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Development and transfer of technologies
Technology framework under Article 10, paragraph 4, of the Paris Agreement

Information on the activities of the Technology Executive Committee and the Climate Technology Centre and Network relevant to the elaboration of the technology framework

Summary

This document contains information on the activities of the Technology Executive Committee (TEC) and the Climate Technology Centre and Network (CTCN) which are relevant to support the implementation of the Paris Agreement. It was prepared in response to the invitation by the Subsidiary Body for Scientific and Technological Advice at its forty-sixth session in the context of the elaboration of the technology framework established by Article 10, paragraph 4, of the Paris Agreement. The document covers past and ongoing activities of the TEC and the CTCN that are relevant for the implementation of the Paris Agreement, taking into account the key themes of the technology framework and their relation to the technology cycle. It also outlines potential additional activities that the TEC and the CTCN could undertake within their current mandates and functions, individually and jointly, to support the implementation of the Paris Agreement.

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I. Introduction

A. Mandate

1. A technology framework was established 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 in order to support the implementation of the Paris Agreement, in pursuit of the long-term vision referred to in paragraph 1 of the same Article (hereinafter referred to as the technology framework). By decision 1/CP.21, paragraph 67, the Conference of the Parties (COP) requested the Subsidiary Body for Scientific and Technological Advice (SBSTA) to initiate the elaboration of the technology framework at SBSTA 44. Subsequently, the SBSTA continued its deliberations on this matter at SBSTA 45 and 46.

2. SBSTA 46 noted that the ongoing work of the Technology Executive Committee (TEC) and the Climate Technology Centre and Network (CTCN), including their work with relevant stakeholders, may be relevant for the elaboration of the technology framework and in facilitating enhanced actions on technology development and transfer. In this context, it invited the TEC and the CTCN to provide at SBSTA 47 information on the following:

(a) Activities that have been or are currently being undertaken, which are relevant for the implementation of the Paris Agreement, taking into account the key themes and their relation to the technology cycle;

(b) Additional activities that the TEC and the CTCN, subject to available resources, could undertake within their respective mandates and functions, individually or jointly, to implement the Paris Agreement.[1]

B. Approach

3. The TEC and the CTCN collated information on past and ongoing activities of the TEC and the CTCN which are relevant for the implementation of the Paris Agreement, as follows:

(a) Chapter III.A organizes information about the work of the TEC along the thematic areas of the work[2] undertaken by the TEC in implementing its rolling work programme since its inception in 2011. The relevance of each activity to the implementation of the Paris Agreement is highlighted and the relevance of each activity to the key themes of the technology framework[3] and to the technology cycle[4] are mapped and presented in tabular format;

(b) Chapter III.B organizes information relevant to the work of the CTCN according to the key themes of the technology framework with a focus on activities implemented and results achieved, in line with its mandate, during its first four years of operation (2014–2017);

(c) Chapter III.C contains information on the work jointly undertaken by the TEC and the CTCN.

4. In addition, the TEC and the CTCN collated information on additional activities that they could undertake, subject to available resources, within their respective mandates and functions to implement the Paris Agreement, as follows:

[1] FCCC/SBSTA/2017/4, paragraph 34.

[2] Adaptation; climate technology finance; emerging and cross-cutting issues; enabling environments and barriers; innovation and research, development and demonstration; mitigation; and technology needs assessment.

[3] Innovation; implementation; enabling environments and capacity building; collaboration and stakeholder engagement; and support (see document FCCC/SBSTA/2016/4, paragraph 29).

[4] Research and development, demonstration, deployment, diffusion and transfer of technology (decision 1/CP.16, paragraph 115).

(a) Chapter IV.A and IV.B outline potential future activities that the TEC and the CTCN, respectively, could undertake;

(b) Chapter IV.C highlights what the TEC and the CTCN could do jointly to support the implementation of the Paris Agreement.

C. Possible action by the Subsidiary Body for Scientific and Technological Advice

5. The SBSTA will be invited to consider the information contained in this document with a view to informing its further deliberations on the elaboration of the technology framework.

II. Background

A. Technology framework under Article 10, paragraph 4, of the Paris Agreement

6. Article 10, paragraph 1, of the Paris Agreement refers to a long-term vision shared by Parties on the importance of fully realizing technology development and transfer in order to improve resilience to climate change and to reduce greenhouse gas (GHG) emissions. Paragraph 3 of the same Article specifies that the Technology Mechanism shall serve the Paris Agreement. As stipulated in paragraph 4 of the same Article, the work of the Technology Mechanism in serving the Paris Agreement, in pursuit of the long-term vision, will be guided by the technology framework.

7. The COP, by decision 1/CP.21, paragraph 67, requested the SBSTA to initiate the elaboration of the technology framework and to report on its findings to the COP with a view to the COP making its recommendation on the framework to the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement for consideration and adoption at its first session.

8. The COP, by the same decision, requested the SBSTA to take into consideration that the technology framework shall facilitate, inter alia:

(a) The undertaking and updating of technology needs assessments (TNAs), as well as the enhanced implementation of their results, particularly technology action plans (TAPs) and project ideas, through the preparation of bankable projects;

(b) The provision of enhanced financial and technical support for the implementation of the results of the TNAs;

(c) The assessment of technologies that are ready for transfer;

(d) The enhancement of enabling environments for and the addressing of barriers to the development and transfer of socially and environmentally sound technologies.

B. Progress to date on the elaboration of the technology framework

9. Parties initiated the elaboration of the technology framework at SBSTA 44. The SBSTA requested the secretariat to prepare an information note on mapping climate technology development and transfer activities and initiatives under and outside the Convention relevant to the implementation of the Paris Agreement and invited Parties to submit their views on the elaboration of the technology framework, including the content, features and characteristics, the purpose and the themes of the technology framework.[5]

10. SBSTA 45 continued the deliberations on the elaboration of the technology framework, taking into account the information note and submissions from Parties referred

[5] FCCC/SBSTA/2016/2, paragraphs 25 and 26.

to in paragraph 9 above. The SBSTA agreed that the technology framework should be short, concise, balanced and comprehensive and allow flexibility to respond to changes over time. The SBSTA also agreed on the initial key themes for the framework, namely innovation, enabling environments and capacity-building, implementation, support and collaboration and stakeholder engagement. The SBSTA invited Parties, observers and other stakeholders to submit their views on the principles and structure of the technology framework.[6]

11. SBSTA 46 continued the deliberations, focusing on the principles and the structure of the technology framework. The SBSTA agreed that the principles of the technology framework, which are coherence, inclusiveness, result-oriented approach, transformational approach and transparency, should guide the Technology Mechanism in implementing the Paris Agreement, and that the possible headings of the technology framework include purpose, principles and key themes. It invited the TEC and the CTCN to provide inputs on their past and ongoing activities as well as additional activities they could undertake to support the implementation of the Paris Agreement. The SBSTA agreed to continue its consideration of this matter at SBSTA 47, taking into account progress made at SBSTA 45 and 46.[7]

C. Technology Executive Committee

12. The COP, by decision 1/CP.16, decided to establish a Technology Mechanism to facilitate the implementation of enhanced action on technology development and transfer in support of action on mitigation and adaptation. The Technology Mechanism consists of two complementary bodies: the TEC and the CTCN. By the same decision, the COP also decided that the TEC and the CTCN shall report to it, through the subsidiary bodies, on their respective activities and the performance of their respective functions.[8]

13. The TEC is the policy arm of the Technology Mechanism and analyses technology policy issues and provides recommendations to support countries in enhancing their climate technology efforts. The detailed functions of the TEC are contained in decision 1/CP.16, paragraph 121, and the overall mandate of the TEC is presented in the annex to this note.

14. To fulfil its mandates, the TEC organizes its work in thematic areas and implements its activities through a rolling workplan. Since its inception, the TEC has successfully implemented two rolling workplans, for the periods 2012–2013 and 2014–2015, and is currently implementing its 2016–2018 workplan.[9,] The key outputs of the TEC are its key messages and recommendations to the COP. Through these, the TEC highlights measures that countries may take to speed up climate technology action. The TEC also produces policy briefs, called TEC Briefs, and other technical documents to enhance information sharing on climate technology efforts.[10]

15. The TEC works closely with key partners and stakeholders to develop inclusive policy recommendations. Under the Convention, the TEC engages with entities including the CTCN, the Adaptation Committee, the Global Environment Facility (GEF), the Green Climate Fund (GCF), the Least Developed Countries Expert Group (LEG), the Paris Committee on Capacity-building, the Standing Committee on Finance (SCF) and the Executive Committee of the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts. The TEC engages with stakeholders through several means, including calls for inputs and invitations to take part in TEC meetings, participating as experts in TEC task forces, workshops, thematic dialogues, expert meetings and side events. In order to reach out to a wider audience and increase stakeholder engagement, TEC meetings are webcast and open to observers, and the use of social media is maintained.

[6] FCCC/SBSTA/2016/4, paragraphs 24–31.
[7] FCCC/SBSTA/2017/4, paragraphs 31–36.
[8] Decision 1/CP.16, paragraphs 117 and 126.
[9] https://goo.gl/C2BSVN.
[10] All TEC documents, including its annual reports, are available at http://unfccc.int/ttclear/tec/documents.html.

D. Climate Technology Centre and Network

16. The CTCN is the implementation arm of the Technology Mechanism. It is specifically tasked with supporting developing countries in their efforts to deploy transformative climate technologies as they seek to fulfil their national climate priorities. The CTCN works across the entire technology cycle, from technology identification and prioritization, through design and piloting, to deployment and scale-up, while strengthening the frameworks and conditions necessary to foster technology deployment in developing country markets.

17. The CTCN also provides training and capacity-building to developing countries, develops and shares knowledge-based resources and tools through the use of its technology portal, webinars and case studies, and supports networking and collaboration among governments, the private sector and financial institutions.

18. The CTCN is co-hosted by the United Nations Environment Programme (UNEP) and the United Nations Industrial Development Organization and supported by over 400 institutions, organizations and companies from 75 countries that provide the expertise to serve countries with the targeted solutions they need in order to implement their nationally determined contributions (NDCs).[11]

III. Past and ongoing activities undertaken under the Technology Mechanism relevant for the implementation of Paris Agreement

A. Activities undertaken by the Technology Executive Committee

19. The past and ongoing work of the TEC relevant for the implementation of the Paris Agreement is explained in this section, grouped in accordance with thematic areas that have been identified by the TEC.[12]

1. Adaptation

20. All the work under this thematic area may be relevant or contribute to the implementation of Article 7 of the Paris Agreement.

(a) Technologies for adaptation, in collaboration with the Adaptation Committee

21. The TEC has promoted the development and transfer of technologies for adaptation, in collaboration with the Adaptation Committee, by holding a workshop, publishing two TEC Briefs on technologies for adaptation in the agriculture and water sectors, and developing key messages for COP 20.

(b) South–South cooperation and triangular cooperation on technologies for adaptation

22. The TEC highlighted the potential of and promoted South–South cooperation and triangular cooperation on technologies for adaptation by holding a thematic dialogue on enablers and barriers to South–South cooperation, exploring the collaboration with the United Nations Office for South–South Cooperation, delivering key messages for COP 22 and publishing a TEC Brief on South–South and triangular cooperation on technologies for adaptation in the water and agriculture sectors. Currently, the TEC is developing a compilation of good practices on information sharing and practical learning on adaptation technologies, and has agreed to study the potential application of South–South cooperation on adaptation and mitigation technologies, aimed to assist countries in implementing their national adaptation plans (NAPs) and NDCs. This work is also relevant for the implementation of Article 10, paragraphs 2 and 5, of the Paris Agreement.

[11] More information about the work of the CTCN can be found at https://www.ctc-n.org/about-ctcn.

[12] Detailed information about each thematic area of work can be found at http://unfccc.int/ttclear/tec.

(c) Engagement and contribution to the work of the Adaptation Committee in the preparation of the technical expert meetings on adaptation

23. The TEC has been engaging with and contributing to the work of the Adaptation Committee in preparing technical expert meetings (TEMs) on adaptation through the participation of a TEC member in the Adaptation Committee working group on the technical examination process on adaptation and the provision of relevant inputs.

2. Climate technology finance

24. All the work under this thematic area may be relevant or contribute to the implementation of Article 9 and Article 10, paragraph 6, of the Paris Agreement.

(a) Evaluation of the Poznan strategic programme on technology transfer

25. In response to the invitation[13] from the Subsidiary Body for Implementation (SBI) at its forty-first session to evaluate the Poznan strategic programme on technology transfer with the aim of enhancing the effectiveness of the Technology Mechanism, the TEC undertook the evaluation and submitted a final report to COP 21. In response to the invitation[14] from SBI 43 to update the evaluation report, the TEC initiated its work and agreed to complete its updated evaluation report in 2018.

(b) Challenges of, best practices in and lessons learned from climate technology financing

26. The TEC has made an analysis of issues surrounding climate technology financing, including challenges and opportunities, good practices and lessons learned from financing climate technologies, and opportunities for enhancing the implementation of TNAs, by holding an in-session thematic dialogue on climate technology financing. The findings of the analysis were delivered to Parties, policymakers and other stakeholders through a TEC Brief and key messages to COP 21 on climate technology financing.

(c) Linkages between the Technology Mechanism and the Financial Mechanism

27. The TEC has elaborated and enhanced the linkages between the Technology Mechanism and the Financial Mechanism of the Convention, including by delivering recommendations for COP 20, initiating consultations with the CTCN and the operating entities of the Financial Mechanism, and holding an in-session workshop at the forty-fourth sessions of the subsidiary bodies. This work is also relevant for the implementation of Article 10, paragraph 5, of the Paris Agreement.

(d) Collaboration with the Standing Committee on Finance

28. The TEC has been collaborating with the SCF by providing inputs on draft guidance for the operating entities of the Financial Mechanism, inputs to in-session workshops on long-term climate finance, and inputs into the review of the Financial Mechanism.

(e) Collaboration with the Green Climate Fund

29. The TEC has been collaborating with the GCF through the participation of the Chair of the TEC in GCF Board meetings and the annual meeting of the GCF with the UNFCCC thematic bodies. The GCF secretariat has also participated in meetings of the TEC. In 2017 the GCF Board invited the Chairs of the TEC and the CTCN Advisory Board to present to the GCF Board their work on innovation and research, development and demonstration (RD&D) during its consideration of the options for GCF support for collaborative research and development in developing countries.

[13] FCCC/SBI/2014/8, paragraph 142.
[14] FCCC/SBI/2015/22, paragraph 79.

3. Emerging and cross-cutting issues

(a) Engagement with the Executive Committee of the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts

30. The TEC has been engaging with the Executive Committee of the Warsaw International Mechanism to exchange views and explore areas of common interest relevant to the work of both bodies, and provided the recommendations on potential collaboration between the two bodies. This work may be relevant for the implementation of Articles 8 and 10 of the Paris Agreement.

(b) Development and enhancement of endogenous capacities and technologies

31. In response to decision 1/CP.21, paragraph 66(b), the TEC agreed to ensure that this matter is taken into consideration in all areas of work. The current work in this area includes reviewing the concept and scope of endogenous capacities and technologies, examples and requirements in various processes under the Convention. The TEC will also reach out to other bodies of the Convention to seek relevant information in their respective area of work. This work is highly relevant for the implementation of Articles 4, 7, 8, 10 and 11 of the Paris Agreement.

4. Enabling environments and barriers

32. All the work under this thematic area is related to decision 1/CP.21, paragraph 67(d), and may be relevant or contribute to the implementation of Article 10, paragraph 4, of the Paris Agreement.

(a) Various issues relating to enabling environments for and barriers to technology development and transfer

33. The TEC discussed and analysed various issues relating to enabling environments and barriers based upon the information provided at the thematic dialogue organized in conjunction with its 3rd and 4th meetings and submissions from observer organizations, and delivered key messages to COP 18.

(b) Policies and strategies to improve enabling environments and address barriers

34. The TEC has continued considering issues related to enabling environments and barriers, by identifying policies and strategies to improve enabling environments and to address barriers, including its current work on mapping enabling environments and barriers as reported in NDCs, CTCN requests and TNAs.

5. Innovation and research, development and demonstration

35. The TEC worked closely with the Advisory Board of the CTCN in implementing its activities on RD&D. All the work under this thematic area is related to decision 1/CP.21, paragraph 66(a) and may be relevant or contribute to the implementation of Article 10, paragraph 5, of the Paris Agreement.

(a) Research, development and demonstration of climate technologies

36. The TEC held a thematic dialogue which highlighted issues related to the RD&D of climate technologies and identified challenges and opportunities, good practices and lessons learned in undertaking RD&D. The findings were delivered through key messages to COP 19.

(b) National systems of innovation

37. The TEC has promoted enhanced understanding among Parties and stakeholders of how national systems of innovation can play an important role in addressing barriers and serving as enabling environments to technology development and transfer. It worked towards achieving this by organizing a workshop on strengthening national systems of innovation and delivering a TEC Brief and key messages to COP 21. This work may also be relevant to decision 1/CP.21, paragraph 67(d).

(c) Assessment of the global technology research, development and demonstration financing needs

38. The TEC assessed global climate technology RD&D financing needs, including options for stimulating private sector investment in RD&D and deploying climate technologies. Based on this assessment, the TEC published a working paper on enhancing climate technology RD&D financing. The TEC agreed to work further on innovation and RD&D, and noted that this work may be related to further conceptual consideration of the role of innovation, and the innovation of emerging climate technologies such as zero-emission and negative-emission technologies.

(d) Analysis of how innovation can support the implementation of the technology elements of nationally determined contributions and Paris Agreement mid-century strategies

39. The TEC analysed how technological innovation can support the implementation of NDCs and the Paris Agreement mid-century strategies and held a special event on this in May 2017. The TEC developed a TEC Brief and prepared key messages and recommendations to COP 23 in this area. This work contributes to the implementation of Articles 4, 7 and 10 of the Paris Agreement.

6. Mitigation

40. All the work under this thematic area may be relevant or contribute to the implementation of Article 4 of the Paris Agreement.

(a) Engagement in the technical examination process on mitigation

41. The TEC has been engaged in the technical examination process on mitigation and contributed to Parties' work on enhanced action prior to 2020, including by sharing relevant work in various TEMs on mitigation, analysing mitigation policy options with high potential, suggesting future topics of TEMs, and hosting a thematic session on innovative policy and technology solutions for sustainable urban development during TEMs on mitigation. In 2017 the TEC provided inputs to the assessment of the technical examination process on mitigation to improve its effectiveness, which is scheduled to take place at COP 23.

(b) Distributed renewable electricity generation

42. The TEC has worked on distributed renewable electricity generation and provided policy recommendations on options, mechanisms and measures to enhance the technology deployment for this area, by holding a thematic dialogue, delivering a TEC Brief on technology deployment in distributed renewable electricity generation and key messages to COP 21 as well as presenting its findings at the TEM on renewable energy.

(c) Industrial energy and material efficiency in emission-intensive sectors

43. The TEC has worked on the issue of industrial energy and material efficiency in emission-intensive sectors, highlighting the high potential for emission reductions from these sectors, by holding a thematic dialogue, developing a TEC Brief and executive summaries for targeted stakeholders (domestic policymakers, industry, financial institutions and international organizations), and delivering key messages to COP 23 in this area.

(d) Engagement with the high-level climate champions

44. The TEC has been engaging with the high-level climate champions, by providing inputs on potential collaboration that are mutually beneficial to work of the TEC and the Marrakech Partnership for Global Climate Action.

7. Technology needs assessments

45. All the work under this thematic area is related to decision 1/CP.21, paragraph 67(a) and (b) and may be relevant or contribute to the implementation of Article 10, paragraph 4, of the Paris Agreement.

(a) Enhancing the implementation of the results of technology needs assessments

46. The TEC has provided analyses of how the implementation of the results of TNAs can be accelerated by conducting a synthesis of TNAs, TAPs, project ideas and progress in the implementation of the results of TNAs, developing a paper on good practices on TNAs and publishing guidance for preparing a TAP in close collaboration with the UNEP DTU Partnership[15] and the CTCN. These activities are important inputs to Parties in implementing their NDCs. The TEC is also preparing a methodology on monitoring (tracking) of TAP implementation. The methodology was tested with 14 TNA countries during a TNA training workshop in June 2017 in Cotonou, Benin. It will be finalized and turned into TAP monitoring guidance for inclusion in the TEC guidance for preparing a TAP.

(b) Linkages between technology needs assessment and nationally determined contributions

47. The TEC is in the process of analysing the linkages between the TNA process and the NDC process with a view to identifying opportunities for, inter alia, minimizing duplication and leveraging the TNA/TAP process to enhance NDC implementation.

(c) Alignment of technology needs assessments and process to formulate and implement national adaptation plans

48. The TEC has been working, in collaboration with the CTCN, the Adaptation Committee and the LEG, on a paper on how Parties could be helped to align their TNAs with the process to formulate and implement NAPs and will continue this work in 2018. This work could also contribute to the implementation of Article 7 of the Paris Agreement.

(d) Overview of new technology needs assessment and technology action plan reports of the Phase II technology needs assessment project

49. The TEC is in the process of providing an overview of new TNA and TAP reports of phase II of the global GEF-funded TNA project.[16]

8. Others

Technology road map as facilitative tools for action on mitigation and adaptation

50. The TEC held an expert meeting and developed a TEC Brief on using road mapping to facilitate the planning and implementation of technologies for mitigation and adaptation, to promote the use of a technology road map. This work could contribute to the implementation of Articles 4 and 7 of the Paris Agreement.

9. Activities by key themes of the technology framework and technology cycle

51. The relevance of the above-mentioned activities related to the five key themes of the technology framework and to the technology cycle are mapped in the table below.

[15] The partnership, formerly known as the UNEP Risoe Centre, operates under a tripartite agreement between Denmark's Ministry of Foreign Affairs, The Technical University of Denmark (DTU) and UNEP.

[16] Between 2014 and 2017 the UNEP DTU Partnership is implementing phase II of the project, which provides financial and technical support in conducting TNAs to 26 countries. Phase I ran from 2009 to 2013, with 36 developing countries participating.

Past and ongoing activities of the Technology Executive Committee relevant for the implementation of Paris Agreement

Thematic area of the Technology Executive Committee	*Activities of the Technology Executive Committee*	*Relevance to the initial key themes*					*Relevance to the technology cycle*				
		Innovation	*Enabling environments and capacity-building*	*Implementation*	*Support*	*Collaboration and stakeholder engagement*	*Research and development*	*Demonstration*	*Deployment*	*Diffusion*	*Transfer*
	Technologies for adaptation, in collaboration with the Adaptation Committee			X		X			X	X	X
	South–South cooperation and triangular cooperation on technologies for adaptation			X		X	X	X	X	X	X
	Engagement and contribution to the work of the Adaptation Committee in the preparation of the technical expert meetings on adaptation			X		X			X	X	X
	Evaluation of the Poznan strategic programme on technology transfer			X	X	X	X	X	X	X	X
	Challenges of, best practices in and lessons learned from climate technology financing				X	X	X	X	X	X	X
	Linkages between the Technology Mechanism and the Financial Mechanism				X	X	X	X	X	X	X
	Collaboration with the Standing Committee on Finance				X	X	X	X	X	X	X
	Collaboration with the Green Climate Fund	X			X	X	X	X	X	X	X
	Engagement with the Executive Committee of the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts					X			X	X	X
	Development and enhancement of endogenous capacities and technologies		X			X	X	X	X	X	X

Thematic area of the Technology Executive Committee	*Activities of the Technology Executive Committee*	*Relevance to the initial key themes*					*Relevance to the technology cycle*				
		Innovation	*Enabling environments and capacity-building*	*Implementation*	*Support*	*Collaboration and stakeholder engagement*	*Research and development*	*Demonstration*	*Deployment*	*Diffusion*	*Transfer*
	Various issues relating to enabling environments for and barriers to technology development and transfer		X			X	X	X	X	X	X
	Policies and strategies to improve enabling environments and address barriers	X	X	X	X	X	X	X	X	X	X
	Research, development and demonstration of climate technologies	X	X			X	X	X			
	National systems of innovation	X	X	X	X	X	X	X	X	X	X
	Assessment of the global technology research, development and demonstration financing needs	X	X		X	X	X	X	X		
	Analysis of how innovation can support implementation of the technology elements of nationally determined contributions and Paris Agreement mid-century strategies	X	X	X	X	X	X	X	X	X	X
	Engagement in the technical examination process on mitigation			X		X			X	X	X
	Distributed renewable electricity generation		X	X		X			X		
	Industrial energy efficiency and material substitution in carbon-intensive sectors		X	X		X			X	X	X
	Engagement with High-Level Climate Champions and providing inputs on potential collaboration					X			X	X	X

Thematic area of the Technology Executive Committee	*Activities of the Technology Executive Committee*	*Relevance to the initial key themes*					*Relevance to the technology cycle*				
		Innovation	*Enabling environments and capacity-building*	*Implementation*	*Support*	*Collaboration and stakeholder engagement*	*Research and development*	*Demonstration*	*Deployment*	*Diffusion*	*Transfer*
	Enhancing the implementation of the results of technology needs assessments		X	X	X	X			X	X	X
	Linkages between the technology needs assessment and nationally determined contributions			X	X	X			X	X	X
	Alignment of technology needs assessments and the process to formulate and implement national adaptation plans			X	X	X			X	X	X
	Overview of new technology needs assessments and technology action plan reports of phase II of the technology needs assessment project		X	X	X	X	X	X	X	X	X
Others	Technology road map as facilitative tool for action on mitigation and adaptation	X	X	X		X	X	X	X	X	X

B. Activities undertaken by the Climate Technology Centre and Network

52. CTCN assistance covers all stages of the technology cycle: (1) technology identification and selection, based on country and stakeholder needs, for an informed decision-making process of government and private actors in their climate technology choices; (2) technology feasibility, piloting and deployment, to ensure that they are appropriate to national context and markets; (3) policy planning and law, to ensure the mainstreaming of climate technologies issues into national planning processes; (4) project readiness and facilitating financing, through networking with donors and investors to increase country capacities to access funding for their climate technology priorities; and (5) training, awareness-raising and experience sharing on proven and innovative climate technologies.

53. All the past and ongoing work of the CTCN is relevant for the implementation of the Paris Agreement and is briefly outlined below. The submissions have been organized according to the key themes of the technology framework with a focus on activities implemented and results achieved in line with its mandate from the COP during its first four years of operation (2014–2017).

1. Innovation

54. In accordance with the recommendations of the COP and the Advisory Board that it be demand driven and user-friendly, the CTCN will continue to provide technical assistance, upon request, across the climate technologies taxonomy and the technology innovation cycle. These climate technologies and the innovation cycle span the continuum between 'hard' and 'soft' technologies, and involve traditional, modern and high-technology solutions. The CTCN will also continue to organize and categorize its technical assistance so as to more effectively share knowledge, build capacity, communicate and evaluate across the full breadth of climate technology solutions.

55. Specific examples of CTCN technical assistance that advance innovative approaches include the following:

(a) In the Dominican Republic, "A Community-based early warning system in every pocket" is supporting a local initiative to develop and implement new technologies that will enable officials to warn at-risk citizens of impending extreme weather events via smartphone technology. The CTCN intervention will strengthen communications protocols, identify new technologies (including a mobile phone application), and broker private financing for the development and scaling-up of communications infrastructure;

(b) In South Africa, "Substantial GHG emissions reduction in the cement industry by using waste heat recovery combined with mineral carbon capture and utilization" concerns an innovative industrial process with significant potential to reduce the GHG intensity of the sector. The CTCN has partnered with the Government of Japan and Japanese implementing experts to assess the feasibility of this approach and the reduction potential and abatement costs, and assist in the development of a business plan to commercialize the approach.

56. The CTCN participated in the TEC innovation workshop held during the forty-sixth sessions of the subsidiary bodies, and incorporated the outputs of that meeting into its own 'first of a kind' workshop in May 2017. The workshop established a common basis for the discussion of climate technology piloting and demonstration, considering representative examples, and mapping the expertise of Climate Technology Network institutions related to innovative, 'first of a kind' climate technologies. This included identifying necessary adaptation of technologies to local contexts that could be facilitated through the CTCN, and the role the CTCN could play as 'matchmaker' and convenor to engage the private sector to advance climate technology innovation. Discussions addressed new business models and market conditions for demonstration and subsequent deployment.

57. In August 2017, the CTCN and the CARISMA (Coordination and assessment of research and innovation in support of climate mitigation actions) project hosted a graduate-level summer school programme addressing innovation and technology transfer for

mitigation. In addition, the CTCN is involved in the Global Science, Technology and Innovation Conference in October 2017.

58. In view of its mandate to highlight endogenous technologies, the CTCN has engaged its consortium partner Environment Development Action in the Third World in collecting and disseminating information on endogenous technologies for climate mitigation and adaptation. This partner will perform an analytical and comparative review of specific endogenous technology solutions which will be identified through research, interviews and in-country field missions in selected countries in Africa. The collaboration will result in a catalogue of solutions and endogenous technology descriptions that will help to strengthen the CTCN Knowledge Management System and further highlight important climate mitigation and adaptation solutions that can be found at the community, regional and national levels.

2. Implementation

59. CTCN assistance has helped countries to identify and prioritize high-potential, transformative climate technologies for both adaptation and mitigation with the goal of NDC implementation. For example, the CTCN has supported the development of TNAs (e.g. in Pakistan and South Africa) as well as providing technical assistance to implement activities identified in TNAs and TAPs. The CTCN also supports activities to implement nationally appropriate mitigation actions and NAPs, and the development of technical products or support that can be used to inform national planning processes. Just over half of the requests for technical assistance received by the CTCN have been submitted by countries that conducted a TNA in 2009 and 2013, indicating that support in the planning process can lead to requests for technical assistance that help to deliver on these strategies.

60. Specific examples of CTCN technical assistance that advances the implementation theme of the technology framework include the following:

(a) In Thailand, the CTCN implementation partner UNEP-DHI[17] worked with Thailand's national designated entity (NDE), the National Science Technology and Innovation Policy Office, to design an urban flood early warning system for a high-risk catchment within the Bangkok metropolitan area. The resulting flood warning system: provides information on flood risk zones to residents and commuters through an automated web and mobile platform; empowers Bangkok city staff with early-warning management skills; proposes methods to expand the system through a city-wide warning platform; and disseminates findings to other municipalities in the region to share best practice;

(b) In Bosnia and Herzegovina, the CTCN provided technical assistance to rehabilitate and modernize the district heating system in the city of Banja Luka. CTCN partner UNEP conducted a city-wide analysis to assess the status of the district heating network and energy efficiency, building efficiency, appropriateness of current heat production sources and the financial situation, including current tariff levels and customer connections rates. The CTCN leveraged a relatively small technical assistance investment to provide the city of Banja Luka with a strategy to significantly upgrade its district heating and finance the implementation of the proposed changes. The proposed CTCN strategy has attracted funding interest from different stakeholders.

3. Enabling environments and capacity-building

(a) Enabling environments

61. At the request of developing countries, the CTCN contributes to the strengthening of enabling environments that build the absorptive capacity of host countries. This work includes, but is not limited to, proposals to support the drafting of new legislation and regulations, feasibility and technology studies, market analyses and other interventions according to the degree of a country's industrial development.

[17] A UNEP centre hosted at DHI, a water resource management not-for-profit foundation.

(b) Capacity-building

62. Capacity-building is an important building block of the work of the CTCN. This includes building or strengthening the capacity of developing countries, in particular the least developed countries and small island developing States, to identify technology options, make technology choices and operate, maintain and adapt technology that will help to increase resilience and mitigate GHG emissions in line with their national priorities.

63. In addition to hosting regional capacity-building forums for its NDEs (16 forums, 600 participants), the CTCN hosts climate technology webinars presented by its network members (42 webinars, 2,500 participants) and continues to develop specific capacity-building and training modules featuring topics that include the preparation of concept notes and project proposals for submission to the GCF. The CTCN also participated in the initial meeting of the Paris Committee on Capacity-building, sharing best practice and its experience on the ground in building capacity for countries to absorb climate technologies.

64. Most CTCN technical assistance includes a capacity-building component and/or assistance for in-country enabling environments. Specific examples of CTCN technical assistance interventions that support enabling environments and capacity-building include the following:

(a) Colombia has implemented national policies to promote increased adoption of energy efficiency measures and renewable energy sources, and needed a tool to monitor and evaluate the effectiveness of its efforts and to explore additional types of incentives. The CTCN partners the National Renewable Energy Laboratory, Bariloche Foundation and Energy Research Centre of the Netherlands delivered the evaluation mechanism, recommended additional actions and developed a monitoring and evaluation framework to monitor future progress;

(b) Uganda’s Ministry of Energy and Mineral Development requested support in drafting a geothermal law and supporting policies, as well as a review of existing regulations to attract private sector investment. CTCN partner Carbon Counts undertook an analysis of geothermal potential and barriers to its deployment at scale, engaged local stakeholders and proposed draft legislation and supporting regulations that would enable officials to develop Uganda's significant geothermal resources;

(c) CTCN partner UNEP DTU Partnership, working closely with the NDE, the private sector and other government departments, developed a climate-smart agriculture manual for agriculture education in Zimbabwe that will be integrated into all national agriculture learning curricula for training of agriculture extension officers. The manual will form the basis for a standardized approach to mainstreaming climate change into the country's agriculture-based economy by guiding extension officers and practitioners to address climate change vulnerability issues, and promote sustainable development in the country's agriculture sector. The draft manual already serves as a source of climate-smart practices for various proposals, including to the GCF.

4. Collaboration and stakeholder engagement

65. Stakeholder engagement plays an integral role in every technical assistance intervention undertaken by the CTCN. Each response is planned in close consultation with stakeholders, coordinated through country technology focal points, screened for gender considerations and assessed for impacts on the ground and against national climate priorities. Regional forums bring together local public and private sector stakeholders to contribute to needs analyses, and partners such as the Private Financing Advisory Network are engaged to identify opportunities to enhance the impact of CTCN activities.

66. Examples of CTCN interventions that support the collaboration and stakeholder engagement theme of the technology framework include the following:

(a) In the Southern African Development Community, the CTCN and its partners are developing the “Regional efficient appliance and equipment strategy in Southern Africa” to address rising energy demand due to economic development and the increased use of appliances. The CTCN intervention brings together governments, utilities and

appliance manufacturers and will prioritize relevant energy-efficient products and concrete actions to maximize regional and country financial, energy and climate benefits by 2030;

(b) Brazil submitted a request for "Technical assistance for the animation of the Brazilian hydrogen energy research and development network", an innovative request that is being implemented in partnership with the European Hydrogen Association. By pairing cutting-edge industry expertise with a high-potential low-carbon opportunity, the CTCN is facilitating a public–private partnership that has the potential to measurably reduce emissions in relation to a 'business as usual' scenario from several key sectors in Brazil.

5. Support

67. In addition to working with the Financial Mechanism to clarify the process to mobilize funding for climate technologies, the CTCN is acting to support NDEs in their objectives by:

(a) Managing a series of pilot projects financed by the GEF;

(b) Enabling participation in NDE meetings, CTCN Advisory Board meetings and sessions of the COP;

(c) Co-hosting regional workshops among country climate focal points, especially technology and financial focal points;

(d) Organizing regional forums back to back with meetings of GCF NDAs, where possible;

(e) Preparing and submitting proposals originating from CTCN technical assistance requests to the GCF Readiness and Preparatory Support Programme.

68. CTCN technical assistance prioritization criteria favour scalable opportunities that can be financed by bilateral and multilateral sources, including the following:

(a) Guinea has developed a series of policies to adapt to climate change, including a national adaptation programme of action. The CTCN, in collaboration with the Green Technology Centre Korea worked with local partners to increase access to finance for adaptation projects. From a wide array of project ideas and national plans, the assistance identified 5 projects and a community of 30 'champions' that have been trained and coached to develop robust concept notes. These consolidated project ideas have been presented to international donors and each project has a specific road map for donor follow-up;

(b) Tonga submitted a request for technical assistance for the development of an energy efficiency master plan. Working with the GCF focal point and the NDE, CTCN experts developed a GCF readiness proposal for the GCF to evaluate options and costs for energy efficiency measures for all major sectors of the Tongan economy that has the potential to lower costs while reducing GHG emissions.

C. Activities undertaken collaboratively between the Technology Executive Committee and the Climate Technology Centre and Network

69. In the spirit of enhancing coherence and synergy in the work of the Technology Mechanism, the TEC and the CTCN have worked closely together in various ways since the full operationalization of the two bodies in 2013 in responding to tasks mandated to them by Parties.

70. In addition to preparing the joint annual reports to the COP and updating the procedures for preparing the joint chapter, the TEC and the CTCN have been collaborating closely on a number of activities and maintaining regular communication, including the participation of the Chair and Vice-Chair of the Advisory Board of the CTCN in the meetings of the TEC, which complements the membership of the Chair and Vice-Chair of the TEC of the Advisory Board of the CTCN. The TEC and the CTCN have regularly co-organized side events during sessions of the subsidiary bodies and the COP on various thematic areas.

71. The two bodies initiated collaboration on TNAs with the organization of an in-session workshop on TNAs during the 7th meeting of the TEC and continued to collaborate in this area with the aim of facilitating the preparation and implementation of TAPs and exploring options for the alignment of the TNA process with the process of formulating and implementing national climate action plans.

72. The TEC and the CTCN worked together to strengthen the linkages between the Technology Mechanism and the Financial Mechanism, including through consultation with the operating entities of the Financial Mechanism and an in-session workshop at the forty-fourth sessions of the subsidiary bodies.

73. In the context of enhancing pre-2020 action, both the TEC and the CTCN engaged in and provided inputs to the technical examination processes on mitigation and adaptation to facilitate the implementation of policies, practices and actions.

74. In addition, the TEC and the CTCN explored opportunities to promote South–South cooperation and triangular cooperation on technologies for adaptation, in collaboration with relevant stakeholders.

75. In supporting the implementation of the Paris Agreement, the TEC and the CTCN collaborated in the area of climate technology innovation and RD&D, including through the organization of events on innovation in May 2017 and the participation of the Chair and Vice-Chair of the CTCN Advisory Board in the TEC task force on innovation and RD&D.

76. The TEC and the CTCN conducted joint communication and outreach activities, including through the work of the knowledge management system of the CTCN, the technology information clearing house TT:CLEAR and social media.

IV. Additional activities that could be undertaken by the Technology Mechanism to implement the Paris Agreement

A. Additional activities of the Technology Executive Committee

77. Climate technologies for mitigation and adaptation will play an important role in the implementation of NDCs and NAPs for all countries to realize the transformational changes envisioned in the Paris Agreement.

78. In this regard, the future work of the TEC will need to consider technological solutions that can help countries to achieve the aims of the Paris Agreement. These may include available technologies, indigenous knowledge and technologies, and innovative and new technologies such as zero and negative emission technologies. The co-benefits, opportunities and risks of such technologies will need to be taken into consideration.

79. The TEC also recognizes the synergy between the Paris Agreement and sustainable development goals (SDG).

80. The current mandate of the TEC is broad enough, and thus has so far allowed the TEC to undertake various activities across different themes on technology development and transfer.

81. To support the implementation of the Paris Agreement, the TEC, beyond its current activities, could undertake the following:

(a) Analyse available and new technologies and innovation that are important to all countries for the implementation of NDCs and NAPs through, inter alia, exploring technological solutions linked to the work of the Intergovernmental Panel on Climate Change;

(b) Develop additional policy guidance tools in the key areas of the technology framework;

(c) Develop linkages with relevant institutions, partnerships, organizations and initiatives that already work in SDG areas, including the Technology Facilitation Mechanism;

(d) Develop a system to monitor and evaluate the impact of its work.

82. Available data collected from various sources by the TEC may be useful to the global stocktake referred to in Article 14 of the Paris Agreement.

B. Additional activities of the Climate Technology Centre and Network

83. By creating an enabling environment for the implementation of appropriate climate technology, the CTCN facilitates action on the ground and contributes to a reduction in GHG emissions, strengthened resilience to the impacts of climate change and enhanced sustainable development in participating countries. The CTCN leverages its convening power to source leading expertise and facilitate public–private partnerships, as well as South–South and triangular cooperation in support of developing country climate priorities. For instance, the CTCN partnered with the Government of Thailand to assist Bhutan in reducing GHG emissions from its transportation sector. As part of the technical assistance intervention, the Thai NDE organized an information-sharing training programme on intelligent transport systems to help to build capacity among the Bhutanese NDE team and other government stakeholders. The technical assistance provided enhanced public transport management knowledge and skills, and is expected to reduce GHG emissions through improved public transport and increased passenger numbers. The CTCN can build on such examples by continuing to leverage local and regional knowledge to enhance its service delivery to developing country NDEs.

84. The CTCN is a primary link between the UNFCCC process and the climate technology innovators and experts whose skill is required to deliver on the ambition of the Paris Agreement. It currently operates at approximately half of its intended budget, and manages to deliver, with its implementing partners, a full suite of expert services that support the objectives of constituted bodies such as the GCF and the Paris Committee on Capacity-building. Sufficient, predictable and sustained funding will be key to the continued delivery of CTCN services at any reasonable level of ambition.

85. A selection of activities that could be undertaken by the CTCN that are relevant to the implementation of the technology framework include:

(a) Further engagement and collaboration with NDEs in order to foster transformational requests that will lead to concrete positive impacts in executing NDCs, NAPs and other national climate strategy documents. The CTCN intervention in the Southern African Development Community, for example, aims to develop a regional efficient appliance and equipment strategy that will drive market transformation to maximize the financial, energy and climate potential of household appliances. This type of regionally transformative intervention can multiply the effectiveness of the assistance provided and make more efficient use of financial resources;

(b) Strengthening linkages with both operating entities of the Financial Mechanism, building on the GCF collaboration currently under way and the pilot projects being implemented with the GEF. This includes the relevant suggested activities and actions identified in decisions 14/CP.22 and 15/CP.22;

(c) Sustained and active engagement with CTCN consortium partners to ensure best use of resources and expertise, and strengthen CTCN service offering, including through, for example, the provision of a 'quick response' service;

(d) Expanding and enhancing network engagement, including enhancing peer learning, and broaden outreach to industrial associations to raise awareness of the CTCN service offering and expand the skills available to address developing country needs;

(e) Enhancing awareness of CTCN services at the national level in developed countries, including with development agencies, which will enable access to additional resources including pro bono support.

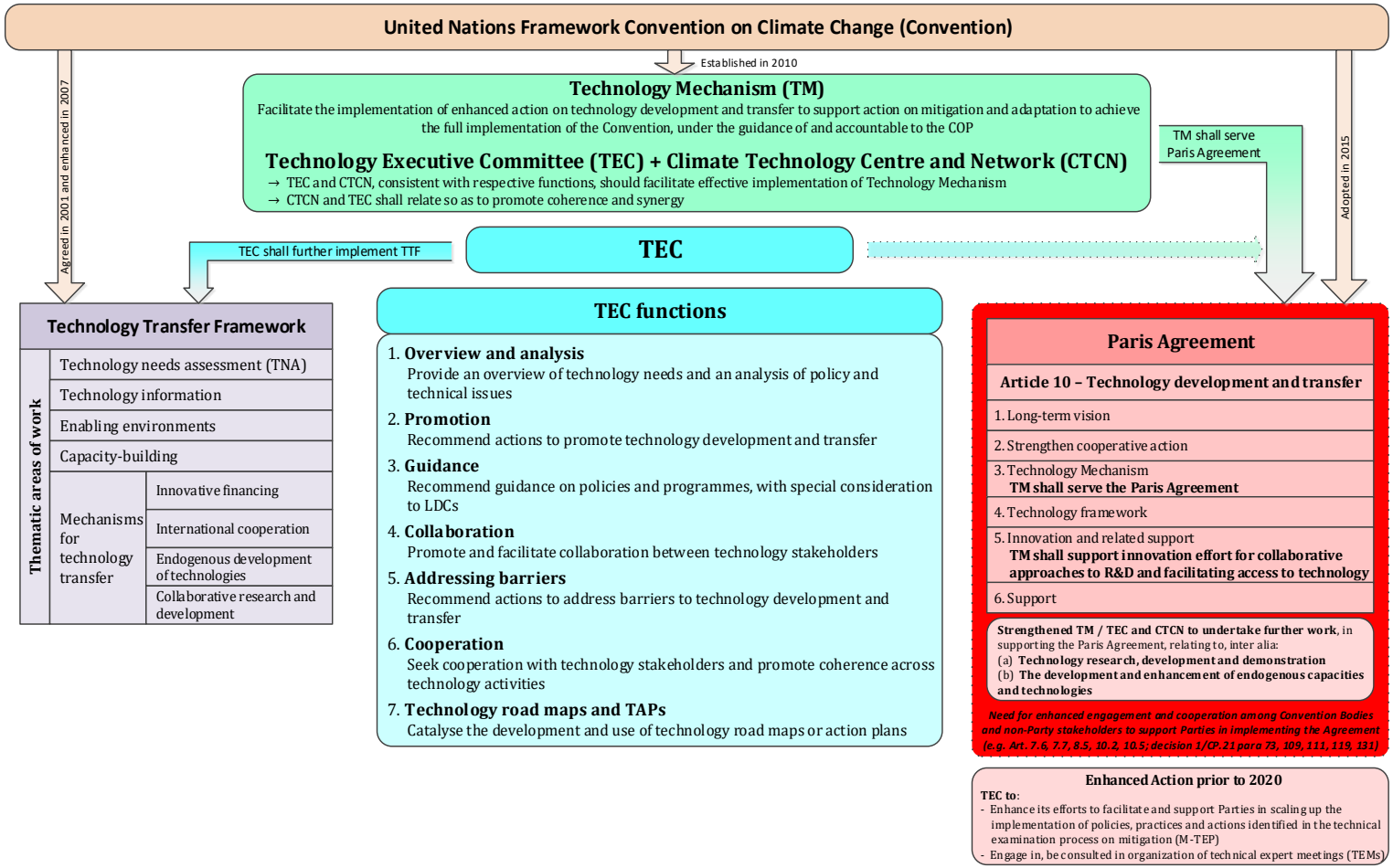
C. Additional joint activities of the Technology Executive Committee and the Climate Technology Centre and Network

86. The TEC and the CTCN will continue to work together to ensure coherence and synergy in supporting countries to implement the Paris Agreement as guided by the technology framework, including through enhanced feedback between the two bodies.

Annex

Overall mandate of the Technology Executive Committee

General mandates of the TEC



Abbreviations: COP = Conference of the Parties, CTCN = Climate Technology Centre and Network, LDCs = least developed countries, M–TEP = technical examination process on mitigation, R&D = research and development, TAPs = technology action plans, TEC = Technology Executive Committee, TEMs = technical expert meetings, TM = Technology Mechanism, TNA = technology needs assessment, TTF = technology transfer framework.