

Report of the expert meeting on technology roadmaps

Summary

- At its fifth meeting, the Technology Executive Committee (TEC) requested the secretariat to prepare a report of the expert meeting on technology roadmaps, held on 25 March 2013 in Langer Eugen, Bonn, Germany.
- This report, contained within, provides a summary of the aforementioned expert meeting on technology roadmaps. The report contains a summary of the eight presentations made and the general discussions carried out during the expert meeting and a section on possible items for further consideration.
- The TEC may wish to take this report into account when considering further work to be undertaken in the area of technology roadmaps, in accordance with its related mandated function.
- The TEC, in considering further work to be undertaken, may wish to take into account the following elements, as outlined in the report:
 - (a) What potential role might TRMs play to support enhanced action on adaptation to climate change?
 - (b) What good practises of TRMs could be used in adaptation planning and implementation processes under the Convention and how could these be shared with stakeholders?
 - (c) What key actions could be adopted to catalyse the development and use of TRMs or TAPs by Parties in the area of adaptation and how could these be effectively implemented?
 - (d) How may TRMs be integrated with other planning processes under the Convention, such as TNAs, TAPs, NAMAs and NAPs?
 - (e) What potential roles could the TEC or other relevant bodies or processes under the UNFCCC play to catalyse the development and use of these roadmaps to stimulate action on mitigation and adaptation to climate change at the national, regional and international levels?

Report on the expert meeting on technology roadmaps

Held on 25 March 2013
Langer Eugen, Bonn, Germany

I. Background

1. By decision 1/CP.16, one of the functions of the Technology Executive Committee (TEC) is to catalyse the development and use of technology road maps (TRMs) or action plans at the international, regional and national levels through cooperation between relevant stakeholders, particularly governments and relevant organizations or bodies, including the development of best practice guidelines as facilitative tools for action on mitigation and adaptation.¹

2. Pursuant to this function, and in accordance with its rolling workplan for 2012-2013, in 2012 the TEC undertook two activities related to TRMs:

(a) An inventory of TRMs, comprising more than 500 TRMs, was developed and converted into a searchable database on the technology information platform of the TEC (TT:CLEAR), and;

(b) A background paper on TRMs was commissioned and work on the background paper began, led by a taskforce consisting of six TEC members: Kanat Baigarin, Albert Binger, Sufyan Emiroglu, Matthew Kennedy, Krzysztof Klineciewicz, and Omedi Moses Jura. This background paper was completed in early 2013.

3. COP 18 noted² that the TEC, in addition to the activities already planned in its rolling workplan for 2012–2013 and consistent with its functions, will undertake specific follow-up activities in 2013 on, inter alia, technology road maps, as identified in the report on activities and performance of the TEC for 2012 to the COP. In this report the TEC agreed that one of its follow-up activities should be to organize an expert meeting with a focus on technology road maps in the area of adaptation to climate change.³

II. Scope of this note

4. This note provides a summary of the expert meeting on technology roadmaps referred to in paragraph 3 above. This note contains a summary of the eight presentations⁴ and general discussions carried out during the expert meeting and a section on possible items for further consideration. The TEC may wish to take this note into account when considering further work to be undertaken in the area of technology roadmaps for climate change, in accordance with its related mandated function.

¹ Decision 1/CP.16, paragraph 121.

² Decision 13/CP.18, paragraph 9.

³ FCCC/SB/2012/2, paragraph 43(c).

⁴ Available at: <http://unfccc.int/ttclear/templates/render cms_page?s=TEM_expert_meeting.>

III. Proceedings

5. The expert meeting on technology roadmaps was organized by the TEC, in collaboration with the UNFCCC secretariat, and was held on the 25 March 2013 in Langer Eugen, Bonn, Germany.

6. The overall objectives of the expert meeting were to:

(a) Share experiences of developing and using TRMs between different stakeholders and the TEC;

(b) Seek ideas on the potential roles the TEC or other relevant bodies or processes under the UNFCCC could play to catalyse the development and use of these roadmaps to stimulate action on mitigation and adaptation to climate change at the international, regional and national levels.

7. More specifically, the expert meeting aimed to:

(a) Share good practices and lessons learned from developing and using TRMs for mitigation and adaptation;

(b) Identify specific needs and actions that could assist Parties in developing and using TRMs for adaptation;

(c) Identify the potential role that the TEC and TRMs might play to support enhanced action on adaptation to climate change.

8. The agenda of the expert meeting, prepared in consultation with the Chair and Vice-Chair of the TEC, and the TRM task force, included three sessions: experiences and lessons learned from developing and using technology road maps; catalysing the development and use of technology road maps for adaptation to climate change; and the way forward. The second session consisted of a breakout session on strategies and recommendations for developing and using TRMs for adaptation.

9. The expert meeting was attended by 23 experts, including members of the TEC, the Vice-Chair of the Least Developed Countries Expert Group (LEG), a member of the Adaptation Committee (AC), two experts from Parties, three representatives from academia, two representatives from the private sector, a representative from an international governmental organization and a representative from a regional development bank.

IV. Summary of the meeting

A. Welcome and opening

10. The expert meeting was opened by Mr. Gabriel Blanco, Chair of the TEC, who recalled the function of the TEC with regards to TRMs, reiterated the key messages of the TEC regarding TRMs which were delivered to COP 18 and highlighted the objectives of the expert meeting. Following this opening, a representative from the secretariat, Ms. Wanna Tanunчайwatana, gave a brief welcome to all participants and encouraged their active participation in the meeting.

B. Session I: Experiences and lessons learned from developing and using technology road maps

11. Session I of the meeting was chaired by Mr. Antonio Pflüger, Vice-Chair of the TEC, and focused on sharing experiences and lessons learned with participants regarding developing and using TRMs.

2. Part I: Setting the scene

12. In Part I, the first presentation was given by Mr. Marc Londo, Senior Manager of the Energy Research Centre of the Netherlands on the background paper on technology road maps of the TEC. Mr. Londo's presentation outlined some of the outcomes of the background paper, including a possible definition of a TRM, the identification of a quality roadmap including evaluation criteria, an overview of the review of the inventory of the TRMs and key findings from this review. Some of the key findings were that: mitigation TRMs dominate over adaptation; the majority of TRMs are focused on and drafted by developed countries and intergovernmental organizations; there are very few good quality TRMs (according to the criteria developed by the consultants in the background paper); and that there is a need to provide guidance in order to improve the quality of TRMs. With regards to TRMs for adaptation, Mr. Londo highlighted that only 11 out of the 159 TRMs analyzed in the inventory were on adaptation related themes.

13. The second presentation was given by Mr. Gabriel Blanco, Chair of the TEC. The first part of Mr. Blanco's presentation focused on providing an overview of the work undertaken by the TEC on TRMs, including noting that in 2012 the TEC had issued a call for inputs from relevant organizations on TRMs and had received seven such inputs, which are all available on the technology clearing house, TT:CLEAR.⁵ Included in the submissions by these organizations were summaries of the organization's work on TRMs, completed TRMs, and online tools to aid in the preparation of TRMs.

14. In the second part of his presentation Mr. Blanco highlighted possible linkages between TRMs and other planning tools under the Convention, such as technology needs assessments (TNAs), technology action plans (TAPs), national adaptation plans (NAPs) and nationally appropriate mitigation actions (NAMAs). Mr. Blanco noted that TRMs may be able to integrate with and complement other technology transfer efforts under the Convention by providing milestones and concrete actions for a specific technology. They may also help to inform national decision makers and other stakeholders of possible technology options for these processes under the Convention. Finally, TRMs may offer insights into the technical, institutional and financial requirements of prioritized technologies.

15. In the following discussions, participants noted: the need for political and financial support and monitoring systems for the successful implementation of TRMs; the predominance of TRMs in the English language in the TRM inventory; challenges in differentiating TRMs from TAPs; the importance of considering the technologies required for implementing NAPAs, particularly in least developed countries; the need for a clear definition of TRMs; and the lack of TRMs for adaptation.

3. Part II: Good practices, methods and tools for developing and using technology road maps

16. In Part II, experts were invited to share their experiences with regards to TRMs at the international, regional and national levels. The first presentation was given by Ms.

⁵ Available at: < http://unfccc.int/ttclear/templates/render cms_page?s=TEM_tec_cfi_rm>.

Cecilia Tam, Unit Head of Energy Demand Technologies of the International Energy Agency (IEA), on IEA's experiences in developing 17 international and two national-level TRMs in the energy sector. In her presentation Ms. Tam provided the IEA definition of a TRM, described IEA's guidebooks on TRMs, outlined the IEA roadmap development process and gave examples of roadmaps undertaken by IEA at the global and national level. She noted that wide stakeholder engagement is essential to ensure support, buy-in and dissemination of the roadmap.

17. Dr. Xuedu Lu, Advisor of the Asian Development Bank (ADB), followed this presentation with a presentation on ADB's experiences of developing and using technology roadmaps in Asia. Dr. Lu described ADB projects in different parts of the Asian region which include roadmap components and noted that ADB, as a regional bank, is focused on the investment aspects of these projects. He noted that TRMs are a tool to assess feasibility, develop business and financial models for bankable projects and prepare projects for investment. Dr. Lu added that TRMs may provide a clear picture for technology investment and identify possible sources of finance.

18. The third presentation was made by Ms. Celia Greaves, Chief Executive Officer of Synnogy Ltd / Energy Generation and Supply Knowledge Transfer Network / UK Hydrogen and Fuel Cell Association, on experiences from developing and using technology roadmaps in the United Kingdom. Ms. Greaves focused her presentation on the UK Fuel Cell development and deployment roadmap, highlighting the actors involved and the process used to develop the roadmap. Amongst the lessons learned from the process, Ms. Greaves noted that: a steering group is invaluable to confirm methods and add legitimacy; wider engagement, including through workshops, leads to greater buy-in; achieving consensus enhances the impact of the roadmap; and, if defining actions, specifying timings and owners of the actions is important.

19. The final presentation was given by Mr. L Rajasekar, Executive President of Ultratech, on experiences from developing and using technology roadmaps in the business sector in India. Mr. Rajasekar described the process for the development of an industry specific TRM on low-carbon technology for the Indian cement industry and noted that social acceptance, political will, policy development and financial support are essential to ensuring widespread deployment and implementation of the roadmap. In particular, he emphasized the importance of ensuring active involvement of local and national policy makers and financial institutions at an early stage of the preparation of the roadmap.

20. In the subsequent discussion, participants commented on several issues including noting: the importance of creating TRMs which are coherent and integrated with other industry and national policy objectives; the possibility of using the example of the Indian cement sector to stimulate other important emitting sectors; the need to implement long-term TRMs following the IEA model; the example of the mitigation and adaptation TAPs recently submitted by Moldova as documents that demonstrate what elements might be included in a TRM; and the possibility of first developing national TAPs to determine if, or how many, TRMs are needed.

C. Session II: Catalysing the development and use of technology road maps for adaptation to climate change

21. Session II was chaired by Mr. Gabriel Blanco, Chair of the TEC, and Part I of this session focused on the role of technologies in efforts to adapt to climate change and the potential integration of these technologies into national adaptation processes.

2. Part I: Potential roles of technology road maps for adapting to climate change

22. Mr. Richard Klein, Senior Research Fellow of the Stockholm Environment Institute, gave the first presentation of this session on strategies for the effective use of technology to adapt to climate change. In this presentation, Mr. Klein noted that adaptation to climate change is a process that comprises more than the deployment of technology hardware; it also explicitly includes considering soft technologies and non-technological options to complement and facilitate the use of technology. Furthermore, the effectiveness of technology to support adaptation to climate change depends on the economic, institutional, legal and socio-cultural contexts. Mr. Klein contended that finance for adaptation needs to move from stand-alone technology-oriented projects to strategic national, regional and sectorial programmes that integrate adaptation (and the deployment of technology) into development plans.

23. With regards to TRMs, Mr. Klein sustained that roadmaps should emerge from, and be part of, a comprehensive adaptation planning process. They should go beyond a focus solely on implementation to include other stages of the adaptation process, as well as links with ongoing development planning. He noted that the scale and scope of TRMs are important to consider; national-level roadmaps may not be as effective as sectorial or local ones.

24. Mr. Golam Rabbani, Research Fellow of the Bangladesh Centre for Advanced Studies, then gave a presentation on adaptation technologies in agriculture, focusing on experiences from Bangladesh. Mr. Rabbani identified the major climate induced hazards that affect Bangladesh and described the adaptation policy and strategy of the Government of Bangladesh and the key adaptation technologies in agriculture in the country. These key technologies included: stress (flood, drought and salinity) tolerant varieties, short duration crops, innovative farming practices (floating gardens, irrigation efficiency), crop diversification, changes to the cropping pattern, adjustments in the irrigation system (excavation of mini-ponds, supplementary irrigation) and changes to the cropping intensity (i.e. X crops in a year).

3. Part II: Breakout sessions: Strategies and recommendations for developing and using technology roadmaps for adaptation

25. In Part II of this session, participants broke into two groups to consider two questions posed by the Chair:

(a) Question 1: What are five good practises of TRMs that could be used in adaptation planning and implementation processes under the Convention, related to technology?

(b) Question 2: What are five key potential actions which could be undertaken to catalyse the development and use of TRMs or TAPs by Parties in the area of adaptation?

26. For one breakout group the moderator and rapporteur were Mr. Matthew Kennedy and Mr. Kanat Baigarin respectively, while for the other group they were Mr. Omedi Moses Jura and Mr. Krzysztof Klinecicz; all four are members of the TEC TRM taskforce.

4. Part III: Outcomes of the breakout sessions and discussion of the potential role of the Technology Executive Committee

27. Following the breakout group session, in a plenary setting the rapporteurs reported back to participants of the expert meeting on the accumulated and non-exhaustive responses of each of the breakout groups to the aforementioned questions.

28. With regards to the first question, the breakout groups suggested various possible good practises of TRMs, including that they:

- (a) Be integrated sectorially and geographically, and include learning from traditional technologies;
- (b) Address barriers;
- (c) Have set criteria/index/metrics that are vast in range to describe risks, and clear information systems and data monitoring;
- (d) Have a political commitment, financial resources allocated;
- (e) Include guidance at the implementation level;
- (f) Have long-term planning;
- (g) Be based on principles of inclusiveness (such as gender) and adopt a participatory approach;
- (h) Include participation of and create interest with stakeholders, including the private sector;
- (i) Be a demand driven or bottom up process, adjustable to local/national/etc. circumstances;
- (j) Specify priorities, timescales, ownership of solutions and funding requirements;
- (k) Include statements of willingness or commitments to guarantee the legitimacy of the process;
- (l) Focus on improving access to existing technologies;
- (m) Be a knowledge based process.

29. With regards to the second question, participants suggested possible key actions to catalyse the development and use of TRMs or TAPs by Parties in the area of adaptation such as:

- (a) Recommending that governments have comprehensive climate change action plans;
- (b) Basing TRMs or TAPs on a sound understanding of specific adaptation challenges;
- (c) Linking TRMs or TAPs to the results of TNAs;
- (d) Integrating currently fragmented efforts;
- (e) Sharing knowledge and experiences using existing or new channels (such as the Nairobi Work Programme or CTCN);
- (f) Delegating planning responsibility to the appropriate level (international, regional, national, local), based on circumstances;
- (g) Learning from existing TNA reports, TNA implementers (UNEP Riso, GEF) and stakeholders;
- (h) Undertaking a gap analysis of existing NAP activities to determine which technology actions are required;
- (i) Undergoing risk assessment to identify actions;
- (j) Including a working matrix of environmental issues of concern and responding appropriate technologies;

(k) Overcoming barriers by strengthening capacities of project implementers at the local level and ensuring regulatory/legislative environment is in place to enable countries;

(l) Establishing a roadmap guidance tool to assist implementation of TAPs and develop national innovation systems.

30. Following the reports by the rapporteurs, in the ensuing discussion participants:

(a) Discussed the possible role of the TEC regarding TRMs, including possible linkages between TRMs and other planning processes under the Convention;

(b) Noted the need for close collaboration/dialogue with the AC, including referring to the work plan of the AC;

(c) Noted the need for close collaboration/dialogue with the LEG, including referring to the LEG's technology guidelines for the NAP process;

(d) Noted the importance of responding to the needs of the adaptation community;

(e) Asked what the next steps should be for the TEC with regards to TRMs;

(f) Noted that there should be consistency and coherence in national adaptation processes;

(g) Asked whether there was a need for TRMs within the Convention;

(h) Suggested developing a concept TRM on adaptation;

D. Session III: Way forward

31. Mr. Antonio Pflüger, Vice-Chair of the TEC, gave a summary of the expert meeting, recalling the objectives of the meeting, the presentations made by the expert participants and the outcomes of the breakout groups. He noted the range of TRMs presented and the divergent definitions of TRMs that could cover the development, deployment and transfer of technology. He also highlighted that the process of developing a TRM is as important as the final TRM, and that stakeholder engagement is important in the roadmapping process. On the way forward, he recalled discussions during the expert meeting on the possibility of refining the background document for future publication and the elements that could be added to continue to clarify the relationship between TRMs and TAPs.

32. It was agreed that the outcomes of the expert meeting and ways forward with regards to TRMs would be further discussed by the TEC at its 5th meeting.

V. Possible items for further consideration

33. In considering further work to be undertaken in the area of TRMs, in accordance with its mandated function on TRMs, the TEC may wish to take into account the following elements:

(a) What potential role might TRMs play to support enhanced action on adaptation to climate change?

(b) What good practises of TRMs could be used in adaptation planning and implementation processes under the Convention and how could these be shared with stakeholders?

(c) What key actions could be adopted to catalyse the development and use of TRMs or TAPs by Parties in the area of adaptation and how could these be effectively implemented?

(d) How may TRMs be integrated with other planning processes under the Convention, such as TNAs, TAPs, NAMAs and NAPs?

(e) What potential roles could the TEC or other relevant bodies or processes under the UNFCCC play to catalyse the development and use of these roadmaps to stimulate action on mitigation and adaptation to climate change at the national, regional and international levels?
