



Technology Executive Committee

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Update on the artificial intelligence-powered tool for identifying country needs related to the setup and implementation of national systems of innovation

Background note

A. Background

1. At TEC 31, the TEC considered a prototype of the “NSI Mapping Tool” developed by the open-ended activity group. The TEC welcomed the concept of an artificial intelligence (AI)-supported tool aimed at identifying country needs related to the setup and implementation of national systems of innovation (NSI), and at translating NSI analysis into actionable outputs for policymakers.

2. The prototype of the tool was developed on the basis of the TEC analytical work conducted in 2023, entitled, “[Good practices and lessons learned on the setup and implementation of National Systems of Innovation](#)”. In particular, the tool, operationalizes the functional NSI framework set out in the aforementioned TEC publication by translating it into a structured, sector-specific self-assessment process. The methodology is designed to support national designated entities (NDEs) and policymakers in systematically identifying strengths and gaps within their national innovation systems for selected climate-technology sectors, while remaining adaptable to diverse country contexts and levels of system maturity.

3. Based on the feedback and guidance provided at TEC 31, the prototype was further developed into the AI-enabled tool described in this paper.

B. Scope of the note

4. The conceptual framework underpinning the “NSI Mapping Tool” is contained in the annex. This includes user inputs, analytical logic and limitations of the approach, with the objective of providing how TEC NSI guidance has been operationalized into a practical, policy-oriented analytical instrument. The methodology is intended as a diagnostic and catalytic support tool, rather than a benchmarking or ranking exercise, and is aligned with the TEC’s mandate to strengthen innovation systems for climate action.

5. The proof of concept of the “NSI Mapping Tool” was shared for country testing with four NDEs out of which two NDEs provided feedback. The feedback from the country testing was reflected in the further development of the tool to the extent possible.

C. Expected action by the Technology Executive Committee

6. The TEC will be invited to consider the conceptual framework for preparing the NSI Mapping Tool and provide further guidance.

Annex

Conceptual framework of the NSI Mapping Tool

I. Background

1. The methodology developed for the “NSI Mapping Tool” is grounded in the NSI framework, which conceptualizes innovation as the outcome of interactions among actors, institutions, technologies, and enabling conditions.
2. It operationalizes the seven NSI functions commonly used in TEC analytical work:
 - (a) Knowledge development and diffusion
 - (b) Entrepreneurial experimentation
 - (c) Market formation
 - (d) Influence on the direction of search
 - (e) Resource mobilization
 - (f) Legitimation
 - (g) Development of positive externalities
3. These functions are applied consistently across all sectors and country contexts.

A. User Inputs and Data Collection

1. Required Inputs

4. The assessment is initiated through structured user inputs provided by the country representative, a mandatory country field is used to contextualize recommendations and to enable the retrieval of relevant national and regional reference material.
5. Users select one climate technology sector per assessment.
6. For the first iteration, six sectors aligned with the TEC workplan are available, ensuring focus and analytical depth.

2. NSI Function Self-Assessment

7. Users to identify the priority of each NSI function (high-priority, medium-priority and low-priority). The tool will conduct a structure analysis of the high-priority function. Users are requested to limit to maximum of two inter-related “high-priority” functions, as it will be subject to deeper structural analysis.

3. Structural Analysis Questions

8. For prioritized functions, users respond to a standardized set of yes/no questions covering:
 - (a) Presence and capacity of relevant actors
 - (b) Adequacy of institutional rules, regulations, and norms

- (c) Institutional capacity
 - (d) Actor–institution interactions and awareness
 - (e) Availability and quality of technologies and infrastructure
9. Negative responses are interpreted as barriers or blocking mechanisms within the innovation system.

4. Optional Contextual Inputs

10. Optional inputs allow users to provide additional national or sub sectoral context, including regional specificity, local challenges, and stakeholder considerations, to enhance realism and relevance.

5. Use of Reference Documents

11. The analytical process draws on a structured set of documents, selected based on country, region, and sector:

- (a) Core sources: TEC NSI materials, TEC 2023–2027 workplan;
- (b) Regional sources: Global Innovation Index, regional context summaries;
- (c) Sector specific sources: TEC sectoral materials, WIPO Green Technology Book;
- (d) National sources: NDCs, NAPs, TNAs (if available).

12. The tool automatically detects sector and regional relevance to feed appropriate sources into the analysis.

B. Generation of the Catalyst Action Plan

1. Analytical Process

13. The Catalyst Action Plan is generated by combining:

- (a) NSI self-assessment;
- (b) Function prioritization;
- (c) Structural analysis results;
- (d) Country and sector specific contextual data;
- (e) Evidence from international good practices.

14. This integrated analysis provides a coherent picture of the current system and feasible leverage points for intervention.

2. Required Outputs

15. Each Catalyst Action Plan contains:

- (a) Executive Summary;
- (b) Analysis by NSI Function, including:

- (i) Original assessment
- (ii) Identified gaps and barriers
- (iii) Structural weaknesses
- (c) Implementation oriented recommendations, focused on systemic challenges;
- (d) References to relevant case study countries where applicable;
- (e) Recommendations are aligned with TEC guidance, particularly the NSI chapter on strengthening innovation systems for climate action.

C. Methodological Limitations

16. The methodology relies on self-assessment and expert judgment rather than externally validated scoring. Results should therefore be interpreted as diagnostic and catalytic, intended to guide dialogue, prioritization, and follow up support rather than to rank countries.

D. Intended Use

17. The tool should be used after reviewing the TEC analytical work entitled, “[*Good practices and lessons learned on the setup and implementation of National Systems of Innovation*](#)” The users should have awareness of the current situation of NSI in their country. The tool would be a starting place to assess the current NSI and should not be used as a stand-alone means to conduct the assessment.

18. This methodology is designed to:

- (a) Support national reflection and priority setting;
- (b) Inform further national support activities;
- (c) Provide evidence informed basis for targeted innovation system interventions.

II. User feedback

19. The NSI Mapping Tool, was shared with four countries, and feedback was received from two.

20. The feedback provided were on the AI-tool and its outputs. With regards to the tool, the users indicated the need to understand better background and expectations of the tool, input requirements, user understanding of NSI.

21. Comments also included on the look and feel of the tool, and how to enhance user friendliness. Regarding the output generated, feedback included the need to generate specific information on national-level policy guidance, investment needs, and targeted funding sources. Comments were also provided on the need for visual summaries and how the output also could be strengthened to allow the shift from the assessment to policy action.

22. Some of the suggestions on enhancing usability were incorporated into the current tool. However, due to technical limitations some suggestions could not be integrated. Other suggestions would require further analysis of input and output and would be outside the scope of the current proof of concept.