



Technology Executive Committee

24 March 2026

Thirty-second meeting

14–17 April 2026 (17 April 2026 TEC-CTCN Advisory Board Joint Session)

TEC practical guide: How developing countries can be supported for conducting and updating their technology needs assessments

Cover note

A. Background

1. In June 2022, the Subsidiary Body for Implementation in its consideration of the Poznan strategic programme on technology transfer,¹ invited the TEC, in consultation with the Climate Technology Centre and Network and the operating entities of the Financial Mechanism, to consider, when updating the guidelines for technology needs assessments (TNAs), how developing countries can be supported in updating their TNAs and implementing their technology action plans and TNA outcomes.
2. In September 2022, the TEC reflected this guidance in the formulation of its work on TNAs under its rolling workplan (2023-2027), which forms part of the joint work programme of the Technology Mechanism (2023–2027).
3. As per activity B.1.1 of its rolling workplan,² the TEC, in 2025, developed a knowledge product on how developing countries can be supported for conducting and updating their TNAs.
4. Pursuant to the guidance at TEC 31, the open-ended activity group on TNA released a beta version of the knowledge product as a practical guide, with a view to test its usability in engagement with relevant national focal points (e.g. by conducting surveys), with support of the secretariat and interested partners. The group developed an online survey to collect the user feedback regarding the content, format, and applicability of the practical guide³.
5. At TEC 32, a co-lead of the activity group, with support from the secretariat, will present the results of the user feedback survey, and the consequently updated practical guide, as contained in the annex.

B. Scope of the note

6. The annex to this note contains the updated practical guide on how developing countries can be supported for conducting and updating their TNAs, reflecting the results of the usability testing.

¹ [FCCC/SBI/2022/10](#), paragraph 98.

² Available at: <https://unfccc.int/tclear/tec/workplan>.

³ The survey was administered by the secretariat for a four-week period from February to March 2026. A total of 17 responses were received from 16 developing countries, including 12 from national designated entities for matters related to technology development and transfer under the UNFCCC.

C. Possible actions by the Technology Executive Committee

7. The TEC will be invited to consider the updated practical guide, and provide guidance for any necessary refinements, with a view to finalizing it.

Annex I

TEC practical guide: How developing countries can be supported for conducting and updating their TNAs



United Nations Climate Change
Technology Executive Committee

TEC practical guide

How developing countries can be supported for conducting and updating their technology needs assessments





Table of contents

1 Preface

- I. About TEC's work on TNA
- II. About this practical guide
- III. Frequently used abbreviations

2 Context

- I. What are TNAs?
- II. How are TNAs conducted?
- III. Why developing countries conduct TNAs and why they need to be updated?
- IV. How TNAs relate to other processes under the UNFCCC and Paris Agreement?

3 Actors

- I. Who conducts and who provides support for conducting TNAs?
- II. Who are the key support providers for TNAs under the UNFCCC?
- III. Which other actors provide support for conducting TNAs?
- IV. How do actors supporting TNAs contribute to the process and advancing its outcomes?
- V. What can be done to maximize synergies and impacts of support mobilized from different actors?

4 Actions

- I. How developing countries conduct or update their TNAs?
- II. What can be done to ensure consistency and complementarily when diversifying sources of TNA support?
- III. What are approaches utilized by developing countries in mobilizing support for conducting and updating TNAs?
- IV. What types of support, and provided by whom, may be utilized by developing countries for conducting or updating TNAs?

5 Cases

- I. Examples from conducting TNAs with support from actors under the UNFCCC
- II. Examples from conducting TNAs with support from actors outside of the UNFCCC
- III. Examples from conducting assessments of technology priorities and implementation pathways similar to TNAs
- IV. Why reporting on TNAs and sharing learnings from it matters?

6 Considerations

- I. Understanding the context: takeaways and considerations
- II. Identifying and mobilizing actors: takeaways and considerations
- III. Utilizing action and support: takeaways and considerations

FAQs



Preface

I. About TEC's work on TNA

Technology needs assessment (TNA) is at the core of the technology transfer framework under the UNFCCC and the technology framework under the Paris Agreement. The Technology Executive Committee (TEC), as the policy arm of the Technology Mechanism under the UNFCCC, continually monitors the TNA process, with a view to providing policy insights and guidance to support developing countries in undertaking TNAs and the implementation of their results - namely technology action plans (TAPs).

II. About this practical guide

Why is it needed?

Developing countries conduct TNAs with the goal to utilize its results for informing climate technology policies, actions, and investment decisions. The extent to which TNAs yield lasting benefits and spark technology actions in a country can vary depending on the context, timing, resources, and actors involved, among other things. Strategic approaches to planning and mobilizing support for TNAs is key to lay the ground work for conducting or updating TNAs that could ultimately be implemented. Figure 1 highlights the focus of this practical guide in the TNA process.

What does it contain?

It provides an overview of important steps and considerations in planning and mobilizing support for conducting a TNA, starting from understanding the institutional context (Context), followed by identifying relevant support providers (Actors), and utilizing modalities and innovative approaches (Actions) for assessing and/or updating the assessment of technology needs and priorities and devising associated implementation pathways. Each section is accompanied with an array of country examples (Cases) and a set of key takeaways and practical check-lists (Considerations) to serve as inspiration for pursuing a TNA.

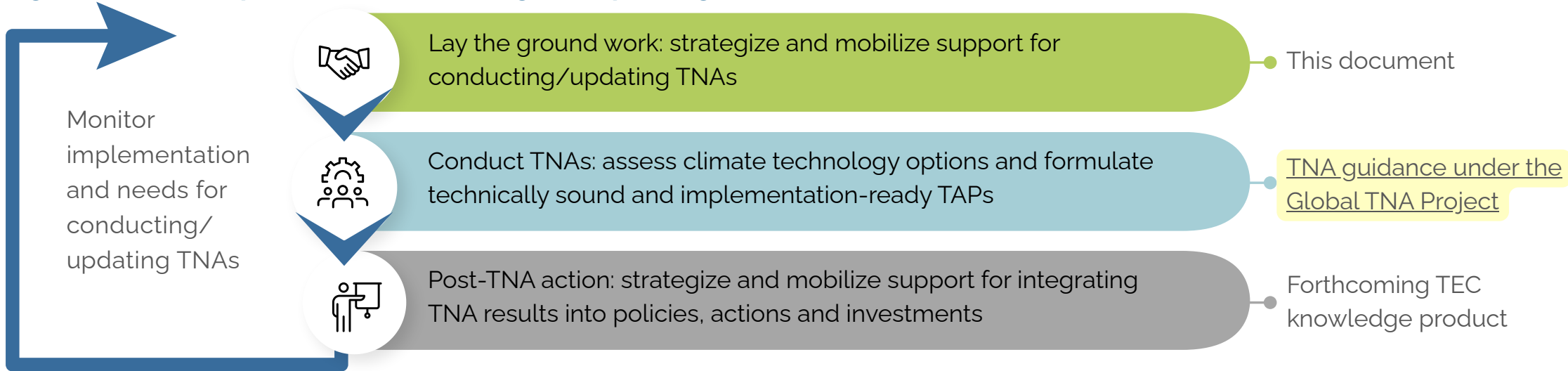
What is not covered?

Users may consult the TNA Step-by-Step Guidebook as well as sectoral/thematic guidance materials for details about the execution of a TNA (see Figure 9). Avenues of support for implementing TNA results will be covered in a separate knowledge product by the TEC (see Figure 1).

Who is the target audience?

This document aims to serve as a practical resource for technology decision-makers and experts in developing countries, particularly national designated entities (NDEs) for matters related to technology development and transfer under the UNFCCC, who look for support to conduct or update their TNAs, and who could benefit from information, approaches and examples of similar efforts in other countries and regions.

Figure 1: Iterative process of conducting and updating TNAs



Relevant decisions: Decision 4/CP.7; Decision 15/CMA.1

Useful links: <https://unfccc.int/ttclear/tna> <https://tech-action.unepccc.org>



How to use it?



The top-bar menu allows the user to navigate through the document with clickable menu items.



The jargon is simplified and concepts are summarized. Relevant decisions by the governing bodies of the UNFCCC and Paris Agreement and complementary readings are provided in the footnotes.

http://

Hyperlinks to external resources are highlighted across the document.



Issues discussed in the document are complemented with numbered country examples that may be consulted, per the interest of the reader.



Key takeaways and considerations are highlighted to help user reflect on and digest the information in each section.



A practical checklist, though non-exhaustive, is provided to assist the user in pursuing a TNA in own context.

III. Frequently used abbreviations

- BTR** - Biennial Transparency Report

BUR - Biennial Update Report

CMA - Conference of the Parties serving as the meeting of the Parties to the Paris Agreement

COP - Conference of the Parties to the UNFCCC

CTCN - Climate Technology Centre and Network

FAO - The Food and Agriculture Organization of the UN

GCF - Green Climate Fund

GEF - Global Environment Facility

GIZ - German Agency for International Cooperation

IGO - Intergovernmental Organization

LDCs - Least Developed Countries

LT-LEDS - long-term low-emission development strategies

MDBs - Multilateral Development Banks

MEA - Multilateral Environmental Agreement

NAPs - National Adaptation Plans

NC - National Communications

NDCs - Nationally Determined Contributions

NDE - National designated entities for technology development and transfer under UNFCCC
- PPF** - Project preparation facility

RD&D - Research, development and demonstration

SDGs - Sustainable Development Goals

SIDS - Small Island Developing States

STI - Science, Technology and Innovation

TAPs - Technology Action Plans

TA - Technical assistance

TEC - Technology Executive Committee

TNAs - Technology Needs Assessments

TT:CLEAR - UNFCCC website for climate technology

UN - United Nations

UNDP - United Nations Development Programme

UNEP - United Nations Environment Programme

UNEP-CCC - UNEP Copenhagen Climate Centre

UNFCCC - United Nations Framework Convention on Climate Change

UNIDO - United Nations Industrial Development Organization

USD - United States dollar



I. What are TNAs?

Formalized in 2001 as part of the technology transfer framework under the UNFCCC, and recognized under the Paris Agreement, TNAs are a set of activities (Figure 2) for the identification and prioritization of technologies needed for climate change adaptation and mitigation in different sectors, and formulating related implementation pathways. The technology framework under the Paris Agreement highlights the importance of undertaking/updating TNAs, implementing TNA results and aligning TNAs with national climate plans and strategies under the "implementation" theme.

II. How are TNAs conducted?

Over time and through an iterative process, collective learnings and practical insights from the global- and country-level work on TNAs have informed and enriched the TNA methodology. Usually, a designated national institution takes the lead, involving a wide range of stakeholders in the process. A typical institutional structure for carrying out a successful TNA is shown in Figure 3. The exact institutional arrangements would depend on the national context and existing structures.



Relevant decisions: Decision 4/CP.7; Decision 3/CP.13; Decision 15/CMA.1
Complementary reading: [Organizing the TNA Process](#) (2018)

Figure 2: Characteristics of TNAs



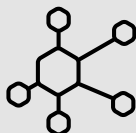
Country-led

The process is initiated, led, and owned by the country



Participatory

Various stakeholders are involved in TNAs e.g. government, private sector, NGOs, academia, local communities



Flexible

Assessments may cover mitigation and/or adaptation technologies, address various sectors and be integrated in other processes e.g. NDCs, NAPs, BTRs



Action-oriented

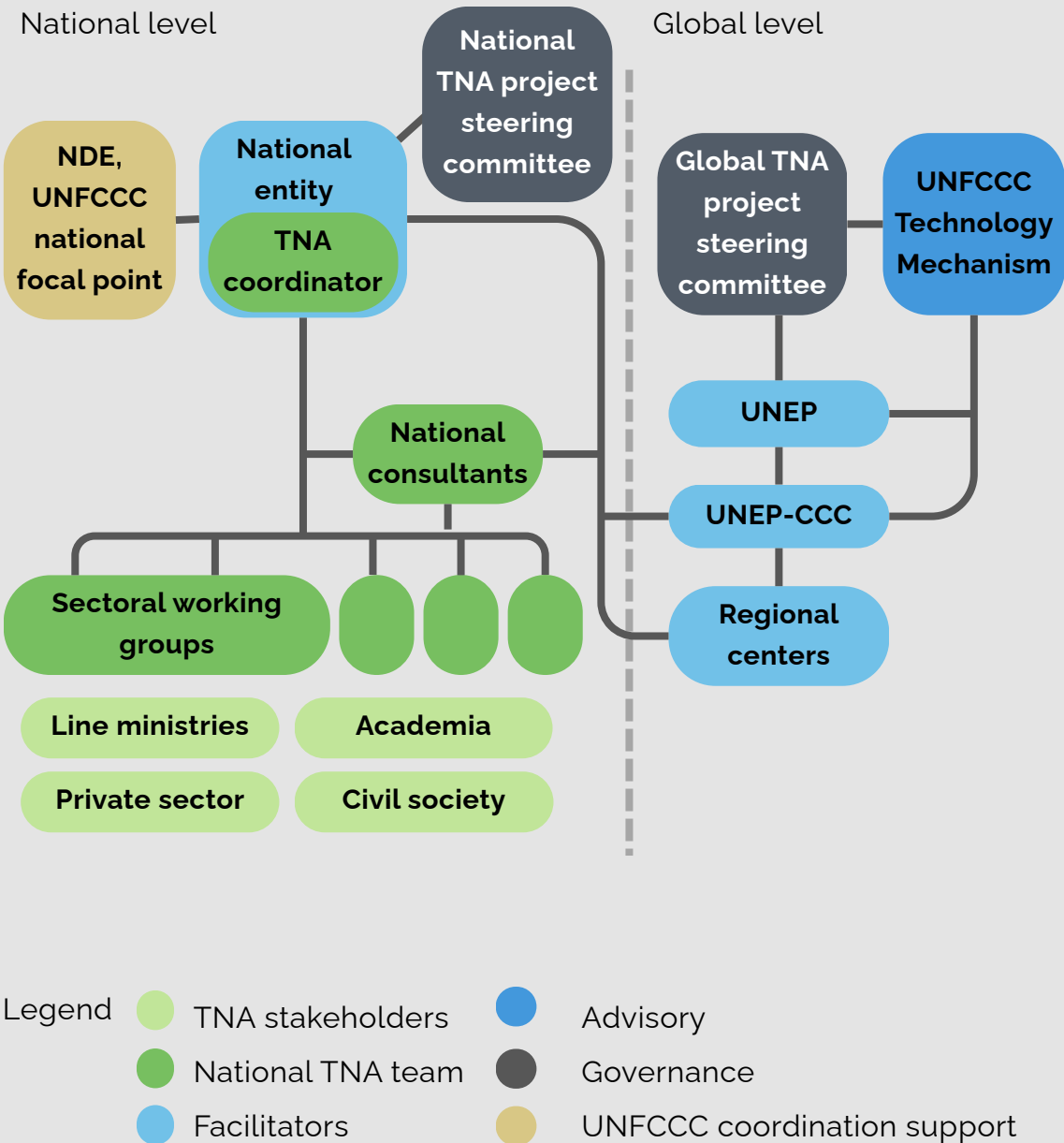
TAPs provide a roadmap for concrete actions to promote development, implementation, and transfer of prioritized technologies



Dynamic

TNAs require regular updates and benefit from an iterative process to stay timely and relevant

Figure 3: An indicative institutional set-up for TNAs



Extracted from: [TNA Step-by-Step Guide](#) (2nd edition - 2024)



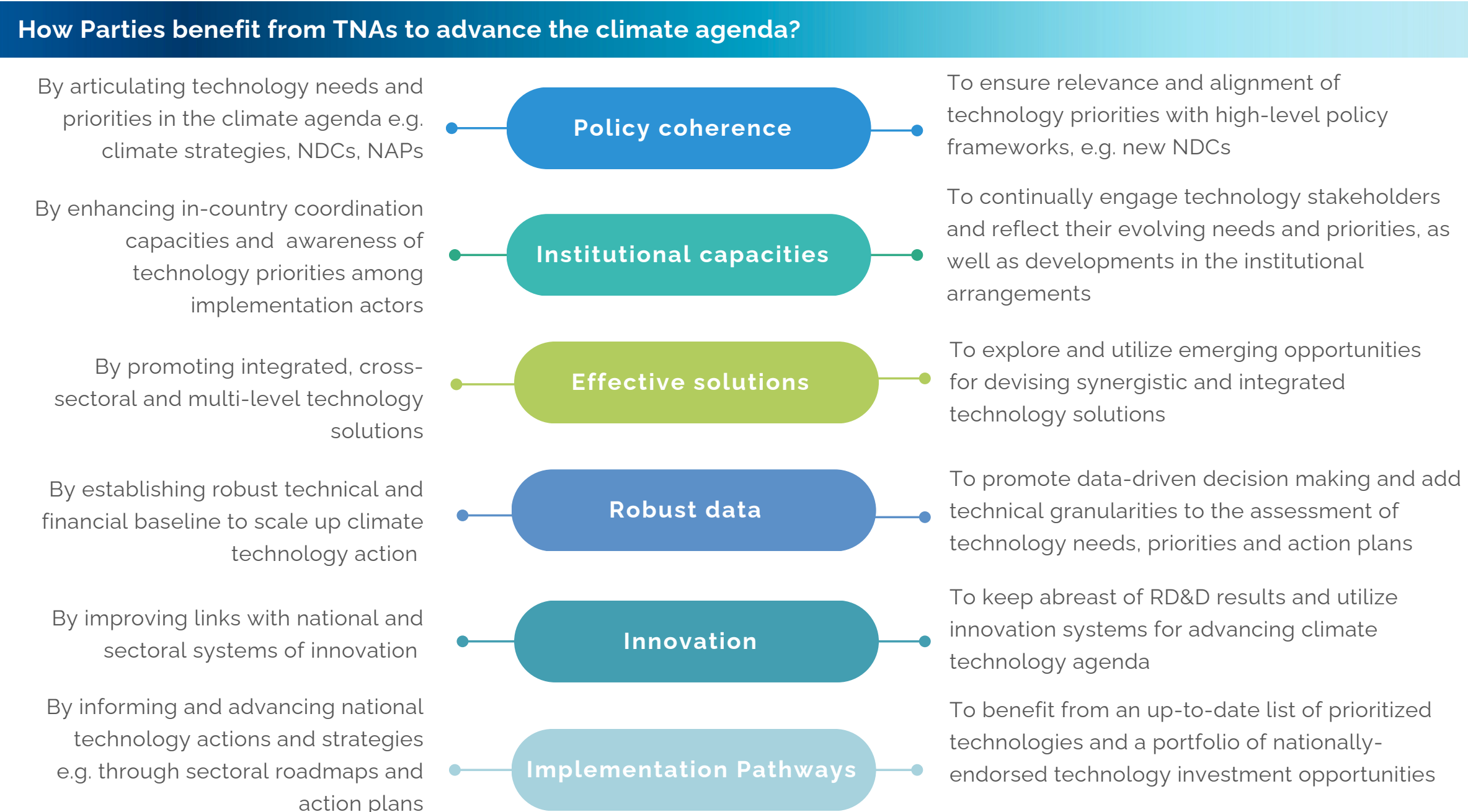
III. Why developing countries conduct TNAs and why they need to be updated?

The TNA process includes extensive stakeholder engagement, multi-criteria analysis of technology options, consideration of context-specific barriers and enabling frameworks, assessment of implementation needs, identification of potential implementation actors, and development of action plans and project ideas for innovation and climate technology action in prioritized sectors. Ultimately, TNAs support technology implementation in line with national climate and development priorities in developing countries.

Evidence gathered by the TEC shows that countries benefit from TNAs beyond the lifetime of activities to conduct the process itself. For example, the institutional set-up and stakeholder engagement for TNA could enhance in-country coordination capacities and institutional linkages. Prioritized technologies in TNAs may trigger action by domestic actors within national and sectoral innovation systems.

Figure 4 summarizes some of the benefits of the TNA process for countries conducting them (How Parties benefit from TNAs to advance the climate agenda?), and explains the rationale for regular updates of TNAs (Why TNAs need to be updated?).

Figure 4: Benefits of TNAs for climate technology policy and action in developing countries





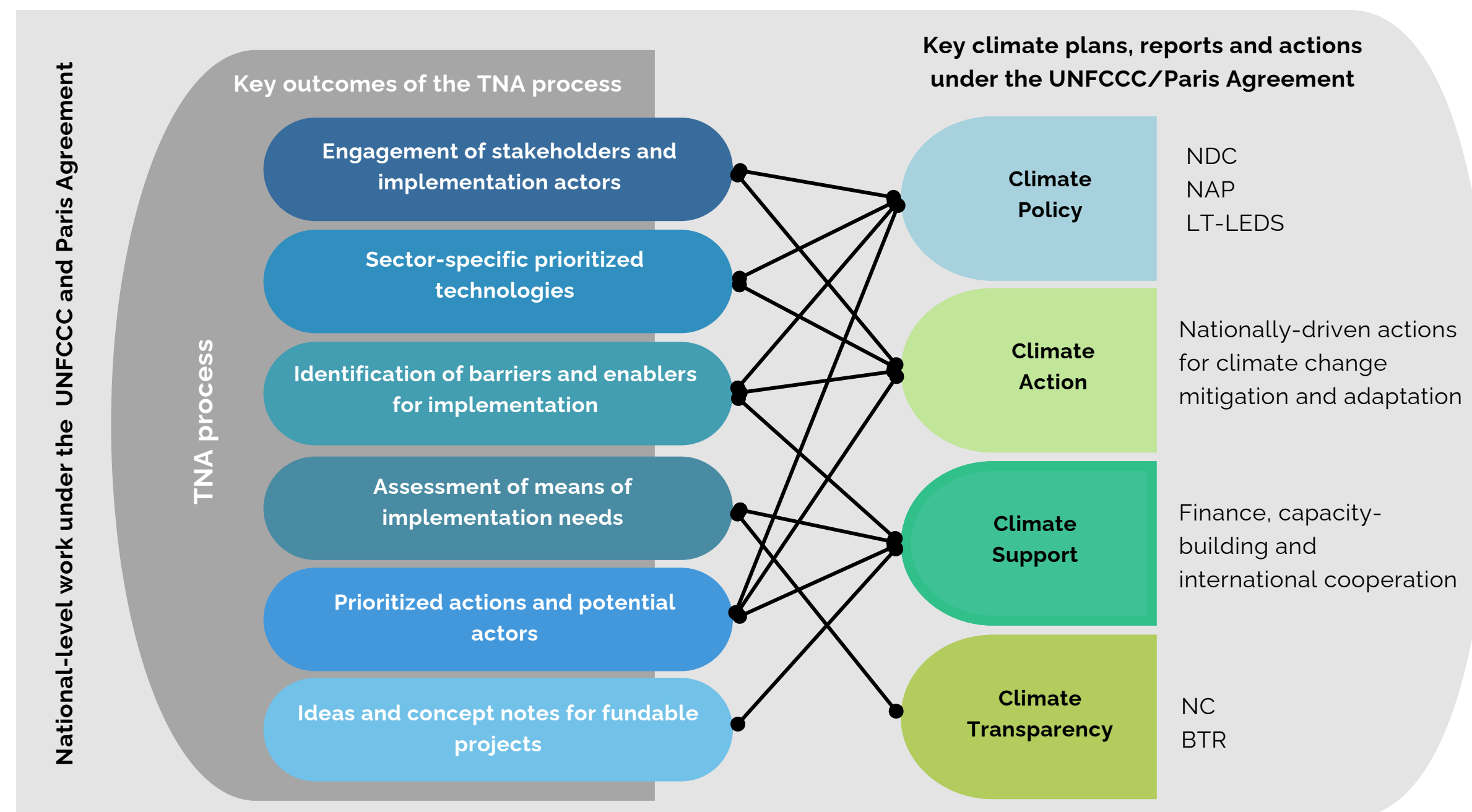
IV. How TNAs relate to other processes under the UNFCCC and Paris Agreement?

The TNA process is inherently connected with or related to other key nationally driven analyses, processes and plans concerning climate technologies under the UNFCCC and Paris Agreement. Sectors covered by TNAs are often prioritized by the NDC, NAP and long-term strategies. TNA results may also feed into national climate reports (e.g. NCs, BTRs). Figure 5 illustrates, in an indicative manner, that when strategically utilized, the results of the TNA process could:

- **Inform climate policy**, by identifying nationally-endorsed, sector-specific priority technologies to achieve climate goals;
- **Enable climate action**, by formulating innovation and technology measures for advancing climate action;
- **Mobilize support**, by engaging implementation partners and strengthening the rationale for funding proposals, donor agreements and investment strategies;
- **Enhance transparency**, by providing robust information on support needed e.g. financial and capacity-building needs for implementation of priority technologies.

The TNA process can be integrated into other processes and be informed by them. It can also be made more effective through application of successful approaches and lessons learned from undertaking similar activities under the UNFCCC and other multilateral environmental agreements (MEAs).

Figure 5: Positioning of TNAs in relation to other relevant processes under the UNFCCC and Paris Agreement (indicative)



Complementary reading: [Linkages Between the TNA Process and the NDC Process \(2022\)](#)



I. Who conducts and who provides support for conducting TNAs?

Pursuant to guidance by the COP, mainly developing country Parties conduct TNAs under the UNFCCC, subject to the provision of resources, as appropriate to country-specific circumstances. The COP through various decisions has:

- Requested the GEF and its implementing agencies (e.g. UNEP) to support TNAs;
- Encouraged the CTCN to support TNAs, including through GCF's readiness support;
- Requested the TEC to provide guidance related to the TNA process; and
- Urged developed country Parties to facilitate support for TNAs.

Other organizations in a position to do so may also assist in facilitating the TNA process e.g. through capacity-building support.

II. Who are the key support providers for TNAs under the UNFCCC?

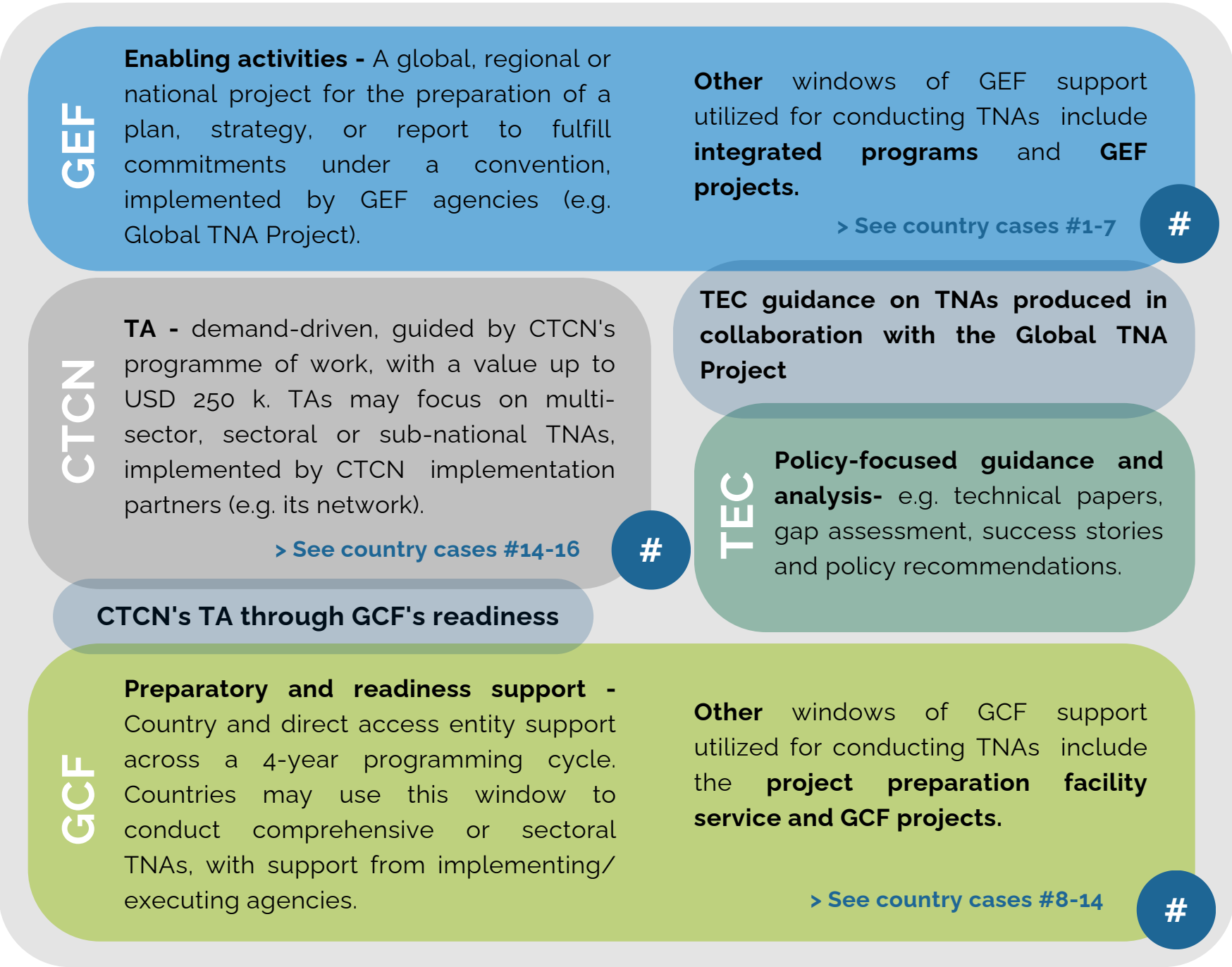
Figure 6 provides an overview of main actors under the UNFCCC that support the TNA process. The GEF is the main support provider for conducting TNAs, having financed the process as an enabling activity in 100+ countries, mainly through the Global TNA Project (2009-present) implemented by the UNEP and UNEP-CCC.

The GCF, through its readiness and preparatory support, and the CTCN, through its technical assistance (TA), also support developing countries in formulating or revising TNAs. Over 15 developing countries have been supported by the CTCN in this context, including through the use of GCF's readiness support.

Besides these key avenues of support, developing countries also tap into other funding windows provided by the GEF/GCF to assess their technology needs and priorities, for instance by conducting sectoral TNAs and technology roadmaps, as part of project preparation activities or as components of climate projects.

The TEC continually monitor results from TNAs and contributes to the evolving guidance and policy-relevant insights emerging from and feeding into the TNA process.

Figure 6: Main actors supporting the TNAs process under the UNFCCC (non-exhaustive)



Relevant decisions: Decision 4/CP.7; Decision 3/CP.13; Decision 17/CP.20; Decision 14/CP.25; Decision 9/CP.26

III. Which other actors provide support for conducting TNAs?

Besides the GEF, the GCF and their implementing/executing agencies, evidence gathered by the TEC shows that a diverse range of actors outside of the UNFCCC also support the work on TNAs in developing countries. This includes actors operating at the global, regional, national and subnational levels and across the value chain of climate technology policy and action (see Figure 7 and related country examples). Depending on their capacities, resources, functions and expertise, these actors may provide different types of support (see Figure 11).

IV. How do actors supporting TNAs contribute to the process and advancing its outcomes?

The Global TNA Project implemented by the UNEP and UNEP-CCC remains the main window of support for conducting national-level TNAs. The work under the project has also shaped the main guidance available on TNA (see Figure 9), that is also used by other actors. These TNAs are conducted at the national level and cover multiple priority sectors for mitigation and adaptation.

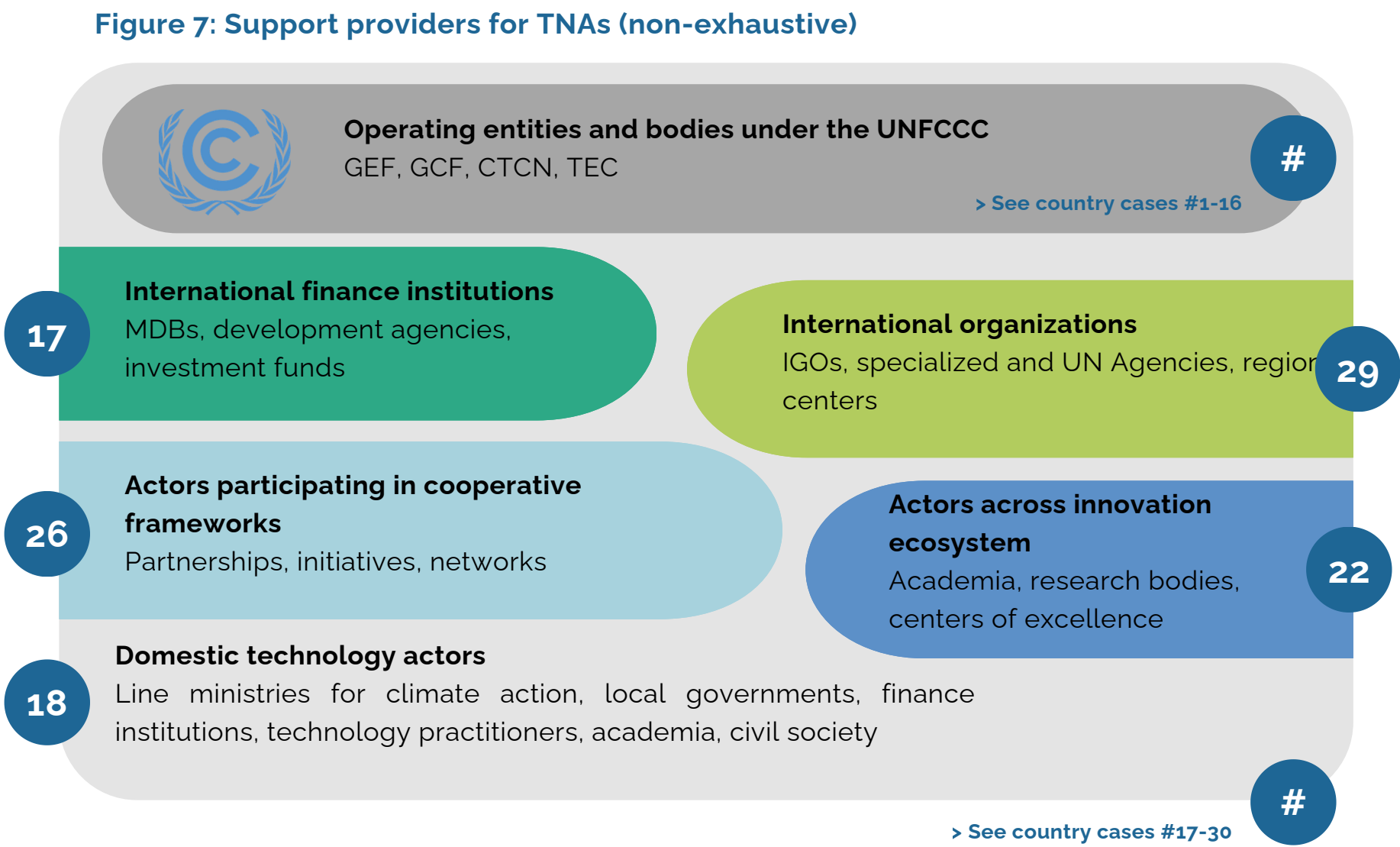
The GCF, the CTCN, UN and development agencies, MDBs, and other actors also support developing countries with conducting and updating TNAs, drawing on the outcomes of already existing TNAs or as follow-on efforts to support the implementation of NDCs and NAPs. Evidence suggests that such efforts often focus on elaborating and updating implementation-related detail of prioritized technologies, e.g by developing technology roadmaps and action plans, and project ideas and concepts.

Specialized agencies and global/regional climate initiatives, building on their unique expertise and know-how, help developing countries to cover additional sectors that are not addressed in previous TNAs, and to delve into more technical depth and granularity for the identification and implementation of prioritized technologies, often from a sectoral perspective.

Involvement of implementation actors (e.g. UN and development agencies) in the TNA process can lead to the mobilization of further support for the implementation of TNA outcomes. This topic will be explored in a future knowledge product.

National team(s) responsible for technology planning and implementation in the country play a foundational role for strategic planning, stakeholder engagement, and importantly, identifying and mobilizing support to conduct and update TNAs and implement their outcomes.

National and local technology experts, practitioners, and stakeholders remain central to the nationally-driven TNA process, regardless of the type of support provider(s) for its execution.

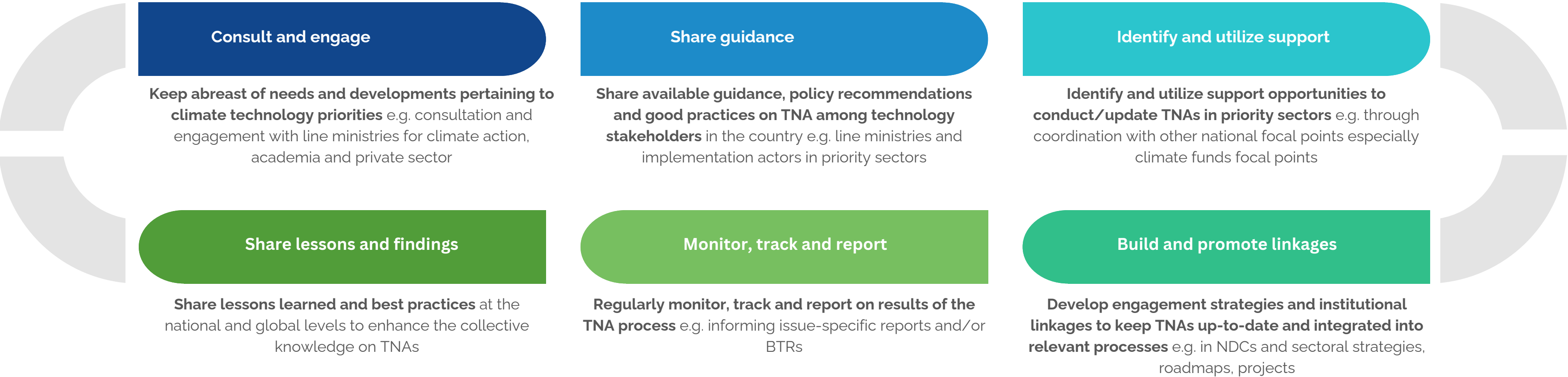


V. What can be done to maximize synergies and impacts of support mobilized from different actors?

National teams in charge of climate change planning and support play a key role in strategic and efficient use of various support windows for conducting TNAs in ways that involve and inform key players and stakeholders (e.g. sectoral decision makers), and lead to concrete action plans and implementation pathways. Strong coordination mechanisms, sometimes coupled with a centralized mandate, are important enabling conditions for ensuring agile, coherent and strategic action to mobilize support for TNAs across existing and emerging activities in the country that overlap with climate technology priorities and action.

Learnings from implemented TNAs highlight benefits of involving NDEs in **setting up and steering** the TNA process, i.e. to ensure **ownership and institutional continuity** (see Figure 8). NDEs could provide **vision and leadership**, coordinate **information exchange and engagement** with experts and stakeholders, form networks, facilitate **communications and knowledge management**, and support the **uptake and monitoring of TNA outcomes** beyond the lifetime of the TNA project.

Figure 8: Role of NDEs in supporting the TNA process in developing countries (indicative)





I. How developing countries conduct or update their TNAs?

TNAs can be conducted as standalone activities (e.g. TNAs under the GEF-funded Global TNA Project) or as a component of larger ones, e.g. as part of planning processes or project preparations.

Nearly all developing countries have conducted at least one round of TNAs, primarily supported by the GEF. In addition, many countries have applied the TNA methodology to identify technology priorities and devise associated implementation pathways in a specific sector, for a specific technology, in a geographic area or at the regional or sub-national level, utilizing a wider array of support options (see Figure 10).

Such activities often build on the outcomes of the GEF-funded TNAs, and are:

- Often conducted in the context of **sector-specific** projects and thematic initiatives;
- Often go hand-in-hand with **road mapping** exercises for achieving climate and sustainable development goals (SDGs);
- At times, with a **different nomenclature but a similar scope** and approach as the TNA; and
- At times, applied beyond the climate change agenda, e.g. in the context of **SDGs and other MEAs**.

II. What can be done to ensure consistency and complementarity when diversifying sources of TNA support?

Regardless of the source of support and the context in which the assessment of technology priorities and the development of associated implementation pathways takes place, methodological consistency and effective coordination mechanisms can ensure complementarity between different TNA-related activities that may take place at the national, regional and sub-national/local levels, at different times.

The available guidance on the TNA process under the UNFCCC provides an overarching methodology for conducting a TNA (see Figure 9). The guidance is primarily developed (/updated) under the GEF-funded Global TNA project, at times in collaboration with the TEC, based on lessons and feedback from stakeholders and in response to Parties' mandate. For example, since 2018, a guidance for a gender-responsive TNA is made available to assist countries with mainstreaming gender consideration in their TNAs.

To ensure methodological consistency as well as comparability and monitoring of outcomes, it is strongly recommended that TNA-related activities follow the established methodology under the UNFCCC, while noting that certain adjustments may be necessary depending on the context of its use.

Figure 9 - examples of available TNA guidance (non-exhaustive)

TEC policy products

Covering topics such as TNA and NDC linkages and enhancing implementation of TNA results

TNA methodology

Providing step-by-step guidance for conducting a TNA

Enhancing TNA process

Providing insights on issues such as gender-responsiveness, financing and linkages with SDGs

Thematic and sectoral guidance

Covering technologies for climate change mitigation (e.g. on energy, agriculture, buildings) and adaptation (e.g. coastal zones, agriculture), as well as cross-cutting consideration such as indigenous Peoples and climate technologies in urban contexts





III. What are approaches utilized by developing countries in mobilizing support for conducting and updating TNAs?

TNA is a versatile process that could be used by countries according to their needs. Evidence suggests that developing countries have undertaken or updated their TNAs through different approaches and support windows from various sources, for example by utilizing:

- **Support for complying with MEAs obligations** - including preparation of planning and reporting instruments;
- **Support for the development of domestic climate change and sectoral strategies and roadmaps**;
- **Support for preparatory work to develop funding and project proposal**, including under regional, multi-country and umbrella programmes;
- **Technical assistance** for technology readiness and feasibility assessments;
- **Support under global initiatives and partnerships**, focused on specific sectors or thematic areas.

In any case, TNAs and their outcomes are meant to interact with the broader climate technology planning and implementation processes, including for efficiency and coherence gains. Country cases in figures 10 and 11 highlight the diversity of sources, approaches, and modalities of support utilized by developing countries to conduct or update their TNAs, including with a thematic, sectoral, landscape or local focus, besides the national-level comprehensive TNAs for climate change mitigation and adaptation.

Figure 10: Positioning of TNAs in broader technology planning and implementation processes (non-exhaustive)



> See country cases



Complementary reading: [Analysis of success stories from implemented TAPs \(2024\)](#)

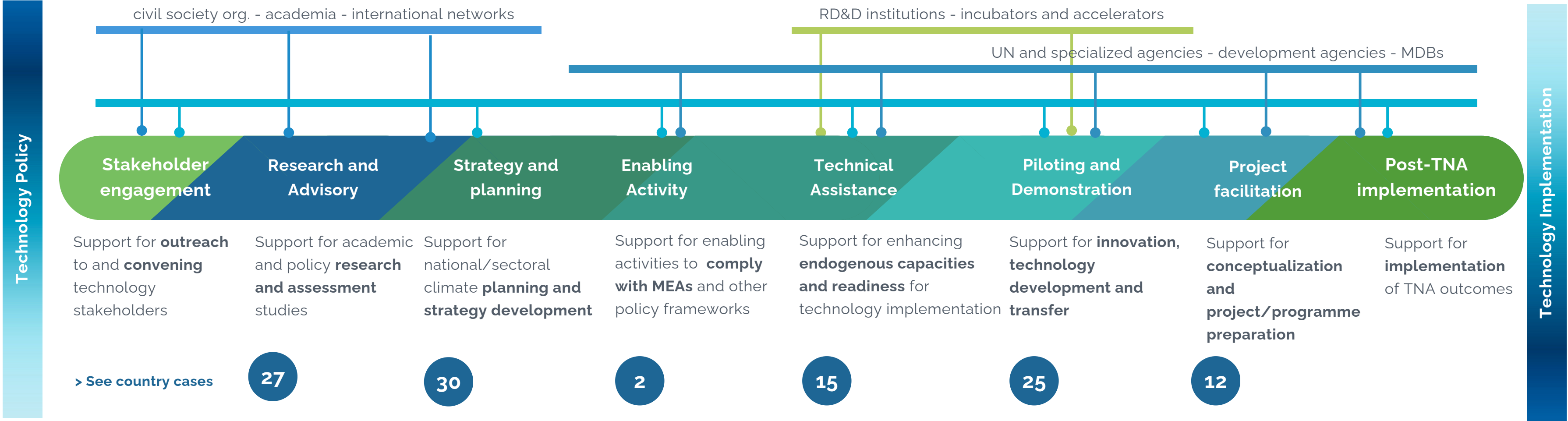


IV. What type of support, and provided by whom, may be utilized by developing countries for conducting or updating TNAs?

Without being exhaustive, a number of support areas are outlined in Figure 11, through which TNAs may be conducted or updated. These modalities indicate a range of policy- to implementation-oriented support - such as stakeholder convening, advisory support, planning and strategy related work, technical assistance, piloting, project preparation - which may be provided by a diverse array of actors including through financial (e.g. bilateral, multilateral), technical, and capacity-building support (e.g. global initiatives, cooperative frameworks, mentoring programs).

Different implementation actors (see Figure 6 and 7), depending on their capacities, resources, functions and unique expertise, may be in a position to provide one or more types of support throughout the value chain of technology planning to implementation and support countries with conducting or updating their TNAs. While individually significant, utilizing a combination of different support providers and support modalities by developing countries to advance their technology priorities would ensure greater synergies and complementarities and yield lasting results.

Figure 11: Examples of TNA-related types of support modalities and support providers across the value chain of technology planning and implementation (non-exhaustive)





TNAs are versatile tools used by developing countries to articulate priority actions and associated implementation pathways on innovation and technology development and transfer that are needed for advancing climate and development agendas. Country cases in this section (and cross-referenced across previous sections of this d include examples of support provided by actors under and outside of the UNFCCC for conducting TNAs, as well as activities conducted with a similar purpose and logic that may have been labeled differently.

I. Examples from conducting TNAs with support from actors under the UNFCCC

As part of GEF's Enabling Activities

Ghana

>Link

#1

Having conducted its first TNA in 2003 on mitigation (GEF-UNDP) and a TNA on adaptation in 2012 under the GEF-funded **Global TNA Project**, Ghana is currently participating in Phase V of the project to update its TNAs.

Sao Tome & Principe

>Link

#2

Under an **umbrella programme**, implemented by UNEP to support 18 countries comply with UNFCCC reporting requirements, Sao Tome & Principe undertook a TNA in the context of preparing its 3rd NC (2019), prioritizing sectors and relevant measures for technology action. The country further elaborated on outcomes of this assessment when joining the GEF-funded **Global TNA Project** (2020-2023).

China

>Link

#3

Between 2012-2016, China concluded a TNA project with support from the GEF with a value of USD 6.7 million, implemented by the World Bank Group. The project was funded as an enabling activity and combined **extensive sectoral TNAs with pilot implementation and monitoring** of activities targeting prioritized climate technologies, i.e. in energy efficiency.

As part of a GEF's Programmes / Frameworks

Grenada

>Link

#4

Grenada under the Global Programme to Support Countries with the Shift to Electric Mobility and together with other Eastern Caribbean has undertaken **baseline and feasibility studies and introduced plans, legislation, incentives and standards** to accelerate the introduction of low-emission and climate-resilient electric mobility, building on, and updating previously conducted TNAs.

Nigeria

>Link

#5

Nigeria under the Global Green Hydrogen Program, implemented by UNIDO, is working to establish a national roadmap to outline **strategic pathways and a clear vision** for the development of green hydrogen, including though assessment of technology needs and identification of implementation pathways.

As part of a GEF Project

Ecuador

>Link

#6

Having undertaken its GEF-funded TNA in 2013 covering the energy sector, Ecuador conducted **updated and more in-depth assessment of its energy system** under a project for Industrial Energy Efficiency (EE), implemented by UNIDO, completed in 2015. The project included an analysis of industrial EE institutional and regulatory arrangements and development of tools to facilitate the adoption of EE measures.

Saint Kitts & Nevis

>Link

#7

St Kitts & Nevis has utilized the GEF support in 2006 and 2020 to undertake TNAs including for the energy sector, and later used the outcomes of these enabling activities to develop a full-size project for achieving a rapid decarbonization of the sector, including by developing a **roadmap, technological pathways and investment plans** for implementing a National Energy Policy.



Context

Actors

Actions

Cases

Considerations

FAQs

As part of GCF's readiness support

Eswatini

> Link

#8

Eswatini **updated its water-sector TNA** in 2021 with support of the GCF and the Global Water Partnership in 2021, as part of readiness support for strengthening NDA's institutional and technical capacity to **mobilize gender-responsive climate finance**.

Brazil

> Link

#9

Brazil, with readiness support from the GCF and in partnership with UNEP conducted comprehensive TNAs in 2018, aiming at **developing local content of priority technologies and sectors** for compliance with the NDC.

Moldova

> Link

#10

Moldova, using GCF readiness implemented by FAO, included a TNA for climate change adaptation as part of broader efforts for **adaptation planning**.

As part of a GCF Project

Liberia

> Link

#11

To elaborate its technology action for enhancing climate resilience, further to the GEF-supported TNA, Liberia with support from the African Development Bank is implementing a GCF project that includes, the **identification of e-infrastructure for enhancing climate services information system** and development of an **implementation roadmap**.

As part of GCF's project preparation facility (PPF)

Antigua & Barbuda

> Link

#12

Antigua & Barbuda joined a multi-country PPF, funded by the GCF and implemented by UNDP, to prepare a full-scale proposal for the delivery of priority actions required to meet the targets of Early Warnings for All initiative. **In-depth assessment of technical and capacity needs** are among core activities under the PPF, resulting in updated TNAs for relevant sectors.

Conducted through CTCN's TA, utilizing GCF's readiness support

Georgia

> Link

#13

Georgia used the technical assistance of the CTCN through the GCF readiness support (2022-2023) to **update its TNAs through development of technology road maps** for prioritized technologies, covering both adaptation and mitigation areas.

Iraq

> Link

#14

Iraq, through the GCF readiness and with implementation support from UNIDO and CTCN, conducted a comprehensive TNA process in 2019, covering both adaptation and mitigation areas, in alignment with its NDC. The project led to the development of **TAPs, accompanied by capacity-building** for communications, guidance, training and **financing strategies** for their implementation.

Conducted through CTCN's TA

Chile

> Link

#15

Chile, through the CTCN TA, completed a comprehensive TNA process in 2024, covering both adaptation and mitigation areas, in alignment with its NDC. The project led to the development of **TAPs, accompanied by national-level consultations** to ensure ownership and deployment of prioritized technology measures.

South Africa

> Link

#16

In 2018, the CTCN TA was utilized by South Africa to conduct a TNA at the **provincial and local levels**, in line with the national TNA but with **more technical details and granularity**. The technical assistance was implemented by UNEP-CCC and the Council for Scientific and Industrial Research.



II. Examples from conducting TNAs with support from actors outside of the UNFCCC

Comprehensive climate TNAs

Kazakhstan

> Link

#17

Having completed its GEF-funded TNA in 2017 for both adaptation and mitigation, Kazakhstan is now updating its TNAs with support from the Asian Infrastructure Investment Bank, with implementation support from UNEP-CCC.

South Africa

> Link

#18

The Council for Scientific and Industrial Research (CSIR) - a scientific and technology research organization- supported the first TNA in South Africa in 2007, **as part of preparations of the 2nd NC** using domestic resources. In 2019, the CSIR was commissioned again to conduct a study updating the TNA results, using funds from bilateral support of the Government of Germany, channeled through GIZ. The outcomes informed the **preparation of the 4th BUR** of South Africa.

Comprehensive TNAs to advance development and climate goals

Tanzania

> Link

#19

Having undertaken its GEF-funded TNA in 2015-2018 for both mitigation and adaptation, Tanzania, with support from the UN Technology Bank for LDCs, conducted a TNA in 2025 focusing on the **blue economy and agriculture sectors to achieve its sustainable development and climate resilience goals**, powered by a digital transformation.

Bhutan

> Link

#20

Having undertaken its GEF-funded TNAs in 2013, Bhutan, with support from the UN Technology Bank for LDCs, conducted a TNA in 2020, reflecting its priority sectors for science, technology and innovation in the context of **achieving SDGs**.

Conducted at the regional and sub-national levels

India

> Link

#21

India with support from the Government of Germany, channeled through GIZ and support of adelphi conducted a TNA for climate adaptation in the water and agriculture sectors **at the sub-national level** in the state of Himachal Pradesh.

The Caribbean

> Link

#22

The Maritime Technology Cooperation Centre Caribbean (hosted by University of Trinidad & Tobago), with support from the European Union and the International Maritime Organization, conducted a **regional TNA** on energy efficiency in maritime shipping in the Caribbean in 2018. The TNA was part of a regional capacity-building programme for climate mitigation and led to the development of TAPs with a regional approach to technology diffusion.

Conducted under other MEAs

Iraq

> Link

#23

In 2015, Iraq utilized support from the GEF and UNEP to conduct a **TNA for biodiversity** as part of its efforts for the development of the first National Biodiversity Strategy and Action Plan and the fifth national report to the Convention on Biological Diversity.

Antigua & Barbuda

> Link

#24

Antigua & Barbuda is participating in a **multi-country soil management initiative** funded by the GEF, implemented by FAO, for integrated landscape restoration and climate-resilient food systems in the Caribbean SIDS. It applies the TNA methodology in the context of achieving Land Degradation Neutrality under the Convention to Combat Desertification.



III. Examples from conducting assessments of technology priorities and implementation pathways similar to TNAs

Sectoral/Thematic assessment of technology needs for climate action

Pakistan

> Link

#25

Pakistan updated and elaborated its adaptation TNAs (concluded in 2017) in 2021, entitled as needs assessment for innovation, utilizing support provided under a regional program for climate resilience and as part of a **climate innovation challenge**, supported by the World Bank and administered by the Asian Disaster Preparedness Center.

Sectoral implementation plan for climate action

Ghana

> Link

#26

In 2019, with support from the Global Water Partnership, Ghana formulated an integrated water resources management **implementation action plan**, updating the water sector TAPs that were previously identified under the GEF-funded TNA.

Kenya

> Link

#27

Kenya with support from the Climate and Development Knowledge Network conducted an assessment of opportunities and challenges for the use of emerging **Fourth Industrial Revolution technologies** to accelerate the implementation of its NDC, including through developing an associated **implementation roadmap**.

Sectoral climate action roadmap

Indonesia

> Link

#28

Indonesia formulated a **roadmap for an energy efficient, low-carbon buildings and construction sector** in 2022 to contribute to its NDC. The roadmap was developed under the umbrella of the Global Alliance for Buildings and Construction and includes a list of recommended technology-related actions with specific targets and timelines. This sector was not covered by the GEF-funded TNA, conducted in 2012.

Sectoral roadmaps to achieve development and climate goals

Antigua & Barbuda

> Link

#29

Having conducted its first TNA in 2002 on mitigation and adaptation (GEF-UNDP), Antigua & Barbuda updated its energy TNA with **technical assistance** of the IRENA in 2016 as part of the Renewables Readiness Assessment process, and later developed a **renewable energy roadmap 2021**. A TNA supported by the GEF-funded Global TNA Project in 2020 covered other priority sectors for mitigation.

Sierra Leone

> Link

#30

In 2024, with support from the Sustainable Energy for All, Sierra Leone formulated an **Energy Transition and Green Growth Plan** under a presidential initiative. Aligned with the NDC, it identifies a set of needed technology transitions to achieve development and climate goals, including associated costs and timeline for action.

IV. Why reporting on TNAs and sharing learnings from it matters?

Since the TNA process was formalized under the UNFCCC, developing countries have been encouraged to share information on its results (e.g. in their NCs and other national reports), and make them available to the secretariat for inclusion on TT:CLEAR.

The TEC continually monitors results of the TNA process and provides guidance where needed. Evidence gathered by the TEC shows that tracking and systematically disseminating information on TNAs/TAPs (e.g. by putting in place related tracking systems at the national level) enhances transparency, enables monitoring, evaluation, and learning, and may facilitate further replication and scale-up.

As the range of support providers and modalities for conducting TNAs expands, monitoring and reporting on the TNA process and outcomes at both national and intergovernmental levels becomes increasingly vital to ensure complementarity, coherence, coordination and continuous learning.



Relevant decisions: Decision 4/CP.7; Decision 3/CP.13
Complementary readings:

Enhancing Implementation of TNAs (2017)



I. Understanding the context: takeaways and considerations

 TNAs are most effective when conducted iteratively and involve monitoring and learning

Adequate resources and robust institutional arrangements are needed to ensure TNA outcomes are disseminated to relevant stakeholders, their implementation is continually monitored and evaluated, and their content are updated on a regular basis.

 TNAs can enable technology implementation, encourage innovation and facilitate investments

Emerging from a country-driven process, TNA results offer a portfolio of nationally-endorsed prioritized technologies and action plans for their implementation that could encourage innovation and facilitate technology investments in a country.

 TNAs can be used to enable policy coherence for climate technology and innovation

TNAs are versatile tools for assessing needs and articulating innovation and technology priorities for climate action, and should be embedded systematically across the climate planning processes in developing countries and be informed by them.

 Timing and institutional set-up of the TNA process plays a role in the uptake of its results

Alignment of timelines and processes in which climate plans, policies and strategies are developed could lead to better cross-fertilization, coherence, and efficiencies in advancing technology priorities of developing countries.

 TNAs benefit the climate technology agenda beyond the lifetime of the process itself

Benefits of TNA often goes beyond the process itself, contributing to the advancement of climate technology agenda in the country, including through improved institutional capacities, data availability on priority technologies, and engagement of implementation partners.

 Institutional linkages are key to ensure TNAs are visible, relevant, and fully utilized

Utilizing institutional arrangement, mandates, and stakeholder platforms used for strategic work on climate change in the country can help raise the visibility of TNA process among implementation actors, while contributing to strengthening domestic capacities and cross-fertilization in relevant planning and reporting processes.

 A practical checklist

a) Does the NDCs, NAPs, BTRs, LT-LEDS cover technology needs and priorities? Is there an associated implementation plan in place?

➤ *Consider integrating TNAs into implementation plans*

b) Is there any climate/technology planning process ongoing in the country (e.g. NDC, NAP, BTR, LT-LEDS or national/sectoral climate change strategy)?

➤ *Consider integrating TNAs into the planning processes*

c) How are high-level climate technology goals translated into line ministries responsibilities? Is there a coordination body/mechanism?

➤ *Consider utilizing such body/mechanism to inform TNAs*

d) Are there any previous or ongoing projects with similar scope and focus as TNAs?

➤ *Consider drawing on the results of previous efforts to avoid duplication*

e) Who performs the role of UNFCCC national focal point, NDE, and climate funds focal points in the country?

➤ *Consider engaging with relevant national focal points in steering TNAs*

f) How can TNAs respond to emerging agreements and findings from intergovernmental work on climate change?

➤ *Consider conducting TNAs in contextually-relevant high-impact sectors identified by, inter alia, the IPCC, the Technology Mechanism, or under the global stocktake of the Paris Agreement*



II. Identifying and mobilizing actors: takeaways and considerations

 NDEs play a crucial role in maximizing the benefits of the TNA process and sustainability of its results

Depending on the institutional arrangements in the country, NDEs may be in a position to initiate, coordinate or conduct TNAs on a regular basis, monitor and track their implementation, and summarize, disseminate and integrate their outcomes into relevant processes such as NDCs and BTRs.

 Actors other than GEF are also supporting the TNA process, e.g. through sectoral TNAs and roadmaps

Besides support from the GEF, mainly channeled through the Global TNA Project, countries have mobilized support from the GCF, the CTCN, implementing agencies of climate funds, specialized agencies, development agencies, and international networks, initiatives and partnerships to conduct TNAs, mostly through sectoral approaches.

 Available guidance on TNAs facilitates methodological consistency and collective learning

TNA is a dynamic and iterative process. When diversifying the sources of support, it is important to consider issues of coherence, methodological comparability and monitoring of TNA outcomes.

 Local and sectoral actors are central to the success of TNAs

Capitalizing on the existing domestic resources, capacities and expertise - including through formal and informal networks, stakeholder platforms and communities of practice - can enrich the TNA process and ensure synergies with the national system of innovation and the broader climate action landscape in the country.

 Implementation partners bring institutional, sectoral and implementation capacities to TNAs

Implementing agencies of climate funds, UN and specialized agencies, and other entities and initiatives active in a developing country/region can support sectoral TNAs and action plans, drawing on their knowledge of the local context and know-how in a specific sector or region.

 A strategic approach is needed to effectively identify and mobilize support providers for TNAs

Aspects to be considered when identifying suitable support providers for a TNA include: policy landscape, focus, scope, and purpose of the TNA, complementarities with relevant processes and initiatives including with respective timelines, prior engagements with the support providers, and eligibility criteria for accessing support, if any.

 A practical checklist

- a) Has the country participated in the GEF-funded Global TNA Project or received TA from the CTCN to conduct a TNA?
> Consider engaging with UNEP-CCC or CTCN to identify support options
- b) Is TNA or specific technology measures highlighted in country's priorities in relation to climate funds? Which windows of support could be utilized to conduct TNAs as a stand-alone or integrated activity in a larger project?
> Consider engaging with funds' focal points in your country to integrate sector/technology-specific TNAs into relevant programming and project activities
- c) Which are providers of capacity-building or TA in priority sectors for climate technology, and what are means and eligibility criteria for engaging with them?
> Consider engaging with these actors to conduct sector/technology-specific TNAs
- d) Is there any project or funding proposal in the formulation stage in prioritized sectors for climate technology, that could include a TNA?
> Consider engaging with project teams to integrate sector/technology-specific TNAs
- e) What are other environmental or development funding windows that may be utilized to conduct or update a TNA?
> Consider engaging with relevant national focal points to integrate sector/technology-specific TNAs into existing and new activities



III. Utilizing action and support: takeaways and considerations

 Effective TNAs are backed by institutional mandates and strategic resource mobilization

Undertaking regular and effective TNAs may entail mobilizing support of different support providers, concurrently or at different times, with complementary types of resources, backed by institutional mandates, coordination mechanisms and strategic engagement with international and domestic technology actors.

 Support for TNAs comes in a variety of modalities and from a diverse range of actors

A range of support modalities provided by different domestic and international actors across the value chain of technology policy and implementation may be considered and utilized, individually or in combination, to conduct or update a TNA.

 Tracking, reporting and coordination mechanisms can improve support for TNAs

A strong coordination mechanism, coupled with robust monitoring and reporting would be key to ensure available support windows are effectively utilized, knowledge and capacities emerging from the TNA process are retained, and key information flows to all stakeholders.

 Methodological consistency facilitate the comparability, monitoring and uptake of results

When diversifying the actors and actions for supporting TNAs, it is important to ensure such efforts do not fragment, duplicate and deviate from national priorities, and to the extent possible, follow the same methodology and are monitored and tracked systematically.

 Localization and sectoral approaches to TNAs bring them closer to implementation

Sector-specific and context-specific TNAs, informed by domestic expertise and know-how, bring the results closer to implementation and engage a broader set of implementation actors, including at the local level.

 Innovation in mobilizing support for TNAs is key: doing things differently and doing different things

If technology prioritization and implementation planning is integrated into existing and emerging opportunities aimed at achieving climate and SDGs (e.g. projects, TAs, MEA reporting, road mapping), in an agile and coherent manner, there is a higher likelihood that the TNA results remain timely, relevant and implementable.



A practical checklist

- a) Which priority technologies should/could be assessed at the regional, national, sub-national or local level?
➤ *Consider engaging actors at different levels to conduct regional/sub-national/local TNAs*
- b) Which technology priorities of the country are ready for deployment and engagement of the private sector?
➤ *Consider engaging the private sector to forge implementation pathways*
- c) Which technology priorities of the country are aligned with existing or emerging global initiatives and cooperative frameworks for climate action?
➤ *Consider participating in such initiatives/cooperative frameworks to facilitate technology implementation*
- d) Is there an implementing agency active in the country in prioritized sectors for climate technology?
➤ *Consider mobilizing its support for a sectoral TNA*
- e) Is there any domestic academic or research institution that is working on priority sectors of TNA?
➤ *Consider mobilizing its support for a sectoral TNA*
- f) Is the implementation of TNAs and their outcomes being monitored?
➤ *Consider tracking the undertaking/implementation of TNAs and reporting such information to the national entity tasked with monitoring of climate technology action and support*



How the TNA process under UNFCCC was created?

The TNA concept was formalized under the UNFCCC process in 2001 with the establishment of the technology transfer framework.

[Find out more](#)



Why developing countries conduct a TNA and how they use them?

Countries use their TNAs to articulate their technology priorities and devise pathways for their implementation. TNAs are also used to inform climate plans (e.g. NDCs and sectoral strategies), communicate support needs (e.g. BTRs), as well as climate funding proposals.

[Find out more](#)



How do I know if my country has conducted TNAs?

Get in touch with your UNFCCC national focal point. TNA reports prepared by developing countries, submitted to the Secretariat are featured on TT:CLEAR.

[Find out more on the UNFCCC website](#) [Global TNA Global Project](#)



Where can I find resources and guidance for undertaking a TNAs?

An overview of available TNA guidance is available on TT:CLEAR, including materials produced by the TEC and under the GEF-funded Global TNA Project.

[Find out more](#)



My country has updated its TNA. Should I share the reports with the UNFCCC?

Yes! Countries could submit their TNA reports to the secretariat (secretariat@unfccc.int) to be featured on TT:CLEAR.

[Find out more](#)



Are TNAs exclusively conducted with support from the GEF?

GEF is the main support provider for conducting TNAs, i.e. through the Global TNA Project, implemented by UNEP/UNEP-CCC. The TNA methodology has also been utilized independently by some countries. The CTCN and the GCF increasingly support developing countries in formulating or revising TNAs.

[Find out more](#)



How could the TNA process be embedded into GEF or GCF projects?

TNAs could be planned as part of enabling activities (GEF), readiness efforts (GCF), or conducted as part of project preparation and design activities. In any case, in-country coordination, including with focal points for these funds, is necessary to utilize synergies across various planning processes and projects.

[Find out more](#)



Does CTCN provide support for TNAs?

Yes, the technical assistance of the CTCN is demand-driven and NDEs could request for support for conducting or updating TNAs at anytime. This could cover multiple sectors or focus on one sector, thematic area or geographical area.

[Find out more](#)



How to find a suitable implementation partners/source of support for updating TNAs?

The climate fund explorer, maintained by the NDC Partnership, may provide useful insights on available windows of support by different providers of support, including for conducting sub-national and sectoral TNAs.

[Find out more](#)



United Nations Climate Change
Technology Executive Committee

About the Technology Executive Committee

The Technology Executive Committee is the policy arm of the Technology Mechanism under the UNFCCC, which also serves the Paris Agreement. The TEC analyzes climate technology issues and develops policies that can accelerate the development and transfer of technologies for climate change mitigation and adaptation.

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Downloads

A digital copy of this publication can be downloaded from:
<https://unfccc.int/ttclear/tec/support.html#Practicalguide>

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