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Transparency Without Results: UN Climate Reports Fail to Show Effective Transfer of Technology to Developing Countries

By Ningxiner Li

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Executive Summary

This report synthesizes the findings of research on the reporting and compliance mechanisms governing transfer of technology[1] obligations of developed country Parties under the United Nations climate change regime. The legal basis for transfer of technology has evolved from foundational principles in the United Nations Framework Convention on Climate Change (UNFCCC) to an enhanced transparency framework (ETF) as part of the Paris Agreement, with defined modalities, procedures and guidelines for the transparency framework for action and support (MPGs). The ETF requires that developed countries submit Biennial Transparency Reports (BTRs) detailing their transfer of technology provided to developing countries. Our review of developed countries' first BTR submissions reveals significant shortcomings that hinder proper evaluation of compliance with the transfer of technology obligations. The current system allows reporting that meets procedural requirements but fails to deliver clear, comparable, and outcome-oriented data essential for enforcing the legal obligations on transfer of technology and ensuring it serves as a genuine catalyst for global climate actions. This report argues that the ETF, as currently operationalized, prioritizes procedural transparency over substantive effectiveness. The design of the reporting requirements is characterized by discretionary language, fragmented methodologies, and weak linkages between financial and technological support. These features undermine the ability of Parties, review bodies, and the global stocktake to assess whether technology is being delivered in a manner that meaningfully supports developing countries' climate action. Recommendations are advanced to strengthen reporting requirements, enhance traceability and comparability, and reorient the transparency framework toward measurable outcomes rather than process-based compliance. As the first comprehensive review of the first BTR submissions by developed countries, this report is intended to provide an evidentiary foundation for the 2028 MPGs review.

[1] Transfer of technology and technology development and transfer are used interchangeably in this report. Transfer of technology is the term under the UNFCCC, while technology development and transfer is used in the Paris Agreement. In the context of this report, both terms refer to the substantive obligations of developed country Parties to promote, facilitate, and finance climate technology for developing countries, including the associated reporting duties. For consistency, this report generally uses transfer of technology except when explicitly discussing the Paris Agreement.

This report identifies five systemic deficiencies in the first cycle of BTR submissions on technology development and transfer (TDT):

1. Voluntary language: the MPGs are saturated with qualifiers such as “to the extent possible,” “if available,” and “as available,” effectively downgrading mandatory reporting obligations to voluntary disclosures without consequence for omission.

2. Methodological fragmentation: at least five distinct methodologies are employed by developed country Parties to define and track technology transfer, rendering cross-country comparison and global aggregation impossible.

3. A disconnect between finance and technology reporting: technology transfer activities are frequently reported without corresponding financial data, and vice versa, severing the accountability link between resources pledged and technologies delivered.

4. Process over impact: reporting emphasizes high-level strategies and project descriptions over measurable outcomes, performance indicators, or alignment with recipient-country needs.

5. “Ongoing/Planned” dominance: approximately 45% of reported technology support remains in “ongoing” status, meaning nearly half of the support claimed in this cycle has not yet reached developing countries.

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List of Abbreviations

BR	Biennial Report
BTR	Biennial Transparency Report
BUR	Biennial Update Report
CBDR-RC	Common but Differentiated Responsibilities and Respective Capabilities
COP	Conference of the Parties
CTCN	Climate Technology Centre and Network
CTF	Common Tabular Format
DAC	Development Assistance Committee
ETF	Enhanced Transparency Framework
FMCP	Facilitative, Multilateral Consideration of Progress
GEF	Global Environment Facility
IPCC	Intergovernmental Panel on Climate Change
LDCs	Least Developed Countries
MPGs	Modalities, Procedures and Guidelines for the transparency framework for action and support
NC	National Communication
NDCs	Nationally Determined Contributions
OECD	Organisation for Economic Co-operation and Development
OMB	Office of Management and Budget
R&D	Research and Development
SBI	Subsidiary Body for Implementation
SBSTA	Subsidiary Body for Scientific and Technological Advice
TDT	Technology Development and Transfer
TEC	Technology Executive Committee
TER	Technical Expert Review
ToT	Transfer of Technology
TRIPS Agreement	Agreement on Trade-Related Aspects of Intellectual Property Rights
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
WTO	World Trade Organization

I. Background: The Legal Basis and Evolution of Technology Transfer Obligations and Reporting Requirements under the United Nations Climate Change Regime

The United Nations Framework Convention on Climate Change (UNFCCC) constitutes the first international treaty addressing climate change. It has near-universal membership, with 198 Parties as of 2025.[2] The UNFCCC sets out fundamental principles, such as the principle of common but differentiated responsibilities and respective capabilities (CBDR-RC)[3] and a general governance system to facilitate Parties' commitments in a structured and progressive manner. The Paris Agreement is a related legal instrument to the UNFCCC that entered into force on 4 November 2016. Currently, 195 out of 198 UNFCCC Parties are Parties to the Paris Agreement.[4] Therefore, it also has near-universal participation and binds nearly all of the Parties to UNFCCC.

In terms of the objective and purpose, the Paris Agreement sets a clear and legally-binding emission target to hold the increase in the global average temperature to well below 2 °C above pre-industrial levels and to pursue efforts to limit it to 1.5 °C.[5] The collective temperature goal is required to be achieved by all Parties to the Agreement through their nationally-determined contributions (NDCs) which are to be communicated every five years.[6] Each new NDC is required to represent a progression beyond the Party's then-current NDC and reflect its highest possible ambition.[7] Therefore, the Paris Agreement has transformed the framework nature of the UNFCCC regime into a goal-oriented regime by legally codifying a quantified temperature objective and establishing binding procedural obligations of conduct designed to achieve the collective target on a progression basis. In addition, it establishes a top-down governance framework for standard-setting and accountability[8] to complement the bottom-up self-monitoring and reporting of progressed NDCs. Thus, it constitutes a hybrid legal architecture, integrating both bottom-up and top-down elements. Furthermore, the Paris Agreement departs from the categorical annex-based differentiation of Parties' obligations under the UNFCCC, instead operationalizing the principle of CBDR-RC in a more tailored manner based on "different national circumstances".[9] However, it still maintains specific obligations for developed countries in certain areas, including mitigation,[10] financial,[11] technology development and transfer (TDT),[12] capacity-building support,[13] as well as reporting.[14]

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[2] United Nations, United Nations Framework Convention on Climate Change, 1992, Art. 2.
[3] United Nations, United Nations Framework Convention on Climate Change, 1992, Art. 3, para. 1. On CBDR-RC, see also Lavanya Rajamani, "The Principle of Common but Differentiated Responsibility and the Balance of Commitments under the Climate Regime", *Review of European Community & International Environmental Law*, vol. 9, no. 2 (2000), pp. 120-131.CBDR-RC suggests that the international community shares a common responsibility for protecting the global atmosphere, but that the responsibility for addressing global climate change should be differentiated among States based on historical contribution to the problem as well as present capacity to respond. This principle serves as an interpretive and operative principle that guides the interpretation, application, and implementation of all provisions of the framework convention, ensuring that developed and developing countries have differentiated obligations according to their capabilities and responsibilities.
[4]United Nations Treaty Collection, "Paris Agreement, Status of Ratification". Available from https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en.
[5] Paris Agreement, 2015, Art. 2, para. 1.
[6] Paris Agreement, 2015, Art. 4, paras. 2 and 9.
[7] Paris Agreement, 2015, Art. 4, para. 3.
[8] Daniel Bodansky, Jutta Brunnée and Lavanya Rajamani, *International Climate Change Law* (Oxford, Oxford University Press, 2017), p. 215.
[9] Paris Agreement, 2015, Art. 2, para. 2.
[10] Paris Agreement, 2015, Art. 4, para. 4.
[11] Paris Agreement, 2015, Art. 9.
[12] Paris Agreement, 2015, Art. 10.
[13] Paris Agreement, 2015, Art. 11.
[14] Paris Agreement, 2015, Art. 13.

The UNFCCC outlines several obligations related to Transfer of Technology (ToT), primarily within Article 4 on commitments and Article 12 on reporting. Article 4.7 states that "the extent to which developing country Parties will effectively implement their commitments under the Convention will depend on the effective implementation by developed country Parties of their commitments under the Convention related to financial resources and transfer of technology and will take fully into account that economic and social development and poverty eradication are the first and overriding priorities of the developing country Parties". This clause creates a conditional and interdependent legal structure, whereby the effective implementation of commitments by developing countries is contingent upon the adequate fulfillment of financial and transfer of technology obligations by developed countries. It emphasizes that global climate efforts can succeed only if developed countries meet their substantive support responsibilities.

The core ToT obligation is set under Article 4.5 of the Convention which states that "developed country Parties and other developed Parties included in Annex II shall take all practicable steps, as appropriate, to promote the transfer of, or access to, environmentally sound technologies (ESTs) and knowhow; to facilitate such transfer; and to finance transfer of technology, to other Parties, particularly developing country Parties. In this process, developed country Parties shall support the development and enhancement of endogenous capacities and technologies of developing country Parties. Other Parties and organizations in a position to do so may also assist in facilitating the transfer of such technologies." Accordingly, developed countries bear a positive legal duty to actively support transfer of technology, including financial assistance and capacity building, through all practicable means.

Other provisions in Article 4 and Article 11 link obligations on developed Parties to provide new and additional financial resources to ToT. The specific needs of vulnerable developing countries and least developed countries (LDCs) should be taken into consideration for ToT, according to articles 4.8 and 4.9.

These obligations are a recognition that the effective implementation of developing country commitments is contingent upon the adequate fulfillment of these financial and transfer of technology obligations.

The Paris Agreement also includes specific provisions on TDT. Article 10 of the Paris Agreement, mirroring the ToT obligations and facilitative mechanisms established under the UNFCCC, emphasizes developed country Parties' responsibilities regarding development and transfer of technology to developing country Parties, as well as the use of Technology Mechanism and previous-established financial mechanisms and a new fund to facilitate such development and transfer support. Article 10.1 provides a long-term vision of "fully realizing technology development and transfer" to improve resilience and reduce emissions. Article 10.2 echoes the earlier requirement that Parties shall cooperate in good faith on TDT, and frames technology as central to implementing mitigation and adaptation actions. Articles 10.3 and 10.4 link the Paris Agreement to the pre-existing Technology Mechanism under the UNFCCC, and also establish a technology framework to guide the mechanism. Article 10.5 emphasizes the support for innovation at the early stages of the technology cycle for developing countries. Article 10.6 stipulates that support, including financial support, "shall be provided" to developing countries for the implementation of Article 10, including for strengthening cooperation action on TDT across all stages of the technology cycle, balancing mitigation and adaptation needs. The global stocktake referred to in Article 14 shall take into account available information on efforts related to suppor TDT for developing country Parties.

The Conference of the Parties (COP) of the UNFCCC has successively developed an overall approach to enhance the implementation of Article 4 by establishing a Technology Transfer Framework. This framework has progressively been developed. In 2007, at COP 13 in Bali, Parties adopted the Bali

Action Plan through Decision 1/CP.13,[15] which called for enhancing the Technology Transfer Framework and introduced four additional themes under the mechanisms for transfer of technology: 1) innovative financing; 2) international cooperation; 3) endogenous technology development; and 4) collaborative research and development (R&D). Then in 2008, at COP 14 in Poznań, Parties adopted Decision 2/CP.14,[16] establishing the Poznań Strategic Programme on Technology Transfer, funded by the Global Environment Facility (GEF) with the aim to support the following activities: 1) conducting technology needs assessments; (2) supporting pilot priority technology projects linked to technology needs assessments; and 3) disseminating GEF experience and successful cases of environmentally sound transfer of technology. In 2010, at COP 16 in Cancun, Parties established the Technology Mechanism, consisting of the Technology Executive Committee (TEC) and the Climate Technology Centre and Network (CTCN), to enhance action on climate TDT.[17] In 2018, at COP 24 in Katowice, Parties adopted the technology framework under the Paris Agreement, focusing on innovation, implementation, enabling environment and capacity-building, collaboration and stakeholder engagement, and support.[18] At COP 29 in 2024, Parties decided to conduct a review of the functions of the Climate Technology Centre and to determine whether to extend its term at COP 30 (November 2025), taking into account the results of the first and second independent reviews of the CTCN and the first periodic assessment of the effectiveness and adequacy of support provided to the Technology Mechanism under the Paris Agreement.[19]

At COP 30 in 2025, Parties established the Belém Technology Implementation Programme under the Paris Agreement and on the basis of the principles of the technology framework adopted in 2018, which runs at least until 2034 with the possibility of extension. Its objectives are to strengthen support for the implementation of technology priorities identified by developing countries and to address the challenges identified in the first periodic assessment of the Technology Mechanism. This functional design of its first implementation programme mainly focuses on addressing challenges encountered by developing countries at different stages of the technology cycle; supporting efforts to strengthen national systems of innovation and enabling environments and integrating climate-technology priorities into policies and programmes; enhancing capacities to prepare and secure funding for climate-technology projects; and promoting effective matchmaking to accelerate project implementation.[20] As such, the programme is designed to facilitate the operationalization of existing commitments under the Convention and the Paris Agreement, rather than to establish new obligations for developed country Parties.

Against this background, TDT continues to feature prominently on the COP agenda, with particular emphasis on enabling developing countries to access climate technologies for the implementation of their NDCs. The Group of 77 plus China has emphasized that a core priority for the group is enabling developing countries to access climate technology for the implementation of their NDCs, and noted that the role of unlocking the linkages between both Financial Mechanism and Technology Mechanism is

[15] United Nations Framework Convention on Climate Change (UNFCCC), *Report of the Conference of the Parties on its Fourteenth Session*, FCCC/CP/2008/7, 2008. Available from https://unfccc.int/resource/docs/2008/cop14/eng/07a01.pdf.
[16] UNFCCC, *Report of the Conference of the Parties on its Sixteenth Session*, FCCC/CP/2010/7, 2010. Available from https://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf.
[17] Ibid.
[18] UNFCCC, Decision 15/CMA.1, *Technology framework under Article 10, paragraph 4, of the Paris Agreement*, 2018. Available from https://unfccc.int/sites/default/files/resource/cma2018_3_add2_new_advance.pdf.
[19] UNFCCC, *Review of the functions of the Climate Technology Centre and Network*, Decision -/CP.29, 2024.
[20] UNFCCC, *Belém Technology Implementation Programme*, Decision -/CMA.7, 2025. Available from https://unfccc.int/documents/655071.

much needed for developing countries in their transformation towards a greener and cleaner future,[21] reflecting persistent shortcomings in the effectiveness of existing support mechanisms, particularly with regard to coordination, sequencing, and matchmaking between finance, technology, and country-defined priorities.

At the same time, the growing focus on institutional coordination, implementation frameworks, and demand-side constraints has implications for how developed country support is assessed. While existing arrangements are intended to operationalize developed country commitments under the UNFCCC and the Paris Agreement, current mechanisms design provide limited basis for systematically evaluating the adequacy, effectiveness, or sufficiency of developed country actions on TDT. As a result, discussions increasingly center on improving delivery mechanisms and absorptive capacity in developing countries, rather than on assessing whether and to what extent developed country Parties are fulfilling their TDT obligations. The coordination of multiple bodies should not dilute focus on the actions that developed countries should take to advance transfer of technology to developing countries and new and additional financing to support transfer of technology.

It is against this backdrop that the present report turns to examine the reporting obligations through which developed countries are expected to account for their TDT commitments.

[21] Group of 77, Statement on behalf of the Group of 77 and China by the delegation of Iraq at the informal meeting of the UN General Assembly on the priorities and preparations for the 2025 UNFCCC (COP30), New York, 5 March 2025. Available from https://www.g77.org/statement/getstatement.php?id=250305.

II. Reporting Obligations Related to Technology Transfer: National Communications and Biennial Reports

Given that developed countries have reporting obligations with respect to transfer of technology to developing countries, this Report focuses on this aspect.

Article 12 of the UNFCCC mandates that Parties communicate information on implementation to the COP through the Secretariat. Article 12.3 specifically requires developed country Parties and other developed Parties in Annex II to report on measures taken pursuant to Articles 4.3, 4.4, and 4.5, including those related to transfer of technology and financial support. Guidance was provided to clarify that the term "communicate" in this context should be understood as a legal obligation to submit national communications by using tabular formats [22], ensuring transparency, accountability, and enabling the COP to oversee compliance and progress.

Article 12.5 states, "Each developed country Party and each other Party included in Annex I shall make its initial communication within six months of the entry into force of the Convention for that Party." Early guidance for developed Parties was then provided in Decision 9/CP.2[23], clarifying that these national communications should include information on transfer of technology support with an Annex to the decision setting out a template in table form that should be reported, including reporting information on project/programme title; purpose; recipient country; sector; total funding; years in operation; description; Ministry or company, contact person, address and phone number; impact on greenhouse gas emissions/sinks (optional). [24] Parties are required to prepare their national communications every four years.[25] The reporting guidelines have been updated. Each Annex II Party "shall provide, in textual and tabular formats, or common tabular format (CTF) (see table 1 below), information on measures and activities related to transfer of technology implemented or planned since its previous national communication or biennial report. In reporting such measures and activities, Annex II Parties shall, to the extent possible, provide information on the recipient country, the targeted area of mitigation or adaptation, the sector involved and the sources of transfer of technology from the public or private sectors, and shall distinguish between activities undertaken by the public and private sectors. As the ability of Parties to collect adequate information on private-sector activities is limited, Parties may indicate, where feasible, how they have encouraged private-sector activities and how those activities help Parties to meet their commitments under Article 4, paragraphs 3, 4 and 5, of the Convention." [26]

[22] UNFCCC, Decision 9/CP.2, *Communications from Parties included in Annex I to the Convention: guidelines, schedule and process for consideration*, 1996. Available from https://unfccc.int/sites/default/files/resource/docs/cop2/15a01.pdf.
[23] UNFCCC, Decision 9/CP.2, 1996, paras. 42(d), 42(e) and 43. Available from https://unfccc.int/sites/default/files/resource/docs/cop2/15a01.pdf.
[24] UNFCCC, Decision 9/CP.2, 1996, Appendix III, Table 11. Available from https://unfccc.int/sites/default/files/resource/docs/cop2/15a01.pdf.
[25] UNFCCC, Decision 9/CP.16, 2010. Available from https://unfccc.int/documents/6528.
[26] UNFCCC, Decision 6/CP.25, *Revision of the "UNFCCC reporting guidelines on national communications for Parties included in Annex I to the Convention"*, 2019, para. 58. Available from https://unfccc.int/sites/default/files/resource/cp2019_13a01_adv.pdf.

Table 1: CTF for Measures and Activities related to Transfer of Technology Implemented or Planned by Annex II Parties Since Their Previous NCs or BRs, in Accordance with National Communication Requirement

Provision of support for technology development and transfer[a, b]

Recipient country and/or region	*Targeted area*	*Measures and activities related to technology transfer*	*Sector*[c]	*Source of funding for technology transfer*	*Activities undertaken by*	*Status*	*Additional information*[d]
	Mitigation *Adaptation* *Mitigation and adaptation*		*Energy* *Transport* *Industry* *Agriculture* *Water and sanitation* *Other*	*Private* *Public* *Private and public*	*Private* *Public* *Private and public*	*Implemented* *Planned*	

[a] To be reported to the extent possible.
[b] The table should include measures and activities implemented or planned since the previous national communication or biennial report.
[c] Parties may report sectoral disaggregation, as appropriate.
[d] Additional information may include, for example, information on funding for technology development and transfer provided, a short description of the measure or activity and information on cofinancing arrangements.

Source: UNFCCC, Decision 6/CP.25 (2019), p. 55, Table 10.[27]

Separately from the national communications, developed country Parties must submit biennial reports (BRs) on "their progress in achieving emission reductions, including information on mitigation actions to achieve their quantified economy-wide emission targets and emission reductions achieved, projected emissions and the provision of financial, technology and capacity-building support to developing country Parties; …"[28]

The UNFCCC adopted biennial reporting guidelines[29] for developed country Parties for the preparation of their first BRs. Annex I Parties are required to prepare their BRs every two years. The specific requirement on reporting financial, technological and capacity-building support to developing country Parties are summarized in Box 1 below.

[27] UNFCCC, Decision 6/CP.25, 2019. Available from https://unfccc.int/sites/default/files/resource/cp2019_13a01_adv.pdf
[28] UNFCCC, Decision 1/CP.16, *The Cancun Agreements: Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention*, 2010, para. 40(a). Available from https://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf.
[29] UNFCCC, Decision 2/CP.17, *Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention*, Annex I, 2011. Available from https://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf.

BOX 1: Developed Country Parties' Reporting of Support related to Transfer of Technology to Developing Countries, in Accordance with Biennial Reporting Guidelines Requirement[30]

Parties included in Annex II to the Convention (Annex II Parties) shall provide information on the provision of financial, **technological** and capacity-building support to non-Annex I Parties consistent with the requirements contained in section VIII of the UNFCCC Annex I reporting guidelines on national communications following common reporting formats, including information to show how this support is new and additional.[31]

Each Annex II Party shall provide information on the **financial support** it has provided, committed and/or pledged **for the purpose of assisting** non-Annex I Parties to mitigate GHG emissions and adapt to the adverse effects of climate change [...] and for capacity-building and **transfer of technology** in the areas of mitigation and adaptation, where appropriate.[32]

Each Annex II Party shall provide information on measures taken to promote, facilitate and finance the **transfer of, access to and the deployment of climate-friendly technologies** for the benefit of non-Annex I Parties, and for the support of the **development and enhancement of endogenous capacities and technologies** of non-Annex I Parties.[33]

Parties may also provide information on **success and failure stories**.[34]

Each Annex II Party shall provide, in textual and tabular formats, information on measures and activities related to **transfer of technology implemented or planned** since its last national communication or biennial report. In reporting such measures and activities, Annex II Parties shall, to the extent possible, provide information on:

- the **recipient country**,
- the **target area of mitigation or adaptation**,
- the **sector involved**, and
- the **sources of transfer of technology** from the public or private sectors; and shall **distinguish between activities undertaken by the public and private sectors**.[35]

Each Annex II Party shall provide information, to the extent possible, on how it has provided capacity-building support that responds to the existing and emerging capacity-building needs identified by non-Annex I Parties in the areas of **mitigation, adaptation, and technology development and transfer**.[36]

A CTF was adopted for "UNFCCC biennial reporting guidelines for developed country Parties" (hereinafter referred to as the BR reporting guidelines).[37] See Table 2 below.

[30] Ibid.
[31] Ibid., para. 13.
[32] Ibid., para. 17.
[33] Ibid., para. 21.
[34] Ibid.
[35] Ibid., para. 22.
[36] Ibid., para. 23.
[37] UNFCCC, Decision 19/CP.18, *Common tabular format for "UNFCCC biennial reporting guidelines for developed country Parties"*, 2012, Table 8. Available from https://unfccc.int/resource/docs/2012/cop18/eng/08a03.pdf.

TABLE 2: CTF for Measures and Activities related to Transfer of Technology Implemented or Planned by Annex II Parties Since Their Previous NCs or BRs, in Accordance with Biennial Reporting Guidelines Requirements

Provision of technology development and transfer support[a,b]

Recipient country and/or region	*Targeted area*	*Measures and activities related to technology transfer*	*Sector*[c]	*Source of the funding for technology transfer*	*Activities undertaken by*	*Status*	*Additional information*[d]
	Mitigation *Adaptation* *Mitigation and adaptation*		*Energy* *Transport* *Industry* *Agriculture* *Water and sanitation* *Other*	*Private* *Public* *Private and public*	*Private* *Public* *Private and public*	*Implemented* *Planned*	

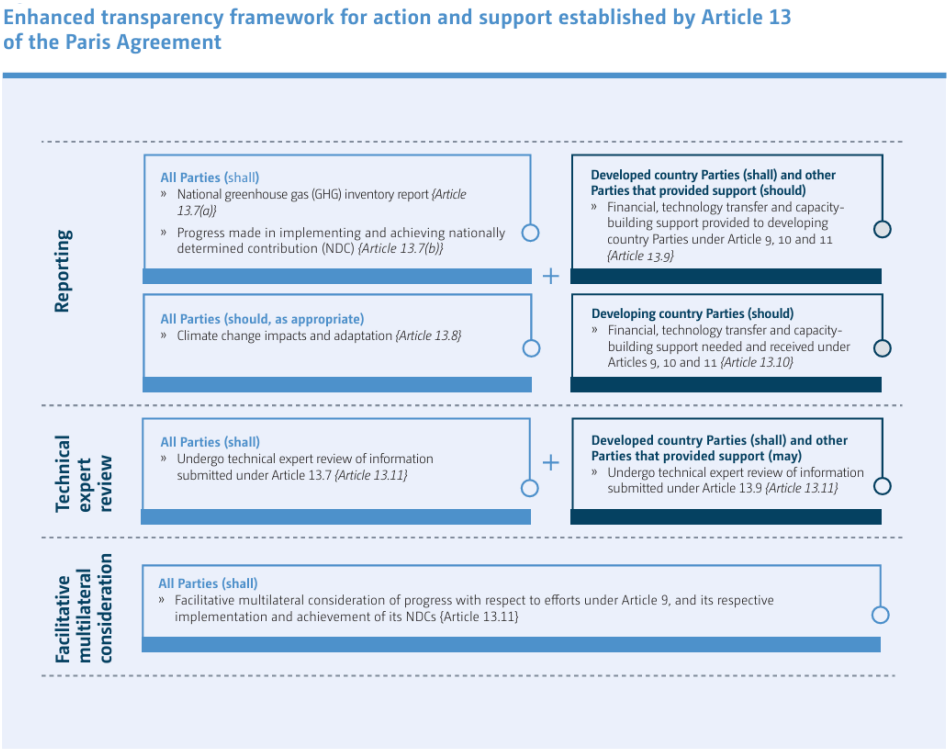
[a] To be reported to the extent possible.
[b] The tables should include measures and activities since the last national communication or biennial report.
[c] Parties may report sectoral disaggregation, as appropriate.
[d] Additional information may include, for example, funding for technology development and transfer provided, a short description of the measure or activity and co-financing arrangements.

Source: UNFCCC, Decision 19/CP.18 (2012), p. 41, Table 8.

The Paris Agreement established an enhanced transparency framework (ETF) which requires all Parties to report information on technology support provided and received. It offers a "built-in flexibility", but only for developing countries, allowing them to self-determine their commitments, including in the scope, frequency and level of detail of reporting, and in the scope of the review [38] (see Figure 1).

[38] UNFCCC, Decision 1/CP.21, *Adoption of the Paris Agreement*, 2015, para. 89. Available from https://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf; and UNFCCC, Decision 18/CMA.1, *Modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement*, 2018, Preamble, paras. 3-6. Available from https://unfccc.int/resource/tet/0/00mpg.pdf.

FIGURE 1: ETF for Action and Support established by Article 13 of the Pairs Agreement, showing Common and Differentiated Reporting Requirements, Review and Facilitation Processes for Developed and Developing country Parties

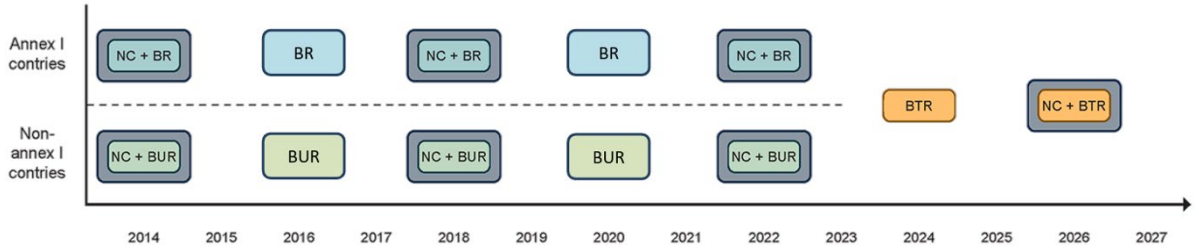


Source: UNFCCC, ETF Technical Handbook, First Edition (2020), p. 9, Figure 2. [39]

The ETF under the Paris Agreement replaced the previous Technology Framework when it came into force on the 31st of December 2024.[40] The requirement for developed countries to submit biennial reports was replaced by biennial transparency reports (BTRs), while National Communications will remain active alongside BTRs.[41] The Figure 2 below represents the requirements under the ETF for Annex I and non-Annex I countries.

[39] UNFCCC, *ETF Technical Handbook*, First Edition, June 2020. Available from https://unfccc.int/sites/default/files/resource/ETF%20Technical%20Handbook%20First%20Edition%20June_2020.pdf.
[40] At COP24, Parties agreed to report under the enhanced transparency framework through Biennial Transparency Reports (BTRs), with the first BTR due by 31 December 2024. Existing transparency reports were to be completed by 31 December 2022 (developed countries) and 31 December 2024 (developing countries).
[41] Climate Transparency Platform, "An introduction to adaptation reporting and the BTR", 2024. Available from https://climate-transparency-platform.org/.

FIGURE 2: Transition to BTRs under the ETF, showing replacement of BRs/BURs and continued use of NCs for Annex I and non-Annex I Parties from 2024 onwards



Source: Climate Transparency Platform, An introduction to adaptation reporting and the BTR, 2024.[42]

Developed country Parties are required to report biennially [43] on financial support, transfer of technology and capacity building in their BTRs, following Article 13.9.[44]

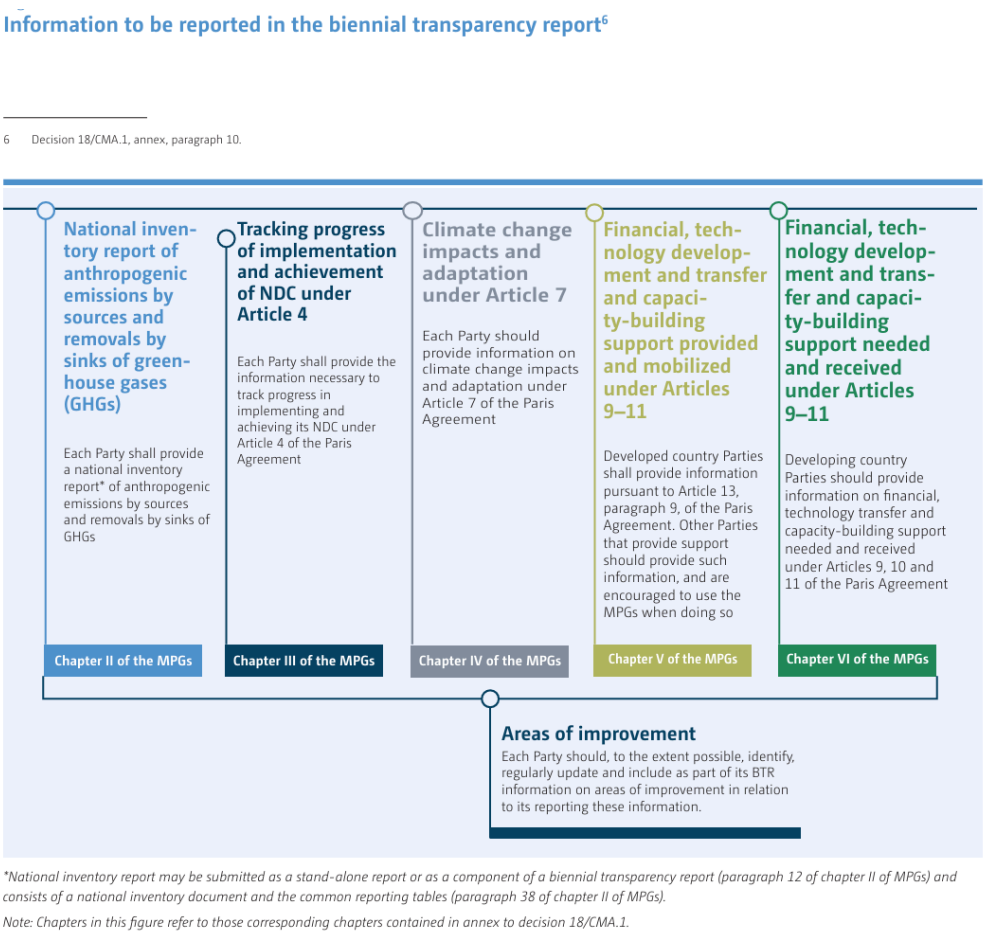
The modalities, procedures and guidelines for the transparency framework for action and support (hereinafter referred to as the MPGs)[45] were adopted by the COP in 2018. The MPGs serve the ETF under the Paris Agreement and guide the preparation and submission of BTRs.

Furthermore, the Subsidiary Body for Scientific and Technological Advice is "expected to undertake the first review and update, as appropriate, of the modalities, procedures and guidelines no later than 2028 on the basis of experience in reporting, technical expert review and facilitative, multilateral consideration of progress, and decide that subsequent reviews and updates will be undertaken as and when the COP determines them to be appropriate."[46]

In accordance with the MPGs, Parties must submit their first BTRs and national inventory report the latest by 31 December 2024. Figure 3[47] shows the information to be provided by Parties in their BTRs and the corresponding chapters of the MPGs that guide the reporting of that information (see Figure 3).

[42] Ibid.
[43] UNFCCC, Decision 1/CP.21, 2015, para. 90(b). Available from https://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf.
[44] UNFCCC, Decision 18/CMA.1, 2018, p. 21. Available from https://unfccc.int/resource/tet/0/00mpg.pdf.
[45] UNFCCC, Decision 18/CMA.1, 2018, Annex, para. 1. Available from https://unfccc.int/resource/tet/0/00mpg.pdf.
[46] UNFCCC, Decision 18/CMA.1, 2018, para. 2. Available from https://unfccc.int/resource/tet/0/00mpg.pdf.
[47] UNFCCC, *ETF Technical Handbook*, First Edition, June 2020. Available from https://unfccc.int/sites/default/files/resource/ETF%20Technical%20Handbook%20First%20Edition%20June_2020.pdf#:~:text=Because%20of%20the%20nature%20of,reported%20in%20a%20textual%20format.

FIGURE 3: Overview of Information to Be Provided by Parties in BTRs and National Inventory Reports According to the MPGs



Source: UNFCCC, ETF Technical Handbook, First Edition, June 2020, page 12, Figure 3.[48]

As evidenced in Figure 3 above, developed country Parties shall provide information on financial, TDT and capacity-building support provided and mobilized pursuant to Article 13.9, and in accordance with chapter V of the MPGs.[49] In addition, other Parties that provide such support should provide this information and, in doing so, are encouraged to use the MPGs contained in chapter V, with information required on TDT listed below (Box 2).

[48] Ibid.
[49] UNFCCC, Decision 18/CMA.1, 2018, paras. 10 and 118. Available from https://unfccc.int/resource/tet/0/00mpg.pdf.

BOX 2: Reporting Requirements on Technology Development and Transfer within National Circumstances, Institutional Arrangements, and Underlying Assumptions, Definitions, and Methodologies, According to the MPGs

A. National circumstances and institutional arrangements, as specified in paragraph 120 of the MPGs:

> A. National circumstances and institutional arrangements
> …
> 120. Information, if available, on national circumstances and institutional arrangements for the provision of technology development and transfer and capacity-building support.

B. Underlying assumptions, definitions and methodologies, as specified in paragraphs 121 and 122:

> B. Underlying assumptions, definitions and methodologies
> …
>
> 121.
> …
> (k) Whether it supported capacity-building and/or technology development and transfer objectives;
> ….
>
> 122. A description of the underlying assumptions, definitions and methodologies used to provide information on technology development and transfer and capacity-building support.

In addition, developed countries should provide information on transfer of technology as part of in information on financial support, as specified in paragraphs 123-125 of the MPGs (see Box 3).

BOX 3: Reporting Requirements on Technology Development and Transfer within Financial Support to Developing Country Parties under Article 9 of the Paris Agreement, According to the MPGs

> C. Information on financial support needed by developing country Parties under Article 9 of the Paris Agreement
>
> 1. Bilateral, regional and other channels
> 123. Relevant information, in a tabular format, for the previous two reporting years without overlapping with the previous reporting periods, on bilateral and regional financial support provided, specifying:
> …
> (l) Whether it contributes to capacity-building and/or technology development and transfer objectives, as available.
>
> 2. Multilateral channels
> 124. Relevant information, in a tabular format, for the previous two reporting years without overlapping with the previous reporting periods, on financial support provided through multilateral channels, specifying:
> …

(n) Whether it contributes to capacity-building and/or technology development and transfer objectives, as applicable, as available.

3. Information on finance mobilized through public interventions

125. Relevant information, in textual and/or tabular format, for the previous two reporting years without overlapping with the previous reporting periods, on financial support mobilized through public interventions through bilateral, regional and multilateral channels, including the operating entities of the Financial Mechanism and entities of the Technology Mechanism, as applicable and to the extent possible:

…

(d) Type of public intervention used (e.g. grant, concessional loan, non-concessional loan, equity, guarantee, insurance, policy intervention, capacity-building, technology development and transfer, technical assistance);

Developed countries should also provide information on support for TDT provided under Article 10 of the Paris Agreement, as specified in paragraphs 126 and 127 of the MPGs (See Box 4).

BOX 4: Reporting Requirements on Technology Development and Transfer under Article 10 of the Paris Agreement, According to the MPGs

D. Information on support for technology development and transfer provided under Article 10 of the Paris Agreement

126. Information, in textual format, on support for technology development and transfer provided under Article 10 of the Paris Agreement, including, to the extent possible, qualitative and/or quantitative information on:

(a) Strategies employed to support technology development and transfer, including case studies;

(b) Support provided at different stages of the technology cycle;

(c) Support for the development and enhancement of endogenous capacities and technologies of developing country Parties;

(d) Efforts to encourage private sector activities related to technology development and transfer and how such efforts support developing country Parties;

(e) Efforts to accelerate, encourage and enable innovation, including research, development and deployment efforts, and collaborative approaches to research and

(f) Knowledge generated.

127. Quantitative and/or qualitative information in a common tabular format on measures or activities related to support for technology development and transfer implemented or planned since their previous report, including, to the extent possible and as relevant:

(a) Title;

(b) Recipient entity;

(c) Description and objectives;

(d) Type of support (mitigation, adaptation or cross-cutting);

(e) Sector;

(f) Type of technology;

(g) Status of measure or activity;

(h) Whether the activity was undertaken by the public and/or private sector.

The time frame for the reports is explicitly required in paragraph 127 of the MPGs and is defined as "since the previous report" clause which refers to the most recent report under the applicable transparency framework for that Party. In practice, Parties define their reporting timeframe in the BTRs. For example, the European Union's first BTR states that the reporting period covers 2021-2022 to reflect support provided since the EU's 8th NC and 5th BR.

The current template for information on support for TDT required by paragraph 127 of the MPGs, namely the CTF (table 4) is presented below (Table 3).

TABLE 3: CTF for Reporting Information on Support for Technology and Transfer provided under Article 10 of the Paris Agreement, According to the Guidance for operationalizing the MPGs for the enhanced transparency framework referred to in Article 13 of the Paris Agreement

Information on support for technology development and transfer provided under Article 10 of the Paris Agreement[a]

Title[b]	*Recipient entity*[b]	*Description and objectives*[b]	*Type of support*[b]	*Sector*[b]	*Subsector*[b]	*Type of technology*[b]	*Status of measure or activity*[b]	*Activity undertaken by*[b]	*Additional information*[e]
			Mitigation Adaptation Cross-cutting[d]	Energy Transport Industry Agriculture Forestry Water and sanitation Cross-cutting Other (specify)[c]			Planned Ongoing Completed	Public sector Private sector Public and private sector	

Notation keys: NA = not applicable; UA = information not available at the time of reporting. NR = not reported (to indicate the voluntary character of the information)

[a] Quantitative and/or qualitative information in common tabular format on measures or activities related to support for technology development and transfer implemented or planned since their previous BTR, to the extent possible and as relevant.

[b] Parties provide the underlying assumptions, definitions and methodologies, as applicable, used to identify and/or report this reporting parameter in the respective section of the BTR.

[c] If "other", Parties should specify this information.

[d] This refers to activities that have both mitigation and adaptation components.

[e] Report, to the extent possible, information on the project/programme and implementing agency and provide a link to any relevant documentation and as appropriate, support to activities related to averting, minimizing and addressing loss and damage associated with the adverse effects of climate change.

…

Custom footnotes

The underlying assumptions, definitions and methodologies of the information in this CTF is available at link/page number of the BTR

Source: UNFCCC, Decision 5/CMA.3, Methodological issues relating to the enhanced transparency framework for action and support referred to in Article 13 of the Paris Agreement, 2021, p. 30, Table III.4.[50]

This reporting framework is riddled with qualifying phrases that function as escape clauses for reporting Parties. The constant repetition of phrases such as "to the extent possible," "if available," and "as available" creates a voluntary rather than mandatory system on how much to disclose. This can be used by developed countries to submit incomplete or vague reports without being considered non-compliant with their obligations and provides a convenient pretext for avoiding the more difficult task of reporting on their actual impact. For developing countries, this makes it impossible to see a complete, reliable, and predictable global picture of available technology support.

[50] UNFCCC, Decision 5/CMA.3, *Methodological issues relating to the enhanced transparency framework for action and support referred to in Article 13 of the Paris Agreement*, 2021, Annex III, Table III.4. Available from https://unfccc.int/sites/default/files/resource/CMA2021_L10a2E.pdf.

BOX 5: Information on transfer of technology in information on capacity-building support provided by developed country Parties under Article 11 of the Paris Agreement, as specified in paragraph 128 of the MPGs

> E. Information on capacity-building support provided under Article 11 of the Paris Agreement
> 128. Information, in textual format, on capacity-building support provided under Article 11 of the Paris Agreement, including, to the extent possible, qualitative and/or quantitative information on:
> …
> (b) How capacity-building support that was provided responds to the existing and emerging capacity-building needs, priorities and gaps identified by developing country Parties in the areas of mitigation, adaptation, and technology development and transfer;
> …

This information (see Box 5) is important to allow assessment on whether TDT support is paired with the training and institutional capacity needed by developing countries to actually use the technology. Parties are allowed to provide either quantitative or qualitative information. However, there is no specific requirement to provide information on the concrete outcomes achieved, the performance indicators used to measure success, or the alignment with the needs of developing countries.

III. A Review of the Reporting Performance on Transfer of Technology Focused on BTR and CTF Submissions and the Institutional Constraints on Accountability

This section analyses the information on TDT support contained in the first BTRs, beginning with the CTF tables and then turning to the narrative sections of the reports. The 31st December 2024 was the deadline of the first BTRs submission. Up until December 2025, 32 developed Parties[51] (excluding Türkiye)[52] provided their first BTRs and 28[53] included transfer of technology support section in their BTRs. 23 out of these 28 developed Parties attached CTFs on transfer of technology support.[54] Six "Other Parties"[55] submitted their BTRs with information on their voluntary transfer of technology support to developing countries in their BTRs, while 4[56] also provided CTF table 4 on transfer of technology support. Overall, approximately 72% (23 out of 32) of developed country Parties that submitted their first BTRs also attached the CTF tables on transfer of technology support.

There are common features observed in developed Parties' submissions, which also reflect underlying weaknesses in the reporting requirements. A review of the CTF tables reveals several common shortcomings. These include: 1) absence of transfer of technology activities reported in the financial entries as well as of the required data on financial contributions in the TDT entries; 2) inconsistent data between the BTRs and CTFs and between financial support tables and technology support tables in the CTFs; 3) responses that appear to be technically compliant with reporting requirements but that are of low practical value unless more details were provided (for example, Parties report on "whether financial support targeted capacity-building and/or TDT objectives" with a yes/no answer in the CTFs. A review of BTRs reveals several cross-cutting issues. These include: 1) the reporting focuses exclusively on high-level descriptions and objectives rather than measured outcomes or impacts; 2) minimal and/or unstructured narratives in BTRs; 3) broad discretion in reporting with no standardized definitions and methodologies, which allows for divergent interpretations that limits the possibility of making the reports comparable across-countries. It is also worth noting that very few include intellectual property-related TDT with only one explicitly referring to its compliance with the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) regarding TDT incentives, and a parallel report in connection with Article 67 of the TRIPS Agreement on technical and financial cooperation in developing countries and LDC World Trade Organization (WTO) Members.

The following examines, through a review of individual Party submissions, what Parties reported in their BTRs on the TDT support they provided, as required by the MPGs.

Paragraph 120 of the MPGs requires developed country parties to report on national circumstances and institutional arrangements for TDT provision, and paragraph 122 requires them to report on the

[51] Australia, Austria, Belgium, Canada, Cyprus, Denmark, European Union, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Lithuania, Luxembourg, Malta, Monaco, Montenegro, Netherlands, New Zealand, Norway, Portugal, Singapore, Slovakia, Spain, Sweden, Switzerland, United Kingdom of Great Britain and Northern Ireland, United States of America.

[52] Türkiye is excluded from this analysis for a specific reason. Türkiye, originally listed in both Annex I and Annex II due to its 1992 Organisation for Economic Co-operation and Development (OECD) membership, was recognized at COP7 in 2001 as having "special circumstances" and was removed from Annex II, the list of developed countries obligated to provide financial and technological support to developing nations.

[53] Australia, Austria, Belgium, Canada, Denmark, European Union, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Lithuania, Luxembourg, Montenegro, Netherlands, New Zealand, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland, United Kingdom of Great Britain and Northern Ireland, United States of America.

[54] Australia, Austria, Belgium, Canada, Denmark, European Union, Finland, Greece, Iceland, Italy, Japan, Lithuania, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland, United Kingdom of Great Britain and Northern Ireland, United States of America.

[55] Estonia, Liechtenstein, Poland, Republic of Korea, Russian Federation, Slovenia.

[56] Estonia, Poland, Russian Federation, Slovenia

underlying assumptions, definitions and methodologies to provide such information. Based on a comparative review of Parties' submissions, it can be observed that national circumstances—such as political systems, institutional capacity, geographic context, and sectoral strengths—are reflected in how countries organize and coordinate their TDT activities. These institutional arrangements, in turn, determine the operational models of TDT, ranging from highly centralized coordination (e.g., Japan, Republic of Korea) to decentralized ecosystem-driven approaches (e.g., Canada, United States), specialized niche-focused programs (e.g., Australia, Greece), public-private integrated models (e.g., Italy), and embedded approaches within broader climate finance or development cooperation projects (e.g., New Zealand). The analysis further suggests that these institutional arrangements are often accompanied by different approaches to defining TDT.[57] More centralized models tend to adopt relatively precise and comprehensive definitions, whereas embedded or integrated approaches frequently rely on broader and less granular understandings. In turn, these definitional choices appear to be reflected in the underlying assumptions used in reporting, including assumptions that TDT contributions are captured within broader programs (embedded approach), that leveraging national strengths constitutes effective TDT support (national strengths approach), or, in some cases, the absence of explicitly stated assumptions or standardized methodologies where systematic tracking is limited.

This pattern illustrates that TDT reporting primarily reflects how developed countries choose to organize and describe their support, rather than providing a transparent and comparable basis for assessing whether such support is adequate, targeted, and responsive to developing countries' technology needs.

The reporting methods and methodologies for identifying, tracking, and reporting transfer of technology support are fragmented and inconsistent. While some countries are beginning to converge on the Organisation for Economic Co-operation and Development (OECD) Development Assistance Committee (DAC) framework[58] as a foundational tool to scope support activities that are climate-relevant, its application on identifying transfer of technology activities varies widely.[59] Other countries either rely on definition-and-tagging[60] or lack a formal methodology for identifying and reporting transfer of technology. Instead, they rely on qualitative or ad hoc practices such as manual screening, keyword searches, illustrative examples, or project-level judgment rather than standardized indicators.[61] This lack of a formal process raises questions about the reliability and completeness of their transfer of technology reporting.

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[57] Parties vary in how they define transfer of technology, creating challenges for cross-country data comparison. For example, the United States combines its OMB Circular A-11 definition with the Intergovernmental Panel on Climate Change (IPCC) definition; Canada adopts the broad IPCC definition but limits reporting to government-led activities; New Zealand follows the UNFCCC definition and includes both hard and soft technologies; Denmark and Finland apply broad definitions encompassing both equipment and capacity-building; Iceland similarly defines transfer of technology broadly but integrates it within broader development projects.

[58] The OECD DAC framework refers to standardized definitions, classifications, and reporting methodologies for official development finance, including climate-related support. Its Creditor Reporting System and the Rio marker methodology allow donor countries to track and categorize projects targeting climate change mitigation and adaptation. See OECD, "Views on methodologies for the reporting of financial information under decision 2/CP.17", submission to the UNFCCC Standing Committee on Finance, 2015. Available from https://unfccc.int/files/documentation/submissions_from_non-party_stakeholders/application/pdf/500.pdf.

[59] OECD DAC Rio Marker-based approaches: Countries such as Australia, Austria, Japan, Denmark, and Sweden use OECD DAC Rio Markers as a starting point, but subsequent screening varies widely, ranging from multi-step code and keyword filters to manual verification and anti-double-counting measures.

[60] Definition-and-tagging approaches involve formalized systems to identify transfer of technology activities. For example, the United States applies a standardized, government-wide tagging system aligned with Office of Management and Budget (OMB) and IPCC definitions, while New Zealand uses a simplified tagging framework distinguishing between hard and soft technologies.

[61] For instance, some Parties use keyword searches and table classifications without formal indicators, while others report selectively, highlighting examples that demonstrate contributions rather than providing exhaustive data. A few adopt case-by-case or project-specific assessments, reflecting subjective judgment rather than systematic screening.

Due to the diversity of methodologies, the data currently reported by developed countries differ significantly in scope, quality, and granularity. As a result, such data cannot be systematically compared, and the total sum of reported support does not reflect an accurate picture. This lack of coherence makes it impossible to form a comprehensive understanding of global transfer of technology flows under the UNFCCC and the Paris Agreement.

There is significant variance in quality and a common failure to provide explicit qualitative and/or qualitative information on strategies adopted, which is required by MPGs paragraph 126(a), with many developed parties not explicitly detailing their transfer of technology strategy at all. Some simply equated their transfer of technology strategy with their financial support strategy, conflating two distinct forms of contribution. The reports also rarely clarify the processes used to identify, assess, or incorporate recipient needs into project design.

Few parties reported targeted or stage-specific support, which is required by MPGs paragraph 126(b), focusing on particular segments of the technology cycle, such as early-stage R&D or late-stage deployment. Several parties either do not structure their support according to the technology cycle or provide insufficient information to assess stage-specific interventions.

Reporting gaps on the development and enhancement of technological endogenous capacities, which is required by MPGs paragraph 126(c), include a lack of alignment with developing countries' national priorities. However, several countries reported that they aligned support with recipient countries' NDCs and National Action Plans to ensure that their interventions are locally relevant through joint governance structures, tailored country strategies, participation in multilateral coordination platforms, and flexible financing that empowers local decision-making. This alignment is important to ensure support is country-driven, context-specific, and strategically integrated with national development plans. Some also reported that they provided support on enhancing governmental and technical institutions, providing targeted technical training, and offering scholarships or knowledge-sharing programs to ensure "hard" equipment is combined with "soft" capacity-building appropriate for local contexts and the skills to operate and maintain them. Further, some reports highlight their support to communities and local actors through engagement with vulnerable groups, indigenous communities, municipal governments, and smallholder farmers. However, the reports do not contain indicators to assess whether that alignment is actually in place.

On efforts to encourage private sector activities related to TDT, as required by MPGs paragraph 126(d), several developed countries reported using financial instruments and helping to create supportive market conditions. For instance, Japan's Joint Crediting Mechanism facilitates the dissemination of advanced decarbonizing technologies through targeted public-private collaborations. Several Parties also provide support by offering advisory services and technical assistance to help local governments develop the policy and regulatory frameworks needed to attract private climate investment. Whether these activities can actually encourage private sector activities related to TDT to support developing country Parties is subject to interpretation. Some countries channel support through dedicated platforms or institutions: Australia uses its Business Partnerships Platform to de-risk and scale green investments, and Belgium utilizes its Development Finance Institution to strategically prioritize climate sustainability in its investments.

An interesting tool some developed countries are employing is a mandatory co-financing requirement, where private enterprises must commit a significant portion of the project costs. For example, Austria requires companies participating in its Business Partnerships Programme to match public funding with at least the same amount from their own funds. Similarly, Estonia mandates a minimum 10% self-financing commitment for bilateral climate projects. This requirement can be substantial, as demonstrated by Lithuania, which increased its mandatory co-financing rate for private companies from 30% to 50% between 2021 and 2024, and similarly, Israel requires industry project leads in its joint

technological innovation fund to contribute a minimum of 50% of project expenses in Israel-India Industrial R&D and Technological Innovation Fund.

Developed countries reported both quantitative and qualitative information on their efforts to accelerate climate innovation, research, development, and deployment in developing countries, which is required by MPGs paragraph 126(e). Quantitatively, some shared figures on funding, project numbers, and impacts—for example, Germany's CLIENT II launched 19 research projects with about €32 million in funding, and Australia reported backing over 1,500 agricultural research projects. Qualitatively, most countries emphasized a shift from one-way technology "transfer" to collaborative R&D and co-innovation, tailoring solutions to local needs, including strengthening institutions, building human capacity, and creating enabling policies, often supported by financial tools such as incubators and guarantees to de-risk projects and mobilize private investment. Some countries, however, noted that direct technological cooperation was not their main method of support, and some reported difficulties in tracking information systematically.

A main observation on reporting gaps is that as developed countries latest BRs and NCs submissions cover data up to around 2020, thus almost all their first BTRs cover data between 2021 - 2022. This reflects the structural time lag for reporting support to developing countries and is not ideal for real-time reflections and decision-making.

Some developed country Parties report their transfer of technology support in general or aggregated categories under CTFs. In this form, the information, while it is formally in line with the reporting requirements, reduces the transparency and traceability of the reporting system. For instance, when reports use "global" or "regional" as the recipient, it is often unclear whether the support has been used by intermediary organizations, whether it matches the specific technological needs of the recipients, or whether the funds or technologies have reached the intended beneficiaries. Similarly, the type of support, sector/subsector, technology type, status, and implementing entity, are often reported inconsistently, incompletely, or in overly broad terms.

An examination of the information submitted by developed Parties under paragraphs 124 and 125 of the MPGs also reveals that reporting on financial support contributing to transfer of technology objectives remains uneven among developed Parties. Approximately two-thirds of those submitting their CTFs provided information under paragraph 124, indicating their bilateral or regional financial support contributes to transfer of technology, while only about half reported such information under paragraph 125 indicating their multilateral financial support contributes to transfer of technology. The majority of the financial support identified as contributing to transfer of technology was channeled through bilateral or regional mechanisms, whereas only a very limited number of projects financed through multilateral channels were explicitly tagged as contributing to transfer of technology objectives. A further analysis of the multilateral channels reported by developed Parties shows that these channels can be broadly categorized as follows: 1) Global climate and environmental funds (e.g., funds under the UNFCCC financial mechanism; 2) International and regional development banks; 3) United Nations and specialized agencies; 4) Technology Mechanism-related institutions; 5) Other multilateral or specialized funds and platforms.

Among these, the United Nations Environment Programme, Green Climate Fund, Global Environment Facility, World Bank, Adaptation Fund, and Food and Agriculture Organization were the most frequently cited. In contrast, entities under the Technology Mechanism were referenced infrequently.

The UNFCCC Secretariat has provided the COP30 in November 2025 with a BTR synthesis report with a short section on TDT support.[62] According to the BTR synthesis report, of the 1,483 reported activities

[62] UNFCCC Secretariat, *Biennial Transparency Reports and National Inventory Reports: Synthesis Report by the Secretariat*, FCCC/PA/CMA/2025/16, 2025, pp. 52-54. Available from https://unfccc.int/documents/651012.

of technology support provided, 1,103 provided regional information and only 888 activities included information on status (completed, ongoing, or planned). This means that a significant portion (40%) of activities cannot be assessed in terms of their regional allocation or whether the support has actually been delivered, limiting the possibility of comparison between support provided and needed by region.

In addition, the BTR synthesis report shows that a substantial portion of these assessed activities is ongoing (about 45%) or at the planning stage (2 out of 888), suggesting that a significant share of the 'Support Provided' in this reporting cycle has not yet been received by developing countries and therefore it will not appear in 'Support Received' until the next reporting cycle(s) when completed. This is evidenced in figure 29 of the BTR synthesis report, which shows that in Africa and Asia-Pacific, the reported 'Support Provided' exceeds the reported 'Support Needed' and 'Support Received'. Because the activities reported as 'Support Provided,' 'Support Received,' and 'Support Needed' in a single cycle do not always refer to the same set of activities, directly comparing these figures—such as in a chart—can be misleading and would not accurately reflect actual support delivery and gaps.

The deficiencies identified above concern the content of the reports themselves. A further set of constraints operates at the institutional level, determining what happens to these reports once submitted. The Paris Agreement's architecture for verification, facilitation, and compliance was strategically designed to enhance transparency and promote the fulfilment of Party obligations. This multi-layered system, which includes the Technical Expert Review (TER), the Facilitative Multilateral Consideration of Progress, and the Global Stocktake, is intended to ensure commitments are met. However, the MPGs explicitly prohibit assessing the adequacy,[63] which results in an accountability system that prioritizes procedural checks over substantive fulfilment of individual Party obligation and accountability, even though all first BTRs must undergo in-country technical expert reviews which would offer a great opportunity to assess the adequacy of reporting. While essential, these mechanisms are not designed to conduct a case-by-case assessment of whether an individual country's TDT support is sufficient or adequate.

Beyond these substantive deficiencies, a further structural limitation deserves attention: the pronounced time lag between the reporting period and the publication of BTRs. The first BTR submissions cover data primarily from 2021 to 2022, with the reports themselves published only in late 2024 or 2025. This means that, at any given moment, the international community lacks visibility on real-time TDT initiatives, with an information gap of approximately two to three years. For a rapidly evolving field such as climate technology, this temporal disconnect significantly undermines the ability of developing countries to identify available support, align their national strategies with current opportunities, and hold developed countries accountable for their contemporary — not historical — obligations. When the data is already anachronistic by the time a new reporting cycle begins, the procedural fact of reporting offers little reassurance that TDT is responsive to urgent climate needs.

[63] UNFCCC, Decision 18/CMA.1, *Modalities, procedures and guidelines for the transparency framework for action and support*, 2018, Annex, paras. 146 and 149. Available from https://unfccc.int/resource/tet/0/00mpg.pdf.

IV. Conclusion: Moving from Procedural Compliance on Transfer of Technology Obligations to Tangible Results

The legal basis for transfer of technology has evolved progressively from the foundational principles in the UNFCCC into the dedicated and operational framework of the Paris Agreement. This evolution has solidified the responsibilities of developed countries to promote, facilitate, and finance the transfer of climate technologies to developing countries. The Paris Agreement's ETF and its associated BTRs and CTFs were specifically designed to bring transparency and accountability to these obligations.

An evaluation of the first BTR and CTF submissions from developed countries reveals, however, significant systemic flaws that undermine the core objectives of transparency in transfer of technology reporting. Far from creating a clear global picture, the initial reports reveal a framework that allows for procedural compliance without delivering the data needed for genuine accountability, hindering efforts to take stock of collective progress and identify gaps at the subsequent global stocktake. Furthermore, the synthesis report on BTR submissions by the UNFCCC Secretariat does not provide a clear picture of whether developed countries are taking practical steps to promote effective transfer of technology to developing countries for climate action.

Five primary areas of concern emerge from this first reporting cycle.

First — discretionary escape clauses embedded in the reporting framework. The MPGs are riddled with qualifying phrases such as "to the extent possible," "if available," and "as available", transforming reporting obligations into a largely voluntary exercise. This drafting choice allows Parties to omit critical information without justification and without being deemed non-compliant, fundamentally undermining accountability and preventing the formation of a complete, reliable, and predictable global picture of transfer of technology support.

Second — inconsistent reporting methodologies. There is widespread diversity in the definitions, methodologies and institutional arrangements used by developed countries to track and report transfer of technology activities. This lack of standardization makes the aggregation and comparison of data impossible. Without common metrics or definitions, the global picture remains fragmented, preventing a meaningful assessment of collective progress from the start. This methodological chaos provides political cover to avoid substantive review.

Third— structural data gaps and silos. The reporting requirement is based on the presumption that transfer of technology is a component of financial support, rather than being treated as a category of support with dedicated and traceable financial resources. Transfer of technology activities are frequently reported without corresponding financial data, severing the accountability link between funding and technological outcomes. This structural fragmentation obscures the scale, nature, and effectiveness of technology-specific support and prevents assessment of whether financial commitments are enabling TDT in practice.

Fourth — an emphasis on process over impact. Reporting often concentrates on qualitative descriptions of high-level strategies, institutional arrangements, and selected projects rather than on quantitative, measurable outcomes or tangible impacts. There is a systemic lack of information on concrete results, performance indicators, or how the support aligns with the specific, identified needs of recipient countries. Consequently, the reports provide little insight into whether transferred technologies are effective, operational, or contributing to climate goals on the ground.

Fifth — the dominance of "ongoing" activities and the structural time lag in reporting. Approximately 45% of reported TDT activities are labelled "ongoing" in the first BTRs submitted in 2025. That label, however, reflects only the status of the activity during the 2021–2022 reporting period. The MPGs require Parties to report status at the time an activity was undertaken, but do not require them to update that status at the time of submission, even when the reporting Party possesses more current information.

A further important concern is that discussions on transfer of technology increasingly focus on procedural matters,[64] particularly the institutional linkages between the Technology Mechanism and Financing Mechanism, over scrutiny of developed country Parties' substantive delivery of TDT. While coordination is necessary, an excessive focus on process risks diverting attention from the core obligation of developed countries to deliver and report on tangible transfer of technology. The establishment of the Belém Technology Implementation Programme at COP 30 reflects efforts to improve implementation support, yet it does not resolve the central accountability deficit identified in this report. Improving the quality of reporting is not an alternative to strengthening the linkages between mechanisms but a necessary precondition for those linkages to function effectively.

To bridge the gap between TDT commitments and verifiable action, the 2028 MPGs review offers the next structured opportunity to address these deficiencies and should address the deficiencies identified in this report through the following reforms:

1. Mandate clearer reporting in MPGs: The reporting guidelines must be strengthened, moving away from discretionary wording toward clearer requirements, such as "shall report where applicable, with justification for any omission," to ensure data is complete and reliable. The MPGs should also be revised to require outcome-oriented reporting rather than purely output-based reporting, including quantified indicators, unless a Party provides a justified explanation for non-reporting.
2. Require quantification of financial support for transfer of technology. Currently, Parties report only on overall financial flows, with any contribution to technology transfer indicated in a binary (yes/no) manner. Requiring quantification of the funds dedicated to technology transfer would enhance transparency, allow for better tracking of support, and facilitate assessment of whether developed countries are meeting their obligations.
3. Ensure traceability and comparability of reported data: Developed countries must adopt standardized tracking methodologies to improve data quality, consistency, and comparability across all Parties, enabling a true global assessment of transfer of technology flows. This requires an agenda for discussing the development of standardized tracking and reporting methods and methodologies at relevant conferences and meetings.
4. Integrate financial and technology reporting: Reporting frameworks must require explicit cross-report consistency, ensuring that all transfer of technology activities listed in the CTF tables are traceable to corresponding entries in the financial support tables to ensure a clear picture of financial flows on transfer of technology.
5. Reorient reporting toward outcomes rather than processes: Reporting must shift from purely describing high-level strategies to including tangible results that meet the needs of recipient countries. This requires the inclusion of quantitative and outcome-based indicators, such as technologies installed, capacity built and avoided emissions.
6. Address the institutional constraints on review and discussion. The MPGs prohibit the TER from assessing the "adequacy" of a Party's support provided (para. 149(d)) but does not prohibit fact-finding, and the Facilitative, Multilateral Consideration of Progress **(**FMCP)—the only mechanism designed for multilateral discussion of individual Parties' efforts—has not, in its previous rounds, substantively addressed the technology transfer information contained in BTRs.

[64] See, for example, UNFCCC, Subsidiary Body for Implementation (SBI) reports and related decisions. Available from https://unfccc.int/sites/default/files/resource/cp2023_11a02_adv.pdf; https://unfccc.int/documents/637479; https://unfccc.int/sites/default/files/resource/sbi2024_16_adv.pdf; and https://unfccc.int/documents/640968.

Without such reforms, the ETF risks entrenching a system in which formal reporting compliance substitutes for substantive delivery. A transparency regime that cannot demonstrate whether developed countries are fulfilling their transfer of technology obligations ultimately undermines trust, weakens ambition, and limits the effectiveness of the Paris Agreement itself.

Proposals can be made to the SBSTA 64th session in June 2026 and the COP 31 in November 2026 as part of initiating early preparatory work of the MPGs review in 2028. Such early work could include a request to the Secretariat to prepare a technical information note quantifying the extent of missing or incomplete data in the first BTR submissions, a call for Party submissions on MPGs revision, and the convening of a technical expert meeting on harmonized methodologies for TDT reporting. These steps would ensure that by the time the formal MPGs review commences, developing countries have built a robust evidentiary record and a set of concrete textual proposals to strengthen the transparency framework for TDT.

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