowledge and techniques and deliver environmental, economic and social benefits to the regions;

(e) To incentivise participation of private sector in supporting climate smart cooling solutions for sustainable buildings.

Annex IV

Key messages and recommendation on technologies for averting, minimizing and addressing loss and damage in coastal zones

3. The TEC welcomes the collaboration with the Executive Committee of the Warsaw International Mechanism in developing a joint policy brief on technologies for averting, minimizing and addressing loss and damage in coastal zones.

4. Drawing on this joint work, the TEC highlights the following:

(a) Various technologies and combinations thereof – hardware, software, and orgware – are currently available to assess and manage climate change related risks and identify recovery and rehabilitation measures for addressing climate-related impacts in coastal zones. Experience of using such technologies can be used to derive lessons learned and opportunities for improvement;

(b) For technologies for risk assessment, there are a number of areas where further improvements can be made: increased awareness of existing technologies; availability and accessibility of high-quality and timely data; appropriate methods and tools for considering multiple hazard types (rapid and slow onset events); and appropriate scales of governance. These areas of improvements also provide opportunities for stakeholders to engage. Scientific dialogues and ongoing efforts by international organizations and partnerships in providing capacity building training and support mechanisms to help disseminate coastal risk assessment technologies are examples of such opportunities;

(c) Technologies for risk retention provide measures for the protection, retention and long-term adaptability of coastal zones and may take the form of structural/engineered measures, organizational and financial planning, legal and regulatory measures, ecosystem-based approaches to adaptation, community-based adaptation, and contingency planning and innovation. These measures require an integrated cross-sectoral approach to coastal zone management. Improving technologies for coastal risk retention is a continuous process and should be supported through the systematic sharing of knowledge and practices;

(d) The complex nature of efforts to avert, minimize and address loss and damage in coastal zones requires different technologies for recovery and rehabilitation, since recovery and rehabilitation happen over multiple time scales, and priorities may shift as a situation progresses. Policy and regulatory tools that enable systems or communities to recover from the effects of a hazard in a timely, efficient manner are available, with international programmes and mechanisms in place to support recovery and rehabilitation. These tools should be complemented by national-level disaster recovery frameworks, which can also incorporate the use of indigenous and local knowledge. Investing in technologies to reduce disaster risks with a focus on prevention and preparedness, while also ensuring an effective emergency response and rehabilitation, is crucial for averting, minimizing and addressing potential loss and damage associated with climate change impacts in coastal zones.

5. The TEC recommends that the COP and the CMA invite Parties to consider the findings of the joint policy brief:

(a) In considering and seeking technological solutions to assess climate-related risks, to retain and manage risks, and to recover and rehabilitate from climate-change related impacts in coastal zones;

(b) In formulating a more comprehensive, long-term approach to rehabilitation and recovery that harmonizes with NAPs and disaster risk reduction strategies;

(c) In stimulating enabling environments that can facilitate the sharing of knowledge and experience among countries, build capacity and upscale dissemination of technologies for averting, minimizing and addressing loss and damage in coastal zones. This could be done through collaboration with international organizations and in close

partnerships with regional and sub-regional institutions and local communities in coastal areas.

Abbreviations and acronyms

| | |
|-------|--|
| BINGO | business and industry non-governmental organization |
| 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 |
| DTU | Technical University of Denmark |
| ENGO | environmental non-governmental organization |
| GCF | Green Climate Fund |
| GHG | greenhouse gas |
| NAP | national adaptation plan |
| NDC | nationally determined contribution |
| RD&D | research, development, and demonstration |
| SED | structured expert dialogue |
| TEC | Technology Executive Committee |
| TNA | technology needs assessment |
| UNEP | United Nations Environment Programme |
