



Technology Executive Committee

03 September 2024

Twenty-ninth meeting

17–20 September 2024 (20 September TEC-CTCN Advisory Board Joint session)

Progress report on activity C.2.1. Concept note and annotated outlines for identified topics and areas for of focus for a knowledge product in 2025 of buildings and infrastructure

Concept note

I. Introduction

1. This note provides information on the progress made since the twenty-eights meeting of Technology Executive Committee (TEC28), on activity C.2.1. Buildings and infrastructure, of the TEC rolling workplan for 2023-2027.

A. Background

2. As per activity C.2.1 of the rolling workplan, the TEC is to explore the use of low and near zero emission materials in buildings, green building codes and green zoning systems that promote energy efficiency and resilience, with a view to support countries in the implementation of their NDCs. An overarching concept for this activity is the integration of emission performance standards with building codes, within NDCs, ensuring that building codes consider the “whole life cycle assessment” (WLCA) concept to achieve net-zero emissions throughout the full lifecycle of buildings.

3. At TEC 28, the TEC provided guidance to the activity group on Buildings and Infrastructure, through further engagement with interested partners and under relevant processes, to identify topics or areas of focus for a knowledge product in 2025 and to report back on the outcomes of such efforts at TEC 29.

4. As per guidance of the TEC 28, the activity group engaged with interested partners, such as Global Alliance for Buildings and Construction (GlobalABC) and Massachusetts Institute of Technology (MIT) Climate Policy Center, to identify topics or areas of focus for a knowledge product in 2025

B. Scope of the note

5. The annex to this note contains the draft concept note and annotated outlines for identified topics and areas for of focus for a knowledge product in 2025.

C. Concept and background of the identified topics for knowledge product

6. The knowledge product is proposed to comprise two related but stand-alone policy briefs. Addressing the TEC-CTCN Joint Work Programme for 2023-2027 (III.B.4), the knowledge product aims to identify and discuss the role of established climate technologies and solutions in enhancing the performance of buildings towards net-zero emission buildings

in building codes. It will also delve into the data and digital solutions required to accelerate sustainable financing for buildings and infrastructure projects.

7. The policy briefs are envisioned to be similar in form and function to recent work performed by the TEC on emerging and transformational adaptation technologies (A.3.1), gender-responsive technology (D.4.1), and hard-to-abate industries (C.3.1).

8. One policy brief will include a mapping of 15-20 high-impact, cost-effective, affordable, market-ready technologies and solutions for improving the emission performance of residential and commercial buildings towards net-zero emission buildings, including new construction and retrofitting of existing buildings, as well as in centralized and decentralized environments. Categories of such technologies could include low- and net-zero carbon building materials, nature-based solutions, energy efficiency measures, and monitoring & evaluation measures.

9. Affordability remains one of the most significant challenges in providing access to sustainable housing in the Global South. This policy brief will address this crucial issue to ensure that sustainable housing and building solutions are accessible to all socio-economic groups.

10. The second policy brief will examine which data and information are critical for evaluating the emission performance of the buildings sector and for mobilizing financial resources for projects and interventions to accelerate the transformation of the sector. Whereas sources of funding often request quantitative evaluations of building performance, such data as will be described in this policy brief can be used to validate and de-risk investments into building projects.

11. Data describing existing buildings is highly fragmented, creating challenges for the design of policies, responses, and plans for increasing the resilience of buildings and occupants to the effects of climate change, for decreasing costs of construction and operation, and for reducing embodied and operational greenhouse gas emissions. This policy brief will explore the data needs associated with the proven technologies described in the complementary policy brief and could include digital solutions, remote observations, artificial intelligence, and other tools. Combinations of these tools could then be used to identify building specific intervention strategies combining mitigation and adaptation actions and be used to justify and de-risk financial support for such interventions. Challenges and opportunities associated with data quality, standardization, interoperability, and privacy will be evaluated.

12. Both policy briefs will evaluate their respective topics across various UN regions, climatic zones and economic classifications, with a particular focus on developing countries, SIDS and LDCs. Collection and utilization of building sector data, as well as deployment of affordable, proven building technologies, are expected to require robust and supportive policy enabling environments. The policy briefs will each examine the institutional, legislative, and regulatory options for accelerating the transition of the sector, as well as workforce and material resource capacity needs. Recommendations of policy interventions for the improvement of data collection and utilization will be complemented by recommendations for the use of data to improve policy interventions.

13. The policy briefs will each contain case studies exemplifying the successful implementation of climate technologies and solutions, along with examples of successful collection and utilization of data to secure and maintain financial resources. These case studies will provide insights into energy and cost savings, improvements in building resiliency and human occupant resiliency, and the use of proven technologies for both mitigation and adaptation. Selection of case studies will include regional balance and gender considerations. Potential case studies include:

14. Low carbon affordable housing: Several low carbon affordable housing projects have been implemented with success in developing countries such as Ghana (Reall and Afreh Group), South Africa (Stoneleigh), Pakistan (Modulus Green Homes) demonstrating the economic feasibility and viability for affordable housing programmes to integrate solutions to reduce energy consumption, passive cooling solutions, renewable energy generation, nature based solutions and low carbon materials.

15. Low carbon retrofits: Low carbon retrofits focus on improving energy efficiency in buildings through the integration of energy-saving technologies, circular economy principles, and nature-based solutions. Case studies typically highlight technological interventions such as enhanced insulation, energy-efficient heating, cooling systems, and renewable energy integration. In developing countries like Kenya, Rwanda, and Ethiopia, retrofits often target outdated infrastructure, contributing to significant reductions in energy consumption and carbon emissions while boosting urban resilience.

16. Buildings data needs and buildings passports: There is a significant gap in data about the building stock, including energy performance, materials used, and maintenance. This lack of comprehensive data hampers efforts to assess and improve energy efficiency, making it difficult to implement effective retrofitting strategies. Building passports ensure that data is readily accessible to policymakers, building owners, and contractors, enabling them to make informed decisions about energy efficiency measures. This approach helps track progress towards carbon neutrality, enhances resource management by promoting circularity, and facilitates compliance with environmental regulations.

17. Deployment of an urban building energy model: Urban building energy modelling has been widely applied in cities to account for local climatic conditions, common building archetypes, and available technologies. These models help identify interventions that reduce operational carbon in residential and commercial buildings. This approach supports urban strategies to attain net-zero emissions targets.

18. Sustainable Cooling Solutions via District Energy Systems: District Energy Systems (DES) are gaining traction in various urban areas globally including Chile, China and Kenya. These systems, which utilize heat pumps and natural refrigerants, aggregate cooling demands across multiple buildings, enabling the use of high-efficiency equipment and reducing overall energy consumption. DES projects are scalable solutions that help mitigate urban heat island effects and lower energy costs, making cooling more affordable and environmentally sustainable.

D. Timelines

19. In accordance with the timeline for Activity C.2.1 in the TEC Rolling Workplan for 2023-2027, the table below shows a proposed timeline of this work and the deliverables, as well as potential opportunities for joint showcasing of the final knowledge product.

#	Deliverable	Timeline
1	Presentation of draft outlines for both Policy Briefs at TEC29	September 2024
2	Finalization of outlines for both Policy Briefs based on feedback from TEC29	October 2024
3	Community input solicitation for both Policy Briefs	October – December 2024
4	Consultation with Activity Group on first draft of Policy Brief #1	January – March 2025
5	Presentation of first draft of Policy Brief #1 at TEC30	April 2025

6	Second draft of Policy Brief #1 based on feedback from TEC30; First draft of Policy Brief #2	May – June 2025
7	Consultation with Activity Group on first draft of Policy Brief #2	July – August 2025
8	Presentation of final draft of Policy Brief #1 at TEC31; Presentation of first draft of Policy Brief #2 at TEC31	September 2025
9	Presentation of Policy Brief #1 at COP30	November 2025
10	Second draft of Policy Brief #2 based on feedback from TEC31	December 2025 – March 2026
11	Presentation of final draft of Policy Brief #2 at TEC32	April 2026
12	Presentation of Policy Brief #2 at COP31	November 2026

E. Possible actions by the Technology Executive Committee

20. The TEC will be invited to consider the draft outlines contained in the annex and agree to them and provide guidance to the activity group, and the lead partners (Global ABC and MIT Climate Policy Center), to prepare the first draft of the policy brief for TEC 30

Annex I

Deploying Proven Climate Technologies and Solutions for Buildings and Infrastructure

Policy Brief

Proposed Outline

- 1) Executive Summary
- 2) Introduction
- 3) Proven Climate Technologies and Solutions for Buildings and Infrastructure
 - a) Definitions and categorization of climate technologies and solutions, including traditional knowledge
 - b) Typologies of buildings and infrastructure, organized by climatic zones and economic classification, with emphasis on developing countries, SIDS and LDCs
 - c) Building performance objectives and assessments
 - d) High-impact, cost-effective, market-ready technologies and solutions for mitigation and resilience with consideration of synergies and trade-offs.
- 4) Technology Enabling Environments
 - a) Challenges and risks to the deployment of climate technology
 - b) Institutional measures to facilitate climate technology deployment
 - c) Capacity needs for climate technology deployment
- 5) Select Case Studies
- 6) Policy Opportunities
 - a) Which proven technologies need policy intervention for scalable deployment?
- 7) Conclusions and Key Messages

Annex II

Leveraging Data to Accelerate Financing for Climate Technologies in Buildings and Infrastructure

Policy Brief

Proposed Outline

- 1) Executive Summary
 - 2) Introduction
 - a) Include data concepts of baselines, modelling, monitoring & evaluation, governance & privacy, etc.
 - 3) Data and Information for Climate Technologies and Solutions for Buildings and Infrastructure
 - a) Definitions and categorization of data related to building construction and performance
 - b) Monitor and evaluate building performance
 - c) Mapping of data characteristics with building typologies, organized by climatic zone and economic classification, with emphasis on LICs and LMICs
 - d) Data needs associated with relevant climate technologies from Policy Brief “Deploying Proven Climate Technologies and Solutions for Buildings and Infrastructure”
 - 4) Technology Enabling Environments
 - a) Challenges and risks to collecting and utilizing data on buildings and infrastructure
 - b) Capacity needs for data collection and utilization
 - c) Institutional measures to facilitate data collection and utilization
 - d) Prioritization of data collection, utilization, and response measures, for mitigation and resilience
 - 5) Select Case Studies
 - 6) Policy Opportunities
 - a) Which data are needed for new policy interventions?
 - b) Which policy interventions need data for continuous improvement?
 - 7) Conclusions and Key Messages
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