Technology & Capacity Building for Just transition: Challenges and Barriers

First global dialogue and first investment-focused event under the Sharm el-Sheikh mitigation ambition and implementation work programme

04 June 2023 | SB 58

United Nations Climate Change
Technology Executive Committee

Stig Svenningsen
Chair, Technology Executive Committee (TEC), UNFCCC

What do we mean by “climate technology” ?

As per the IPCC- Climate technology is any equipment, technique, knowledge and skill needed for:

- **In the context of reducing greenhouse gas emissions**, through sectors such as:

Agriculture	Industry
Energy	Transport
Forestry	Waste

Also the TEC adopted understanding of technology

- **Hardware: p**hysical equipment and capital goods,
- **Software:** the processes, knowledge and skills required to use the technology, and
- **Orgware:** ownership and institutional arrangements pertaining to a technology.

Challenges observed – TNA, NDC and CTCN Technical Assistance

Understanding technology needs assessment is starting point for effective action on climate change

Process undertaken by countries to determine their technology needs and prioritizes, including barriers, enablers and technology action plan

Almost all Parties reported technology-related elements that are directly related to both mitigation and adaptation (2022 NDC Synthesis report)

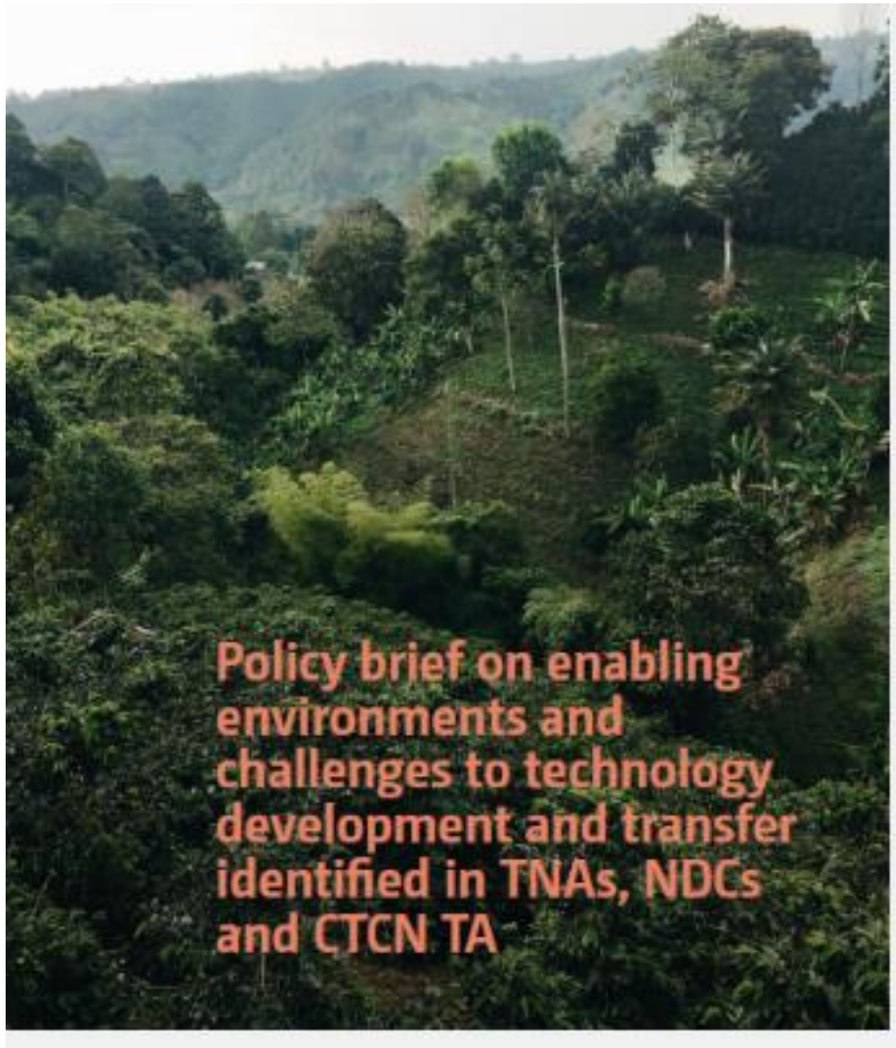
- Energy sector
- Agriculture technology
- Water and waste management
- Digital technologies

CTCN as implementation arm of technology mechanism, provides technical assistance at the request of developing countries

Challenges and opportunities identified from TNA, NDC and CTCN TA

- TEC in 2022 published the policy brief and technical paper on this topic

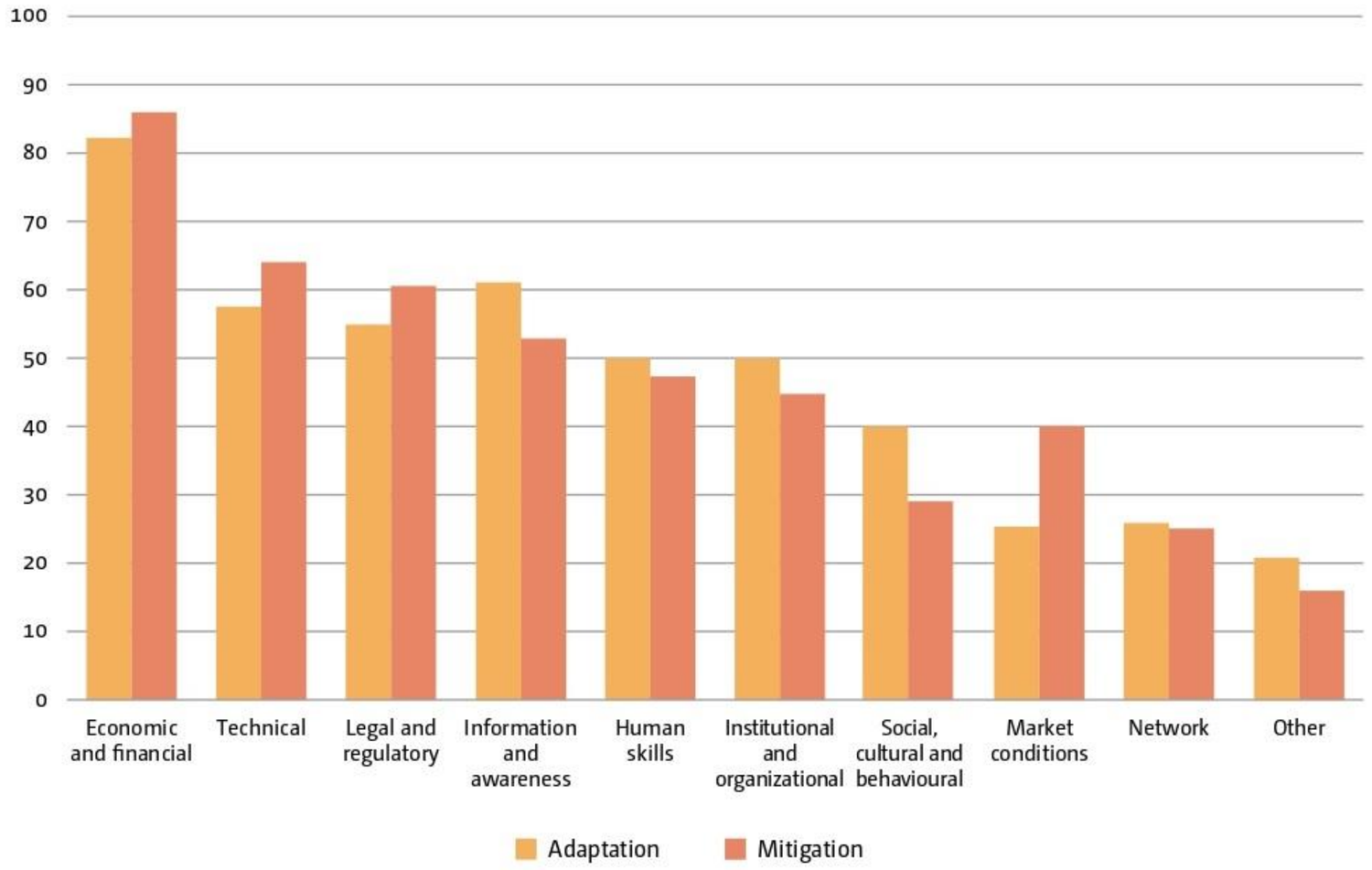
- Source: https://unfccc.int/ttclear/tec/enablingenvironments.html



Distribution of all challenges reported for technology development and transfer in TNAs, NDCs and CTCN TA documents

Examples of economic and financial challenges

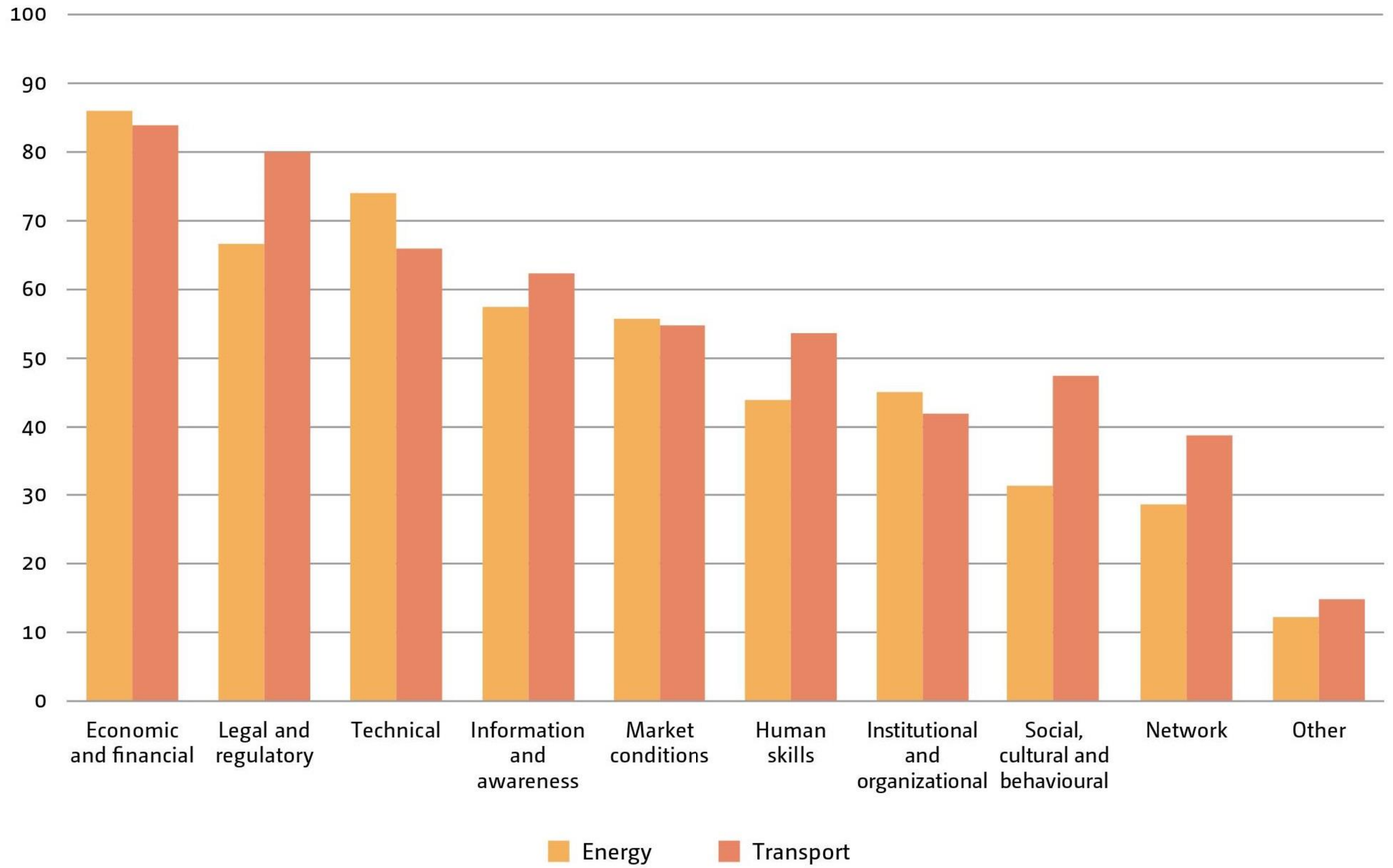
- ❑ High initial cost of technologies
- ❑ Difficulties in obtaining loans
- ❑ Uncertainties regarding returns on investment
- ❑ High upfront costs and high capital costs



Challenges in the energy & transport sector based on CTCN TA and TNA data

- Economic and financial challenges are the most commonly identified challenges in the **energy sector** (86%), followed by **technical** (74%) and legal and regulatory (66%) challenges.

- Challenges in legal and regulatory frameworks, networks, **human skills**, and social, cultural and behavioural aspects are more **frequently reported** for technologies in the **transport sector** than in the energy sector



Selected opportunities to address challenges

Multifaceted actions are recommended to ensure that all challenges that hinder successful development and transfer are targeted

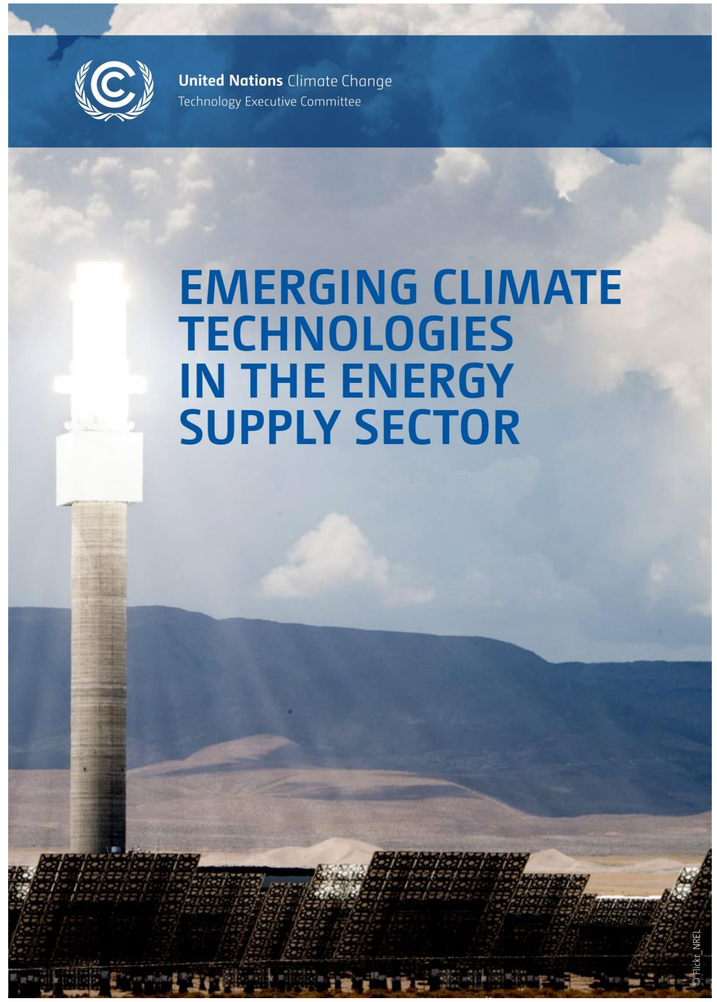
Governments have a major role to play in **creating enabling environments** to address the **challenges to technology development and transfer** by establishing and enforcing the appropriate regulatory and institutional frameworks

To further **stimulate the transition** to improved enabling environment conditions for **technology development and transfer**, a combination of **market stimulation** and **human capacity development** is identified as key by developing country Parties

Education and training to assist countries in making **early-stage decisions on financing, match countries' planned technology priorities** with funding sources, and in general establish an essential bridge between the policy and finance communities

Emerging Climate Technology in the Energy Supply Sector

TEC in 2021 published the technical paper on this topic



Source:
https://unfccc.int/ttclear/tec/energysupplysector.html

Summary of key technology characteristics for emerging primary energy supply technologies

The table summaries the maturity level, probable cost, key applications and probable barriers of the potential climate technologies, which would be helpful for just energy transition.

Technology	TRL	Current and eventual levelized cost 2019 USD/kWh	Size and generality of resource if available	Key co-benefits, non-monetized costs, key barriers and other considerations
Airborne wind energy	3-8	<0.30 for current first commercial systems, 0.14 by 2030	Large but vague; offshore AWE technical potential for United States of America: roughly 1,293 GW for a 5 MW system, up to 9,029 GW onshore	Can potentially be used for remote sites far from grid with poor solar radiation; floating offshore potential; grid connection in sparsely populated areas. Lower material use per kWh produced
Floating solar PV	8+	0.35 historic, current low auction bids at 0.05, projected 2030 ~0.05, ~0.04 2050	Very large and broadly geographically spread: 4,251 to 10,616 TWh/year	When tied with existing hydropower frees water resource for use as firm power, utilizes existing transmission, and reduces evaporation losses
Floating wind	8+	Current auctions at 0.13-0.15	Very large and confined to large lakes and ocean EEZs: <=83,229 TWh/year	When placed in deep ocean very large resource with low siting conflicts
Wave power	5-8	Current 0.30-0.55. 0.22 by 2025 and 0.165 by 2030.	Moderate: 2 TW globally, but highly regional	Highly regional. No convergence on design.
Tidal power	3-8	Current 0.20-0.45. 0.11 by 2022-2030.	Moderate: very regional, can be locally large	Highly regional. Tidal barrages are unlikely to be approved, floating axial turbines showing promise
Ocean thermal energy conversion	5-6	Current 0.20-0.67 for 10 MW units falling to 0.04-0.29 for 100 MW units	Very large but localized: 4,000-13,000 TWh/year	Can be located anywhere between 30° north and south with access to 1km+ ocean depth. Desalinization co-benefit
Bioenergy with carbon capture and storage (BECCS)	6-8	Variable with application. Fossil unit cost plus CCS cost minus carbon revenue benefit	Very large	Net-neutrality is sensitive to biomass feedstock and how it is extracted. CCS should be ~$50-$100/t, but is only proven with ethanol production

Summary of key technology characteristics for emerging enabling technologies

Technology	TRL	Cost 2019 USD	Key applications	Key barriers
Green hydrogen	8+	USD4.5-6/kg, could fall to less than USD2 by 2030 with economies of scale and innovation	Storage of variable renewable electricity; high process heat; steel reduction; ammonia fertilizers; heavy transport	Unfamiliarity of end users with handling; fast and invisible flammability; lack of storage and transport infrastructure
Next-generation batteries	3-8+	Lithium-ion batteries are now USD150-300/kWh, and expected to fall to <USD75 by 2030	Small and large vehicles; supply and end-use in electricity grids; portable electronic and motor devices	Design for recyclability and recyclability standards are still lacking
Thermal energy storage	3-8+	Highly variable	As a supplement to residential heating; electricity firm power	High CAPEX and low utilization rates lead to high use costs

Capacity gaps and needs

- Capacity of National Designated Entities differ according to the individual.
- Skills and knowledge needs elating to endogenous capacities and technologies differ by subject area and the role
- Assessing local community needs for climate technologies and making development more
- Gaps and needs are likely to vary depending on the nature of the problem and the communities involved

Recommendation

- Ensure that NDEs and TNA focal points have necessary capacities to **assess** technology needs, **identify** appropriate technologies, **develop** endogenous technologies, understand the demands and implications of existing processes and engage stakeholders.
- **Customize capacity-building projects** based on local needs and levels of skills and knowledge.
- Consider **targeting groups** such as young people and workers for local capacity-building projects, training and educational programmes.

Source: Building Capacities in Climate Technologies: Understanding Gaps, Needs, Challenges and Enabling Measures to Promote Endogenous Capacities and Technologies
https://unfccc.int/ttclear/endogenous/index.html

Find out more at:
https://unfccc.int/ttclear