POCKET GUIDE TO TECHNOLOGY

UNDER THE UNFCCC

ecbi

POCKET GUIDE TO TECHNOLOGY

UNDER THE UNFCCC

Edited by **Anju Sharma** anju.sharma@oxfordclimatepolicy.org

Contributions from Brianna Craft, International Institute for Environment and Development, and Fred Onduri Machulu, Head of Department of Youth and Children Affairs, Uganda.

We are grateful to Stella Gama (Malawi) and Thinley Namgyel (Bhutan) for their comments and suggestions.

Funding Partners

Sida

Member Organisations

oxford climate policy

iied

LRI

FOREWORD

For over a decade, the European Capacity Building Initiative (ecbi) has adopted a two-pronged strategy to create a more level playing field for developing countries in the UN Framework Convention on Climate Change (UNFCCC): training negotiators from developing countries; and providing opportunities for senior negotiators from developing countries and Europe to interact, understand each other's positions, and build mutual trust.

The first part of the strategy focuses on providing training and support to new developing country negotiators, particularly from Least Developed Countries. The climate change negotiations are often technical and complex, and difficult for new negotiators (who are most often not climate specialists) to fully grasp even over a period of two or three years. We hold regional training workshops to bring them up to speed on the negotiations. We also organise training workshops before each Conference of Parties (COPs) to the UNFCCC, covering topics specific to that COP. To ensure continuity in our capacity building efforts, we offer bursaries to a few women negotiators to attend the negotiations and represent their country and region/grouping. Finally, we help negotiators build their analytical capacity through our publications, by teaming them up with global experts to author policy briefs and background papers.

This strategy has proven effective over time. "New" negotiators that trained in our early regional and pre-COP workshops have risen not only to become senior negotiators in the process, but also leaders of regional groups and of UNFCCC bodies and committees, and ministers and envoys of their countries. These individuals remain part of our growing alumni, and are now capacity builders themselves, aiding our efforts to

train and mentor the next generation. Their insights from once being new to the process themselves have helped us improve our training efforts.

The second ecbi strategy relies on bringing senior negotiators from developing countries and from Europe together, at the annual Oxford Seminars and the Bonn Seminars. These meetings provide an informal space for negotiators to try to understand the concerns that drive their specific national positions, and come up with solutions to drive the process forward. They have played a vital role in resolving some difficult issues in the negotiations.

Following the adoption of the Paris Agreement in 2015, ecbi produced Guides to the Agreement in English and in French. Since they proved popular with both new and senior negotiators, we developed this series of thematic Pocket Guides, to provide negotiators with a brief history of the negotiations on the topic; a ready reference to the key decisions that have already been adopted; and a brief analysis of the outstanding issues from a developing country perspective. These Guides are mainly web-based and updated frequently. Although we have printed copies of the English version of the Guides due to popular demand (please write to us if you would like copies), the online versions have the added advantage of hyperlinks to access referred material quickly.

As the threat of climate change grows rather than diminishes, developing countries will need capable negotiators to defend their threatened populations. The Pocket Guides are a small contribution to the armoury of information that they will need to be successful. We hope they will prove useful, and that we will continue to receive your feedback.

Anju Sharma
Deputy Managing Director, Oxford Climate Policy and
Head, Communications and Policy Analysis Programme, ecbi

LIST OF ABBREVIATIONS

CDM	Clean Development Mechanism
CMA	Conference of the Parties serving as the Meeting of the Parties to the Paris Agreement
COP	Conference of the Parties
CTCN	Climate Technology Centre and Network
EGTT	Expert Group on Technology Transfer
ESTs	Environmentally sound technologies
FDI	Foreign direct investment
GCF	Green Climate Fund
GEF	Global Environment Facility
GHGs	Greenhouse gases
IPCC	Intergovernmental Panel on Climate Change
IPRs	Intellectual property rights
LDCs	Least Developed Countries
NAPs	National Adaptation Plans
NAPAs	National Adaptation Programmes of Action
NAMAs	Nationally Appropriate Mitigation Actions
NDAs	National designated authorities (of the GCF)
NDCs	Nationally Determined Contributions
NDEs	National Designated Entities (for the CTCN)
NFPs	National Focal Points (of the GEF)
PSP	Poznan Strategic Programme
R&D	Research and development
SBI	Subsidiary Body for Implementation

SBSTA	Subsidiary Body for Scientific and Technological Advice
SDGs	Sustainable Development Goals
SIDS	Small Island Developing States
STI	Science, technology, and innovation
TAPs	Technology Action Plans
TDT	Technology development and transfer
TEC	Technology Executive Committee
TNAs	Technology Needs Assessments
TRIPS	Trade-Related Aspects of Intellectual Property
UNCED	UN Conference on Environment and Development
UNCTAD	UN Conference on Trade and Development
UNDP	UN Development Programme
UNFCCC	UN Framework Convention on Climate Change
UNIDO	UN Industrial Development Organization
WTO	World Trade Organization

CONTENTS

What is technology?	1
What is technology transfer, and why is it important in the climate negotiations?	2
How have the negotiations on technology evolved under the UNFCCC?	6
How is technology addressed in the Paris Agreement and its implementation guidelines?	23
What are the global challenges realated to TDT?	29
What national challenges do developing countries face with regard to TDT?	33
What is the role of the private sector in climate-related TDT?	39
What is the role of other stakeholders in TDT?	42
References	43
Annex	49

WHAT IS TECHNOLOGY?

Technology is broadly defined as ways and means of using the application of science to solve problems.[1] Climate technologies refer to technologies used to address climate change, both mitigation and adaptation. For instance, while science helps us understand that the sun's rays generate a lot of potentially useful energy, technology can transform these rays and heat into solar energy for domestic and industrial use, while minimising greenhouse gas (GHG) emissions and contributing to growth and sustainable development. The knowledge generated from science can thus be used to reduce GHGs and vulnerability to climate-related risks and challenges.

The concept of technology encompasses not only a product, but also the knowledge or information of its use and application – therefore including methods, skills, and techniques.[2] The term "technology" can encompass:

- Hardware (physical tools).
- Software (knowledge and skills required to use the technology).
- Orgware (institutions, policies, rules, and legislation).

In the agricultural sector, for example, different crop varieties represent hardware. The farming practices or research to develop new crop varieties are software and orgware is represented by the local institutions that support the use of these technologies.[3]

WHAT IS TECHNOLOGY TRANSFER, AND WHY IS IT IMPORTANT IN THE CLIMATE NEGOTIATIONS?

Rapid technological innovation and deployment is essential to stabilise GHG concentrations and reduce vulnerability to climate change. It will be impossible to achieve the Paris Agreement's 1.5°C aspiration or 2°C goal without new, disruptive, and innovative technology, according to the Intergovernmental Panel on Climate Change (IPCC). In its 2018 special report on *Global Warming of 1.5°C*, the IPCC finds that "[t]*he systems transitions consistent with adapting to and limiting global warming to 1.5°C include the widespread adoption of new and possibly disruptive technologies and practices and enhanced climate-driven innovation*".[4]

A key challenge, however, is that the resources for this rapid technological innovation is mainly available in richer, more developed countries (although this is changing in recent years – China recently joined the US, Japan, South Korea, and Germany in the list of countries with the highest number of patents in force worldwide).[5] This poses a challenge for developing countries who are poorer, but more vulnerable, and therefore have more need for adaptation technologies; and for developing countries where there is considerable potential for mitigation by employing cleaner technologies, but these technologies are not available or affordable.

Under the global climate negotiations, countries have sought to address this through commitments for "technology transfer" from developed to developing countries. Technology transfer commitments are also viewed as an indirect channel to compensate the developing world for the historical contribution of developed countries to climate change.[6]

The IPCC defines technology transfer as "*a broad set of processes covering the flows of know-how, experience and equipment for mitigating and adapting to climate change amongst different stakeholders such as governments, private sector entities, financial institutions, non-governmental organizations (NGOs) and research/education institutions*".[7]

This definition is based on the work of the UN Conference on Trade and Development (UNCTAD), which views successful technology transfer not only as the mere sale or lease of goods, but also including the transfer of the knowledge needed to successfully install, operate, and maintain any equipment that embodies a technology.[8] It also includes the capacity to choose and adapt technologies to local conditions and integrate them with indigenous technologies.[9]

The UNCTAD definition, meanwhile, echoes the understanding of technology transfer in Agenda 21, adopted at the 1992 UN Conference on Environment and Development (UNCED). Chapter 34 of Agenda 21 defines environmentally sound technologies (ESTs) as: "*not just individual technologies, but total systems which include know-how, procedures, goods and services, and equipment as well as organizational and managerial procedures. This implies that when discussing transfer of technologies, the human resource development and local capacity-building aspects of technology choices, including gender-relevant aspects, should also be addressed*".[10]

Agenda 21 further recognised that a critical mass of research and development (R&D) capacity is crucial for the effective dissemination and use of ESTs and their generation locally. To achieve this critical mass, it emphasised education and training programmes to build the capabilities of craftspersons, technicians, middle-level managers, scientists, engineers, and educators, and of social or managerial support systems. It also recognised that technology transfer involves innovatively adapting and incorporating the technologies into the local or national culture.

Countries rely on different modes of technology transfer, depending on their stage of industrial development. UNCTAD identifies three stages of industrial development in the context of technology transfer:[11]

- Initiation, when technologies are acquired from other countries through the acquisition of machinery and equipment and reverse engineering. The situation in least developed countries (LDCs) in particular, with many other developing countries, corresponds with this phase.
- Internalisation, when local firms can learn through imitation under a flexible Intellectual Property Rights (IPRs) regime. (IPRs refer to the legal protection of inventions or creations used in commerce through patents, copyright, and trademarks, which enable people or companies to earn financial benefit from what they invent or create).
- Generation, when local firms carry out their own R&D and generate IPRs.

The UNFCCC moved from using "technology transfer" to "technology development and transfer" (TDT) in 2009, at the Climate Change Conference in Copenhagen, to recognise the critical role of R&D in technology transfer.[12] The following year, Cancun Decision 1/CP.16 recognised TDT as encompassing R&D, demonstration, deployment, diffusion, and transfer of technology (§115). This framing goes beyond the mere transfer of technology, to facilitating action throughout the technology cycle, including graduation from piloting to actual implementation of technology needs of developing countries.[13]

HOW HAVE THE NEGOTIATIONS ON TECHNOLOGY EVOLVED UNDER THE UNFCCC?

The central role of technology, and of technology transfer, in reducing GHG emissions and addressing climate change impacts, was recognised early in global efforts to address climate change. The first high-level political meeting to consider global action, in Noordwijk, the Netherlands, in November 1989, proposed a global climate change convention, and listed four main objectives for such a convention: monitoring climate change; action to deal with GHGs and the effects of global warming; addressing the financial needs of the developing countries in the access to, and transfer of, technology; and strengthening sustainable forest management.[14]

The early focus of the negotiations was mainly on mitigation technologies particularly to emerging economies where future emissions were expected to grow. The second World Climate Conference, in Geneva, Switzerland, in 1990, for instance, recognised that developing countries must adopt modern technologies early in the process of development, to avoid the emissions-intensive development pathway followed by industrialised countries. At the same time, the need for adaptation-related technologies, and the impediments to accessing technology generally – such as lack of financial resources, institutions, trained man-power, restrictive trade practices, and over-protection of IPRs – were also flagged by developing country participants.[15]

1992 UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

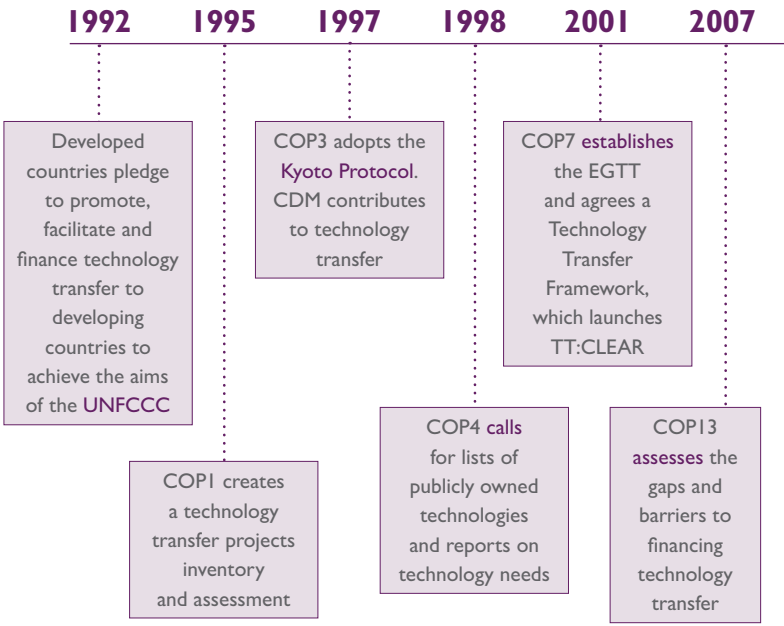
The contours of the politics of technology transfer in the climate change negotiations emerged while the global convention on climate change was being negotiated. Southern governments and civil society called for a global system for the transfer of environment-friendly technology on preferential and non-commercial terms from developed to developing countries.[16] They also called for new institutions to facilitate technology transfer, and an inventory of technology transferable free of costs.[17]

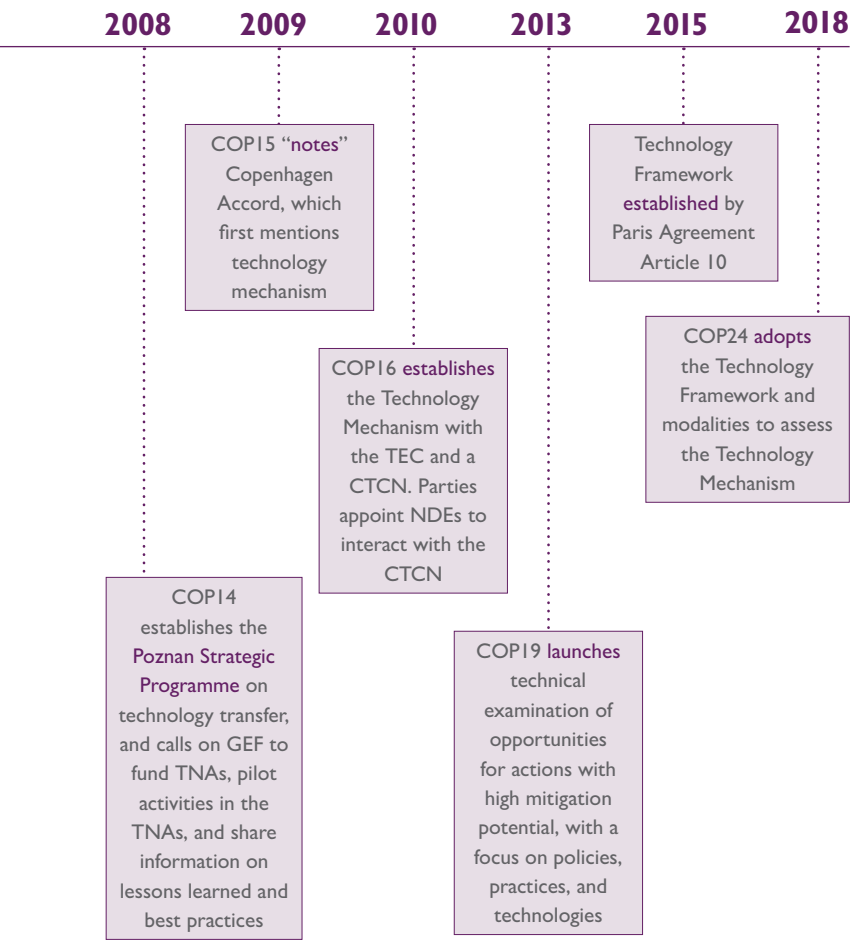
Developed countries, however, supported the transfer of such technology at commercial or market rates. The issue of how IPRs can be safeguarded without hindering access to patented technology was also a concern for them.[18] They were only willing to expand technology cooperation, facilitate the transfer of technologies, and enhance the capacities of developing countries to use and develop technologies after taking into account the need to protect IPRs.[19]

The preamble of the UN Framework Convention on Climate Change Convention (UNFCCC) that was eventually adopted in 1992 states that all countries, especially developing countries, need access to resources to achieve sustainable development. New technologies, which are economically and socially beneficial, will enhance the possibility that developing countries achieve greater energy efficiency, and control GHG emissions even as their energy consumption grows.

Article 4 of the UNFCCC, on commitments, includes the provisions on technology transfer. Article 4.3 states that developed countries shall provide "*such financial resources, including for the transfer of technology, needed by developing country Parties to meet the agreed full incremental costs of*

TIMELINE


1992
1995
1997
1998
2001
2007
Developed countries pledge to promote, facilitate and finance technology transfer to developing countries to achieve the aims of the UNFCCC
COP1 creates a technology transfer projects inventory and assessment
COP3 adopts the Kyoto Protocol. CDM contributes to technology transfer
COP4 calls for lists of publicly owned technologies and reports on technology needs
COP7 establishes the EGTT and agrees a Technology Transfer Framework, which launches TT:CLEAR
COP13 assesses the gaps and barriers to financing technology transfer


2008
2009
2010
2013
2015
2018
COP14 establishes the Poznan Strategic Programme on technology transfer, and calls on GEF to fund TNAs, pilot activities in the TNAs, and share information on lessons learned and best practices
COP15 "notes" Copenhagen Accord, which first mentions technology mechanism
COP16 establishes the Technology Mechanism with the TEC and a CTCN. Parties appoint NDEs to interact with the CTCN
COP19 launches technical examination of opportunities for actions with high mitigation potential, with a focus on policies, practices, and technologies
Technology Framework established by Paris Agreement Article 10
COP24 adopts the Technology Framework and modalities to assess the Technology Mechanism

implementing measures" that are listed in Article 4.1. The notion of "*agreed incremental costs*" was a controversial one during the negotiations, involving the calculation of the global benefits of implementing measures, after subtraction of the national benefits. Developing countries pointed to its potential to cause confusion and controversy.

In Article 4.5, developed countries pledge to "*take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how*" to developing countries. In doing so, developed countries indicate that they shall support the development and enhancement of developing countries' endogenous capacities and technologies.

Article 4.7 clearly recognises that the extent to which developing countries can implement their commitments will depend on developed countries effectively fulfilling their commitments related to finance and technology transfer.

Article 4.8 further underlines that Parties shall give full consideration to necessary actions, including those related to funding, insurance, and the transfer of technology, to meet the special needs and concerns of developing countries arising from the adverse effects of climate change and/or the impact of the implementation of response measures, especially on a list of nine categories of countries considered vulnerable. The list includes: small island countries; countries with low-lying coastal areas; countries with arid and semi-arid areas, forested areas and areas liable to forest decay; countries with areas prone to natural disasters; countries with areas liable to drought and desertification; countries with areas of high urban atmospheric pollution; countries with areas with fragile ecosystems, including mountainous ecosystems; countries whose economies are highly dependent on income generated

from the production, processing, and export, and/or on consumption of fossil fuels and associated energy-intensive products; and landlocked and transit countries.

Article 4.9 further calls on Parties to take full account of the specific needs and special situations of LDCs in their actions with regard to funding and transfer of technology.

In designing the institutions that would advance the work of the UN climate change negotiations, Parties established a Subsidiary Body for Scientific and Technological Advice (SBSTA) that would, among other things, work to identify innovative, efficient and state-of-the-art technologies and know-how. SBSTA would then advise on the ways and means of promoting the development of and/or transfer of these technologies (Article 9.2.c). (The Subsidiary Body for Implementation, or SBI, also has a role in finding the best way for Parties to provide relevant guidance on stronger action on the ground – see, for instance, the section on the 2008 Poznan Strategic Programme below).

1995 BERLIN MANDATE

The first meeting of the Conference of the Parties (COP1), the supreme decision-making body of the UNFCCC, culminated in the Berlin Mandate of 1995. The technology activities specified in the Berlin Mandate largely focused on gathering information on technology development and transfer.[20]

Parties mandated the secretariat to prepare an inventory and assessment of environmentally sound and economically viable technologies and know-how conducive to mitigating and adapting to climate change. The inventory was to elaborate the terms under which transfers of such technologies and know-how could take place. Parties mandated the SBSTA to identify innovative, efficient, and state-of-the-art technologies and

know-how, and advise on the ways and means of promoting development and/or transfer of such technologies. The Berlin Mandate urged developed country Parties to communicate their own measures to transfer technology, and to review at each COP their implementation of Articles 4.5 and 4.1(c) of the Convention.

1997 KYOTO PROTOCOL

Article 10(c) of the Kyoto Protocol calls on all Parties "*to cooperate in the promotion of effective modalities for the development, application, and diffusion of, and take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies, know-how, practices and processes pertinent to climate change, in particular to developing countries*".

The Article calls for the formulation of policies and programmes for the effective transfer of ESTs that are publicly owned or in the public domain, and the creation of an enabling environment for the private sector, to promote and enhance the transfer of, and access to, environmentally sound technologies. Article 11.2.(b) of the Protocol calls on developed countries to provide financial resources, including for the transfer of technology.

The Kyoto Protocol also created the Clean Development Mechanism (CDM, in Article 12), which does not specifically mandate technology transfer, but has been credited with contributing to it (*see Box 1: CDM and technology transfer*).

BOX 1: CDM and technology transfer

To what extent did the Kyoto Protocol's Clean Development Mechanism contribute to technology transfer? A 2006 analysis estimated that roughly a third of all CDM projects involved technology transfer. While large projects involved mostly equipment transfer, smaller projects involved transfer of both equipment and knowledge or knowledge alone.[21]

An updated analysis in 2015, based on the analysis of 3949 CDM project design documents and a survey, found that at least 39% of the projects were expected to involve technology transfer.[22] It found that technology transfer was more common for larger projects, and involved both knowledge and equipment. Technology transfer had declined in time in China, India, and Brazil – the countries that host most of the CDM projects – but remained high in others (including Bolivia, Ecuador, Guatemala, Honduras, Indonesia, Kenya, Malaysia, Mexico, Pakistan, South Africa, Sri Lanka, Thailand and Vietnam). The decline in the three large countries is attributed to, among other things, increasing capacity to rely on local knowledge and equipment, and technology transfer taking place through channels other than CDM. About 85% of the CDM projects that involve technology transfer obtain their technology from developed countries. The top five technology suppliers for CDM projects are Germany, the US, Denmark, Japan, and China.

The CDM's impact on technology transfer to least developed countries (LDCs) and Small Island Developing States (SIDS) is limited by the fact that their participation in the CDM has been limited. As of March 2020, only 116 CDM projects were registered in LDCs, and 34 in SIDS, out of a total of 7825 registered projects.[23] This is partly due to the capacity within these countries to develop and implement projects, but also because of the nature of large-scale mitigation technologies that are available for transfer, which are not suited to the needs of smaller and poorer countries, with already low emissions.

To ensure that these countries accrue technological benefits from the voluntary approaches under Article 6 of the Paris Agreement, the lessons from the experience from CDM will have to be taken into account. This includes capacity building to develop and implement projects; allowing these countries to use and build on the institutional and human capacity they built for the CDM; and building incentives and approaches to encourage the distribution of technologies that fit their particular needs, like the "Programme of Activities" approach of the CDM that allowed for bundling of small projects.[24]

1998 BUENOS AIRES PLAN OF ACTION

In 1998, COP4 provided further impetus to technology transfer. Developed countries were urged to provide lists of publicly owned ESTs and know-how related to adaptation to, and mitigation of climate change. Developing countries were urged to submit reports outlining their prioritised technology needs.[25]

The COP asked all Parties to stimulate private sector investment and, most importantly, called for a consultative process to consider a list of nineteen specific issues and associated questions. To further this process, the secretariat organised three regional workshops – in Africa, Asia and the Pacific, and Latin America and the Caribbean – along with an informal consultation in the US. The background papers and national submissions generated through these workshops spurred the development of a technology framework under the UNFCCC.

2001 MARRAKESH ACCORDS

In 2001, the work of COP7 culminated in the creation of a Technology Transfer Framework with five key themes and areas for action:[26]

- Technology Needs Assessments (TNAs)
- Technology information
- Enabling environments
- Capacity building
- Mechanisms for technology transfer

The Technology Transfer Framework oversaw the establishment of the launch of a Technology Transfer Information Clearing House (TT:Clear), the creation of a network of information centres, and the drawing up of a list of activities needed for capacity building.

The Marrakesh Accords also established an Expert Group on Technology Transfer (EGTT) with twenty experts, drawn from developing countries, SIDS, developed countries, and relevant international organisations. Tasked with identifying ways to advance technology transfer activities under the Convention, the EGTT worked closely with the UN Development Programme (UNDP) to prepare a *Handbook for Conducting Technology Needs Assessments for Climate Change*.[27]

2007 BALI ACTION PLAN

COP13 in Bali launched a comprehensive process to fully implement the Convention through long-term cooperation, including through enhanced action on technology development and transfer, as well as enhanced action on the provision of financial resources and investment to support technology cooperation.[28]

Under this mandate, Parties agreed to assess the gaps and barriers to the use of, and access to, financing for technology transfer. The EGTT undertook this assessment, exploring how technology financing and capacity building could help countries address their needs. Regional workshops were held to train project developers in preparing project proposals for financing. Work on technology financing led to the creation of the Poznan Strategic Programme the following year.

In 2007, countries added four sub-themes to the Technology Transfer Framework's "mechanisms for technology transfer" theme:

- Innovative financing
- International cooperation
- Endogenous development of technologies
- Collaborative R&D

2008 POZNAN STRATEGIC PROGRAMME

In 2008, the Global Environment Facility (GEF) approved a strategic programme on technology transfer in response to Decision 4/CP.13 from Bali, with three funding windows totalling US$ 50 million for:

- TNAs (*see Box 2: The experience with TNAs*).
- Piloting priority technology projects linked to TNAs.
- Dissemination of GEF experience and successfully demonstrated technologies.

The programme was renamed the Poznan Strategic Programme on technology transfer (PSP) at COP14 later that year.[29] A plan for the long-term implementation of the PSP was approved in 2010, with US$ 1 billion to address five elements: support for climate technology centres and a climate technology network; piloting priority technology projects to foster innovation and investments; public-private partnerships for technology transfer; TNAs; and GEF as a catalytic supporting institution for technology transfer. The SBI monitors the implementation of the PSP.

Box 2: The experience with TNAs

Since 2001, more than 90 developing countries have undertaken TNAs with support from the GEF, to:

- Identify and prioritise their mitigation and adaptation technology priorities.
- Identify and analyse the barriers that hinder successful deployment and diffusion of the prioritised technologies.
- Develop Technology Action Plans (TAPs).[30]

Funding for the "first generation" of TNAs was provided as "top-ups" to ongoing projects to prepare the Initial National Communications. Around US$100,000 was made available from the GEF for the TNAs, and the process was administered by UNDP, through the National Communications Support Programme. The TNAs were conducted without any guidelines, however, and were considered incomplete, on the basis that they did not include an in-depth analysis of barriers for technology transfer and diffusion, and did not identify "enabling frameworks". They did not, therefore, result in any TAPs.

Two phases of a "second generation" of TNAs was implemented by UN Environment (UNEP) and UNEP DTU Partnership between 2009 and 2018. 36 countries were supported during the first phase, from 2009-2013, and 26 countries were supported during the second phase, from 2014-2018. In 2018, TNAs were initiated in 23 additional countries, including mainly LDCs and SIDS.

A select group of countries receive assistance in each phase, based on their readiness and willingness to conduct TNAs. The overall budget made available by GEF for conducting a TNA is around US$ 250,000 per country. The TNAs have been prepared mainly by Ministries of Environment, based on guidelines developed by UN Environment, and with technical support from UNEP DTU Partnership. The guidelines promote a stakeholder driven, participatory process that includes all levels and sectors.

The guidelines also encourage integration with existing national planning processes – including the National Adaptation Programmes of Action (NAPAs), Nationally Appropriate Mitigation Actions (NAMAs), Nationally Determined Contributions (NDCs), and National Adaptation Plans (NAPs). Mitigation and adaptation assessments carried out under NAPAs, NAMAs, NDCs, and NAPs can, for instance, result in the identification of hard technology needs such as early warning systems, solar panels,

Box 2: The experience with TNAs

and biogas technologies. However, these synergies and possible overlaps have not yet been fully identified or maximised. Country experiences suggest, for instance, that the actions identified in TNAs were often difficult to distinguish from the actions prioritised within mitigation assessments or adaptation assessments, particularly when the actions involve "practices" or "soft technology" or "institutional capacity" (software or org ware). Moreover, the technology aspect is often overlooked when these national plans are developed. To develop synergies with national climate plans, and for TNAs and TAPs to identify a pathway towards the achievement of climate-related national plans, additional guidelines and resources will be needed, possibly targeted at all the sectors of the economy addressed in these plans.[31]

While the TNAs have been a useful step for countries to identify and prioritise their climate-related TDT needs and analyse barriers and challenges, they face numerous challenges. These include a lack of funds for implementation of the TAPs; difficulties in integration into exiting national development planning processes; limited technical capacities and knowledge to translate TNA outcomes into bankable technology proposals for implementation; and the lack of capacity and resources for National Designated Entities (NDEs) to follow up on TNAs.

2009 COPENHAGEN CLIMATE CONFERENCE

In the run up to the Copenhagen Conference, where Parties were expected to agree on the successor to the Kyoto Protocol, developing countries proposed the creation of a Technology Mechanism, comprising an Executive Body and a Multilateral Climate Technology Fund, funded by contributions from developed countries.[32] The proposal called for the Executive Body to support research, development, and transfer and diffusion of technologies, through a technology action plan.

For technologies in the public domain, the proposal called for the action plan to focus on an international cooperation system to ensure lowest cost options, as well as transferring know-how to use and maintain the technologies and adapt them to local conditions, including endogenous technologies.

For patented technologies, the proposal called for the action plan to ensure that privately owned technologies are available on an affordable basis, including through measures to resolve IPR barriers and compulsory licensing of patented technologies. It called for technologies with shared ownership (government and private) to be made available on an affordable basis by facilitating transfer of the government proportion on a reduced or no-cost basis; and technologies that are government-owned to be made available on an affordable basis by facilitating transfer at reduced or no-cost basis. The proposal also called for the establishment of national and regional technology excellence centres, to reinforce North-South, South-South, and triangular cooperation, including joint R&D.

Other IPR-related proposals from developing countries in the run-up to Copenhagen included IPR sharing arrangements for joint development of technologies; joint technological or patent pools to disseminate technologies to developing countries at low cost; and limited-time patents and the provision of incentives for patent holders, for differential pricing.[33] A proposal from the Philippines also sought to ensure that biological resources (microorganisms, plant and animal species and varieties, and parts) that are used for adaptation and mitigation of climate change would not be patented.[34]

The Copenhagen Conference ended in disarray, and the Copenhagen Accord, negotiated by heads of state and government, was not adopted – it was only "*noted*" because many Parties felt the negotiation process was not sufficiently inclusive.[35] However, the Accord called for the establishment of a Technology Mechanism, guided by a country-driven approach and based on national circumstances and priorities. While the proposal from developing countries for a Multilateral Climate Technology Fund was not agreed, the

Accord called for the establishment of a Green Climate Fund (GCF) to support, among other things, TDT. The Copenhagen Conference also marked the change in terminology under the UNFCCC, as noted earlier, from technology transfer to TDT.

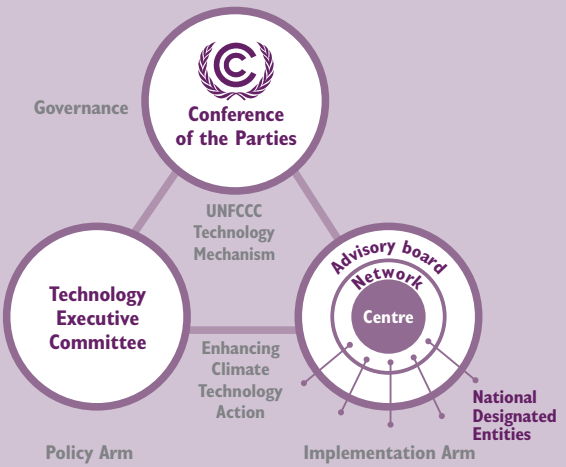
2010 CANCUN AGREEMENTS

The technology elements of the Copenhagen Accord were formally adopted under the UNFCCC in Cancun the following year, including the establishment of the Technology Mechanism and the GCF.

Parties established the Technology Mechanism, to facilitate the implementation of TDT, with two branches: a policy arm, the Technology Executive Committee (TEC); and an implementation arm, the Climate Technology Centre and Network (CTCN). The Mechanism became fully operational in 2012 (*see Box 3: Role of the Technology Mechanism*). In the absence of a separate fund to implement TDT, Parties began work to further elaborate the linkages between the Technology Mechanism and the UNFCCC Financial Mechanism in 2012, and linkages with other stakeholders within and outside the Convention.[36]

Countries ended the EGTT's mandate in 2010 when they established the Technology Mechanism, and requested the TEC to further implement the Marrakesh Technology Transfer Framework.

Box 3: The role of the Technology Mechanism



Source: UN Industrial Development Organization

The Technology Mechanism has two branches: the Technology Executive Committee (TEC) and the Climate Technology Centre and Network (CTCN). It remains the UNFCCC's primary technology body.

As the policy arm of the Technology Mechanism, the TEC analyses technology policy issues and provides recommendations to support countries in enhancing their climate technology efforts. It analyses contemporary climate technology issues and develops policy recommendations for countries to consider, including on the issues of: climate technology financing; enabling environments and barriers; innovation; mitigation and adaptation technologies; technology needs; and technology research, development, and demonstration. The TEC consists of 20 technology experts representing both developing and developed countries. Since 2011, most of its meetings have occurred in Bonn, Germany.

The CTCN acts as the implementation arm of the Technology Mechanism. It has three core services: providing technical assistance at the request of developing countries; creating access to knowledge on climate technologies; and fostering collaboration among climate technology stakeholders. UNEP, in collaboration with the UN Industrial Development Organization (UNIDO), hosts the CTCN with

Box 3: The role of the Technology Mechanism

the support of 11 consortium members, and a global network of more than 150 organisations to support developing countries in finding climate technology solutions. (UNIDO was chosen because it is the arm of the UN that focuses on technical cooperation, knowledge transfer, networking, and industrial cooperation). It is guided by an advisory board and its secretariat, which meets twice yearly primarily in Copenhagen.[37] Developing countries issue requests for technical assistance to the CTCN through their NDEs. The requests cover a broad range of both mitigation and adaptation issues and reflect the diverse challenges that different countries face. To date, more than 140 countries have nominated NDEs.

The TEC and the CTCN issue a joint annual report to the COP. Every four years, the UNFCCC secretariat commissions an independent review of the CTCN to enhance its performance – the findings and recommendations are then considered by the COP.[38] The 2017 review found that the lack of predictability and security over financial resources significantly affected the CTCN's ability to deliver services at the expected level, as did the CTCN's lack of human and organisational resources, and the capacity of NDEs.[39]

HOW IS TECHNOLOGY ADDRESSED IN THE PARIS AGREEMENT AND ITS IMPLEMENTATION GUIDELINES?

On 12 December 2015, Parties adopted the landmark Paris Agreement, which establishes the legal foundation of the international climate regime from 2020 onwards (for more information see the *Guide to the Paris Agreement*).[40] Under the Agreement, all Parties are required to submit their climate change plans in the form of NDCs, to reflect what measures they intend to put in place to contribute towards the realisation of the global goal of limiting the average temperature rise to well below 2°C compared to the pre-industrial period.

The Paris Agreement's preamble reiterates the language of Article 4.9 of the UNFCCC, in calling on Parties to take full account of the specific needs and special situations of the LDCs with regard to funding and transfer of technology.[41]

In the Paris Agreement, nations put forward a series of long-term goals that would further their efforts to combat climate change. One is the long-term vision to fully realise TDT, which countries identified as critical for improving resilience to climate change and reducing GHG emissions (Article 10.1). In order to achieve this vision, Parties agreed to strengthen cooperative action on TDT (Article 10.2).

Parties also agreed that the Technology Mechanism – including its CTCN and TEC – will serve the Agreement (Article 10.3). Article 10.4 establishes a Technology Framework that will provide overarching guidance to the Technology Mechanism in promoting and facilitating enhanced action on TDT.

Support for TDT is detailed in Article 10.5 and Article 10.6. Parties recognise the critical role of innovation and state that efforts to accelerate, encourage, and enable innovation will be supported (Article 10.5). They agree that developing countries will be supported to strengthen cooperative action on TDT at different stages of the technology cycle and that support should aim at achieving a balance between mitigation and adaptation (Article 10.6). Unlike the UNFCCC however, the Paris Agreement does not specify that this support shall come from developed countries. The named actors in Article 10.5 and Article 10.6 are the Technology Mechanism and the Financial Mechanism of the Convention.

Article 10.6 states that the global stocktake – a process by which Parties shall periodically evaluate their implementation of the Paris Agreement and assess their collective progress toward achieving its purpose and long-term goals (Article 14) – will take into account available information on support for TDT. Parties also agreed to strengthen and periodically assess the effectiveness and adequacy of support to the Technology Mechanism.[42] This furthered existing efforts to review support for TDT and enhanced the anchoring of the Technology Mechanism in the post-2020 international climate regime.[43]

2018 KATOWICE CLIMATE CHANGE CONFERENCE

From 2016, Parties worked to articulate the rules for implementing the Paris Agreement. Regarding technology, these rules related to defining the Technology Framework and the periodic assessment of the Technology Mechanism. In addition, Parties explored the linkages between the Technology Mechanism and the Financial Mechanism of the UNFCCC.

At COP24, Parties adopted the Technology Framework established under the Paris Agreement.[44] The Framework will be implemented by the TEC and CTCN, under the guidance of the Conference of the Parties serving as the Meeting of the Parties to the Paris Agreement (CMA). It will operate under the five guiding principles of: coherence; inclusiveness; result-oriented approach; transformational approach; and transparency. As such it will:

- Align with the long-term vision for TDT and other provisions of the Paris Agreement, national plans and strategies under the UNFCCC and actions undertaken by relevant institutions in the international climate regime and beyond.
- Be designed and implemented in a manner that facilitates the active participation of all relevant stakeholders and takes into account sustainable development, gender, the special circumstances of LDCs and SIDS, and the enhancement of indigenous capacities and endogenous technologies (*see Box 4: Gender and technology*).
- Be results-oriented in terms of output, outcome, and impact.
- Address the transformational changes envisioned in the Paris Agreement.
- Be designed and implemented in a manner that enhances the transparency of the results, costs, and process, such as through planning, resource management, and reporting on activities and support.

The Framework will focus on five key themes:

- Accelerating and scaling up technological innovation.
- Facilitating the implementation of collaborative TDT and actions identified in planning tools and processes (such as TNAs).

Box 4: Gender and technology

While technology innovation and use is widely viewed as "men's work", technologies are not gender neutral, and the engagement of both women and men in their development is essential to ensure that the gendered aspects of technology are considered. For example, in the energy sector, women and men have different technology needs and priorities: men's energy needs tend to involve commercial and large-scale industrial development, whereas women's needs generally prioritise energy access for cooking, family or community needs, or home-based small and often informal enterprises (for more information, see *Pocket Guide to Gender Equality under the UNFCCC*).[45]

Women tend to have much slower rates of adoption of a wide range of technologies than men, because of relatively weaker participation and engagement of women farmers and stakeholders than men in priority-setting and decision-making, gender difference in access to these technological innovations, information about these innovations, or complementary inputs and services that explain gender differences in adoption. The under-representation of women as scientists, educators, graduates, managers, and extension agents is also a limiting factor in making innovation organisations more responsive to the needs of women and men.[46]

The mission of the CTCN, agreed in 2011, specifically calls on it to "*facilitate the preparation and implementation of technology projects and strategies taking into account gender considerations to support action on mitigation and adaptation and enhance low emissions and climate-resilient development*".[47]

In 2017, the principles for the Technology Framework of the Paris Agreement highlighted the need to take into account gender in the design and implementation of the Framework. Gender responsiveness is also called for in the context of accelerating, encouraging, and enabling innovation; an enabling environment to promote gender-responsive technologies; collaboration and stakeholder engagement; and support.[48]

A 2019 synthesis report by the UNFCCC secretariat of submissions from Parties and non-Party stakeholders on the integration of gender considerations in climate policies, plans, and actions found that none of the submissions addressed the integration of gender in TDT as a separate topic, although some mentioned sector-specific technology that addressed the needs and perspectives of women, as well as men, in the context of mitigation or adaptation action.[49]

Box 4: Gender and technology

A 2018 guide for gender-responsive TNAs calls for:

- Analysis of the differential impacts of proposed interventions on women and men respectively.
- Full recognition of women's and men's different needs, based on consultations that purposely seek advice from both women and men.
- Recognition of the respective potential of women and men to play an active role in contributing to climate change adaptation and mitigation.
- Recognition of the need to tackle institutional barriers that limit women's participation in climate change mitigation and adaptation planning and implementation.
- Recognition of the potential of women and men to participate in technology transfers.
- A focus on context-specific gender-mainstreaming that is anchored in local systems.[50]

- Fostering the creation and enhancement of enabling environments and capacity building.
- Enhancing collaboration and stakeholder engagement.
- Enhancing the provision and mobilisation of support for TDT.

The TEC and CTCN will report on the progress of their work, as well as challenges and lessons learned in implementing the Technology Framework in their joint annual reports to the COP and the CMA.

Parties also adopted the modalities for a periodic assessment of the effectiveness and adequacy of the support provided to the Technology Mechanism. The review will start at CMA4 in 2021 and aim to end by CMA5 in 2022. Its outcome should serve as an input to the global stocktake and be considered when updating the technology framework.

On linking the Technology Mechanism and the UNFCCC Financial Mechanism, Parties acknowledged and encouraged enhanced collaboration between the CTCN and the GCF –

including coordination between NDEs, the National Designated Authorities (NDAs) of the GCF, and the National Focal Points (NFPs) of the GEF. They also welcomed support provided for TDT by the GEF and the GCF through projects and programmes, including for projects resulting from TNAs.

Continued progress in strengthening the linkages between the Technology Mechanism and the Financial Mechanism will be considered at COP26.

WHAT ARE THE GLOBAL CHALLENGES REALATED TO TDT?

The global challenges affecting TDT stem from the complexity and duration of negotiating appropriate technology solutions, and limited support for their actual implementation. Parties spend lengthy periods reaching decisions, whose implementation does not receive the requisite technical and financial support.

The effectiveness of the Technology Mechanism will play a key role in the effectiveness of global TDT efforts going forward. While it addresses a long-standing demand by developing countries to institutionalise technology transfer under the UNFCCC, its potential success is limited by the absence of a specific funding basket for TDT, or even clearer linkages with the Financial Mechanism. Developing countries have already had some experiences in the past under the UNFCCC – including with the TNAs – where they have received funds for planning or the identification of needs, but not for implementing the plans or addressing the needs. They have therefore pressed for deeper linkages between the Technology Mechanism and the Financial Mechanism, including through the creation of a dedicated window under the GCF for TDT. While synergies and linkages with the Financial Mechanism have been built and strengthened over time, and most of these institutions have included implementation of TDT in their respective work plans, there is still limited financial and technical support provided by developed countries. The Technology Mechanism therefore has its work cut out, to prove that it can actually facilitate implementation.

An important step will be to map the fast-changing landscape of the Mechanism's "clientele". On one hand, a few larger developing countries have already graduated from demonstration and deployment stages to investments in domestic R&D, and innovation systems to enable domestic production. Some, like China, India, and Brazil, have increased domestic technological capabilities sufficiently to attract international investment for R&D. (This also expands the scope for "South-South" technology transfer).

On the other hand, other developing countries face challenges even in defining climate technologies; some have not undertaken TNAs to establish their technology needs; and some lack capacity and knowledge to integrate technology needs into their mitigation, adaptation, and national development plans. Many developing countries, especially LDCs, lack capacity to develop bankable technology proposals to enable them to access available funding opportunities. For these countries, outreach and support will be necessary to improve the interface between the country and the Mechanism, including through awareness raising at the national level of the support the Mechanism can offer; capacity building of NDEs and sectoral players; translation of toolkits (for instance, for conducting TNAs and identifying technology needs to implement NDCs and NAPs) into local languages; and support in accessing the funds that are available from the GEF and GCF.[51]

The three synthesis reports of TNAs prepared by the UNFCCC secretariat provide further insights into the TDT challenges faced by countries. While many of the barriers relate to domestic factors (discussed in the next section), most countries list economic and market barriers as the biggest barriers to TDT.[52] The 2013 synthesis report found that many

countries also raised IPR-related barriers – in particular regarding the cost implications of obtaining access to certain technologies, but also policy, legal, and regulatory barriers (for instance, relating to the protection of IPRs in the recipient country). Some identified the lack of experts in negotiating IPR contracts as a barrier to the transfer and diffusion of their prioritised technologies.[53] IPRs can therefore create legal and financial barriers, but also capacity-related barriers, as countries may lack the expertise or financial wherewithal to deal with patent licensing.

While the legal solutions to IPR-related barriers may need a collaborative effort between the UNFCCC, World Intellectual Property Organization, and the World Trade Organization (WTO), the proposal from developing countries for joint technological or patent pools to disseminate technologies to developing countries at low-cost could also help overcome capacity barriers to some extent (*see Box 5: Technology Bank for LDCs*).[54] LDCs could further be supported by the GEF and GCF to participate in these pools.[55]

However, developed countries continue to oppose discussion of IPRs as a barrier to implementing TDT. While the TEC highlighted IPRs as an issue where more clarity will be needed in its report to COP18 in Doha, the extent of the controversy that surrounds this issue is indicated by the observation that this mention in the TEC report is the only instance where the term "IPRs" has featured in a document adopted by a UNFCCC body in recent years.[56] Efforts by the developing countries to raise these issues in the WTO have also failed, as developed countries contest that IPR issues are hindering the transfer of climate-related technologies.[57]

Box 5: Technology Bank for LDCs

The Sustainable Development Goals (SDGs), adopted in 2015, included a specific target under SDG 17 (on global partnerships) to establish a technology bank (target 17.8). The UN Technology Bank for LDCs was therefore launched in 2017, with its headquarters in Gebze, Turkey. It is currently conducting a series of baseline science, technology, and innovation (STI) reviews and TNAs in a few LDCs, with the goal of scaling them up to all 47 LDCs in future. It is also taking steps to stimulate the production of high-quality research in LDCs through capacity development and fostering international research collaboration, both South-South and South-North; and strengthening the capacity of National Academies of Science in LDCs, to act as advisors to government and industry on STI.

In future, the Bank aims to assist LDCs in building their national and regional capacities on IPRs and technology-related regulations. An Intellectual Property Bank will be established within the UN Technology Bank to act as a conduit between IPR holders and relevant actors in LDCs and to facilitate access and use of appropriate IPRs covering desired technologies. The UN Technology Bank will also help LDCs identify, access, and use appropriate technologies no longer protected by IPRs.

The Bank will facilitate technology transfer by working as an intermediary to develop capacity in absorption, adaptation, human capital formation, and promotion of technology transfer on mutually agreed terms. It will also serve as a conduit to connect potential entrepreneurs with existing sources of R&D to support the creation of new inventions, ventures, and companies.

Finally, it will promote regional innovation hubs and Innovation Labs to promote research and innovation in LDCs.

WHAT NATIONAL CHALLENGES DO DEVELOPING COUNTRIES FACE WITH REGARD TO TDT?

National-level challenges include domestic policies, capabilities, infrastructure, human capital, and market and investment conditions in accessing climate-related technology. These challenges are highlighted in the three TNA synthesis reports prepared by the UNFCCC secretariat.

The first synthesis report, produced in 2006, analysed 23 TNAs and 25 initial National Communications from developed countries. The key barriers to TDT listed by countries included: economic and market barriers (83%); information and awareness barriers (78%); policy-related barriers (74%); technical barriers (74%); and barriers relating to human capacity (70%). Regulatory and institutional barriers were identified in 15 of the 23 TNAs. At least one country (Indonesia) expressed concern about the high investment costs of mitigation options, which could translate into higher product prices and loss of competitiveness in the case of the energy sector.

The economic and market barriers listed by countries related to: lack of financial resources; high investment costs; incompatible prices, subsidies and tariffs; lack of incentives; high up-front costs; lack of access to credit; lack of competition; and weak local currencies.

The information and awareness barriers related to: lack of information on technical performance of technologies; lack of information on how to acquire technologies; limited information sharing and lack of information on costs of

technologies; and lack of information on markets, on operation and maintenance and on vendors of technologies. The lack of awareness of various stakeholders about energy conservation, energy efficiency, and sustainable development issues was also highlighted in the TNAs.

Most of the TNAs listed the lack of capacity to address technology transfer, and highlighted the need to build human and institutional capacity.

The second synthesis report, produced in 2009, analysed 70 TNAs and 39 National Communications from developing countries.[58] Once again, economic and market barriers were the most frequently mentioned (by 82% of the countries). Other barriers, in decreasing order of their frequency of identification, were human capacity, information and awareness, institutional, regulatory, policy-related, and technical.

The economic and market barriers this time included: lack of financial resources; lack of potential investors; low solvency of enterprises; lack of purchasing power of populations; lack of participation of national banks in technology transfer activities; high transport costs; and lack of contact with overseas markets.

Barriers related to information and awareness included: a shortage of information on energy efficiency and on ecological safety of technology used; difficulties for stakeholders in obtaining information on modern technologies; and lack of information in governmental structures, companies, and the public on climate change related problems.

The need for human and institutional capacity building was again highlighted, with some countries listing capacity constrains by sector, and for different stakeholders.

This synthesis report also analysed the TNAs by some country groupings. LDCs listed the following obstacles:

inadequate national policies to support technology development; non-transparent legal, regulatory, and enforcement mechanisms; high economic vulnerability; lack of financial and human capacity to undertake assessments of country-specific technology needs; weak basis of technical information; lack of an appropriately skilled critical mass at the technical level; and inadequate service, communication, and transport infrastructures. They also noted the lack of market incentives to stimulate development and deployment of technologies, as these technologies are often of small installed capacity, face unstable pricing systems, have low rates of investment return, and are also of high political risk.

Other pressing obstacles to capacity building in LDCs included: lack of ability to assess, import, develop, and adapt appropriate technologies; inadequate capacity to collect data, information, and knowledge, especially on emerging technologies; no confidence in unproven technologies; aversion to taking risks; inadequate science, engineering, and technical knowledge; the absence of small entrepreneurs to be able to access capital at concessionary lending rates; the absence of investment projects, feasibility studies, and project finance sourcing to attract international consideration of, and assistance to develop, capacity building projects.

SIDS also highlighted limited resources and the need for capacity building and sharing knowledge and information, while increasing local participation, building on existing capacities instead of replacing them, and respecting cultural identities and values.

The third synthesis report considered barriers and gaps for mitigation and adaptation technologies separately, and region-wise (*see Tables 1 and 2*).

The enablers listed by developing countries to address economic and market barriers for mitigation technologies in the TNAs analysed in the third synthesis report include tax exemptions for imported technology and the provision of financial support for the R&D of the technology. Legal and regulatory barriers, meanwhile, called for detailed regulations and standards for new technologies, and the need to amend existing laws. Countries felt technical barriers could be addressed through demonstration projects, and databases and inventories of technologies.

Table 1: Commonly reported barriers to the development and transfer of mitigation technologies by region

AFRICA	ASIA-PACIFIC
Inappropriate financial incentives and disincentives Insufficient legal and regulatory framework Poor market infrastructure Inadequate information	Lack of or inadequate access to financial resources High cost of capital Insufficient legal and regulatory framework Poor market infrastructure Lack of skilled personnel for the installation and operation of climate technologies
EASTERN EUROPE	**LATIN AMERICA AND CARIBBEAN**
Inappropriate financial incentives and disincentives Lack of or inadequate access to financial resources High cost of capital Insufficient legal and regulatory framework Poor market infrastructure	Inappropriate financial incentives and disincentives Weak connectivity between actors favouring the new technology Limited institutional capacity Lack of skilled personnel for the installation and operation of climate technologies Inadequate information

Table 2: Commonly reported barriers to the development and transfer of adaptation technologies by region

AFRICA	ASIA-PACIFIC
Lack of or inadequate access to financial resources	Lack of or inadequate access to financial resources
Poor market infrastructure	Limited institutional capacity
Restricted access to technology	Inadequate information
Limited institutional capacity	
Inadequate information	
EASTERN EUROPE	**LATIN AMERICA AND CARIBBEAN**
High cost of production	Lack of or inadequate access to financial resources
Financially not viable	Insufficient legal and regulatory framework
Restricted access to technology	Traditions and habits
Insufficient legal and regulatory framework	Inadequate information
Inadequate information	

90% of the TNAs highlighted lack of or inadequate access to financial resources as the main barrier for adaptation technologies, followed by insufficient legal and regulatory frameworks; limited institutional capacity; and system constraints. Enablers included increasing the financial resources available for the technology through budgetary allocations or financial schemes, funds, mechanisms or policies; strengthening current institutions; the provision of capacity building; and the establishment of information and awareness programmes to promote and develop capacity with regard to the technology.

The findings of the three synthesis reports also echo, to some extent, the findings of the IPCC – in a 2000 report, the IPCC highlighted capacity building, an enabling environment, and mechanisms for technology transfer as the three major

dimensions of making technology transfer more effective at the domestic level. Capacity building included human and organisational capacity, and information assessment and monitoring capacity. An enabling environment included measures to internalise the externalities to capture the environmental and social costs; reform of legal systems, including for IPR and licence protection; and encouraging reforms to attract foreign direct investment (FDI). Mechanisms for technology transfer, meanwhile, included national systems for innovation, and improved access to international sources of funding.[59]

Finally, more specific measures to enhance the engagement of countries with the Technology Mechanism include enhancing the capacity of, and providing resources for, the NDEs, who are expected to act as a link between the Technology Mechanism and the respective country. NDEs often lack capacity and funding to carry out this work. They often are assigned this role over and above their assigned duties in national government, and sometimes treat it as secondary.

Limited collaboration between the NDEs for technology, the NDAs for the GCF, and the NFPs of the GEF at the national level also poses a challenge.

WHAT IS THE ROLE OF THE PRIVATE SECTOR IN CLIMATE-RELATED TDT?

The private sector both at the global and domestic level are key actors in TDT.

At the global level, they can play a role in directing investments towards climate-friendly technologies (or hamper such investments). They can also influence governments to enforce their IPRs strictly, and not grant any concessions for ESTs. The US Chamber of Commerce, for instance, lobbies to limit the access of developing countries to ESTs, and to ensure that the WTO's rules on Trade-Related Aspects of Intellectual Property (TRIPS) extend and enforce US-style patent and copyright law throughout the world.[60] In May 2009, a group of developed country companies launched a coalition called Innovation, Development & Employment Alliance (IDEA) to defend IPRs in the climate change negotiations. Lobbying by this coalition resulted in the approval of the 2009 American Clean Energy and Security Act (an amendment to the 1978 Act by the same name), which aims to protect IPRs related to energy or environmental technology, by the US House of Representatives.[61] As a result, the US (along with the EU and Japan), has a strong position on IPRs in the climate negotiations, viewing them as an enabler of innovation rather than a barrier to technology transfer, and opposing the mention of IPRs in any outcome on technology.[62]

In the context of adaptation technologies, the filing of patent applications by large agrochemical and seed companies for exclusive monopoly rights over plant gene sequences that

enhance the climate resilience of crops is of particular concern, not only in the context of access by vulnerable and poor farming communities, but also future research.[63]

The private sector can choose to take a more enlightened approach to patents for ESTs, as demonstrated by car manufacturers Tesla and Toyota recently. In 2014, Tesla declared its electric vehicle patents open source,[64] and Toyota did the same for fuel cell patents. While commentators attribute this to enlightened self-interest, with the companies using open patents as a tool to advance their competing visions of the future of clean technology, their actions are likely to have a significant impact on the transportation sector worldwide.[65]

FDI, commercial lending, and equity investment decisions of the global private sector also influence the flow of technology, along with joint ventures, cooperative research arrangements, and co-production arrangements – these have traditionally favoured larger developing countries, with larger companies, more stable domestic markets, and higher domestic capacity.[66] Governments in industrialised countries can play an important role in directing their companies towards private sector partners in developing countries that they would not traditionally consider, including small and medium enterprises, by funding R&D aimed at technology transfer, insuring risk, providing matchmaking services, and funding demonstration sites.[67]

In this context, it is worth mentioning technologies whose development is funded by the public sector, through research grants from governments and other non-commercial grants given to public universities. These technologies should be in the public domain, not under IPR protection, and be easier to share.

At the national level, the domestic private sector can heavily influence whether climate-resilient technologies are used rather than conventional ones. Governments in developing countries can play a critical role in creating incentives for the domestic private sector to invest in climate-friendly technologies, and in innovation for such technologies.

WHAT IS THE ROLE OF OTHER STAKEHOLDERS IN TDT?

At the end of the day, ESTs are only successful if they meet the needs of users and do not cause negative social and environmental impacts. Public pressure and customer choice also play a critical role in driving the use of climate-friendly technologies and influencing policy making. Awareness raising on the importance of adopting climate-friendly technologies, and information provision, on the climate-impact of different technological choices, are therefore important adjuncts to promote TDT. To promote locally-driven technological solutions, "citizen science", which emphasises co-creation to facilitate scientific and community-based solutions, and to integrate local and indigenous knowledge, should be the basis not only for the TNAs and resulting TAPs, but also for national and global policies and regulations on TDT. Finally, stakeholders can also play an important role in "crowdsourcing" technology, or establishing platforms to provide access to "open source" technologies.

REFERENCES

1. Herschbach, D.R. (1995). Technology as knowledge: Implications for instruction. *Journal of Technology Education*. Vol. 7 No. 1, Fall 1995. https://scholar.lib.vt.edu/ejournals/JTE/v7n1/pdf/herschbach.pdf. Also: Wahab, S.A., Rose, R.C. & Osman, S.I.W. (2012). Defining the Concepts of Technology and Technology Transfer: A Literature Analysis. *International Business Research*. Vol. 5, No. 1, January. http://www.ccsenet.org/journal/index.php/ibr/article/view/13847
2. Wahab, S.A., Rose, R.C. & Osman, S.I.W. (2012). Defining the Concepts of Technology and Technology Transfer: A Literature Analysis. *International Business Research*. Vol. 5, No. 1, January. http://www.ccsenet.org/journal/index.php/ibr/article/view/13847
3. UNFCCC (2014). *Joint annual report of the Technology Executive Committee and the Climate Technology Centre and Network for 2014*. FCCC/SB/2014/3. https://unfccc.int/resource/docs/2014/sb/eng/03.pdf#page=12; and Christiansen, L., Olhoff, A. & Trærup, S. (eds) (2011). *Technologies for Adaptation: Perspectives and Practical Experiences*. UNEP Risoe Centre.
4. IPCC (2018). *Global Warming of 1.5°C*. Summary for Policymakers. https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_SPM_version_report_LR.pdf
5. WIPO (2019). *World Intellectual Property Indicators 2019*. https://www.wipo.int/edocs/pubdocs/en/wipo_pub_941_2019.pdf
6. Glachant, M. & Dechezlepretre, A. (2016). What role for climate negotiations on technology transfer? *Climate Policy*. ISSN 1752-7457. http://eprints.lse.ac.uk/67598/7/Climate_negotiations_technology%20transfer_LSERO.pdf
7. IPCC (2000). *Methodological and technological issues in technology transfer: Summary for policymakers*. Special Report of Working Group III. Intergovernmental Panel on Climate Change. https://www.ipcc.ch/site/assets/uploads/2018/03/srtt-en-1.pdf
8. UNCTAD (2014). *Transfer of technology and knowledge sharing for development: Science, technology and innovation issues for developing countries*. UNCTAD Current Studies on Science, Technology and Innovation. No 8. https://unctad.org/en/PublicationsLibrary/dtlstict2013d8_en.pdf
9. Craft, B., Gama, S. & Namgyel, T. (2017). *Least Developed Countries' experiences with the UNFCCC Technology Mechanism*. IIED Issue Paper. https://pubs.iied.org/10189IIED/
10. United Nations (1992). *Agenda 21*. United Nations Conference on Environment & Development Rio de Janerio, Brazil, 3 to 14 June 1992. https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf

11. Correa, C. (2007). *The Least Developed Countries Report 2007: Intellectual Property in LDCs: Strategies for Enhancing Technology Transfer and Dissemination*. UNCTAD. https://unctad.org/Sections/ldc_dir/docs/ldcr2007_Correa_en.pdf
12. UNFCCC (2009). *Report of the Conference of the Parties on its fifteenth session, held in Copenhagen from 7 to 19 December 2009*. FCCC/CP/2009/11/Add.1. https://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf
13. UNFCCC (2010). *Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010*. FCCC/CP/2010/7/Add.1. https://unfccc.int/sites/default/files/resource/docs/2010/cop16/eng/07a01.pdf
14. Anon (1989). *The Noordwijk Declaration on Climate Change: Atmospheric pollution and climatic change ministerial conference held at Noordwijk, the Netherlands, on 6th and 7th November 1989*. https://ntrl.ntis.gov/NTRL/dashboard/searchResults/titleDetail/PB90210196.xhtml
15. Sarma, M.K. (1991). Adaptation Measures. In Jäger, J. & Ferguson, H.L. *eds.* (1991). *Climate Change: Science, Impacts and Policy. Proceedings of the Second World Climate Conference*. Cambridge University Press. https://library.wmo.int/doc_num.php?explnum_id=4324
16. South Centre (1991). *Environment and Development: Towards a Common Strategy for the South in the UNCED Negotiations and Beyond*. https://books.google.co.uk/books/about/Environment_and_Development.html?id=bPb0ugAACAAJ&redir_esc=y. See also: Anon (1991). *Compilation of possible elements for a framework convention on climate change: Note by the secretariat*. Intergovernmental Negotiating Committee for a framework convention on climate change, second session, Geneva, 19-28 June 1991. https://unfccc.int/resource/docs/1991/a/eng/misc02r01.pdf
17. IISD (1995). Summary of the eleventh session of the INC for a framework convention on climate change: 6-17 February 1995. *Earth Negotiations Bulletin*. Vol 12 No 11. 20 February. https://enb.iisd.org/download/pdf/enb1211e.pdf
18. Earth Summit Bulletin (1992). *Prepcom IV: The final stop on the road to Rio*. Island Press. Vol 1 No 27. 20 April. https://enb.iisd.org/download/pdf/enb0127e.pdf
19. OECD (1991). *Policy Statement of the Meeting of OECD Ministers on Environment and Development*. Organisation for Environment and Development, Paris. December 2-3. §11.
20. UNFCCC (1995). *Report of the Conference of the Parties on its First Session, Held at Berlin from 28 March to 7 April 1995*. FCCC/CP/1995/7/Add.1. https://unfccc.int/resource/docs/cop1/07a01.pdf
21. Haites, E., Duan, M. & Seres, S. (2006). Technology transfer by CDM Projects. *Climate Policy*. 6(3):327-344. https://www.researchgate.net/publication/233526380_Technology_Transfer_by_CDM_Projects

22. Murphy, K., Kirkman, G.A., Seres, S. & Haites, E. (2015). Technology transfer in the CDM: an updated analysis. *Climate Policy*. 15:1, 127-145. https://doi.org/10.1080/14693062.2013.812719
23. Fenhann, J. (2020). *CDM Pipeline Spreadsheet*. UNEP DTU Partnership. http://www.cdmpipeline.org/overview.htm
24. Michaelowa, A., Jember, G., Diagne, M. (2014). Lessons from the CDM in LDCs, for the design of NMM and FVA. *LDC Paper Series*. European Capacity Building Initiative. http://www.ldc-climate.org/wp-content/uploads/2018/01/updated-cdm-lessons_final.pdf
25. UNFCCC (1998). *Report of the Conference of the Parties on its Fourth Session, held at Buenos Aires from 2 to 14 November 1998*. FCCC/CP/1998/16/Add.1. https://unfccc.int/resource/docs/cop4/16a01.pdf
26. UNFCCC (2002). Report of the Conference of the Parties on its Seventh Session, held at Marrakesh from 29 October To 10 November 2001. FCCC/CP/2001/13/Add.1. https://unfccc.int/resource/docs/cop7/13a01.pdf
27. UNDP and UNFCCC (2009). *Handbook for Conducting Technology Needs Assessment for Climate Change*. https://www.undp.org/content/dam/aplaws/publication/en/publications/environment-energy/www-ee-library/climate-change/handbook-for-conducting-technology-needs-assessment-for-climate-change/TNAHandbook_9-15-2009.pdf
28. UNFCCC (2007). *Report of the Conference of the Parties on its thirteenth session, held in Bali from 3 to 5 December 2007*. FCCC/CP/2007/6/Add.1. https://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf
29. UNFCCC (2008). *Development and transfer of technologies*. Decision 2/CP.14. https://unfccc.int/resource/docs/2008/cop14/eng/07a01.pdf. See also UNFCCC (2010). *Report of the Global Environment Facility on the progress made in carrying out the Poznan strategic programme on technology transfer*. FCCC/SBI/2010/25. https://unfccc.int/resource/docs/2010/sbi/eng/25.pdf
30. GEF (2019). *Report of the Global Environment Facility to the Twenty-Fifth Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change*. 26 August. https://www.thegef.org/sites/default/files/documents/gef_report_unfccc_cop25.pdf
31. Charlery, L. & Trærup, S. (2019). The nexus between nationally determined contributions and technology needs assessments: A global analysis. *Climate Policy*, 19:2, 189-205. https://doi.org/10.1080/14693062.2018.1479957
32. G77 and China (2008). *Proposal by the G77 and China for a Technology Mechanism under the UNFCCC*. http://unfccc.int/files/meetings/ad_hoc_working_groups/lca/application/pdf/technology_proposal_g77_8.pdf
33. UNFCCC (2008). *Ideas and proposals on paragraph 1 of the Bali Action Plan*. FCCC/AWGLCA/2008/16/Rev.1. https://unfccc.int/resource/docs/2008/awglca4/eng/16r01.pdf
34. UNFCCC (2009). *Notes on sources for FCCC/AWGLCA/2009/INF.1 - Part II*. Ad hoc Working Group on Long-term Cooperative Action. 14 August.

35. UNFCCC (2009). *Report of the Conference of the Parties on its fifteenth session, held in Copenhagen from 7 to 19 December 2009*. FCCC/CP/2009/11/Add.1. https://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf#page=3
36. UNFCCC (2013). *Report of the Conference of the Parties on its eighteenth session, held in Doha from 26 November to 8 December 2012*. FCCC/CP/2012/8/Add.3. Decision 1/CP.18. §62. https://unfccc.int/sites/default/files/resource/docs/2012/cop18/eng/08a03.pdf
37. Abdel-Latif, A (2015). Intellectual property rights and the transfer of climate change technologies: Issues, challenges, and way forward. *Climate Policy* 15(1) 103–126
38. UNFCCC (2012). *Report of the Conference of the Parties on its seventeenth session, held in Durban from 28 November to 11 December 2011*. Decision 4/CP.17, Annex VII. https://unfccc.int/sites/default/files/resource/docs/2011/cop17/eng/09a01.pdf
39. UNFCCC (2017). *Report on the independent review of the effective implementation of the Climate Technology Centre and Network*. FCCC/CP/2017/3. https://unfccc.int/resource/docs/2017/cop23/eng/03.pdf
40. Sharma, A. (ed). (2020). *Guide to the Paris Agreement*. European Capacity Building Initiative, Oxford, UK. https://ecbi.org/sites/default/files/Guide%20to%20Paris%20Agreement.pdf
41. UNFCCC (2015). *Paris Agreement*. https://unfccc.int/sites/default/files/english_paris_agreement.pdf
42. UNFCCC (2015). *Report of the Conference of the Parties on its twenty-first session, held in Paris from 30 November to 13 December 2015*. Decision 1/CP.21, paragraphs 66 and 69. https://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf
43. Abeysinghe, A., Craft, B. & Tenzing, J. (2016). *The Paris Agreement and the LDCs: Analysing COP21 outcomes from LDC positions*. IIED Issue Paper. https://pubs.iied.org/pdfs/10159IIED.pdf
44. UNFCCC (2018). *Technology framework under Article 10, paragraph 4, of the Paris Agreement*. Decision 15/CMA.1. https://unfccc.int/sites/default/files/resource/cma2018_3_add2_new_advance.pdf#page=4
45. Burns, B. (2018). *Pocket Guide to Gender Equality under the UNFCCC*. Ecbi, Oxford. https://ecbi.org/sites/default/files/2018%20Edition%20of%20Pocket%20Guide%20to%20Gender_1.pdf
46. Ragasa, C. (2012). *Gender and Institutional Dimensions of Agricultural Technology Adoption: A Review of Literature and Synthesis of 35 Case Studies*. http://ageconsearch.umn.edu/record/126747/files/IAAE.2012.gender.pdf
47. UNFCCC (2012). *Report of the Conference of the Parties on its seventeenth session, held in Durban from 28 November to 11 December 2011*. FCCC/CP/2011/9/Add.1. https://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf
48. UNFCCC (2018). *Technology framework under Article 10, paragraph 4, of the Paris Agreement*. Decision 15/CMA.1. https://unfccc.int/sites/default/files/resource/cma2018_3_add2_new_advance.pdf

49. UNFCCC (2019). *Differentiated impacts of climate change on women and men; the integration of gender considerations in climate policies, plans and actions; and progress in enhancing gender balance in national climate delegations*. FCCC/SBI/2019/Inf.8. https://unfccc.int/sites/default/files/resource/sbi2019_inf8.pdf
50. De Groot, J. (2018). *Guidance for a gender-responsive Technology Needs Assessment*. UNEP DTU Partnership, UNEP, and GEF. https://tech-action.unepdtu.org/wp-content/uploads/sites/2/2019/07/web-tna-gender-guidebook-01.pdf
51. Craft, B. Gama, S.F. & Namgyel, T. (2017). *Least Developed Countries' experiences with the UNFCCC Technology Mechanism*. IIED. Issue Paper. https://pubs.iied.org/pdfs/10189IIED.pdf
52. UNFCCC (2009). *Second synthesis report on technology needs identified by Parties not included in Annex I to the Convention*. FCCC/SBSTA/2009/INF.1. https://unfccc.int/resource/docs/2009/sbsta/eng/inf01.pdf
53. UNFCCC (2013). *Third synthesis report on technology needs identified by Parties not included in Annex I to the Convention*. FCCC/SBSTA/2013/INF.7. https://unfccc.int/resource/docs/2013/sbsta/eng/inf07.pdf
54. UNFCCC (2008). *Ideas and proposals on paragraph 1 of the Bali Action Plan*. FCCC/AWGLCA/2008/16/Rev.1. https://unfccc.int/resource/docs/2008/awglca4/eng/16r01.pdf
55. Chuffart-Finsterwald, S. (2014). Environmental Technology Transfer and Dissemination under the UNFCCC: Achievements and New Perspectives. *Environmental Claims Journal*, 26:3, 238-260. https://doi.org/10.1080/10406026.2014.878562
56. Abdel-Latif, A. (2015). Intellectual property rights and the transfer of climate change technologies: Issues, challenges, and way forward. *Climate Policy*. 15:1, 103-126. https://doi.org/10.1080/14693062.2014.951919
57. Saez, C. (2013). WTO TRIPS Council: Discussion of Innovation Shows Divergent Views. *Intellectual Property Watch*. 13 June. http://www.ip-watch.org/2013/06/13/wto-trips-council-discussion-of-innovation-shows-divergent-views-tobacco-back-on-agenda/
58. UNFCCC (2009). *Second synthesis report on technology needs identified by Parties not included in Annex I to the Convention*. FCCC/SBSTA/2009/INF.1. https://unfccc.int/resource/docs/2009/sbsta/eng/inf01.pdf
59. IPCC (2000). IPCC (2000). *Methodological and Technological Issues in Technology Transfer*. https://www.ipcc.ch/site/assets/uploads/2018/03/srtt-en-1.pdf
60. Weisbrot, M. (2009). Green technology should be shared. *The Guardian*. 20 May. https://www.theguardian.com/commentisfree/cifamerica/2009/may/19/wto-climate-change-intellectual-property
61. Zhuang, W. (2017). *Intellectual Property Rights and Climate Change: Interpreting the TRIPS agreement for environmentally sound technologies*. Cambridge University Press.

62. Khor, M. (2012). *Climate Change, Technology and Intellectual Property Rights: Context and Recent Negotiations*. South Centre. https://www.southcentre.int/wp-content/uploads/2013/05/RP45_Climate-Change-Technology-and-IP_EN.pdf
63. ETC Group (2010). *Capturing "Climate Genes": Gene giants stockpile "climate-ready" patents*. https://www.etcgroup.org/sites/www.etcgroup.org/files/publication/pdf_file/Genegiants2011_0.pdf
64. See, for instance: Musk, E. (2014). *All our patent are belong to you*. https://www.tesla.com/en_GB/blog/all-our-patent-are-belong-you
65. Pernick, R. (2015). Tesla, Toyota, and Open Patents: The Hype and the Hope. *Renewable Energy World*. https://www.renewableenergyworld.com/2015/03/05/tesla-toyota-and-open-patents-the-hype-and-the-hope/#gref
66. IPCC (2000). *Methodological and Technological Issues in Technology Transfer*. https://www.ipcc.ch/site/assets/uploads/2018/03/srtt-en-1.pdf
67. Inbal, A.B. & Tzachor, A. (2013). National policy and SMEs in technology transfer: the case of Israel. *Climate Policy*. https://www.tandfonline.com/doi/abs/10.1080/14693062.2013.770299

ANNEX

1992 UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

Article 4: COMMITMENTS

1. All Parties, taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances, shall: (...)
   (c) Promote and cooperate in the development, application and diffusion, including transfer, of technologies, practices and processes that control, reduce or prevent anthropogenic emissions of greenhouse gases not controlled by the Montreal Protocol in all relevant sectors, including the energy, transport, industry, agriculture, forestry and waste management sectors;
   (…)
3. The developed country Parties and other developed Parties included in Annex II shall provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties in complying with their obligations under Article 12, paragraph 1. They shall also provide such financial resources, including for the transfer of technology, needed by the developing country Parties to meet the agreed full incremental costs of implementing measures that are covered by paragraph 1 of this Article and that are agreed between a developing country Party and the international entity or entities referred to in Article 11, in accordance with that Article. The implementation of these commitments shall take into account the need for adequacy and predictability in the flow of funds and the importance of appropriate burden sharing among the developed country Parties.
   (…)
5. The developed country Parties and other developed Parties included in Annex II shall take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how to other Parties, particularly developing country Parties, to enable them to implement the provisions of the Convention. In this process, the 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.
   (…)

7. 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.
8. In the implementation of the commitments in this Article, the Parties shall give full consideration to what actions are necessary under the Convention, including actions related to funding, insurance and the transfer of technology, to meet the specific needs and concerns of developing country Parties arising from the adverse effects of climate change and/or the impact of the implementation of response measures, especially on:
   (a) Small island countries;
   (b) Countries with low-lying coastal areas;
   (c) Countries with arid and semi-arid areas, forested areas and areas liable to forest decay;
   (d) Countries with areas prone to natural disasters;
   (e) Countries with areas liable to drought and desertification;
   (f) Countries with areas of high urban atmospheric pollution;
   (g) Countries with areas with fragile ecosystems, including mountainous ecosystems;
   (h) Countries whose economies are highly dependent on income generated from the production, processing and export, and/or on consumption of fossil fuels and associated energy-intensive products; and
   (i) Landlocked and transit countries.

   Further, the Conference of the Parties may take actions, asappropriate, with respect to this paragraph.
9. The Parties shall take full account of the specific needs and special situations of the least developed countries in their actions with regard to funding and transfer of technology.

1995 BERLIN MANDATE

Decision 13/CP.1: Transfer of technology

(…)

1. *Requests* the Convention secretariat:
   (a) To prepare an itemized progress report (according to the types of activities specified in paragraphs 34.15 to 34.28, inclusive, of chapter 34 of Agenda 21) on concrete measures taken by the Parties listed in Annex II to the Convention, with respect to their commitments related to the transfer of environmentally sound technologies and the

know-how necessary to mitigate and facilitate adequate adaptation to climate change; and, at the same time,

(b) To collect information from relevant sources, from, inter alia, the Commission on Sustainable Development, United Nations agencies, the Intergovernmental Panel on Climate Change and the Subsidiary Body for Scientific and Technological Advice, and to prepare an inventory and assessment of environmentally sound and economically viable technologies and know-how conducive to mitigating and adapting to climate change. This inventory should also include an elaboration of the terms under which transfers of such technologies and know-how could take place;

2. *Further requests* the Convention secretariat:

(a) To submit the documents referred to in subparagraphs 1 (a) and (b) above, through the Subsidiary Body for Scientific and Technological Advice, to the Conference of the Parties at its second session, and to update them at regular intervals (each interval not to exceed a year) for consideration by the Conference of the Parties at each of its sessions;

(b) To take the advice of the Subsidiary Body for Scientific and Technological Advice (as described in section A, paragraph 3, of annex I to decision 6/CP.1) in implementing these responsibilities and to coordinate this matter with the relevant United Nations agencies and other organizations and institutions;

3. *Urges:*

(a) The Parties listed in Annex II to the Convention to include in their national communications 1/ the measures taken for the transfer of technology in order to enable the Convention secretariat to compile, analyse and then submit the above-mentioned documents to each session of the Conference of the Parties;

(b) Other Parties to include in their communications, where possible, information on measures taken for the transfer of technology in order to enable the Convention secretariat to compile, analyse and then submit the above-mentioned documents to each session of the Conference of the Parties;

4. *Decides:*

(a) To review, at the second session of the Conference of the Parties, and at each session of the Conference of the Parties thereafter, the implementation of Article 4.5 and 4.1(c) of the Convention as a separate agenda item under "Matters relating to commitments";

(b) To provide continuous advice to improve the operational modalities for the effective transfer of technology;

(c) To support and promote the development of endogenous capacities and appropriate technology relevant to the objectives of the Convention in developing countries which are Parties to the Convention.

1998 BUENOS AIRES PLAN OF ACTION

Decision 4/CP.4: Development and transfer of technologies

The Conference of the Parties,

(…)

Recognizing the need for continued efforts by Parties to promote and cooperate in the development, application, diffusion and transfer of technologies,

Recognizing that the private sector plays, in some countries, an important role in the development, transfer and finance of technologies, and that the creation of enabling environments at all levels provides a platform to support the development, use and transfer of environmentally sound technologies and know-how,

(…)

1. *Agrees* that strengthening the capacities and capabilities of developing country Parties to address climate change will help these Parties to contribute to the ultimate objective of the Convention and to achieve sustainable development;
2. *Encourages* all relevant international organizations to mobilize and facilitate efforts to provide financial resources needed by developing country Parties to meet their agreed incremental costs, including development and transfer of technologies, enhancement of endogenous capacities, implementation of such measures as improving energy efficiency, exploiting renewable energies, enhancing sinks and preparing for adaptation to adverse effects of climate change;
3. *Requests* Parties included in Annex II to the Convention (Annex II Parties):
   (a) To take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of environmentally sound technologies and know-how to developing country Parties and their access thereto;
   (b) To support capacity-building and the strengthening of appropriate institutions in developing countries to enable the transfer of environmentally sound technologies and knowhow;
4. *Further requests* Parties included in Annex I to the Convention (Annex I Parties), and in particular Annex II Parties:
   (a) To assist developing country Parties in their efforts to build capacity and institutional frameworks to improve energy efficiency and utilization of renewable energies through multilateral and bilateral cooperative efforts;
   (b) To provide assistance to developing country Parties to build capacity for sustainable management, conservation and enhancement, as appropriate, of sinks and reservoirs of all greenhouse gases not controlled by the Montreal Protocol, including biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems;
   (c) To assist developing country Parties to build capacity to adapt to the adverse effects of climate change;

(d) To assist developing country Parties to strengthen their endogenous capacities and capabilities in the areas of technological and socio-economic research and systematic observation relevant to climate change and its associated adverse effects;

(e) Taking into account Article 6 of the Convention, to cooperate in and promote capacity-building of developing country Parties at the international, regional, sub-regional and national levels through cooperation programmes supported by United Nations and other multilateral agencies, as well as bilateral agencies;

5. *Requests* all Parties to enhance reporting in their national communications of technology cooperation and transfer activities and invites Parties not included in Annex I to the Convention (non-Annex I Parties) to include, where possible, their technology needs;

6. *Encourages* Parties to implement practical cooperation programmes and projects to promote and facilitate the transfer of technologies to reduce greenhouse gas emissions and facilitate adaptation to climate change and its adverse effects, while supporting sustainable development;

7. *Urges:*

(a) Annex I Parties, in their technology transfer activities, to take into account support for the development and enhancement of the endogenous capacities and technologies of developing country Parties;

(b) Annex II Parties to provide, as appropriate, for reference by developing country Parties, a list of environmentally sound technologies and know-how related to adaptation to and mitigation of climate change that are publicly owned, and to report in their national communications steps taken to implement Article 4.5 of the Convention;

(c) Non-Annex I Parties, in the light of their social and economic conditions, to submit their prioritized technology needs, especially those relating to key technologies to address climate change in particular sectors of their national economies, taking into account state-of-the-art environmentally sound technologies;

(d) Both developed and developing country Parties to create an enabling environment, as referred to in paragraph 2(e) of decision 6/3 of the Commission on Sustainable Development, to stimulate private sector investment in the transfer of environmentally sound technologies and know-how to developing countries and to promote the implementation of endogenous know-how;

8. *Invites* all Parties and interested international and non-governmental organizations to identify projects and programmes incorporating cooperative approaches to the transfer of technologies which they believe can serve as models for improving the diffusion and implementation of clean technologies under the Convention, and to provide information thereon to the secretariat, by 15 March 1999, for compilation into a miscellaneous document to be considered by the Subsidiary Body for Scientific and Technological Advice (SBSTA) at its tenth session;

9. *Requests* the Chairman of the SBSTA to establish a consultative process to consider the list of issues and questions contained in the annex to this decision, as well as any additional issues and questions subsequently identified by Parties, and to make recommendations on how they should be addressed in order to achieve agreement on a framework for meaningful and effective actions to enhance implementation of Article 4.5 of the Convention. Such a process should also consider issues identified in the secretariat progress report on transfer of technology and in submissions from Parties. The consultative process could include, resources permitting, regional meetings, regional workshops and a SBSTA workshop, arranged with the assistance of the secretariat and drawing upon the roster of experts and, as appropriate, experts engaged in the IPCC process;
10. *Further requests* the Chairman of the SBSTA to report on the outcome of the consultative process to the SBSTA at its eleventh session, with a view to recommending a decision for adoption by the Conference of the Parties at its fifth session;
11. *Invites* Parties to provide submissions to the secretariat, by 15 March 1999, on how the issues and questions listed in the annex to this decision should be addressed, as well as suggestions for additional issues and questions;
12. *Requests* the Convention secretariat:
    (a) To continue its work on the synthesis and dissemination of information on environmentally sound technologies and know-how conducive to mitigating, and adapting to, climate change, and in so doing to complete its ongoing activities for 1999 as defined in the secretariat progress report;
    (b) In preparing the budget for the next biennium, to give priority to activities on the theme of building the capacity of Parties to enhance the transfer of environmentally sound technologies, as defined in the secretariat progress report, including assessing and synthesizing information on environmentally sound technologies and know-how, and in so doing to identify specific tasks;
    (c) To further strengthen its activities in support of capacity-building in developing country Parties with regard to the transfer of environmentally sound technologies and know-how.

2001 MARRAKESH ACCORDS

Decision 4/CP.7: Development and transfer of technologies (decisions 4/CP.4 and 9/CP.5)

The Conference of the Parties,

(…)

1. *Decides* to adopt the framework for meaningful and effective actions to enhance the implementation of Article 4, paragraph 5, of the Convention contained in the annex to this decision as part of the outcome of the

technology transfer consultative process (decision 4/CP.4) and the Buenos Aires Plan of Action (decision 1/CP.4);

2. *Decides* to establish an expert group on technology transfer to be nominated by Parties, with the objective of enhancing the implementation of Article 4, paragraph 5, of the Convention, including, inter alia, by analysing and identifying ways to facilitate and advance technology transfer activities and making recommendations to the Subsidiary Body for Scientific and Technological Advice. The Conference of the Parties will review at its twelfth session the progress of the work and terms of reference, including, if appropriate, the status and continuation of the expert group;
3. *Requests* the Global Environment Facility, as an operating entity of the financial mechanism of the Convention, to provide financial support for the implementation of the annexed framework through its climate change focal area and the special climate change fund established under decision -/CP.7 (Funding under the Convention);
4. *Urges* developed country Parties to provide technical and financial assistance, as appropriate, through existing bilateral and multilateral cooperative programmes to support the efforts of the Parties in implementing the programmes and measures identified in the annexed framework and to enhance the implementation of Article 4, paragraph 5, of the Convention;
5. *Requests* the Convention secretariat:
   (a) To consult with relevant international organizations, and solicit information on their capabilities and abilities to support certain activities identified in the framework for meaningful and effective actions contained in the annex to this decision, and to report on its findings to the Subsidiary Body for Scientific and Technological Advice at its seventeenth session;
   (b) To facilitate the implementation of the annexed framework in cooperation with the Parties, the Global Environment Facility and other relevant international organizations.

2007 BALI ACTION PLAN

Decision 1/CP.13: Bali Action Plan

The Conference of the Parties,

(…)

1. *Decides* to launch a comprehensive process to enable the full, effective and sustained implementation of the Convention through long-term cooperative action, now, up to and beyond 2012, in order to reach an agreed outcome and adopt a decision at its fifteenth session, by addressing, inter alia:

   (…)

(d) Enhanced action on technology development and transfer to support action on mitigation and adaptation, including, inter alia, consideration of:
    (i) Effective mechanisms and enhanced means for the removal of obstacles to, and provision of financial and other incentives for, scaling up of the development and transfer of technology to developing country Parties in order to promote access to affordable environmentally sound technologies;
    (ii) Ways to accelerate deployment, diffusion and transfer of affordable environmentally sound technologies;
    (iii) Cooperation on research and development of current, new and innovative technology, including win-win solutions;
    (iv) The effectiveness of mechanisms and tools for technology cooperation in specific sectors;

(e) Enhanced action on the provision of financial resources and investment to support action on mitigation and adaptation and technology cooperation, including, inter alia, consideration of:
    (i) Improved access to adequate, predictable and sustainable financial resources and financial and technical support, and the provision of new and additional resources, including official and concessional funding for developing country Parties;
    (ii) Positive incentives for developing country Parties for the enhanced implementation of national mitigation strategies and adaptation action;
    (iii) Innovative means of funding to assist developing country Parties that are particularly vulnerable to the adverse impacts of climate change in meeting the cost of adaptation;
    (iv) Means to incentivize the implementation of adaptation actions on the basis of sustainable development policies;
    (v) Mobilization of public- and private-sector funding and investment, including facilitation of climate-friendly investment choices;
    (vi) Financial and technical support for capacity-building in the assessment of the costs of adaptation in developing countries, in particular the most vulnerable ones, to aid in determining their financial needs;

(…)

Decision 3/CP.13: Development and transfer of technologies under the Subsidiary Body for Scientific and Technological Advice

The Conference of the Parties,

(…)

Welcoming the progress of the work and achievements of the Expert Group on Technology Transfer since its inception in advancing and facilitating the

implementation of the framework for meaningful and effective actions to enhance the implementation of Article 4, paragraph 5, of the Convention, and its related activities under the framework,

Noting the range of important actions and partnerships undertaken by Parties within and outside the framework of the Convention, which contribute to the development, transfer and deployment of environmentally sound technologies, including through joint research and development programmes,

Noting with appreciation the progress made by Parties included in Annex II to the Convention in establishing innovative financing partnerships such as the Global Energy Efficiency and Renewable Energy Fund and the European Union Energy Initiative,

Further noting the actions of Parties to contribute to addressing technology financing issues, through such vehicles as the Global Environment Facility, the Special Climate Change Fund, the Least Developed Countries Fund, the World Bank and the Climate Technology Initiative,

Recognizing that there is a crucial need to accelerate innovation in the development, deployment, adoption, diffusion and transfer of environmentally sound technologies among all Parties, and particularly from developed to developing countries, for both mitigation and adaptation,

Emphasizing that effective actions to address climate change require a broad portfolio of activities, including the widespread uptake of new and existing technologies and the creation of appropriate enabling environments,

Recognizing that close collaboration between government, industry and the research community, in particular through public-private partnerships, can stimulate the development of a wide range of mitigation and adaptation technologies and reduce their costs,

Further recognizing that the immediate and urgent delivery of technology development, deployment, diffusion and transfer to developing countries requires suitable responses, including a continued emphasis by all Parties, in particular Parties included in Annex I to the Convention, on enhancement of enabling environments, facilitating access to technology information and capacity-building, identification of technology needs and innovative financing that mobilizes the vast resources of the private sector to supplement public finance sources where appropriate,

Further recognizing the importance of an effective institutional arrangement, access to financing and suitable indicators for monitoring and evaluating effectiveness to the development, deployment, diffusion and transfer of environmentally sound technologies to developing countries,

1. *Agrees* that the five themes listed in the framework for meaningful and effective actions to enhance the implementation of Article 4, paragraph 5, of the Convention (the technology transfer framework), as contained in the annex to decision 4/CP.7, and the structure, definitions and purpose of this framework, continue to provide a solid basis for enhancing the implementation of Article 4, paragraph 5, of the Convention;
2. *Adopts* the set of actions, for consideration by the Expert Group on Technology Transfer in formulating its future work programmes, as set out

in the recommendations for enhancing the technology transfer framework contained in annex I to this decision, and agrees that these activities would complement the actions in the technology transfer framework;

3. *Agrees* to reconstitute the Expert Group on Technology Transfer for a further five years with the terms of reference contained in annex II to this decision, and to review, at its eighteenth session, progress of the work and terms of reference, including, if appropriate, the status and continuation of this body; and agrees that the Expert Group on Technology Transfer should provide advice as appropriate to the subsidiary bodies;
4. *Decides* that the Expert Group on Technology Transfer shall constitute an effective institutional arrangement within the Convention, which is necessary to support action, and that this Expert Group on Technology Transfer shall have particular regard to the need for, and in accordance with the terms of reference referred to in paragraph 3 above:
   (a) Adequate and timely financial support, within the context of Article 4, paragraph 5, of the Convention;
   (b) Development of performance indicators, for monitoring and evaluating effectiveness;
5. *Requests* the Expert Group on Technology Transfer, with the support of the secretariat, to consult with relevant international organizations, and solicit information on their abilities to support certain activities identified in the set of actions contained in annex I to this decision, and to report on its findings to the subsidiary bodies at their twenty-ninth session;
6. *Invites* each of the relevant international organizations and initiatives referred to in paragraph 5 above to closely coordinate with the Expert Group on Technology Transfer on the relevant activities in its work programme;
7. *Urges* Parties not included in Annex I to the Convention to use the United Nations Development Programme handbook Conducting Technology Needs Assessments for Climate Change1 when undertaking their technology needs assessments;
8. *Urges* Parties included in Annex II to the Convention, relevant intergovernmental organizations, international financial institutions, and other partnerships and initiatives, including the Climate Technology Initiative, in a position to do so, to provide technical and financial support to Parties not included in Annex I to the Convention and countries with economies in transition to help them conduct, identify and implement prioritized technology needs;
9. *Requests* the secretariat to facilitate the implementation of the actions for enhancing the technology transfer framework further elaborated in annex I to this decision, and of the work of the Expert Group on Technology Transfer in cooperation with Parties, the Global Environment Facility and other relevant international organizations, initiatives and intergovernmental processes;
10. *Requests* the Global Environment Facility, as an operating entity of the financial mechanism of the Convention, to provide financial support for

the technology transfer framework, and complemented by the set of actions referred to in paragraph 2 above.

Decision 4/CP.13: Development and transfer of technologies under the Subsidiary Body for Implementation

The Conference of the Parties,

(…)

Recognizing that there is a crucial need to accelerate innovation in the development, deployment, adoption, diffusion and transfer of environmentally sound technologies among all Parties, and particularly from developed countries to developing countries, for both mitigation and adaptation,

Further recognizing that current institutional arrangements, access to financing and suitable indicators for monitoring under the Convention for the implementation of Article 4, paragraph 5, are limited and should be enhanced to deliver immediate and urgent technology development, deployment, diffusion and transfer to developing countries,

Further recognizing that the immediate and urgent delivery of technology development, deployment, diffusion and transfer to developing countries requires suitable responses, including a continued emphasis by all Parties on the enhancement of enabling environments, facilitating access to technology information and capacity-building, identification of technology needs and innovative financing that mobilizes the vast resources of the private sector to supplement public finance sources where appropriate,

Also recognizing that the implementation of the results of technology needs assessments and national communications remains a key objective, which could be enhanced through technical assistance to improve the preparation of project proposals and improve access to financing resources and models, which could be based on advisory networks such as the pilot project on the Private Financing Advisory Network of the Climate Technology Initiative,

Further recognizing the good work of the Expert Group on Technology Transfer during the past six years, which has contributed to better understanding of the issues related to effective technology transfer,

1. *Agrees* that the Expert Group on Technology Transfer shall make recommendations for consideration, as appropriate, by the subsidiary bodies to inform subsequent decisions of the Conference of the Parties related to development and transfer of technologies;
2. *Decides* that the following points are important for funding through existing vehicles and new initiatives:
   (a) The implementation of technology needs assessments;
   (b) Joint research and development programmes and activities in the development of new technologies;
   (c) Demonstration projects;
   (d) Enabling environments for technology transfer;
   (e) Incentives for the private sector;
   (f) North-South and South-South cooperation;
   (g) Endogenous capacities and technologies;

(h) Issues associated with meeting the agreed full incremental costs;
(i) Licences to support the access to and transfer of low-carbon technologies and know-how;
(j) A window for, inter alia, a venture capital fund related to, or possibly located in, a multilateral financial institution;

and agrees that the Expert Group on Technology Transfer, through the Subsidiary Body for Scientific and Technological Advice, should, based on the identification and analysis of existing and potential new financing resources and vehicles, assess gaps and barriers to the use of, and the access to, these financing resources; and that the results of this work (identification, analysis and assessment) should be made available to the Subsidiary Body for Implementation not later than its thirtieth session, with a view to considering the role of new financing mechanisms and tools for scaling up development and transfer of technologies;

3. *Requests* the Global Environment Facility, as an operational entity of the financial mechanism under the Convention, in consultation with interested Parties, international financial institutions, other relevant multilateral institutions and representatives of the private financial community, to elaborate a strategic programme to scale up the level of investment for technology transfer to help developing countries address their needs for environmentally sound technologies, specifically considering how such a strategic programme might be implemented along with its relationship to existing and emerging activities and initiatives regarding technology transfer and to report on its findings to the twenty-eighth session of the Subsidiary Body for Implementation for consideration by Parties;
4. *Requests* the Expert Group on Technology Transfer, as part of its future programme of work, to develop a set of performance indicators that could be used by the Subsidiary Body for Implementation to regularly monitor and evaluate the effectiveness of the implementation of the framework for meaningful and effective actions to enhance the implementation of Article 4, paragraph 5, of the Convention (the technology transfer framework), complemented with the set of actions set out in annex I to decision 3/CP.13, as referred to in paragraph 2 of that decision, considering the related work under the Convention and other relevant bodies; the results of this work should be made available to the subsidiary bodies for consideration at their thirtieth session, in order to make the final report of the Expert Group on Technology Transfer available to the Conference of the Parties at its fifteenth session;
5. *Agrees* that the issues concerning the implementation of Article 4, paragraph 5, of the Convention on the development and transfer of, or access to, environmentally sound technologies and know-how is a continuing process, and that, inter alia, the assessment of technologies, terms of access and technology needs of Parties will continue to be undertaken under the Convention, in order to ensure that further substantive progress is made;
6. *Urges* all Parties, and in particular developed country Parties, to provide technical and financial assistance, as appropriate, through existing and

potential future bilateral and multilateral cooperative programmes to support the efforts of developing country Parties in implementing the set of actions referred to in paragraph 4 above;

7. *Requests* Parties to submit to the secretariat, by 15 February 2008, for synthesis and compilation, their views on elements for the terms of reference for the review and assessment of the effectiveness of the implementation of Article 4, paragraph 5, and Article 4, paragraph 1(c), in accordance with decision 13/CP.3;
8. *Invites* Parties in a position to do so to identify and designate their national entity for the development and transfer of technologies and to communicate this to the secretariat by the fourteenth session of the Conference of the Parties;
9. *Requests* the secretariat to facilitate the implementation of the technology transfer framework and of the work of the Expert Group on Technology Transfer, in cooperation with Parties, the Global Environment Facility and other relevant international organizations, initiatives and intergovernmental processes;
10. *Requests* the Global Environment Facility, as an operating entity of the financial mechanism of the Convention, to provide financial support to developing countries for the implementation of the technology transfer framework, and complemented by the set of actions referred to in paragraph 4 above.

2008 POZNAN STRATEGIC PROGRAMME

Decision 2/CP.14: Development and transfer of technologies

The Conference of the Parties,

(…)

1. *Welcomes* the Poznan strategic programme on technology transfer,1 as a step towards scaling up the level of investment in technology transfer in order to help developing countries address their needs for environmentally sound technologies, and recognizes the contribution that this strategic programme could make to enhancing technology transfer activities under the Convention;
2. *Requests* the Global Environment Facility:
   (a) To promptly initiate and expeditiously facilitate the preparation of projects for approval and implementation under the strategic programme referred to in paragraph 1 above in order to help developing countries address their needs for environmentally sound technologies;
   (b) To collaborate with its implementing agencies in order to provide technical support to developing countries in preparing or updating, as appropriate, their technology needs assessments using the updated handbook for conducting technology needs assessments for climate change published by the United Nations Development Programme,

to be made available in early 2009 in collaboration with the Expert Group on Technology Transfer, the UNFCCC secretariat and the Climate Technology Initiative;

(c) To consider the long-term implementation of the strategic programme, including: addressing the gaps identified in current operations of the Global Environment Facility that relate to investment in the transfer of environmentally sound technologies; leveraging private-sector investment; and promoting innovative project development activities;

(d) To report on the progress made in carrying out the activities referred to in paragraph 2 (a-c) above to the Conference of the Parties at its sixteenth session, in addition to providing interim reports to the Subsidiary Body for Implementation at its thirtieth and thirty-first sessions, with a view to assessing its progress and future direction in order to help inform Parties in their consideration of long-term needs for implementation of the strategic programme;

3. *Invites* Parties and relevant organizations to make submissions to the secretariat, by 16 February 2009, in accordance with paragraph 9 of the terms of reference for the review and assessment of the effectiveness of the implementation of Article 4, paragraphs 1(c) and 5, of the Convention, contained in the annex to document FCCC/SBI/2008/L.28.

2010 CANCUN AGREEMENTS

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

The Conference of the Parties,

(…)

IV. Finance, technology and capacity-building

(…)

B. Technology development and transfer

(…)

Confirming the importance of promoting and enhancing national and international cooperative action on the development and transfer of environmentally sound technologies to developing country Parties to support action on mitigation and adaptation now, up to and beyond 2012, in order to achieve the ultimate objective of the Convention,

Recognizing that an early and rapid reduction in emissions and the urgent need to adapt to the adverse impacts of climate change require large-scale diffusion and transfer of, or access to, environmentally sound technologies,

Stressing the need for effective mechanisms, enhanced means, appropriate enabling environments and the removal of obstacles to the scaling up of the development and transfer of technology to developing country Parties,

113. *Decides* that the objective of enhanced action on technology development and transfer is to support action on mitigation and adaptation in order to achieve the full implementation of the Convention;
114. *Also decides* that, in pursuit of this objective, technology needs must be nationally determined, based on national circumstances and priorities;
115. *Further decides* to accelerate action consistent with international obligations, at different stages of the technology cycle, including research and development, demonstration, deployment, diffusion and transfer of technology (hereinafter referred in this decision as technology development and transfer) in support of action on mitigation and adaptation;
116. *Encourages* Parties, in the context of Article 4, paragraphs 1(c) and 5, of the Convention and consistent with their respective capabilities and national circumstances and priorities, to undertake domestic actions identified through country-driven approaches, to engage in bilateral and multilateral cooperative activities on technology development and transfer and to increase private and public research, development and demonstration in relation to technologies for mitigation and adaptation;
117. *Decides* to establish a Technology Mechanism to facilitate the implementation of actions for achieving the objective referred to in paragraphs 113–115 above, under the guidance of and accountable to the Conference of the Parties, which will consist of the following components:
    (a) A Technology Executive Committee, to undertake the functions contained in paragraph 121 below;
    (b) A Climate Technology Centre and Network, to undertake the functions contained in paragraph 123 below;
118. *Also decides* that the Technology Executive Committee and the Climate Technology Centre and Network, consistent with their respective functions, should facilitate the effective implementation of the Technology Mechanism, under the guidance of the Conference of the Parties;
119. *Further decides* that the Technology Executive Committee shall further implement the framework for meaningful and effective actions to enhance the implementation of Article 4, paragraph 5, of the Convention adopted by decision 4/CP.7 and enhanced by decision 3/CP.13;
120. *Decides* that priority areas that could be considered under the Convention may include:
    (a) Development and enhancement of the endogenous capacities and technologies of developing country Parties, including cooperative research, development and demonstration programmes;
    (b) Deployment and diffusion of environmentally sound technologies and knowhow in developing country Parties;
    (c) Increased public and private investment in technology development, deployment, diffusion and transfer;
    (d) Deployment of soft and hard technologies for the implementation of adaptation and mitigation actions;
    (e) Improved climate change observation systems and related information management;

(f) Strengthening of national systems of innovation and technology innovation centres;
(g) Development and implementation of national technology plans for mitigation and adaptation;

121. *Also decides* that the functions of the Technology Executive Committee shall be to:
(a) Provide an overview of technological needs and analysis of policy and technical issues related to the development and transfer of technologies for mitigation and adaptation;
(b) Consider and recommend actions to promote technology development and transfer, in order to accelerate action on mitigation and adaptation;
(c) Recommend guidance on policies and programme priorities related to technology development and transfer with special consideration given to the least developed country Parties;
(d) Promote and facilitate collaboration on the development and transfer of technologies for mitigation and adaptation between governments, the private sector, non-profit organizations and academic and research communities;
(e) Recommend actions to address the barriers to technology development and transfer in order to enable enhanced action on mitigation and adaptation;
(f) Seek cooperation with relevant international technology initiatives, stakeholders and organizations, and promote coherence and cooperation across technology activities, including activities under and outside of the Convention;
(g) Catalyse the development and use of technology road maps or action plans at the international, regional and national levels through cooperation between relevant stakeholders, particularly governments and relevant organizations or bodies, including the development of best practice guidelines as facilitative tools for action on mitigation and adaptation;

122. *Further decides* that the Technology Executive Committee shall have the mandate and composition as contained in appendix IV to this decision;

123. *Decides* that the Climate Technology Centre shall facilitate a network of national, regional, sectoral and international technology networks, organizations and initiatives with a view to engaging the participants of the Network effectively in the following functions:
(a) At the request of a developing country Party:
(i) Providing advice and support related to the identification of technology needs and the implementation of environmentally sound technologies, practices and processes;
(ii) Facilitating the provision of information, training and support for programmes to build or strengthen capacity of developing countries to identify technology options, make technology choices and operate, maintain and adapt technology;

(iii) Facilitating prompt action on the deployment of existing technology in developing country Parties based on identified needs;

(b) Stimulating and encouraging, through collaboration with the private sector, public institutions, academia and research institutions, the development and transfer of existing and emerging environmentally sound technologies, as well as opportunities for North–South, South–South and triangular technology cooperation;

(c) Facilitating a network of national, regional, sectoral and international technology centres, networks, organization and initiatives with a view to:

(i) Enhancing cooperation with national, regional and international technology centres and relevant national institutions;

(ii) Facilitating international partnerships among public and private stakeholders to accelerate the innovation and diffusion of environmentally sound technologies to developing country Parties;

(iii) Providing, at the request of a developing country Party, in-country technical assistance and training to support identified technology actions in developing country Parties;

(iv) Stimulating the establishment of twinning centre arrangements to promote North–South, South–South and triangular partnerships, with a view to encouraging cooperative research and development;

(v) Identifying, disseminating and assisting with developing analytical tools, policies and best practices for country-driven planning to support the dissemination of environmentally sound technologies;

(d) Performing other such activities as may be necessary to carry out its functions;

124. *Also decides* to terminate the mandate of the Expert Group on Technology Transfer at the conclusion of the sixteenth session of the Conference of the Parties;

125. *Further decides* that the Technology Executive Committee shall convene its first meeting as soon as practicable following the election of its members and shall elaborate its modalities and procedures taking into account the need to achieve coherence and maintain interactions with other relevant institutional arrangements under and outside of the Convention, for consideration by the Conference of the Parties at its seventeenth session;

126. *Decides* that the Technology Executive Committee and the Climate Technology Centre and Network shall report, on an interim basis9 and without prejudice to the relationship between the Technology Executive Committee and the Climate Technology Centre and Network as referred to in paragraph 128 (a) below to the Conference of the Parties, through the subsidiary bodies, on their respective activities and the performance of their respective functions;

127. *Also decides* that the Climate Technology Centre and Network and the Technology Executive Committee shall relate so as to promote coherence and synergy;

Work programme for the Ad Hoc Working Group on Long-term Cooperative Action under the Convention in 2011 on technology development and transfer

128. *Underlines* the importance of continued dialogue among Parties in 2011 through the Ad Hoc Working Group on Long-term Cooperative Action under the Convention, including on the following matters, with a view to the Conference of the Parties taking a decision at its seventeenth session, in order to make the Technology Mechanism fully operational in 2012:
    (a) The relationship between the Technology Executive Committee and the Climate Technology Centre and Network, and their reporting lines;
    (b) The governance structure of and terms of reference for the Climate Technology Centre and Network and how the Climate Technology Centre will relate to the Network, drawing upon the results of the workshop referred to in paragraph 129 below;
    (c) The procedure for calls for proposals and the criteria to be used to evaluate and select the host of the Climate Technology Centre and Network;
    (d) he potential links between the Technology Mechanism and the financial mechanism;
    (e) Consideration of additional functions for the Technology Executive Committee and the Climate Technology Centre and Network;
129. *Requests* the Ad Hoc Working Group on Long-term Cooperative Action under the Convention to convene an expert workshop, in conjunction with one of its sessions in 2011, on the matters contained in paragraph 128 above, drawing upon the preliminary work undertaken by the Expert Group on Technology Transfer, and to report on the results of this workshop at that session;

2015 PARIS AGREEMENT

Decision 1/CP.21: Adoption of the Paris Agreement

The Conference of the Parties,
(…)

Technology development and transfer

65. *Takes note of* the interim report of the Technology Executive Committee on guidance on enhanced implementation of the results of technology needs assessments as contained in document FCCC/SB/2015/INF.3;
66. *Decides* to strengthen the Technology Mechanism and *requests* the Technology Executive Committee and the Climate Technology Centre

and Network, in supporting the implementation of the Agreement, to undertake further work relating to, inter alia:

(a) Technology research, development and demonstration;

(b) The development and enhancement of endogenous capacities and technologies;

67. *Requests* the Subsidiary Body for Scientific and Technological Advice to initiate, at its forty-fourth session (May 2016), the elaboration of the technology framework established under Article 10, paragraph 4, of the Agreement and to report on its findings to the Conference of the Parties, with a view to the Conference of the Parties making a recommendation on the framework to the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement for consideration and adoption at its first session, taking into consideration that the framework should facilitate, inter alia:

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

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

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

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

68. *Decides* that the Technology Executive Committee and the Climate Technology Centre and Network shall report to the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement, through the subsidiary bodies, on their activities to support the implementation of the Agreement;

69. *Also decides* to undertake a periodic assessment of the effectiveness and adequacy of the support provided to the Technology Mechanism in supporting the implementation of the Agreement on matters relating to technology development and transfer;

70. *Requests* the Subsidiary Body for Implementation to initiate, at its forty-fourth session, the elaboration of the scope of and modalities for the periodic assessment referred to in paragraph 69 above, taking into account the review of the Climate Technology Centre and Network as referred to in decision 2/CP.17, annex VII, paragraph 20, and the modalities for the global stocktake referred to in Article 14 of the Agreement, for consideration and adoption by the Conference of the Parties at its twenty-fifth session (November 2019);

Annex

Paris Agreement

The Parties to this Agreement,

(…)

Taking full account of the specific needs and special situations of the least developed countries with regard to funding and transfer of technology,

(…)

Article 10

1. Parties share a long-term vision on the importance of fully realizing technology development and transfer in order to improve resilience to climate change and to reduce greenhouse gas emissions.
2. Parties, noting the importance of technology for the implementation of mitigation and adaptation actions under this Agreement and recognizing existing technology deployment and dissemination efforts, shall strengthen cooperative action on technology development and transfer.
3. The Technology Mechanism established under the Convention shall serve this Agreement.
4. A technology framework is hereby established to provide overarching guidance to the work of the Technology Mechanism in promoting and facilitating enhanced action on technology development and transfer in order to support the implementation of this Agreement, in pursuit of the long-term vision referred to in paragraph 1 of this Article.
5. Accelerating, encouraging and enabling innovation is critical for an effective, long-term global response to climate change and promoting economic growth and sustainable development. Such effort shall be, as appropriate, supported, including by the Technology Mechanism and, through financial means, by the Financial Mechanism of the Convention, for collaborative approaches to research and development, and facilitating access to technology, in particular for early stages of the technology cycle, to developing country Parties.
6. Support, including financial support, shall be provided to developing country Parties for the implementation of this Article, including for strengthening cooperative action on technology development and transfer at different stages of the technology cycle, with a view to achieving a balance between support for mitigation and adaptation. The global stocktake referred to in Article 14 shall take into account available information on efforts related to support on technology development and transfer for developing country Parties.

2018 KATOWICE CLIMATE CHANGE CONFERENCE

Decision 15/CMA.1: Technology framework under Article 10, paragraph 4, of the Paris Agreement

The Conference of the Parties serving as the meeting of the Parties to the Paris Agreement,

(…)

Recognizing the need to ensure that the operationalization of the technology framework undertaken by the Technology Mechanism to support the achievement of the Paris Agreement is consistent with the long-term vision for technology development and transfer and Article 2 of the Paris Agreement,

Noting with appreciation the work undertaken by the Subsidiary Body for Scientific and Technological Advice in elaborating the technology framework in accordance with decision 1/CP.21, paragraph 67,

1. *Adopts* the technology framework under Article 10, paragraph 4, of the Paris Agreement as elaborated in the annex;
2. *Decides* that the Technology Executive Committee and the Climate Technology Centre and Network, consistently with their respective functions, mandates and modalities of work, shall implement the technology framework in close collaboration under the guidance of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement;
3. *Requests* the Technology Executive Committee and the Climate Technology Centre and Network:
   (a) To incorporate the guidance contained in the technology framework into their respective workplans and programmes of work, which should also include methods for the monitoring and evaluation of their activities;
   (b) To include information in their joint annual report for 2019 on how they incorporated the guidance contained in the technology framework into their respective workplans and programmes of work as referred to in paragraph 3(a) above;
4. *Takes note* of the recommendation of the Technology Executive Committee and the Climate Technology Centre and Network to prepare and submit their joint annual report to both the Conference of the Parties and the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement;1
5. *Requests* the Technology Executive Committee and the Climate Technology Centre and Network to report on the progress of their work and challenges and lessons learned in implementing the technology framework in their joint annual reports;
6. *Reiterates* the importance of the support, including financial support, that shall be provided to developing country Parties for strengthening cooperative action on technology development and transfer at different

stages of the technology cycle, and *agrees* that the technology framework can facilitate the strengthening of such support;

7. *Decides* that the outcome of and/or recommendations resulting from the periodic assessment referred to in decision 1/CP.21, paragraph 69, shall be considered when updating the technology framework;
8. *Requests* the secretariat to facilitate the implementation of the technology framework;
9. *Also requests* that the actions of the secretariat called for in this decision be undertaken subject to the availability of financial resources.

Decision 16/CMA.1: Scope of and modalities for the periodic assessment referred to in paragraph 69 of decision 1/CP.21

The Conference of the Parties serving as the meeting of the Parties to the Paris Agreement,

(…)

1. *Adopts* the scope of and modalities for the periodic assessment of the effectiveness and adequacy of the support provided to the Technology Mechanism in supporting the implementation of the Paris Agreement on matters relating to technology development and transfer, in accordance with decision 1/CP.21, as contained in the annex;
2. *Decides* that the periodic assessment referred to in paragraph 1 above should be undertaken in a transparent, inclusive and participatory manner;
3. *Also decides* to initiate the first periodic assessment referred to in paragraph 1 above at its fourth session (November 2021) in accordance with the scope and modalities as contained in the annex, or as these may be subsequently amended, with a view to completing the first periodic assessment at its fifth session (November 2022);
4. *Further decides* that the outcomes of the periodic assessment referred to in paragraph 1 above should serve as an input to the global stocktake referred to in Article 14 of the Paris Agreement;
5. *Decides* that the outcome of the periodic assessment should guide improved effectiveness and enhanced support to the Technology Mechanism in supporting the implementation of the Paris Agreement;
6. *Requests* the Subsidiary Body for Implementation to initiate, at its fifty-first session (December 2019), consideration of the alignment between processes pertaining to the review of the Climate Technology Centre and Network and the periodic assessment referred to in paragraph 1 above with a view to recommending a draft decision for consideration and adoption by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement at its third session (November 2020);
7. *Also requests* that the actions of the secretariat called for in this decision be undertaken subject to the availability of financial resources.

Decision 14/CP.24: Linkages between the Technology Mechanism and the Financial Mechanism of the Convention

The Conference of the Parties,

(…)

1. *Welcomes* the information provided by the Technology Executive Committee, the Climate Technology Centre and Network, the Global Environment Facility and the Green Climate Fund on their actions in strengthening the linkages between the Technology Mechanism and the Financial Mechanism in their annual reports to the Conference of the Parties in response to decision 14/CP.22, paragraph 9;
2. *Acknowledges* the ongoing coordination between the national designated entities for technology development and transfer and the national designated authorities of the Green Climate Fund as well as the Global Environment Facility focal points, and *encourages* enhanced coordination in this area;
3. *Welcomes with appreciation* the increased engagement between the Climate Technology Centre and Network and the Green Climate Fund with respect to using the Readiness and Preparatory Support Programme of the Fund, and *notes with appreciation* the support provided by the Fund for readiness requests submitted by national designated authorities;
4. *Invites* the Climate Technology Centre and Network and the Green Climate Fund to continue enhancing collaboration, wherein the services and expertise of the Climate Technology Centre and Network can be used to strengthen proposals seeking support under the Readiness and Preparatory Support Programme of the Fund, noting the need for such engagement in supporting developing country Parties in building their capacity for undertaking technology projects and programmes;
5. *Welcomes* the support provided for technology development and transfer by the Global Environment Facility and the Green Climate Fund through projects and programmes, including for projects resulting from technology needs assessments;
6. *Invites* developing country Parties to seek support from the Climate Technology Centre and Network to develop and submit technology-related projects, including those resulting from technology needs assessments and from the technical assistance of the Climate Technology Centre and Network, to the operating entities of the Financial Mechanism for implementation, in accordance with their respective policies and processes;
7. *Also invites* the Climate Technology Centre and Network to consult with the Green Climate Fund and the Global Environment Facility to identify ways to enhance information-sharing among national designated entities, national designated authorities and Global Environment Facility focal points;
8. *Welcomes with appreciation* the collaboration between the Technology Executive Committee, the Climate Technology Centre and Network and the Green Climate Fund on climate technology incubators and accelerators,

noting that this will help inform the Green Climate Fund as it develops the terms of reference for a request for proposals to support climate technology incubators and accelerators, in response to decision 13/CP.21;

9. *Requests* the Subsidiary Body for Implementation, at its fifty-third session (November 2020), to take stock of progress in strengthening the linkages between the Technology Mechanism and the Financial Mechanism with a view to recommending a draft decision on this matter, including on the consideration of a conclusion on this matter, for consideration and adoption by the Conference of the Parties at its twenty-sixth session (November 2020).

2019 MADRID CLIMATE CHANGE CONFERENCE

Decision 14/CP.25: Enhancing climate technology development and transfer through the Technology Mechanism

The Conference of the Parties,

(…)

1. *Welcomes* the joint annual report of the Technology Executive Committee and the Climate Technology Centre and Network for 20191 and their progress in facilitating effective implementation of the Technology Mechanism;
2. *Also welcomes* the collaboration of the Technology Executive Committee and the Climate Technology Centre and Network, including through the organization of back-to-back meetings between the Technology Executive Committee and the Advisory Board of the Climate Technology Centre and Network and regional technical expert meetings, and *invites* them to enhance their collaboration and to ensure the provision of feedback between them;
3. *Further welcomes* the coherent approach of the Technology Executive Committee and the Climate Technology Centre and Network to developing and enhancing their monitoring and evaluation systems, and *encourages* them to use these systems to improve reporting on the outputs and impacts of their work and facilitate the achievement thereof;
4. *Invites* the Technology Executive Committee and the Climate Technology Centre and Network to continue undertaking joint communication and outreach activities to ensure coherent communication under the Technology Mechanism;
5. *Welcomes* the engagement and collaboration of the Technology Executive Committee and the Climate Technology Centre and Network with the operating entities of the Financial Mechanism and *encourages* their continued and enhanced collaboration;

I. Activities and performance of the Technology Executive Committee in 2019

6. *Welcomes* the rolling workplan of the Technology Executive Committee for 2019–2022 and the progress of the Committee in advancing the implementation thereof, including in the areas of

innovation, implementation, enabling environment and capacity-building, collaboration and stakeholder engagement, and support;

7. *Invites* Parties and relevant stakeholders, in planning and implementing action related to technology development and transfer, to consider and build on the recommendations of the Technology Executive Committee on ways forward and actions to be taken on the basis of the outcomes of the technical expert meetings on mitigation in 2019 as well as the key messages of the Committee for 2019 on endogenous capacities and technologies;
8. *Notes with appreciation* that the Technology Executive Committee adopted an approach to integrating gender considerations into its rolling workplan for 2019–2022, and *encourages* the Technology Executive Committee to continue its efforts in this regard and report on this matter;
9. *Welcomes* the collaboration of the Technology Executive Committee with the Executive Committee of the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts in preparing a joint policy brief on technologies for averting, minimizing and addressing loss and damage in coastal zones, and *looks forward* to the completion of the policy brief in 2020;
10. *Takes note* of the Technology Executive Committee's efforts to reach out to regional stakeholders and national designated entities, including through the participation of representatives of the Technology Executive Committee in regional forums of the Climate Technology Centre and Network;
11. *Invites* the Technology Executive Committee to continue the efforts referred to in paragraph 10 above to enhance the visibility of and seek feedback on its work and *requests* the Technology Executive Committee to report on such efforts;
12. *Notes* the initiative of the Technology Executive Committee, under its rolling workplan for 2019–2022, to promote innovative approaches to upscaling adaptation technologies, including through the organization of an in-session technology day in 2020;

II. Activities and performance of the Climate Technology Centre and Network in 2019

13. *Welcomes* the appointment by the United Nations Environment Programme, as host of the Climate Technology Centre, of Rose Mwebaza as the new Director of the Climate Technology Centre and Network;
14. *Expresses its appreciation* to the former Director of the Climate Technology Centre and Network, Jukka Uosukainen, for his leadership in ensuring the full operationalization of the Climate Technology Centre and Network;
15. *Welcomes* the programme of work of the Climate Technology Centre and Network for 2019–20225 and the progress in implementing the

activities therein, including multi- country and regional approaches to delivering its services;

16. *Also welcomes* the progress of the Climate Technology Centre and Network in collaborating with the Green Climate Fund and *encourages* the Climate Technology Centre and Network to continue this collaboration, including under the Green Climate Fund Readiness and Preparatory Support Programme, for, inter alia, developing and updating technology needs assessments and technology action plans to support implementation of nationally determined contributions;
17. *Also encourages* the Climate Technology Centre and Network to continue implementing plans and actions in response to the recommendations from the independent review of the effective implementation of the Climate Technology Centre and Network;
18. *Welcomes with appreciation* the collaboration of the Climate Technology Centre and Network with relevant stakeholders, including the private sector, in implementing their activities, and *requests* the Climate Technology Centre and Network to enhance this collaboration;
19. *Invites* the Climate Technology Centre and Network to enhance engagement with Network members, including through new and innovative approaches, and to include information on this matter in the joint annual report of the Technology Executive Committee and the Climate Technology Centre and Network for 2020;
20. *Notes with appreciation* the continued efforts of the Climate Technology Centre and Network in mainstreaming gender consideration in its operations and technical assistance activities and *encourages* the Climate Technology Centre and Network to continue these efforts and to report thereon;
21. *Also notes with appreciation* the ongoing efforts of the Climate Technology Centre and Network to mobilize resources for implementing its functions, including pro bono and in-kind contributions;
22. *Requests* the Climate Technology Centre and Network to analyse experience and lessons learned with regard to pro bono and in-kind contributions, including with a view to increasing such contributions, and to include information thereon in the joint annual report of the Technology Executive Committee and the Climate Technology Centre and Network for 2020;
23. *Expresses its appreciation* for the financial contributions provided by Parties to support the work of the Climate Technology Centre and Network to date;
24. *Notes with concern* the challenge of securing sustainable financial resources for the Climate Technology Centre and Network;
25. *Recalls* the memorandum of understanding between the Conference of the Parties and the United Nations Environment Programme regarding the hosting of the Climate Technology Centre, as contained in annex I to decision 14/CP.18, and *invites* the United Nations Environment Programme, as the host of the Climate Technology Centre, to develop

and implement plans to financially support the operation of the Climate Technology Centre and Network so as to facilitate its effective functioning, in accordance with this memorandum of understanding;

26. *Requests* the Climate Technology Centre and Network to:
    (a) Enhance its resource mobilization efforts and further diversify the sources, including by exploring new and innovative ways, to support its operation in order to effectively implement its programme of work;
    (b) Report on the activities and plans referred to in paragraph 26(a) above in the joint annual reports of the Technology Executive Committee and the Climate Technology Centre and Network.

Decision 8/CMA.2: Enhancing climate technology development and transfer to support implementation of the Paris Agreement

The Conference of the Parties serving as the meeting of the Parties to the Paris Agreement,
Recalling Article 10 of the Paris Agreement,
Also recalling decision 1/CP.21, paragraphs 66 and 68, and decision 15/CMA.1,

1. *Welcomes* the joint annual report of the Technology Executive Committee and the Climate Technology Centre and Network for 20191 and the efforts of the bodies in incorporating the guidance contained in the technology framework into their respective workplan and programme of work;2
2. *Notes,* recalling decision 15/CMA.1, paragraph 3, that the information on how the Technology Executive Committee and the Climate Technology Centre and Network have incorporated the guidance contained in the technology framework into their respective workplan and programme of work was not included in a comprehensive manner in the joint annual report referred to in paragraph 1 above, and *requests* the Technology Executive Committee and the Climate Technology Centre and Network to include this information in their joint annual report for 2020;
3. *Also notes* the areas identified by the Technology Executive Committee and the Climate Technology Centre and Network for collaboration in 2019–20223, 4 in supporting implementation of the Paris Agreement, and *requests* them to finalize in 2020 the development of activities to be undertaken jointly in those areas with a view to incorporating the guidance contained in the technology framework into these activities;
4. *Encourages* the Technology Executive Committee and the Climate Technology Centre and Network to continue to report on the progress of their work as well as on challenges and lessons learned in implementing the technology framework;
5. *Requests* the Technology Executive Committee and the Climate Technology Centre and Network to continue to implement their respective mandates with strengthened efforts on all key themes of the technology framework when serving the Paris Agreement.

NOTES


oxford
climate
policy

iied


L R I


Sida