# Bangladesh Climate Action Roadmap for Buildings and Construction Sector

In partnership with:

UN environment programme

Global Alliance for Buildings and Construction

UNOPS

UN-HABITAT

Ministry of Housing and Public Works of Bangladesh.

With funding from the

Federal Ministry for Economic Cooperation and Development

Ministry of Housing & Public Works (mohpw)
Room#202, Building No # 5,  Bangladesh Secretariat, Dhaka-1000
Telephone: +880-2-55100465, Fax: +880-2-9576616
E-mail: secretary@mohpw.gov.bd
Web: www.mohpw.gov.bd

# Acknowledgements

The *Bangladesh Climate Action Roadmap for Buildings and Construction Sector* was prepared by Taufique Mohiuddin, Md. Ashikur Rahman Joarder, Sheikh Serajul Hakim, Khurshid Zabin Hossain Taufique, Marco Voltolina, Aziza Usoof, Priyanka Kochhar and Md. Asaduzzaman, with contributions from Alicia Regodón (UNOPS), Talía Rangil Escribano (UNOPS), Chloe Decazes (UNOPS), Joshua Maviti (UN-Habitat), Naila Ahmed (MoH&PW, Government of Bangladesh), Azmeri Ashrafi (Urban Development Directorate, MoH&PW, Government of Bangladesh) and Celia Martinez Juez (UNEP). Other contributors to the report are Md. Parvez Khadem (Principal Research Engineer, HBRI), Monjur Parvez (Senior Research Architect, Housing Division, HBRI), Md. Arifujjaman (Senior Research Engineer, Structural Engineering & Construction Division, HBRI), Md. Ashraful Islam (Chief Town Planner, RAJUK), Md. Harijur Rahaman (Superintending Engineer, Dhaka Circle, NHA), Md. Raihan Ali (Assistant Engineer, Civil, NHA), Israt Jahan (Planner, UDD), Abdullah Al Mamun (Additional Chief Architect, DoA), Saad Ben Mostafa (Assistant Architect, DoA), Anisa Noori Kakon (Professor, DURP, Jahangirnagar University), Milena Wald (GIZ), Shaikh Mohammad Alavee (UNOPS) and Iftekhar Ahmed (Infrastructure Specialist, UNOPS).

The contents of this report do not necessarily reflect the views or policies of UNEP, UNOPS, UN-Habitat or contributory organizations. Mention of a commercial entity or product in this publication does not imply endorsement by UNEP, UNOPS, or UN-Habitat. The designations employed and the presentations of material do not imply the expre ssions of any opinion whatsoever on the part of UNEP, UNOPS, UN-Habitat or contributory organizations concerning the legal status of any country, territory, city area or its authorities, or concerning the delimitation of its frontiers or boundaries or the designation of its name, frontiers, or boundaries. The mention of a commercial entity or product in this publication does not imply endorsement by UNEP, UNOPS, or UN-Habitat.

The authors would like to thank the following members and partners who supported this report with their important contributions, input, comments and reviews: Adilur Rahman Khan , (Adviser, Ministry of Housing and Public Works), Kazi Wasi Uddin, ( Former Secretary , Ministry of Housing and Public Works), Md. Nabirul Islam, (former Secretary, Ministry of Housing and Public Works), Md. Hamidur Rahman Khan, (Secretary, Ministry of Housing and Public Works), Shakila Zerin Ahmed, ( Additional Secretary, Ministry of Housing and Public Works), Md. Showkat Ali Additional, ( Secretary, Ministry of Housing and Public Works), Md. Ashfaqul Islam Babool, ( Additional Secretary, Ministry of Housing and Public Works), Md. Abdul Matin, (Additional Secretary, Ministry of Housing and Public Works), Naila Ahmed, (Joint Secretary, Ministry of Housing and Public Works), Md. Faridul Islam, (Joint Secretary, Ministry of Housing and Public Works), Md. Abul Kalam Azad, (Joint Secretary, Ministry of Housing and Public Works), Sheikh Nur Mohammad, (Joint Secretary, Ministry of Housing and Public Works), Md. Motaher Hossain, (Joint Secretary, Ministry of Housing and Public Works), Md. Mozammel Hossain Khan, (Joint Secretary, Ministry of Housing and Public Works), Md. Mahbubur Rahman, (Deputy Secretary, Ministry of Housing and Public Works), M. Mahmud Ali, (Director, Urban Development Directorate), KM Hossain Taufique, (Former Director, Urban Development Directorate), Mohsinat Nasrin, (Planner, Urban Development Directorate), Md. Munim Hasan, (Chairman , National Housing Authority), Khondoker Mostafizur Rahman, (Chairman National Housing Authority), Md. Harijur Rahman, (Superintending Engineer, National Housing Authority), Md. Anisur Rahman Mian, (Chairman, Rajdhani Unnayan Kartripakkha, RAJUK), Md. Zakir Hossain, (Engineer, (Public Works Department), Md. Ziaur Rahman, (Executive, Engineer Public Works Department), Mashrur Fateh, (SD Engineer, Public Works Department), Fateh Azam Khan, (Executive Engineer, Public Works Department), KM Mostafa Hasan, (S Engineer, Public Works Department), Md. Shahidul Alam, (Additional Chief Engineer, Public Works Department), Md. Shamsul Islam, (Executive Engineer, Public Works Department), Mohammad Shamim Akhter, (Chief Engineer, Public Works Department), Md. Parvez

Khadem, (Principal Research Engineer, Housing and Building Research Institute), Md. Nafizur Rahman, (Principal Research Officer, Housing and Building Research Institute), Monjur Parvez Senior, (Research Architect, Housing and Building Research Institute), Mir Manzurur Rahman, (Chief Architect, Department of Architecture), Abdullah Al Mamun, (Additional Chief Architect, Department of Architecture), Saiqua Bente Alam, (Executive Architect Department of Architecture), Michel David, ( Asst. Architect, Department of Architecture), Md. Raquibul, (Islam Bhuiyan Asst. Architect, Department of Architecture), Rubya Jesmin, (Sr. Asst. Architect, Department of Architecture), Saad Ben Mostafa, Assistant Architect, Department of Architecture), Syed Shahjahan Ahmed, Deputy Secretary, Ministry of Environment, Forest and Climate Change), Mr. Sarowar, (Ministry of Defence), Mohammad Abul Hasnat Saikat, (Assistant Engineer, Education Engineering Department), SM Shafin Hasan, (Executive Engineer, Education Engineering Department), Samir Kumar Razak Das, (Superintending Engineer, Education Engineering Department), SM Shafin Hasan, (Executive Engineer, Education Engineering Department), Riziya Sultana, (Executive Engineer, Health Engineering Department), Tanjina Akter, (Assistant Director Department of Environment), Ziaul Haque, (Director, Department of Environment), Tahmina Yeasmin, (Joint Secretary, Energy and Mineral Resources Division), Mohammad Mahbubul Haque, (Joint Secretary, Local Government Division), SM Nazrul Islam, (Joint Secretary, Local Government Division), Md. Maksudul Islam, (Deputy Chief General, Economics Division), Gopal Krishna Debnath, ( Additional Chief Engineer, Local Government Engineering Department), Md. Abdul Alim, (Sr AE, Local Government Engineering Department), Md. Abdur Razzak, (Executive Engineer, Local Government Engineering Department), Md. Shafiqul Islam, ( Sr A. Engineer, Local Government Engineering Department), Hasibul Hasan Sumi, (Assistant Director, Department of Archaeology), Hirendra Chandra Paul, (Executive Engineer, Bangladesh Power Development Board), Md. Mamunur Rahman, (Sr. Road Safety Specialist, Dhaka Transport Coordination Authority), Md. Nahmadul Hasan, (Senior Urban Planner, Dhaka Transport Coordination Authority), Madani M. Imtiaz Hossain, (Technical Advisor, GPH Ispat Limited), Maherul Kader, (Prince Assistant Professor, Department of Architecture Bangladesh University of Engineering and Technology), Neelopal Adri, (Associate Professor, Department of Urban and Regional Planning Bangladesh University of Engineering and Technology), Shakil Akhter, (Professor, Department of Urban and Regional Planning Bangladesh University of Engineering and Technology), Tanvir Manzur, (Professor, Department of Civil Engineering Bangladesh University of Engineering and Technology), Imran Ebne Amin, (Asst. Professor, Ahsanullah University of Science and Technology), Roxana Hafiz, (Professor, Ahsanullah University of Science and Technology), Farhadur Reza Associate, (Professor, Department of Urban and Regional Planning Jahangirnagar University), Shammi Akter Satu, (Professor, Department of Urban and Regional Planning Jahangirnagar University), Syed Shahriar Amin, (Vice President, Bangladesh Institute of Planners), Md. Abu Nayeem Shohag, (Board Member, Bangladesh Institute of Planners), Md. Tamzidul Islam, (Joint Secretary, Bangladesh Institute of Planners), S. M. Mehedi Hasan, (General Secretary, Bangladesh Institute of Planners), Md. Alamgir Kabir, (President, Bangladesh Cement Manufacture's Association), Shankar Kumar Roy, (Executive Director, Bangladesh Cement Manufacture's Association), Md. Tuhin Ahmed, (Deputy Director, Admin-2, Bangladesh Standards and Testing Institution), Md. Tahsin Mahmud, (Engineering Examiner, Bangladesh Standards and Testing Institution), Md. Shahidul Islam, (Deputy Director, Bangladesh Standards and Testing Institution), Tahsin Mahmud, (Examiner, Bangladesh Standards and Testing Institution), Md. Shamsul Alam Khan, (Executive Director, Bangladesh Steel Mills Association), Md. Tanvirul Haque, (Deputy Director, Infrastructure Investment Facilitation Company), Saddam Hossain, ( AD, Infrastructure Investment Facilitation Company), Raihan Uddin Ahmed, (EVP, Infrastructure Development Company), Fatiha Polin, (CEO, Perceive), Williem Gees, (Managing Director, Eco-Home Solution Ltd.), Md. Ahaduzzaman, (Executive Engineer, Eco-Home Solution Ltd.), Mustafa Atikul Mazid, (Planner Individual Consultant), Florien Hollen, (Head, German Development Cooperation), Redita Rokib, (Advisor, German Development Cooperation), Hamidul Islam Chowdhury, (Cluster Project Manager, German Agency for International Cooperation (GIZ)), Milena Wald, (Advisor, GIZ), Srinivasa Popuri, (Chief, Bangkok Programme Office, UN-Habitat), Golam Sarwar, (NDC Action, UNEP), Md. Akter Uz Zaman, (Housing Coordinator UNDP),

# Foreword from the Honorable Adviser of the Ministry of Housing and Public Works

It gives me immense pleasure to know that the *Bangladesh Climate Action Roadmap for Buildings and Construction Sector* is being published which is a result of collective effort of the GlobalABC led by UNEP under the project titled "Transforming the Built Environment through Sustainable Materials", funded by the German Ministry for Economic Development and Cooperation (BMZ), and implemented in partnership with UNOPS and UN-Habitat. This roadmap marks a transformative milestone in reshaping building and construction sector in Bangladesh which will foster sustainability, resilience, and economic growth of the country. The outcomes of this roadmap are vital in addressing the pressing concerns of climate change and ensuring a sustainable future for Bangladesh.

The comprehensive strategies outlined in this document can be a guideline towards reducing greenhouse gas emissions, enhancing the resilience of our environment, and promoting resource efficiency. As we move forward, the implementation of these recommendations will be instrumental in laying the foundation for a low-carbon future and will help to achieve our nation's sustainable development goals. We eagerly anticipate the impactful changes that this roadmap will bring a greener and more resilient future.

I would like to extend my heartfelt thanks and gratitude to the German Development Cooperation and our esteemed partners including UNEP, UNOPS and UN-Habitat for their invaluable contribution in spearheading this pivotal initiative in Bangladesh.

**Mr. Adilur Rahman Khan**
Honorable Adviser
Ministry of Housing and Public Works
People's Republic of Bangladesh

# Foreword from the Secretary of the Ministry of Housing and Public Works

I am pleased to know that the roadmap towards greening the building and construction sector in Bangladesh has been prepared. This document represents a very significant step in ongoing efforts at addressing sustainability and then resilience in our urban development.

The roadmap is anchored by the Ministry of Housing and Public Works, for its broad mandate over housing, infrastructure, urban planning, and concerned research. We have 13 organizations related to building and construction sector. Hence, there is a need to formulate policy framework which will lead to a positive change in building and construction sector to combat climate change which are in line with our national sustainable development objectives and our commitments to global climate action. It sets out measures for mitigating greenhouse gas emissions and enhancing energy efficiency, with the view of ensuring resilience in our built environment.

The preparation of this roadmap involved extensive collaboration with various stakeholders, including government agencies, private sector representatives, and sustainability experts. Their collective insights have ensured that the roadmap is comprehensive, addressing the diverse needs and challenges of the building and construction sector while promoting a unified approach towards sustainability.

The proper implementation of this roadmap will require coordinated action which involves strengthening further our institutional capacities, providing support to research and innovation through various entities.

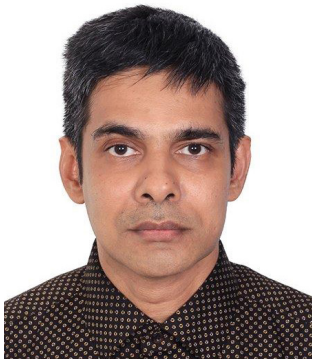
I look forward, in the future, to working with all relevant stakeholders as we strive to translate these strategies into reality. We strive to have a more sustainable and resilient built environment that can support long-term health and prosperity of our citizens.

I thank all those who provided support through this initiative. The challenge now, with resolution and persistence, is to provide real progress over the next few years.

**Mr. Md. Hamidur Rahman Khan**

Secretary
Ministry of Housing and Public Works
People's Republic of Bangladesh

# Foreword from the director of the Urban Development Directorate



The Urban Development Directorate (UDD) has been a proud partner throughout the development of this roadmap, contributing significantly to Bangladesh's urban planning system. This document closely aligns with our strategic priorities, particularly in the areas of urban and spatial planning. From the inception of this project to its final stages, UDD has played a crucial role in integrating sustainable development principles into our national planning framework.

By following the roadmap, we can enhance the resilience of urban areas, promote low-carbon infrastructure, and ensure that our cities are well-prepared for future challenges. This roadmap provides a blueprint for incorporating sustainable practices into urban planning, positioning us to contribute effectively to the decarbonization of the construction sector and the broader goals of national development.

**Mr. M. Mahmud Ali**

Director (Additional Secretary)
Urban Development Directorate
Ministry of Housing and Public Works
People's Republic of Bangladesh

# Table of contents

## Figures



## Tables

# How to use this report

1. **Introduction:** This section briefly explains why the decarbonization of the buildings and construction sector is critical for Bangladesh It includes a brief summary of the current and projected country emissions, context on national climate commitments, policy framework and international obligations that drive the need for decarbonization of the built environment in Bangladesh.

2. **Country overview:** This section provides essential background information about Bangladesh, including basic figures on geography and climate, population, socio-economic development, environment, and the buildings and construction sector. It sets the stage by offering contextual data that impact the country's decarbonization efforts.

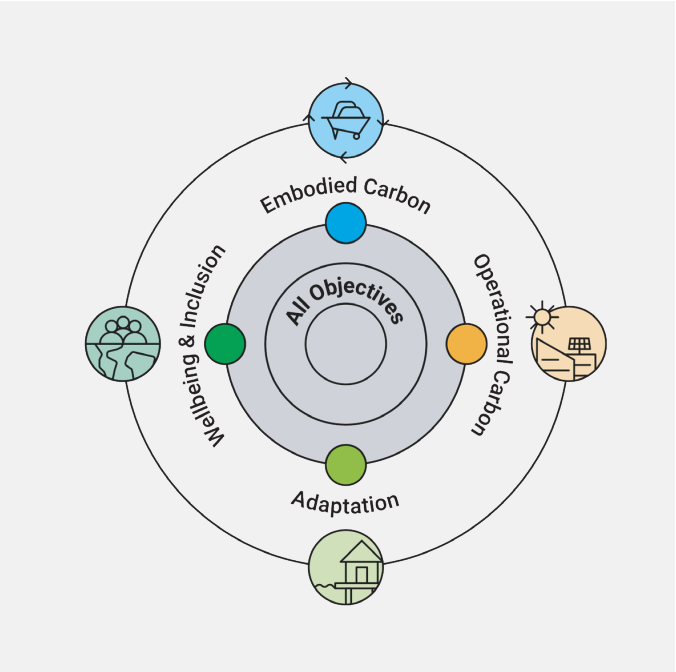
3. **Climate Action Area Status:** This section provides information on the current status of each action area, the main challenges and opportunities, the desired goals and targets, and the recommended interventions for the short, medium and long term to achieve them. With the exception of the Strategic Priorities action area, which refers only to the enabling environment, all the action areas also include valuable information on projections of future emissions if no measures are taken.

4. **Project concepts for implementation:** This section includes 15 project concepts for prioritized actions that are considered essential for advancing climate action for the building and construction sector in Bangladesh.

The four GlobalABC objectives, i.e. Embodied carbon reduction, Operational carbon reduction, Adaptation, and Wellbeing and Inclusion are key themes mentioned throughout the document. To enhance clarity and aid in quickly identifying these objectives, specific icons are used in various tables and graphs.

These icons serve as visual markers, helping the reader to easily associate the data, goals, actions, etc. with the corresponding GlobalABC objectives.

Additionally, a fifth icon representing “All objectives’’ has been included to represent content that applies simultaneously to the four objectives, e.g. cross-cutting actions. You can find the icons below:



# Acronyms

| | |
|---|---|
| **AC** | Air Conditioning |
| **ADB** | Asian Development Bank |
| **AMaR DESH** | Addition, Modification and Retrofitting Design for Environment and Sustainable Habitations |
| **ASK** | Ain o Salish Kendra |
| **BACI** | Bangladesh Association of Construction Industry |
| **BAU** | Business as Usual |
| **BB** | Bangladesh Bank |
| **BBRA** | Bangladesh Building Regulatory Authority |
| **BBS** | Bangladesh Bureau of Statistics |
| **BBCTF** | Bangladesh Climate Change Trust Fund |
| **BCCSAP** | Bangladesh Climate Change Strategy and Action Plan |
| **BDP 2100** | Bangladesh Delta Plan 2100 |
| **BEER** | Building Energy and Environment Rating |
| **BFRI** | Bangladesh Forest Research Institute |
| **BHBFC** | Bangladesh House Building Finance Corporation |
| **BIP** | Bangladesh Institute of Planners |
| **BMZ** | German Federal Ministry for Economic Cooperation and Development |
| **BNBC** | Bangladesh National Building Code |
| **BTEB** | Bangladesh Technical Education Board |
| **BUET** | Bangladesh University of Engineering and Technology |
| **CBO** | Community-based Organisation |
| **COVID-19** | Coronavirus Disease 19 |
| **CPD** | Continuing Professional Development |
| **CRIIP** | Climate Resilient Infrastructure Improvement Project |
| **CSC** | Construction Supply Chain |
| **CSEB** | Compressed Stabilized Earth Blocks |
| **DAP** | Detailed Area Plan |
| **DCE** | Directorate of Continuing Education |
| **DESH** | Design for Environment and Sustainable Habitations |
| **DoA** | Department of Architecture |
| **DoE** | Department of Environment |
| **DPP** | Development Project Proposal |
| **EDGE** | Excellence in Design for Greater Efficiencies |
| **EECMP** | Energy Efficiency and Conservation Master Plan up to 2030 |
| **EED** | Education Engineering Department |
| **EPD** | Environmental Product Declaration |
| **ESAB** | Engineering Students Association of Bangladesh |
| **ESCB** | Engineering Staff College Bangladesh |
| **EU** | European Union |
| **FBBCI** | Federation of Bangladesh Chambers of Commerce & Industries |
| **FYP** | Five Year Plan |
| **GDP** | Gross Domestic Product |
| **GED** | General Economics Division |

| | |
|---|---|
| **GHG** | Greenhouse Gas |
| **GIZ** | German Agency for International Cooperation |
| **GlobalABC** | Global Alliance for Buildings and Construction |
| **GoB** | Government of Bangladesh |
| **HBRI** | Housing and Building Research Institute |
| **HCFCs** | Hydrochlorofluorocarbons |
| **HDI** | Human Development Index |
| **HED** | Health Engineering Department |
| **IAB** | Institute of Architects Bangladesh |
| **IDEB** | Institution of Diploma Engineers Bangladesh |
| **IEB** | Institution of Engineers Bangladesh |
| **IEMPM** | Integrated Energy and Power Master Plan |
| **ILO** | International Labour Organization |
| **ISO** | International Organization for Standardization |
| **IMED** | Implementation Monitoring and Evaluation Division |
| **KUET** | Khulna University of Engineering and Technology |
| **LCA** | Life Cycle Assessment |
| **LDC** | Least Developed Country |
| **LEED** | Leadership in Energy and Environmental Design |
| **LGD** | Local Government Division |
| **LGED** | Local Government Engineering Department |
| **LGI** | Local Government Institution |
| **MoE** | Ministry of Education |
| **MoEFCC** | Ministry of Environment, Forest and Climate Change |
| **MoF** | Ministry of Finance |
| **MoHPW** | Ministry of Housing and Public Works |
| **MoIB** | Ministry of Information and Broadcasting |
| **MoIND** | Ministry of Industries |
| **MoL** | Ministry of Land |
| **MoLE** | Ministry of Labour and Employment |
| **MoLGRDC** | Ministry of Local Government, Regional Development and Co-operatives |
| **MoLJPA** | Ministry of Law, Justice and Parliamentary Affairs |
| **MoP** | Ministry of Planning |
| **MoPEMR** | Ministry of Power, Energy and Mineral Resources |
| **MoRTB** | Ministry of Road, Transport and Bridges |
| **MoSW** | Ministry of Social Welfare |
| **MoU** | Memorandum of Understanding |
| **MoWCA** | Ministry of Women and Children Affairs |
| **MPGCA** | Marrakech Partnership for Global Climate Action |
| **MRV** | Monitoring, reporting and verification |
| **MSME** | Micro, small and medium enterprises |
| **NAP** | National Adaptation Plan |
| **NBR** | National Board of Revenue |
| **NDC** | Nationally determined contribution |
| **NEP** | National Environment Policy |
| **neZECom** | Nearly Zero Emission Communities |
| **neZECoRA** | Nearly Zero Emission Communities Renovation and Adaptation |

| | |
|---|---|
| **neZECoRBo** | Nearly Zero Emission Communities Renovation Body |
| **neZECoRI** | Nearly Zero Emission Communities Research Institute |
| **NGO** | Non-governmental organization |
| **NHA** | National Housing Authority |
| **NIPORT** | National Institute of Population Research and Training |
| **NLUP** | National Land-Use Policy |
| **nZEB** | Nearly zero energy building |
| **OHS** | Occupational health and safety |
| **OJT** | On-the-Job training |
| **OpenDRI** | Open Data for Resilience Initiative |
| **OSHA** | Occupational Safety and Health Administration |
| **PKSF** | Palli Karma-Sahayak Foundation |
| **PMO** | Prime Minister's Office |
| **PP** | Perspective Plan |
| **PR** | Public relations |
| **PRA** | Participatory Rapid Appraisal |
| **PWD** | Public Works Department |
| **RAJUK** | Rajdhani Unnayan Kartripakkha (Capital Development Authority) |
| **REHAB** | Real Estate and Housing Association of Bangladesh |
| **RHD** | Roads and Highways Department |
| **R&D** | Research and Development |
| **SDG** | Sustainable Development Goal |
| **SFD** | Sustainable Finance Department |
| **SMART** | Specific, Measurable, Attainable, Relevant, Timely |
| **SME** | Small and medium enterprise |
| **SREDA** | Sustainable and Renewable Energy Development Authority |
| **SUHII** | Surface urban heat island intensity |
| **SWM** | Solid waste management |
| **UDD** | Urban Development Directorate |
| **UGC** | University Grants Commission |
| **UN** | United Nations |
| **UNEP** | United Nations Environment Programme |
| **UN-Habitat** | United Nations Human Settlements Programme |
| **UNIDO** | United Nations Industrial Development Organization |
| **UNOPS** | United Nations Office for Project Services |
| **URP** | Urban Resilience Project |
| **US** | United States of America |
| **USGBC** | United States Green Building Council |
| **WARPO** | Water Resources Planning Organization |

# Executive summary

**Introduction**

Bangladesh is highly susceptible to climate and natural hazards, particularly cyclones, floods and sea level rise. In fact, over half of the country's population lives in areas with high climate exposure. The frequency and intensity of extreme weather events are increasing due to climate change, and the amount of loss and damage is exacerbated by uncontrolled urbanisation and destruction of natural ecosystems, putting at risk Bangladesh's infrastructure, economy and social fabric.

Being one of the leading causes of climate change and environmental degradation, the buildings and construction sector has the potential to make a significant difference in achieving mitigation and adaptation goals. Recognizing this, Bangladesh has joined international efforts, including endorsing the *Declaration de Chaillot*, and has implemented several national policies aimed at reducing emissions and increasing the resilience of its building sector. However, its unstructured approach and the gaps in coordination, enforcement and inclusion of marginalized communities have hindered progress. This *Climate Action Roadmap* sets out a comprehensive path to achieve a sustainable and resilient built environment by 2050, while also addressing sociocultural aspects and ensuring equitable outcomes for all.

**Overview of the roadmap**

This roadmap follows the Global Alliance for Buildings and Construction (GlobalABC) framework, developed through a partnership between the United Nations Environment Programme (UNEP), the United Nations Human Settlements Programme (UN-Habitat) and the United Nations Office for Project Services (UNOPS). It emphasizes reducing emissions and improving resilience across the entire life cycle of buildings, and sets ambitious short-, medium-, and long-term targets for decarbonizing the built environment, aligned with the Marrakech Partnership for Global Climate Action.

The roadmap is centred around four main cross-cutting objectives: (1) zero embodied carbon; (2) zero operational carbon; (3) adaptation; and (4) well-being and inclusion.

**Country overview**

Bangladesh is a densely populated, low-lying country in South Asia, highly vulnerable to the impacts of climate change due to its geography. Its population, currently around 165 million, is projected to peak at 206.9 million by 2061. While the country remains classified as a least developed country (LDC), it has made strides in socioeconomic development, significantly reducing the poverty rate, although challenges such as wealth inequality persist. The construction sector, which accounts for 8 per cent of GDP and employs 2.4 million people, is critical to the country's economic development and urbanisation. However, it also poses environmental risks, and the projected doubling of Bangladesh's greenhouse gas emissions by 2041 underlines the urgent need for sustainable practices in this sector.

**Strategic priorities**

Bangladesh's national development strategies focus on reducing poverty and graduating from LDC status, but at the same time recognize that a sustainable and resilient approach to urbanisation is necessary. Despite strong institutional arrangements, gaps in policy implementation and coordination remain. For instance, although the country's nationally determined contributions (NDCs) aim to reduce greenhouse gas emissions in brick production and housing, the construction industry is not always included, and marginalized communities are often excluded from decision-making processes. Moreover, there is a need for greater technical capacity, funding and data management to tackle climate change effectively, especially in terms of mitigation.

**Spatial and urban development**

Spatial and urban development in Bangladesh is rapidly evolving as the country experiences significant economic and urban growth, and population increase. However, the country's institutions and policy frameworks struggle to keep pace with such fast growth. The lack of comprehensive planning and institutional coordination remains a crucial issue. For instance, urban planning frameworks cover only 10 per cent of the country's total area, with governance primarily concentrated in large cities. The lack of structured plans in smaller cities and rural areas exacerbates issues like inadequate housing and environmental degradation. To attend to these challenges, Bangladesh must strengthen its institutional capacity and policy frameworks. A critical step would be the introduction of a National Urban Policy to streamline these processes and foster better coordination among stakeholders. Equally important is developing guidelines for sustainable urban infrastructure that integrates low-carbon building practices, renewable energy sources and climate resilience strategies. Stakeholder engagement in urban planning also remains weak, primarily due to the lack of formal mechanisms and procedures. By promoting participatory approaches, Bangladesh can ensure that marginalized communities are included in the decision-making processes. In addition to these gaps, data management poses a significant hurdle. Currently, there is no comprehensive digital platform for land use or spatial planning. Bangladesh is working on developing such a system, but the timeline for its completion is unclear. Improved access to land and urban planning data through geolocalized platforms would allow for more informed decision-making and efficient resource allocation.

**Existing and new buildings**

Bangladesh's rapid urban development and the rise of multi-storey buildings have transformed urban landscapes, generating new challenges on energy efficiency, environmental impact and occupant well-being. Although the Government has introduced policies to deal with these issues, efforts are seen as inadequate, especially with regard to funding, technical capacity and data management. The focus remains heavily on new construction, neglecting the retrofitting of existing buildings, which hampers embodied carbon reduction. Embodied carbon emissions from construction materials, especially bricks and concrete, are rising, and operational carbon emissions linked to energy use in buildings are also projected to grow significantly by 2050. Additionally, many buildings are vulnerable to natural hazards due to non-compliance with building codes and the use of substandard materials. Bangladesh also faces housing deficits, especially in urban areas, with limited access to financing and challenges in inclusive housing for vulnerable populations, including persons with disabilities.

The key steps to integrate sustainability and resilience in Bangladesh's buildings include regulating the informal recycling market, using data analytics for informed decisions, improving regulations, offering training and financial incentives for sustainability, investing in sustainable materials research, creating green building labels, supporting affordable housing, and increasing housing finance accessibility. The key steps to integrating sustainability and resilience in Bangladesh's buildings include regulating the informal recycling market, using data analytics for informed decision-making, improving regulations, providing a training programme, financial incentives for sustainable practices, investing in sustainable materials research, establishing context-specific green building labels and certifications, promoting affordable housing, and increasing access to housing finance.

**Construction supply chain**

The construction sector in Bangladesh has expanded rapidly, leading to increased demand and prices, yet it heavily relies on high-carbon materials like cement and bricks, with minimal innovation in sustainable alternatives. Challenges in the sector include supply chain risk from climate hazards and political issues, as well as worker exploitation concerning human rights. While the Government has implemented policies to promote sustainability, resilience and equity, weak enforcement persists due to widespread informality. The growing demand for construction materials risks

depleting non-renewable resources and exacerbates environmental problems. Research and development on low-carbon materials are limited, and traditional sustainable practices are fading. Key recommendations include increasing the use of low-carbon materials, ensuring a reliable supply of materials, minimizing environmental degradation and improving worker conditions and rights. Prioritized actions focus on research funding, integrating low-carbon technologies into education, incentivizing sustainable practices and enhancing regulatory frameworks and coordination.

# Introduction

Bangladesh is one of the world's most vulnerable countries to climate and natural hazards. Cyclones, floods and sea-level rise are the greatest threats, but the country also faces significant risks from droughts, coastal and river erosion, storm surges, fires, landslides, tsunamis and earthquakes. Climate-related events, in particular, pose serious challenges. In fact, 56 per cent of Bangladesh's population live in areas with high climate exposure, and another 33 per cent is in territories with very high exposure. Only considering the period from 2000 to 2019, the country has experienced 185 extreme weather events, resulting in 11,450 deaths and severe economic damage. The frequency and intensity of these phenomena are increasing due to climate change, and the amount of losses and damages is exacerbated by uncontrolled urbanisation and destruction of natural ecosystems. In the long term, these trends might disrupt the country's infrastructure, economy and social fabric. Today, climate and other hazards already put 1.14 per cent of Bangladesh's building stock at risk each year, for an average annual loss of $7.7 billion. Furthermore, over the last three years 7.28 per cent of the population has been directly affected by natural disasters. If no significant action is taken, these numbers will keep rising; projections suggest at least 13.3 million people will become climate migrants by 2050.

The buildings and construction sector is one of the leading causes of climate change and environmental degradation globally. The sector produces 21 per cent of total greenhouse gas emissions, consumes 34 per cent of the world's energy, generates vast amounts of waste and pollution, and harms natural ecosystems. At the same time, the built environment is often the primary cause of death, injuries and economic damage during natural disasters, due to structural failures, inadequate construction, and the use of substandard materials. For these reasons, buildings and construction are poised to play a key role in humanity's efforts towards climate change mitigation and adaptation. Recognising the great potential of this sector for achieving a sustainable and prosperous future for everyone, over 70 countries, including Bangladesh, have endorsed the Declaration de Chaillot during the first "Buildings and Climate Global Forum" held in Paris, France, in March 2024. This ambitious document, aligned with major international frameworks such as the United Nations Sustainable Development Goals (SDGs) and the Paris Agreement, highlights the need to implement policies and actions "to drastically and systematically decrease GHG emissions from existing and new buildings; to enhance carbon uptake and storage in the urban environment; and to adapt existing and new buildings to current and future climate change". To achieve this, the signatories of the declaration have committed to "establishing and implementing (…) inclusive decarbonization and resilience pathways for buildings at all levels".

In recent years, Bangladesh has made significant efforts in climate change mitigation and adaptation, adopting several policies and plans that focus on the sustainability and resilience of its building stock. Some of the main milestones in this field are as follows:

- The *Bangladesh National Building Code* (BNBC) of 2020, including regulations for energy efficiency, safety, disaster risk reduction, accessibility and thermal comfort in buildings, with a view to reducing embodied and operational carbon emissions and increasing resilience to climate hazards.

- The *Nationally Determined Contributions* (NDCs) updated in 2021, that set targets for climate change mitigation and adaptation, including measures related to buildings and construction such as reducing greenhouse gas emissions in brick production and appliances for residential buildings, and promoting climate-resilient housing.

- The *National Adaptation Plan 2023–2050 (NAP),* that comprehensively discusses climate change adaptation in the country, including measures for improving the resilience of buildings and infrastructure and reducing heat island effect.

- The *Integrated Energy and Power Master Plan* (IEPMP) of 2023, which outlines strategies for promoting renewable energy and sets a target for achieving a zero emissions economy by 2070.

The country has also adopted policies and regulations to ensure fair housing access, protect the environment and biodiversity, promote sustainability in the construction supply chain (such as materials extraction, forest management, bricks production, waste management and recycling), establish standards for construction materials and energy-efficient systems and appliances, and increase access to clean cooking fuels and technologies. However, the lack of a comprehensive framework for the buildings and construction sector has severely hindered the country's progress towards a sustainable and resilient built environment. Other significant factors that hinder Bangladesh in this field include difficulties in implementation and enforcement of existing policies; low awareness of the importance of mitigating climate change and reducing greenhouse gas emissions; lack of human resources, technical capacities and funding; scarce coordination between stakeholders, and especially between national and local government institutions; exclusion of vulnerable and marginalized communities from decisional processes; and widespread informality and illegality (including human rights violations) in the construction sector.

To correct this situation, the Government, with support from the GlobalABC, UNEP, UN-Habitat, UNOPS, and funding from the German Ministry for Economic Development and Cooperation (BMZ), has developed this *Climate Action Roadmap for Buildings and Construction Sector*. Its purpose is to assess the current status, identify gaps, challenges and opportunities and outline a path for achieving a sustainable and resilient built environment by 2050. This will also contribute to strengthening the country's NDCs and raising ambitions on targets related to buildings and construction in their next round of updates.

Based on solid research and consultations with several relevant stakeholders, this roadmap proposes goals, actions and priorities for advancing climate change mitigation and adaptation through buildings and construction. Furthermore, recognising Bangladesh's main goal of reducing poverty and becoming a developed and prosperous nation by 2041, this roadmap makes sure to combine the much-needed climate action with equally important sociocultural aspects of sustainability, advocating for the costs of the ecological transition to not disproportionately fall on the poorest and most vulnerable members of society. In fact, this document focuses on the tasks of providing affordable housing, community-driven slum upgrading, participatory planning and design, vernacular materials and techniques, and conditions of workers in construction.

Bangladesh stands today at a unique crossroads, where challenges can be transformed into opportunities. With the right actions and a collective commitment, the country has the potential to build a future that is sustainable and resilient, but also equitable and inclusive, taking a decisive step towards the vision of "zero poverty, zero unemployment and zero net carbon emissions".

# Overview of the roadmap

## The GlobalABC framework

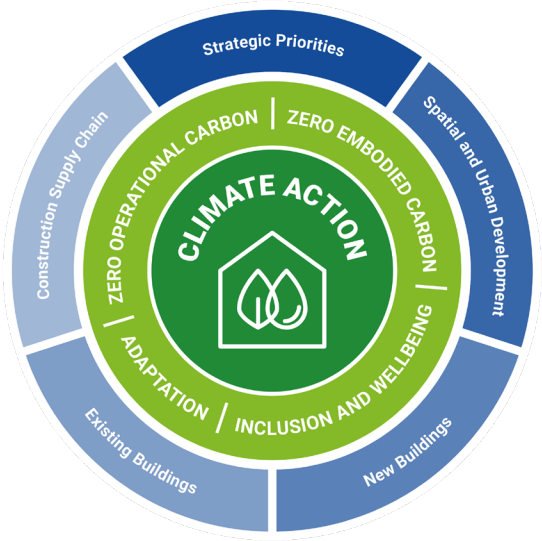
The Global Alliance for Buildings and Construction (GlobalABC), whose secretariat is hosted by UNEP, is leading efforts to support governments and their partners to develop regional, national and local Inclusive Climate Action Roadmaps for the Buildings and Construction Sector. Bangladesh's plan aligns with the GlobalABC Roadmap framework, created with input from GlobalABC members and UNEP's project "Transforming the Built Environment through Sustainable Materials," supported by BMZ, UNOPS, and UN-Habitat from July 2023 to October 2024.

The GlobalABC Roadmaps present a comprehensive and inclusive approach to emissions reduction from and improved resilience of the built environment along the full life cycle. They set aspirational short-, medium-, and longer-term targets aligned with the Marrakech Partnership for Global Climate Action (MPGCA) Human Settlements Pathways. The roadmaps focus on four main cross-cutting objectives: (1) zero embodied carbon; (2) zero operational carbon; (3) resilience; and (4) inclusive and healthy environment.

With the aspiration to reduce material use and carbon emissions and improve climate adaptation, the roadmaps include five key action areas: (1) strategic priorities, (2) spatial and urban development, (3) new buildings, (4) existing buildings, and (5) construction supply chain (see figure 1).

Following this approach, the Bangladesh Roadmap assesses the present situation of the country's building and construction industry and suggests targets for decreasing operational and embodied carbon emissions between 2030 and 2040, with the aim of creating a decarbonized, resilient and healthy built environment by 2050. The roadmap then identifies priority actions with project concepts for implementation.

**Figure 1:** The GlobalABC framework




## The roadmap development process

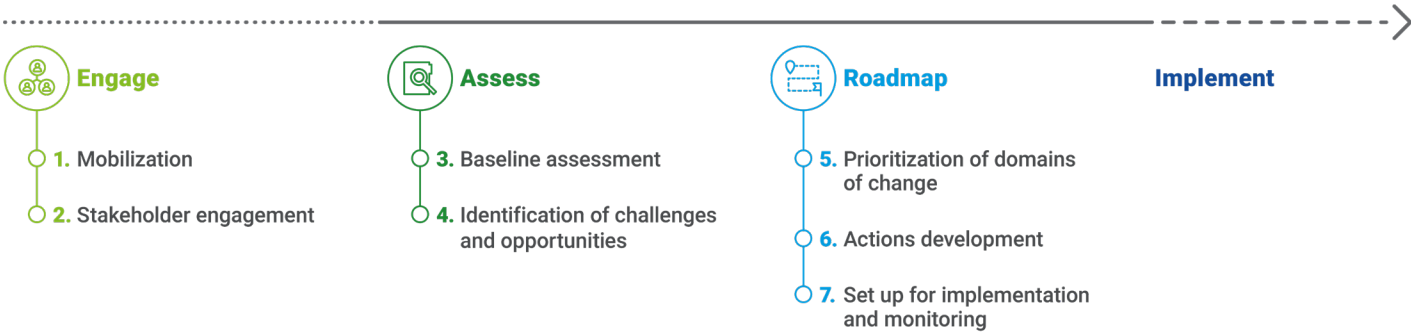
The roadmap development in Bangladesh followed a seven-step methodological process (see figure 2).

**Step 1 - Mobilization**: This step of the process involved engagement with relevant authorities with a mandate covering sustainable, resilient and inclusive buildings and construction in the country. It includes the definition of the roadmap objectives and the scope, and the creation of a steering committee to provide direction for the roadmap development (see annex 1).

**Step 2 - Stakeholder engagement**: This step entailed the identification of country stakeholders from the public and private sectors, academia and research institutions, as well as relevant donors and financing entities to support development of the roadmap and future implementation (see annex 2).

**Step 3 - Baseline assessment:** This step focused on understanding the current status of the building and construction sector in Bangladesh, encompassing the physical and the enabling environment. It included collecting quantitative and qualitative data to identify a

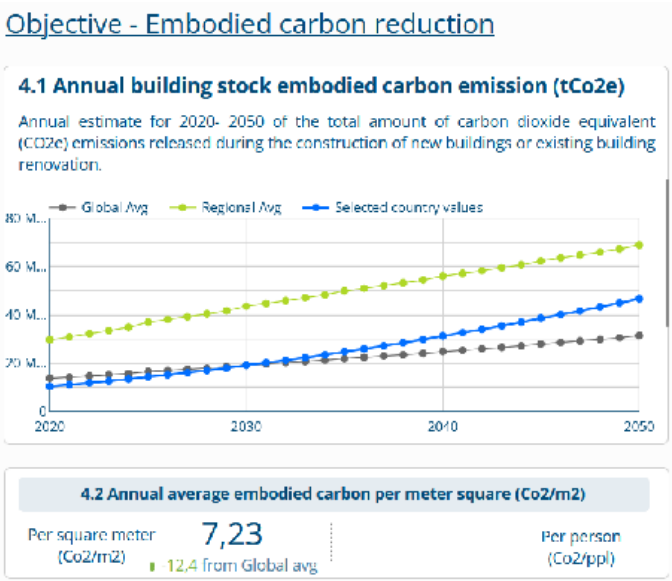
**Figure 2:** Roadmap methodological process




baseline, make projections, and identify gaps to achieve the country's decarbonization goals (see annex 3). The following tools were used to support the process:

**The Physical Environment Data Collection Checklist:** A comprehensive list of physical components of the buildings and construction sector to be analysed was defined within the GlobalABC action areas. This was accompanied by a data collection checklist that helped identify key documents and information necessary for the analysis. The assessment was based on data from the Bangladesh Bureau of Statistics, international organizations (including the United Nations and the World Bank) and scientific publications and was validated by relevant stakeholders.

**Figure 3:** Sample from the GlobalABC Projections Dashboard




**GlobalABC Projection Dashboard** (link): This tool was designed to provide current estimates and projections for 2030 and 2050 for a set of indicators (e.g. annual building stock operational carbon emissions, carbon emissions of imported construction materials, etc.) under each action area.[1] The end goal of these dashboards was to help assess and analyse the current data and projections of the country (blue line) compared with the regional average (green line), and the global average (grey line; see figure 3). This was particularly useful in the case of Bangladesh where data on carbon emissions is rarely disaggregated for the building and construction sector.

**The Enabling Environment Assessment Tool:** This qualitative question-based tool is used to analyse the current status of the building and construction sector's enabling environment, that is how buildings are planned, delivered and managed throughout their life cycle and value chain. The tool helps identify what impairs or supports the physical environment to adapt to and mitigate climate change. The tool looks at seven enabling domains: (1) institutional arrangements, (2) processes, (3) policies, laws and regulations, (4) stakeholder engagement, (5) financial management and funding, (6) knowledge and technical capacities, (7) data management and reporting through the 5 GlobalABC action areas. The assessment was based on Government documents and policies, scientific publications, news articles and direct feedback from relevant stakeholders. For the action areas on existing and new buildings, a comprehensive survey was carried out among stakeholders (see annex 4).

**Step 4 - Identification of challenges and opportunities:** This step included the identification of information gaps, challenges and opportunities per action area. Several small workshops were organized to validate the results and collect further input from stakeholders to complete the baseline assessment. Problem trees were also drafted during this step to visualize the relationship between the challenges and opportunities and the country objectives to be achieved (see annex 5).

**Step 5 - Prioritization of domains of change:** This step consisted of the definition of priority areas of intervention (i.e. domains of change) and the final goals and targets the roadmap would support to achieve. Goals and targets were validated by relevant stakeholders and the Government.

**Step 6 - Actions development:** This step encompassed the identification and prioritization of actions. It also involved the definition of their timeline and the responsible bodies for their implementation. Among the prioritized actions, 15 were selected to be further developed as project concepts to be presented to donors or partners to explore funding opportunities for its implementation. Priorities and timelines were validated by relevant stakeholders and the Government.

**Step 7 - Set up for implementation and monitoring:** This step involved defining the steps towards the implementation of the roadmap and the monitoring mechanism.

Overall, the process lasted from July 2023 to October 2024 (see table 1).

**Table 1:** Roadmap development timeline

| 2023 | | | 2024 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **6 Jul** | **10 Jul** | **23 Oct** | **18-19 Feb** | **23 May** | **21 Aug** | **1-2 Sep** | **8 Sep** | **17 Sep** | **7 Oct** |
| Kick-off meeting (mobilization of delivery team) | Steering Committee Meeting | Inception Workshop (stakeholder engagement) | Working Group Meetings (baseline assessment and identification of challenges and opportunities) | Stakeholder Consultation (prioritization of domains of change) | Technical Committee Meeting (actions development) | Working Group Meetings (actions development) | Steering Committee Meeting | Dissemination Workshop | Launch of the roadmap on World Habitat Day |

# Country overview

## Geography and climate

Bangladesh is part of the Indian subcontinent and covers an area of 148,460 km$^2$. It is one of the most densely populated countries in the world, with 1,119 people per km$^2$.[1] Being a riverine low-lying country, its mean elevation is 85 m above sea level, with more than 60 per cent of the total landmass at less than 6 m above sea level.[2] The country can be divided into three main regions: the Ganges Delta; the Madhupur and Barind plateaus in the north-western and central areas; and the hill ranges in the north-east and south-east.

Bangladesh has a tropical climate with a mild period extending from October to March, a hot humid one from March to June, and a warm rainy monsoon season from June to October. The average minimum annual temperature is 21.0 °C, while the maximum is 30.5 °C. The country is relatively wet, receiving an average annual rainfall of 2,200 millimetres.[3]

## Population

Bangladesh ranks eighth in global population, with around 165 million people,[4] which represents about 2 per cent of the world's population. According to the United Nations, this figure is expected to keep growing and peak at 206.9 million in 2061 and then decline to around 176.4 million by 2100 (see figure 6).[5]

The median age of the population is 26.3 and is projected to reach 49.3 in 2100.[6] Life expectancy is 72.4 years.[7] Of the total population, 49.5 per cent is male and 50.5 is female.[8] There are also 12,629 *hijra*, an officially recognized third gender.[9] The share of urban population percentage falls within the range of 31.51 per cent (as per the official 2022 census)[10] and 40 per cent (according to World Bank estimates).[11] Approximately 1 per cent of the population is officially recognized as ethnic minorities.[12]

**Figure 4:** Main data on Bangladesh's geography and climate

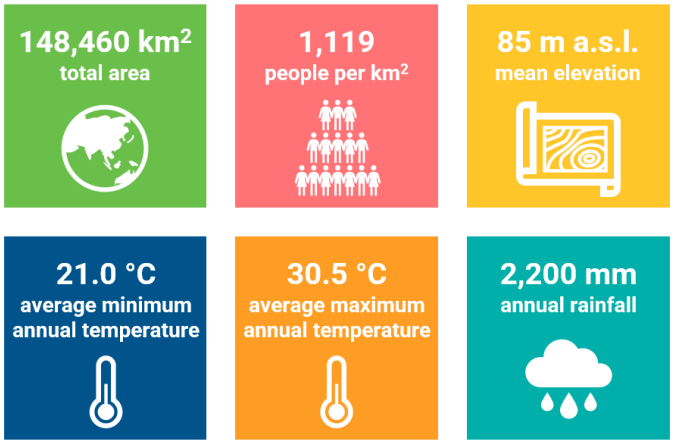
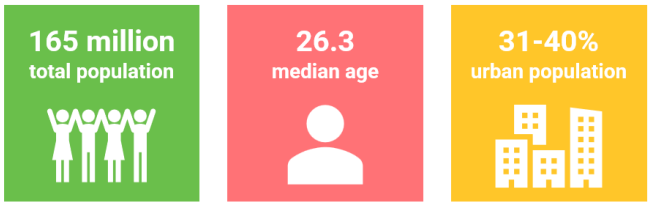



**Figure 5:** Main data on Bangladesh's population

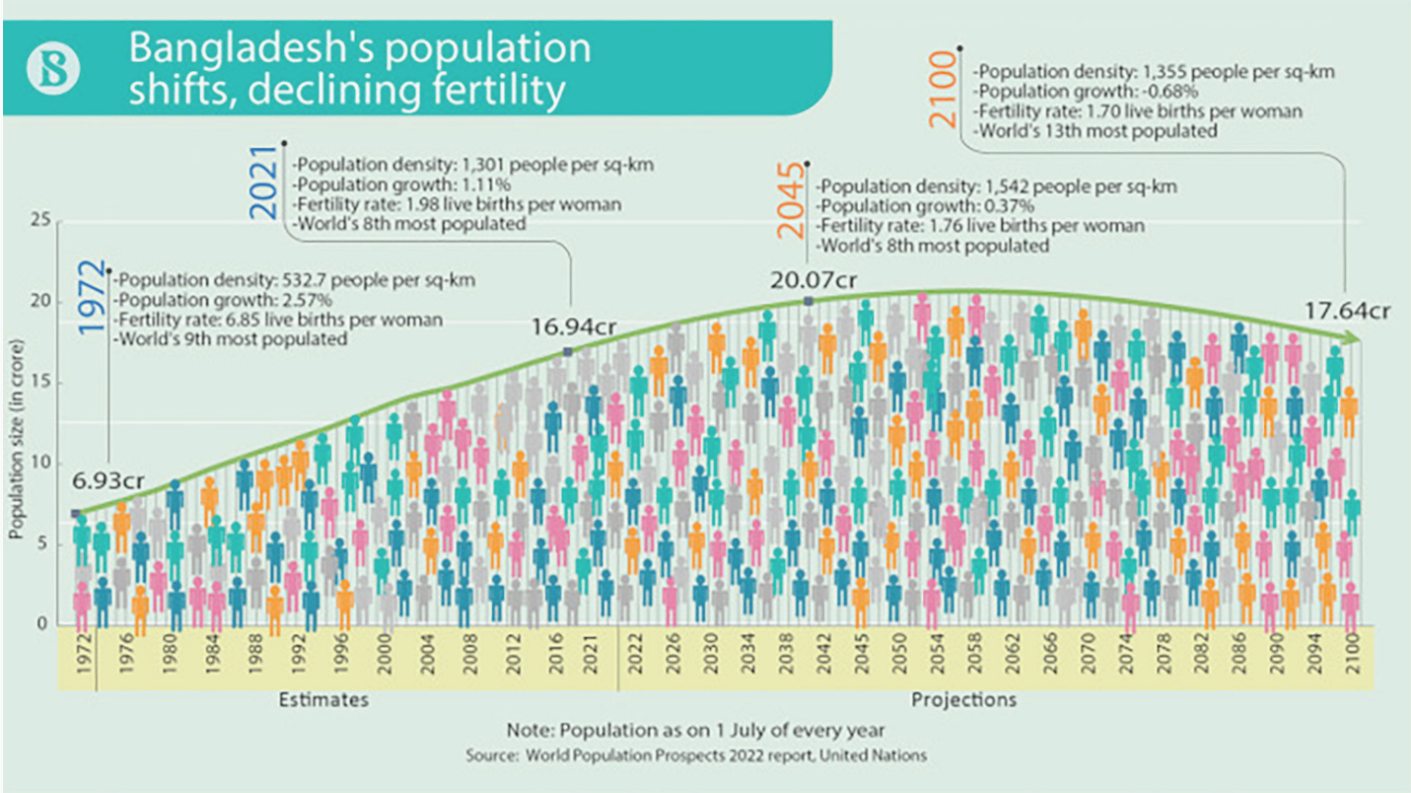



## Socioeconomic development

Bangladesh is a least developed country, scheduled to graduate in 2026 as per the decision of the United Nations General Assembly held in November 2021.[14] In 2022, the country's GDP was $460.2 billion and the GDP per capita $2,688.3.[15] The economy has seen an average annual growth rate of 6.6 per cent for the decade preceding the COVID-19 pandemic, then has slowed down. In 2024, the country's GDP is expected to increase by 5.6 per cent.[16]

The Human Development Index (HDI) value for Bangladesh in 2022 was 0.670. This puts the country in the medium human development category, ranking 129th out of 193.[17] Bangladesh has made relevant progress in reducing poverty, with a decline from 11.8 per cent in 2010 to 5 per cent in 2022, and a similar

**Figure 6:** Bangladesh's population shift[13] ('Crore', or 'cr,' is a word used in many South Asian countries to indicate 10 million)




decrease in moderate poverty from 49.6 per cent in 2010 to 30.0 per cent in 2022.[18] The unemployment rate in 2023 was 5.1 per cent.[19] Wealth inequalities remain a challenge and keep hindering economic progress, with the Gini index increasing from 0.46 in 2010 to 0.57 in 2022.[20]

**Figure 7:** Main data on Bangladesh's socioeconomic development


## Environment

Compared with other countries in the world, Bangladesh is currently a relatively small emitter of greenhouse gases. In 2019, Bangladesh emitted a total of 213.19 million tCO2e of greenhouse gases, which corresponds to 1.29 mtCO2e per capita.[21] This constitutes approximately 0.3 per cent of global carbon dioxide emissions from fuel combustion.[22] However, in the last 20 years the country's carbon dioxide emissions have increased by almost 400 per cent[23] and, according to the business-as-usual (BAU) scenario, Bangladesh's overall emissions are projected to more than double by 2041, reaching 427.72 million tCO2e.[24]

In terms of vulnerability to natural hazards, Bangladesh ranked ninth in the *WorldRiskIndex 2023*.[25] The main threats are cyclone, floods and sea level rise, but the country is also at risk of droughts, coastal and river erosion, storm surges, fires, tsunamis and earthquakes (see figure 9).[26] Between 2000 and 2019, Bangladesh

**Figure 8:** Main data on Bangladesh's environment


**Figure 9:** Map of climate stress areas in Bangladesh [37]

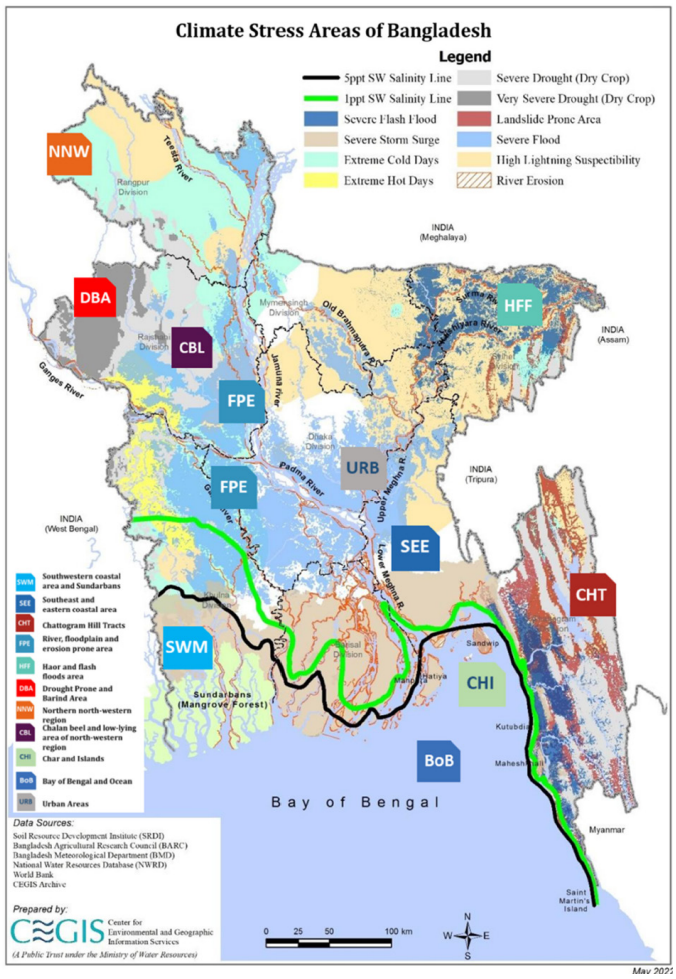



**Figure 10:** Main data on Bangladesh's buildings and construction sector


has suffered significantly from climate change, losing 11,450 lives and incurring economic losses of $3.7 billion due to 185 extreme weather events.[27] Furthermore, climate change is expected to affect human migration, with estimates indicating that more than 13.3 million Bangladeshis could become internal climate migrants by 2050.[28]

## Buildings and construction

The construction sector accounts for about 8 per cent of Bangladesh's GDP.[29] In 2017, the sector had a workforce of 2.4 million people, making up 5.6 per cent of the total employed population.[30] Of this workforce, 7.8 per cent were women.[31]According to Mordor Intelligence, a firm specializing in market intelligence, the current worth of Bangladesh's construction market is around $32.33 billion, with a projected increase to $44.13 billion by 2029.[32] Infrastructure development and urbanisation are the two main drivers of the sector, accounting respectively for 8 per cent and 4 per cent of GDP growth.[33] As of 2020, the demand for affordable housing was of 6 million units, projected to grow to 10.5 million by 2030. On the other hand, supply was much lower, at 31,500 units per year, of which 17,000 were provided by the private sector.[34] However, the residential real estate sector is projected to grow at an annual rate of 7.13 per cent between 2024 and 2028.[35] Additionally, it should be noted that Bangladesh sends a substantial amount of construction workers to various countries, including developed nations. While the numbers are not exact, it is believed that more than 15.5 million Bangladeshi workers (almost 9 per cent of the population) are working abroad, with many in construction.[36]

# Strategic priorities

The national development strategies of Bangladesh focus on graduating from LDC status, but at the same time recognize that managing the inevitable urban transition with minimum impact to the environment is imperative to achieve development goals.[1] Key areas of focus pertaining to buildings and construction include sustainable transport infrastructure, increased urban resilience, sustainable energy, climate change adaptation, urban housing, management of urban slums, water supply and sanitation, pollution reduction and urban risk reduction.[2, 3]

## Current status and progress

Bangladesh has solid institutional arrangements, with the Ministry of Planning playing a pivotal role in defining the country's strategic priorities. The Ministry of Environment, Forest and Climate Change develops and monitors climate change mitigation and adaptation targets, while the Ministry of Social Welfare and the Prime Minister's Office focus on social disparities and promote equity. However, there are gaps in translating priorities into actions and ensuring coordination between different institutions. Furthermore, there is a general lack of awareness on climate change mitigation, which is not a Government priority as Bangladesh is a low-emitting country.

The policy framework, described by table 2, is moderately comprehensive. However, it does have gaps on climate change mitigation; for example, the current NDCs do not consistently deal with the construction sector and lack an implementation plan. Stakeholder engagement mechanisms are in place for supporting the definition of Bangladesh's strategic priorities, but marginalized communities are often excluded due to lack of awareness of these processes. The main gaps in the area of strategic priorities are funding (especially with regard to mitigation and renewable energy), technical capacities and data management, monitoring and reporting.

**Table 2:** Main plans, policies, laws and regulations of Bangladesh related to buildings and construction

| Plan, policy, law, regulation | Strategy/ provision related to buildings and construction | Related GlobalABC objective | | | | |
|---|---|---|---|---|---|---|
| | |  |  |  |  |  |
| Integrated Energy and Power Master Plan (IEPMP) of 2023[4] | Strategies for promoting renewable energy and reducing GHG emissions in the energy sector. | | | | | |
| National Adaptation Plan 2023–2050 (NAP), adopted in 2023[5] | Strategies for improving resilience of buildings, infrastructure and drainage systems and reducing heat island effect. | | | | | |
| Sand and Soil Management Act of 2010[6] and its amendment of 2023[7] | Regulations on sustainable extraction of raw materials. | | | | | |
| National Cooling Plan for the Implementation of the Montreal Protocol of 2021[8] | Regulations on standards for cooling systems. | | | | | |
| Nationally Determined Contributions (NDCs), updated in 2021[9] | Targets for mitigation through GHG emission reduction in industries, brick production, appliances for residential buildings, municipal solid waste, wastewater; targets for adaptation on coastal defences, early warning systems, climate-resilient housing. | | | | | |
| Solid Waste Management Rules of 2021[10] | Regulations for collecting, transporting and disposing of solid waste, including construction waste. | | | | | |
| Bangladesh National Building Code (BNBC) of 2020[11] | Regulations for safety, disaster risk reduction, accessibility and thermal comfort in buildings; strategies for enhancing energy efficiency and reducing buildings' embodied and operational carbon emissions. | | | | | |
| Perspective Plan of Bangladesh 2021–2041, adopted in 2020[12] | Vision to graduate from LDC in 2026 and become a developed country by 2041, recognizing the inevitable need for sustainable urbanisation to drive the economic development goals of the country. | | | | | |
| Bangladesh Standards and Testing Institution Act of 2018[13] | Regulations on standards and certifications for construction materials and products. | | | | | |
| Labour Act of 2006[14] and its amendment of 2018[15] | Regulations on health and safety of workers, including those in the construction industry. | | | | | |
| National Environment Policy (NEP) of 2018[16] | Strategies for reducing the environmental impact of housing and urbanisation, reducing pollution, enhancing renewable energy generation, protecting natural resources, improving adaptation and disaster management. | | | | | |

| Plan, policy, law, regulation | Strategy/ provision related to buildings and construction | Related GlobalABC objective | | | | |
|---|---|---|---|---|---|---|
| | |  |  |  |  |  |
| SREDA Standard and Labeling (Appliances & Equipment) Regulation of 2018[17] | Regulations on energy efficiency standards and labels for systems and appliances. | | | | | |
| National Forest Policy of 2016[18] | Strategies to stop deforestation and promote sustainable forest management. | | | | | |
| National Housing Policy of 2016[19] | Strategies for ensuring equitable access to adequate, safe, healthy and affordable housing and amenities to all persons. | | | | | |
| Brick Manufacturing and Brick Kilns Establishment (Control) Act of 2013[20] | Regulations for limiting negative impacts of brick production on human health and the environment. | | | | | |
| Country Action Plan for Clean Cookstoves of 2013[21] | Targets for mainstreaming clean cooking solutions across the country. | | | | | |
| Rights and Protection of Persons with Disability Act of 2013 | Strategies for enhancing public buildings' accessibility for persons with disabilities. | | | | | |
| Public Procurement Act of 2006[22] | Strategies for promoting environmental sustainability in public procurement. | | | | | |
| National Land Use Policy (NLUP) of 2001 | Strategies for discouraging conversion of agricultural land for urban development. | | | | | |
| Premises Rent Control Act of 1991[23] | Regulations for controlling rent prices and promoting housing affordability. | | | | | |

## Challenges and opportunities

| Challenges | Related GlobalABC objective | | | | |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| **Lack of coordination** including inadequate horizontal coordination at strategic level and vertical coordination between policymakers and planners on one hand, and implementers and enforcement authorities at ground level on the other hand. Similarly, there is a lack of coordination with researchers to ensure evidence-based decision-making and actions. | | | | | |
| **Gaps in the NDCs**, with buildings and construction not considered a priority, and with lack of an updated implementation plan. | | | | | |
| **Poor awareness on climate change mitigation** among stakeholders, including Government authorities at all levels, giving rise to neglect of mitigation in strategic planning and financing. | | | | | |
| **Inadequate integration of climate change into academic curricula**, especially with regard to mitigation. | | | | | |
| **Lack of robust monitoring and evaluation frameworks** to track the effectiveness of adaptation measures and ensure accountability. Adaptation plans should be regularly reviewed and updated based on evolving climate risks and changing socioeconomic conditions. | | | | | |
| **Lack of human resources and institutional capacity** at local level to mainstream climate change adaptation measures. | | | | | |
| **Lack of investments and financial resources** for achieving climate change mitigation and adaptation targets, especially for scaling up renewable energy. | | | | | |
| **Lack of capacities of Government authorities and other stakeholders to access climate financing**, including vertical climate funds such as the Green Climate Fund, the Adaptation Fund and the Loss and Damage Fund. The lack of capacities includes development of competitive proposals with data collection and analysis, conceptualization of proposals and proposal writing. | | | | | |
| **Low engagement of vulnerable and marginalized communities** in the definition of the country's strategic priorities for climate change mitigation and adaptation. | | | | | |
| **Allocation of climate-related funding among ministries not aligned with current needs** of the country, as it follows outdated criteria (based on the Bangladesh Climate Change Strategy and Action Plan of 2009 – BCCSAP). | | | | | |
| **Lack of accessibility to climate data**, including emission data, for stakeholders and Government officials, and lack of a dedicated institution for collecting data, monitoring and reporting on GHG emissions of the construction sector. | | | | | |

| Opportunities | Related GlobalABC objective | | | | |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| **Strong focus on social inclusion** and reduction of poverty and inequalities in the country's main strategic documents and plans. This can ensure that the ecological transition takes place without generating negative impacts on low-income and marginalized communities. | | | | | |
| **Presence of some relevant targets in the NDCs**, including reduction of emissions from brick production and home appliances. These could represent a starting point for reducing emissions in the buildings and construction sector. | | | | | |
| **NDC revision currently ongoing**, with possibility of integrating more targets related to buildings and construction and to draft an adequate implementation plan. | | | | | |
| **Strong policies on climate change adaptation** at the national level, including measures for resilient urban development. The next step would be to implement and enforce these policies at the local level. | | | | | |
| **Existence of established formal mechanisms for stakeholder engagement** in the definition of the country's strategic priorities for climate change mitigation and adaptation. If strengthened, they could allow effective participation of marginalized communities. | | | | | |
| **High awareness of climate change among the population** and strong support for policies for the energy transition and the protection of communities vulnerable to climate-induced disasters. This allows the Government to set ambitious targets without fearing loss of political consensus from the population. | | | | | |
| **Availability of opportunities for financing** outside of the Government's budget, including through international climate finance, public-private partnerships and green financial instruments. Through capacity-building programmes, civil servants could be trained to use these diverse instruments to scale up efforts for climate change mitigation and adaptation in the construction sector. | | | | | |

## The way forward

### Goals and targets

The overall vision for the development of Bangladesh, as outlined in the Perspective Plan of Bangladesh 2021–2041[24] and the consequent 8th Five Year Plan 2020–2025[25], aims to graduate from LDC in 2026 and become a developed country by 2041, recognizing the inevitable need for sustainable urbanisation to drive the economic development goals of the country. This will be achieved through the following strategic goals:

- Reduce GHG emissions of 21.85 per cent by 2030 (as per the updated Nationally Determined Contributions of 2021)[26] and achieve zero emissions by 2070 (as per the Integrated Energy and Power Master Plan of 2023).[27] The target for 2030 consists of an unconditional reduction of 6.73 per cent and a conditional reduction of 15.12 per cent. The conditional reduction will be implemented only if the country receives external financial and technical support. *(Embodied and operational carbon)*

- Reduce the number of persons directly affected by disasters to less than 2,000 per 100,000 population by 2025 (as per the United Nations Sustainable Development Cooperation Framework 2022–2026, Indicator 3.1 of Strategic Priority 3)[28] and to less than 1,000 by 2050. *(Adaptation)*

- Ensure equitable access to adequate, safe, healthy and affordable housing and amenities to all persons (as per the National Housing Policy of 2016)[29] by 2050. (*Inclusion and well-being*)

| Effect on | Country Strategic Goals | Outcome | Baseline | 2030 Target | 2040 Target | 2050 Target |
|---|---|---|---|---|---|---|
|  | **Reduce GHG emissions of 21.85 per cent by 2030 and achieve zero emissions by 2070.** | GHG emissions reduction integrated in buildings and construction. | High levels of embodied carbon in buildings and infrastructure. | 30% reduction in embodied carbon from 2020 levels. | 60% reduction in embodied carbon from 2020 levels. | Achieve near-zero embodied carbon in new constructions. |
| | | | High operational carbon emissions due to inefficient energy use in buildings. | 25% reduction in operational carbon from 2020 levels. | 50% reduction in operational carbon from 2020 levels. | Achieve near-zero operational carbon in new and existing buildings. |
| | | Behavioural shifts towards sustainable practices among building occupants. | Limited awareness and adoption of sustainable practices among building occupants. | Launch public awareness campaigns to educate building stakeholders about the benefits of decarbonization, material reuse and sustainable construction practices.<br><br>50% of building occupants adopt sustainable practices. | Facilitate knowledge-sharing platforms and networking events to promote best practices in energy-efficient building design.<br><br>75% of building occupants engage in sustainable practices, leading to significant operational carbon reductions. | Develop educational materials, such as brochures and online resources, for the widespread dissemination of information.<br><br>100% of building occupants practice sustainability, including energy efficiency, waste reduction, reuse, and recycling. |
| | | Enhanced knowledge and technical capacity among construction professionals on sustainable building technologies and renovation methods. | Inadequate technical knowledge and capacity in the construction sector for sustainable renovations. | Provide training for unskilled labour to improve the quality of construction and safety standards. Provide training for architects, engineers, contractors, inspectors, and stakeholders in resilient design and construction.<br><br>Technical training programmes introduced for 50% of construction professionals on sustainable renovation practices. | Provide training to construction personnel on construction waste management plans, waste classification, recycling and reuse. Strengthen the integration of sustainability principles into architecture and engineering curricula and vocational programmes.<br><br>75% of construction professionals trained in sustainable construction and low-carbon technologies. | Invest in building inspector training and certification programmes to enhance competency in assessing energy performance and compliance.<br><br>100% of professionals engaged in the renovation are certified in sustainable building technologies. |

| Effect on | Country Strategic Goals | Outcome | Baseline | 2030 Target | 2040 Target | 2050 Target |
|---|---|---|---|---|---|---|
|  | **Reduce the number of persons directly affected by disasters to less than 2,000 per 100,000 population by 2025 and to less than 1,000 by 2050**. | Strengthened adaptive capacities and planning. | Limited adaptive capacity, high vulnerability to climate impacts. | Integration of climate adaptation in all regional development plans. | Increased human, technical and financial capacity of local governments to implement adaptation measures. | Full adaptation capacity in all regions, with resilience measures integrated into all planning and construction processes. |
|  | **Ensure equitable access to adequate, safe, healthy and affordable housing and amenities to all persons by 2050.** | Enhanced participation of marginalized communities and data transparency. | Marginalized communities are underrepresented in planning processes, limited data transparency. | Formal mechanisms for marginalized community and youth participation in all strategic planning processes. | Comprehensive digital platform for construction-related climate data accessible to all stakeholders. | Fully integrated and inclusive planning processes with real-time data access for all citizens. |

**Prioritized actions**

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
|  | 1 | Establish a central data repository integrated with national climate systems to monitor carbon emissions in the buildings and construction sector, ensuring data is accessible to local governments and private developers for immediate action. | | | | MoEFCC | NIPORT, BBS, local governments, private sector |
| | 2 | Form a Council for Decarbonization comprising relevant experts and stakeholders from Government, academia, professional bodies, industry, and NGOs. The council would be responsible for promoting, regulating, and overseeing sustainable buildings and construction in the country, ensuring a coordinated approach to implementing sustainability measures and providing support and guidance to the construction industry. It would also engage in partnerships and community outreach to define key energy consumption and carbon emissions indicators, facilitating data-driven decisions for sustainable development in the building and construction sector. | | | | MoHPW, DoA, BBRA | Academia, industry, professional bodies, international partners and donors, NGOs |
| | 3 | Strengthen coordination among Government agencies involved in land-use planning, disaster management, and sustainable development. Establishing regular communication and collaboration channels would ensure a unified and efficient approach to promoting sustainable construction practices. | | | | MoHPW | International partners and donors |

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
| | **4** | Develop a Monitoring, Reporting, and Verification (MRV) system to track the progress and impact of sustainable construction initiatives. Regular assessments and audits would help identify areas for improvement, ensure compliance with regulations, and demonstrate the benefits of sustainable practices to stakeholders. | | | | MoEFCC | Real estate developers, construction industry associations, professional bodies, local governments |
| | **5** | Integrate embodied and operational carbon reduction strategies into nationally determined contributions with clear targets for the construction sector, ensuring alignment with Bangladesh's climate goals. | | | | MoEFCC | MoPEMR, MoHPW, Planning Commission |
| | 6 | Revise and enforce the Bangladesh National Building Code (BNBC) to incorporate actionable regulations on embodied and operational carbon reduction, with clear compliance paths and penalties for non-compliance. | | | | MoHPW | RAJUK, construction industry associations, professional bodies |
| | **7** | Create provision of qualified and adequate human resources in local government institutions for proper BNBC implementation and monitoring. | | | | Development Authorities | Pourashavas, LGED |
| | **8** | Incorporate sustainability principles into the education system at all levels, from primary schools to universities. | | | | MoE | Academia, Government, professional bodies |
| | **9** | Include modules on climate change mitigation in academic curricula, especially in the fields of urban planning, architecture and engineering. Ensure that vocational training institutions also include sustainable building technologies and energy efficiency principles in their curricula. | | | | MoE, BTEB | Academia, international partners and donors, Government, professional bodies, industry |
| | **10** | Establish continuous education and certification programmes that focus on sustainable buildings and construction. These programmes would encourage ongoing professional development, ensuring that construction professionals stay updated on the latest sustainability trends and technologies. | | | | MoHPW | Academia, NGOs, professional bodies, Government, industry |
| | **11** | Encourage and support research and development initiatives focused on sustainable buildings, construction materials and technologies. This includes funding research projects and fostering partnerships with academic institutions and innovation hubs. | | | | HBRI | Industry, academia, Government, international partners and donors, professional bodies |

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
| | 12 | Establish collaborations with international organizations to leverage global knowledge and expertise on sustainable buildings and construction. These partnerships would help develop local capacities, enhance technical know-how, and ensure that Bangladesh adopts best practices. | | | | MoHPW | International partners and donors, academia, HBRI |
| | 13 | Launch a campaign to raise awareness of climate change mitigation and energy efficiency, highlighting the cost savings, environmental benefits and improved performance of energy-efficient buildings and technologies. Use various media platforms, including social media, television, radio, and print, to reach a wide audience, making sustainable practices more mainstream and driving behavioural change. | | | | SREDA, MoHPW | Government, academia, MoIB, industry, NGOs, media partnerships, PR agencies |
| | 14 | Organize workshops, seminars, and exercises on sustainable practices to engage stakeholders, including architects, engineers, builders, and homeowners. | | | | HBRI | Government, professional bodies, industry, academia, railways, PWD, LGD, NHA |
| | 15 | Create platforms to share success stories and case studies that demonstrate the tangible benefits of sustainable practices in television and social medias. | | | | MoIB, MoHPW | NGOs, Government, industry, international partners and donors |
| | 16 | Identify and secure funding from national and international sources to support sustainability initiatives in the construction sector. Develop financial products and incentives, such as grants, low-interest loans, and tax benefits, to encourage developers and builders to adopt sustainable construction practices. Establish dedicated funding mechanisms, such as green bonds and public-private partnerships, to mobilize investment in zero-energy projects. Promote investments by offering affordable long-term financing, technical and construction assistance, favourable tax policies, and direct cash incentives. | | | | MoHPW | International partners and donors, NBR, MoF, financial institutions, RAJUK, professional bodies, NGOs, MoPEMR |
| | 17 | Develop incentive programmes (such as competitions and certification schemes) that reward individuals and organizations for adopting sustainable practices. These incentives could include financial subsidies, tax breaks, or public recognition, encouraging more people to make eco-friendly choices. | | | | DoE | Government, international partners and donors, industry, private developers, municipalities |

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
|  | **18** | Establish a cross-ministerial task force to prioritize climate adaptation, ensuring that national policies on adaptation are translated into actionable plans at local levels with clear resource allocation and accountability mechanisms. | | | | MoEFCC | LGIs, NGOs, Development Authorities, MoHPW |
| | **19** | Schedule and conduct regular online and offline coordination events, such as view exchange meetings, workshops, seminars and conferences among relevant Government departments and stakeholders. These events would ensure ongoing communication, tackle challenges, and align efforts towards common adaptation goals. | | | | MoHPW | Industry, professional bodies, NGOs |
| | **20** | Implement a centralized database to facilitate information sharing among Government agencies. This database should include data on building resilience, climate risks, and adaptation measures, enabling agencies to access and use up-to-date information for decision-making. | | | | MoHPW | Industry |
| | **21** | Mainstream climate adaptation into local and regional development plans by integrating local climate data and providing technical and financial support to enhance resilience. | | | | LGD | MoEFCC, LGIs, Development Authorities |
| | **22** | Implement community-based participatory planning in vulnerable regions, ensuring local knowledge is integrated into national adaptation strategies through formal feedback mechanisms. | | | | MoEFCC | Local communities, NGOs |
| | **23** | Develop long-term adaptive capacity at the local level by offering continuous training programmes and resource mobilization, with a focus on building local expertise in climate adaptation. | | | | MoEFCC | LGIs, NGOs |
| | **24** | Establish dynamic monitoring and evaluation frameworks for adaptation measures, ensuring that local governments regularly update their plans based on evolving risks and climate data insights. | | | | MoEFCC | Development Authorities, academia |
| | **25** | Develop and enforce updated building codes (i.e. BNBC) that integrate climate resilience measures. These codes should focus on the specific risks of extreme weather events, such as floods, cyclones, and heat waves, ensuring that new buildings are designed to withstand these challenges. | | | | HBRI, PWD | Academia, Government, professional bodies, industry, Development Authorities, LGD, DoA |
| | **26** | Launch awareness campaigns and training programmes to educate property owners, builders, and developers about the importance of resilience in buildings and construction. | | | | MoHPW, NGOs | Government, industry |

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
| | 27 | Conduct training programmes on climate resilience for architects, engineers, builders, and other construction professionals. | | | | HBRI | Academia, PWD, LGD, international partners and donors, Government, professional bodies, NGOs |
| | 28 | Ensure that all planning, programmes and projects related to adaptation are adopted in accordance with national policy, with emphasis on hierarchy, harmony, and integration. | | | | Planning Commission | MoHPW, RAJUK, LGIs |
|  | 29 | Establish formal mechanisms to promote the participation of marginalized communities and youth in decision-making processes, ensuring their input is reflected in national and local policies. | | | | MoEFCC | NGOs, local communities, Planning Commission |
| | 30 | Create a user-friendly digital platform for climate data, integrating real-time data updates and offering training for stakeholders to ensure practical use in decision-making. | | | | MoLGRDC | NIPORT, academia, NGOs |
| | 31 | Launch a cohesive public awareness and education campaign on operational carbon reduction, integrating energy-efficient practices into national climate goals, and ensuring community-level understanding and action. | | | | MoEFCC | NGOs, media, civil society organizations |

# Spatial and urban development

Spatial and urban development in Bangladesh is evolving rapidly as the country experiences significant economic and urban growth and population expansion. This generates opportunities but also poses considerable challenges such as ensuring sustainable cities and environmental concerns. The country's institutions and policy frameworks are struggling to keep pace with such fast growth and to govern urban expansion in an effective manner.

## Current status, projections and progress

Bangladesh has experienced remarkable progress in urbanisation and urban growth in the past decades. In 1951, Bangladesh was mostly rural with only 4 per cent of the inhabitants living in urban areas,[1] but now the urban population is thought to range between 31.5 per cent and 40 per cent.[2, 3]

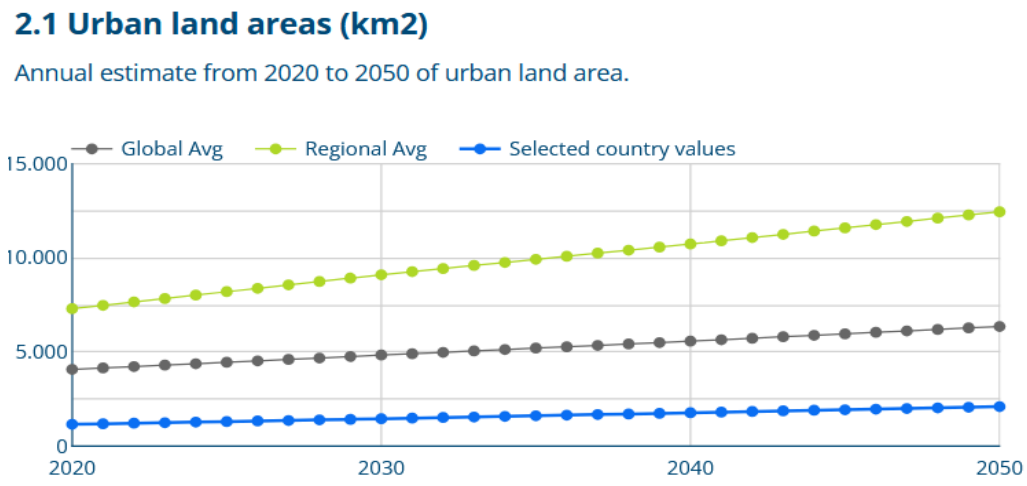
Major obstacles to the successful management of these trends include overlapping mandates, absence of a National Urban Policy, and limited coordination among the key institutions responsible for spatial and urban development. The entities are the Ministry of Housing and Public Works, the Ministry of Local Government, Rural Development and Co-operatives, and local government institutions. Therefore, spatial planning covers just 10 per cent of the country's entire land area. Urban plans are successfully adopted almost only in large cities governed by Development Authorities, and even in these cases there are difficulties in implementation and enforcement.

Furthermore, stakeholder engagement in spatial and urban planning is not being effectively implemented due to the lack of official guidelines and procedures. Public funding for sustainable spatial and urban planning is limited, and knowledge and technical capacities are overall low, with Development Authorities being the only institutions that have well-organized planning departments. Another obstacle arises from the insufficient availability of land data. Bangladesh is in the process of developing a digital land data management system that will provide easy access to geolocalized land records, but there is no clarity on when this platform will be completed.

**Embodied carbon**

The total built-up area in the country has increased from 329 km$^2$ in 2000 (0.23 per cent of the total land mass) to 830 km$^2$ in 2018 (0.59 per cent),[4] and is estimated to increase to 1,453 km$^2$ by 2030 (0.98 per cent) and 2,098 km$^2$ by 2050 (1.41 per cent; see figure 11).[5] Rapid urban

**Figure 11:** Annual estimate from 2020 to 2050 of urban land area in Bangladesh (km$^2$)[6]



expansion is driven by a myriad of factors, including population growth, rural-to-urban migration and the quest for better economic opportunities. Furthermore, climate change impacts on coastal areas, such as floods, are prompting migration towards cities. This rapid urban growth poses significant challenges, including increased pressure on limited resources, inadequate infrastructure and housing supply, environmental degradation and social inequalities.

**Operational carbon**

Bangladesh has almost achieved universal access to electricity, covering 99.25 per cent of households. Up to 97.61 per cent of households are connected to the national grid.[7] However, the network is obsolete and inefficient. Frequent power supply disruptions occur, and only 28 per cent of the country's population uses clean fuels and technologies for cooking (see figure 12).[8] Furthermore, electricity demand is exacerbated by urban heat islands, which are a relevant phenomenon in the country's largest cities, and especially in the core areas of Dhaka where the average surface urban heat island intensity during the day can be as high as 5°C (see figure 13).[9]

**Figure 12:** Sources of cooking fuel for Bangladesh's households[10]

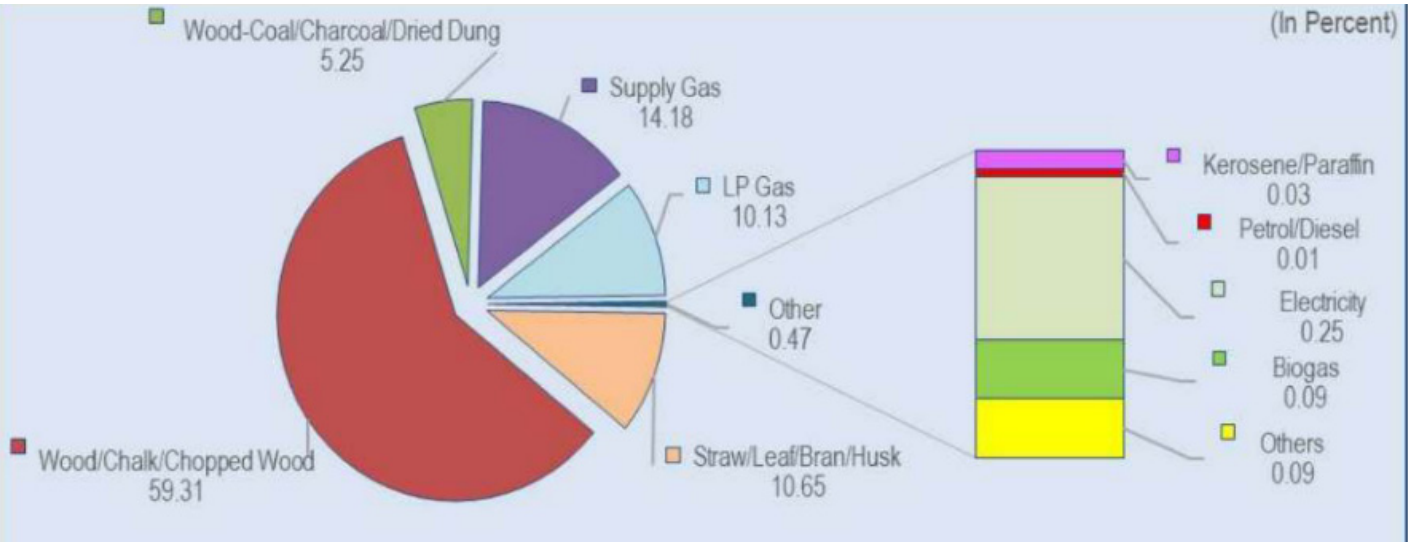
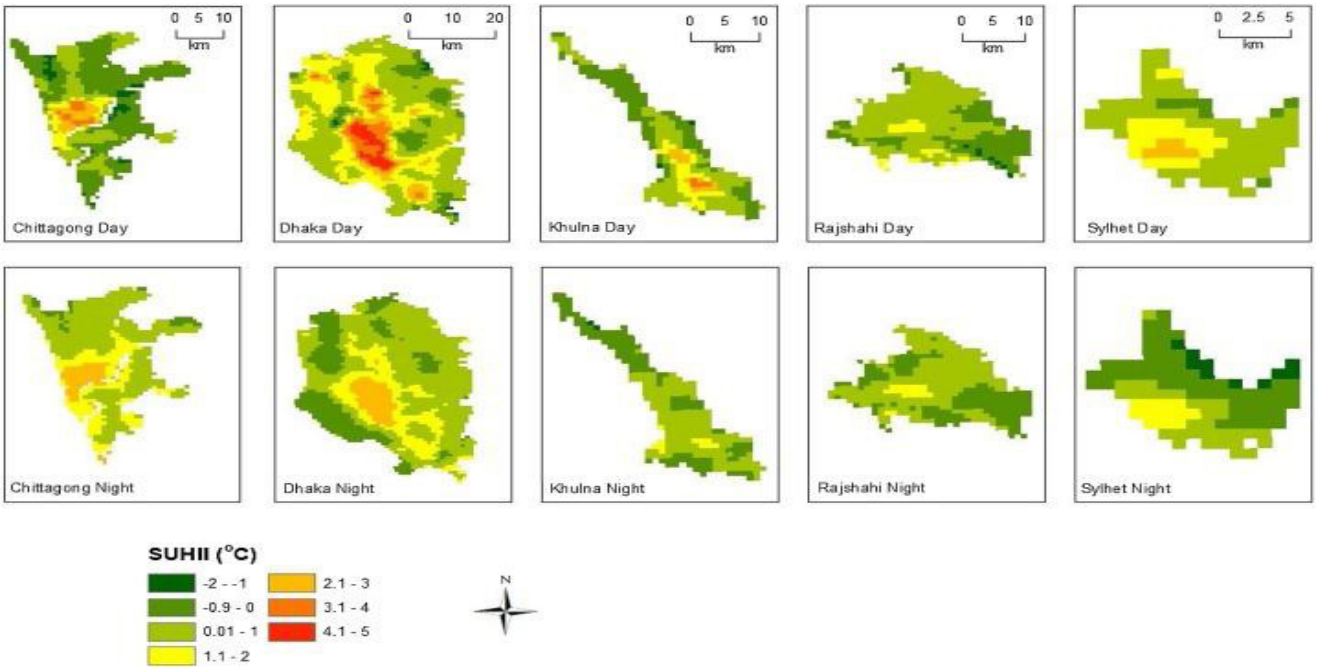


**Figure 13:** Surface urban heat island intensity (SUHII) in Bangladesh's major cities[11]



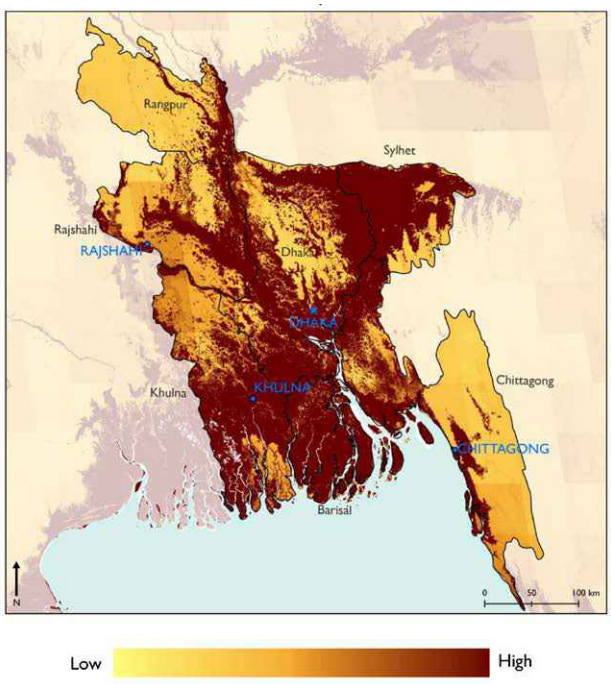

**Adaptation**

Bangladesh is highly prone to natural hazards and extreme weather events, with 33 per cent of its population living in areas affected by very high climate exposure and another 56 per cent living in areas with high climate exposure (see figure 14).[12] Every year, climate and other hazards put at risk 1.14 per cent of Bangladesh's buildings, for an average annual loss of $7.7 billion, mostly due to flood hazards.[13] Between 2020 and 2022, 7.28 per cent of the population has been affected by natural disasters.[14] There is limited data on urban disaster resilience across the country, but it is generally considered to be inadequate.

**Well-being and inclusion**

Slums are a significant phenomenon in Bangladesh, reflecting the challenges of rapid urbanisation, poverty and inadequate housing. The official census of 2022 has assessed a slum population of about 1.74 million people,[16] but World Bank estimates put that figure much higher, suggesting 52 per cent of the country's urban population live in informal settlements.[17] Despite the Government's efforts to raise living conditions in slums and increase the stock of affordable housing (e.g. through the Ashrayan Project), challenges persist, including land tenure complications and limited access to formal housing markets.

**Figure 14:** Climate exposure in Bangladesh[15]



## Challenges and opportunities

| Challenges | Related GlobalABC objective | | | | |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| **Rapid and uncontrolled urbanisation** not keeping pace with the high demand for adequate shelter, infrastructure and amenities in urban areas and leading to the disruption of agricultural lands and natural environments. | | | | | |
| **Climate change impacts prompting migration** towards cities, thus placing added strain on urban areas. | | | | | |
| **Low use of clean fuels** and technologies for cooking, especially (but not only) in rural areas. | | | | | |
| **Lack of policies aimed at reducing urban heat islands** and lack of official data on the issue. | | | | | |
| Large portions of territory, buildings and population extremely **vulnerable to climate-induced disasters**. | | | | | |
| **Insufficient level of urban resilience** in large cities, especially in terms of natural and institutional resilience. | | | | | |
| **Lack of reliable data on slum population**, with very different estimates from the Government and the World Bank. | | | | | |
| **Lack of coordination** among institutions at the national level and between central Government and local institutions. | | | | | |
| **Lack of a National Urban Policy** and an overall spatial planning framework for the whole country. | | | | | |
| **Lack of an institutional framework** for implementing, monitoring and enforcing spatial and urban planning. | | | | | |
| **Lack of provisions for adaptation**, resilience, environmental preservation and biodiversity in spatial and urban planning. | | | | | |
| **Lack of official guidelines for stakeholder engagement** and for participation of marginalized communities in the planning process. | | | | | |
| **Limited or non-existing funding** for climate change mitigation and adaptation in spatial and urban planning. | | | | | |
| **Lack of capacity** on spatial and urban planning in the public sector at the national and local levels. Inadequate teaching of climate change in university courses on urban planning, and lack of research on climate change mitigation and adaptation for spatial and urban planning. | | | | | |
| **Lack of data on land use** that are publicly available, digitalized and geolocalized, as well as lack of vulnerability mapping and early warning systems. | | | | | |
| **Lack of mechanisms for monitoring and evaluating** the impact of spatial and urban planning initiatives on social inclusion and well-being (e.g. indicators on housing affordability and community satisfaction). | | | | | |

| Opportunities | Related GlobalABC objective | | | | |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| Presence of a **draft National Urban Policy**. If updated and approved, it could provide an effective framework for spatial and urban planning nationwide. | | | | | |
| **Universal access to electricity** almost achieved. If properly strengthened, the electricity system has the potential to reduce emissions significantly and allow the widespread adoption of clean cooking technologies. | | | | | |
| Existence of policies and initiatives for strengthening the **resilience of the electricity network** and for promoting **clean fuels** and technologies for cooking. If strengthened, they could contribute significantly to reduce emissions. In particular, efforts to promote clean fuels and technologies for cooking would have a very significant impact on Bangladesh's carbon emissions. | | | | | |
| Existence of large **affordable housing programmes**, providing adequate shelter to homeless and marginalized families. If scaled up, these programmes could significantly improve social inclusion, reduce slums and improve the overall sustainability and resilience of the built environment. Specifically, the Ashrayan Project could be improved by integrating designs and materials that consider climate change mitigation and adaptation. | | | | | |
| Implementation of successful **experiments of participatory approaches** to spatial and urban planning (e.g. PRA approach, GIZ manual for stakeholder participation). If promoted and replicated, these approaches could increase the level of public participation and the involvement of marginalized communities. | | | | | |
| Existence of a platform for **data on urban resilience** (GeoDASH), which is publicly available, digitalized and geolocalized. If improved and regularly updated, this could allow national and local governments to integrate measures for adaptation and resilience, effectively. into spatial and urban planning. | | | | | |

## The way forward

### Goals and targets

The vision for spatial and urban development is to create resilient, inclusive, and sustainable urban environments that enhance the quality of life for all residents while minimizing environmental impact and promoting economic prosperity. This will be achieved through the following objectives:

- Limit carbon emissions by 2050. *(Embodied and operational carbon)*
- Develop climate sensitive cities for improvement of urban environment, well-being and sustainability (as per Goal 3 of the National Adaptation Plan 2023–2050).[18] *(Adaptation)*
- Manage the rural to urban transition with minimal impact on the environment and society. *(Well-being and inclusion)*

| Effect on | Country Strategic Goals | Outcome | Baseline | 2030 Target | 2040 Target | 2050 Target |
|---|---|---|---|---|---|---|
|  | **Limit carbon emissions by 2050.** | Reduce emissions associated with land use and land cover change. | High levels of embodied carbon due to inefficient land use and construction practices. | 25% reduction in embodied carbon through improved spatial planning. | 50% reduction with widespread adoption of low-carbon zoning. | Achieve near-zero embodied carbon in urban development. |
|  | | Minimize operational carbon emissions from buildings and infrastructure. | High operational carbon emissions due to outdated building practices. | 20% reduction in operational carbon through energy-efficient designs. | 40% reduction with the implementation of low-carbon coastal urban development plans. | Achieve near-zero operational carbon in all building and infrastructure projects. |
|  | **Develop climate sensitive cities for improvement of urban environment, well-being and sustainability.** | Improve climate adaptation in urban planning. | Low resilience in urban areas, with high vulnerability to climate impacts. | Climate adaptation integrated into 50% of urban and regional development plans. | 80% resilience in urban areas with significant reduction in climate-related vulnerabilities. | Full resilience with all urban areas adapted to climate impacts. |
|  | **Manage the rural to urban transition with minimal impact on the environment and society.** | Enhance data accessibility and transparency for informed decision-making. | Establishment of formal mechanisms for participation and a digital platform for data transparency. | Comprehensive inclusion of marginalized communities in all urban planning processes. | Full integration of marginalized communities in urban planning, with real-time data access for all citizens. | Fully integrated and inclusive planning processes with real-time data access for all citizens. |

### Prioritized actions

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
|  | 1 | Enforce spatial planning and zoning guidelines through regular field inspections to promote high-density development and prevent urban sprawl. | | | | City Corporations, municipalities | LGIs, UDD, NHA |
| | 2 | Develop spatial development frameworks for all regions, including urban growth boundaries, preservation of historical areas, and creation of low-carbon districts. | | | | MoHPW | LGIs, UDD, NHA |
| | 3 | Revise zoning guidelines to incorporate low-carbon building zone requirements. | | | | MoHPW | LGIs, UDD, NHA |
| | 4 | Create a national digital land-use database to track spatial and urban development effectively. | | | | MoL | LGIs, UDD |
| | 5 | Improve the technical capacities of built environment professionals at city corporations, municipalities, and LGIs in low-carbon development to improve planning and management of human settlements. | | | | MoHPW | City Corporations, municipalities, LGIs |
| | 6 | Implement tax measures and other mechanisms to discourage speculation on residential land and retention of vacant land in urban and semi-urban areas. | | | | MoF | LGIs, UDD, NHA |
| | 7 | Advocate for the creation of a National Urban Policy and an overall spatial planning framework for the entire country, including the introduction of a new climate-sensitive urban and regional planning law. | | | | MoHPW | UDD, BIP |
| | 8 | Integrate renewable energy systems (solar, wind) into urban planning strategies for residential, commercial, and industrial areas. | | | | MoHPW | LGIs, private sector, REHAB, DoA, UDD |
| | 9 | Develop and implement green building codes and guidelines for rainwater harvesting, waste management, and carbon sink zones in construction projects. | | | | MoHPW | RAJUK, Development Authorities, construction industry associations, NGOs |
| | 10 | Prepare comprehensive spatial plans for smaller but rapidly growing cities to ensure sustainable urban development. | | | | MoHPW | City Corporations, LGIs, UDD |

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
| | 11 | Promote the development of satellite towns around Dhaka and Chittagong to manage urban expansion and reduce the pressure on major cities. | | | | MoHPW | City Corporations, RAJUK, UDD |
|  | 12 | Develop policies to increase the use of clean fuels and technologies for cooking, particularly in rural areas, as part of the broader strategy to reduce operational carbon. | | | | MoHPW | LGIs, private sector, REHAB, DoA, professional institutes, UDD |
| | 13 | Identify and tackle challenges such as policy updates, awareness-raising, incentives, and capacity-building for clean fuels and technologies in cooking, particularly in rural areas. | | | | MoEFCC | LGIs, NGOs, private sector |
| | 14 | Develop a low-carbon coastal urban development masterplan for coastal cities in the southern part of the country to manage growth while minimizing emissions. | | | | MoHPW | Coastal Development Authorities, LGIs, NGOs |
| | 15 | Develop a comprehensive urban greening programme, prioritizing heat-prone areas and involving local governments and NGOs. | | | | Department of Arboriculture | LGIs, Development Authorities |
| | 16 | Address the lack of policies and official data on urban heat islands by incorporating urban heat mitigation strategies and initiating data collection. | | | | Department of Arboriculture | LGIs, Development Authorities |
| | 17 | Develop a masterplan for public infrastructure in major cities, focusing on green urban transport and energy-efficient public facilities. | | | | MoHPW | City Corporations, RAJUK, private sector |
|  | 18 | Mandate the inclusion of climate adaptation in local and regional development plans, with technical and financial support for local governments. | | | | LGD | LGIs, UDD |
| | 19 | Develop sustainable urban infrastructure with green building practices and climate-resilient designs, ensuring guidelines are mandatory for all publicly funded infrastructure. | | | | MoHPW | LGIs, NHA, private sector |
| | 20 | Incorporate water-sensitive design principles into urban planning to manage storm water, reduce flooding risks, and integrate rainwater harvesting systems in buildings. | | | | MoHPW | City Corporations, LGIs, Development Authorities |
| | 21 | Develop strategies for urban heat island mitigation in major metropolises by incorporating green spaces and reflective materials in urban planning. | | | | MoEFCC | City Corporations, LGIs, Development Authorities |

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
|  | 22 | Strengthen local government institution (LGI) enforcement mechanisms to involve slum dwellers and vulnerable populations in urban planning across Bangladesh to ensure equitable participation in urban development. | | | | LGD | NGOs, NHA, Development Authorities |
| | 23 | Initiate comprehensive data collection efforts to remedy the lack of reliable data on the slum population, ensuring regular updates to estimates for accurate planning. | | | | LGD | NGOs, NHA, Development Authorities |
| | 24 | Enforce inclusionary zoning policies that require a mix of housing types and income levels in new developments. This will help ensure that affordable housing options are available within new projects, promoting socioeconomic diversity. Encourage mixed-use developments that combine residential, commercial, and recreational spaces to optimize land use and create vibrant, integrated communities. | | | | UDD | NHA, Development Authorities, academia, industry, NGOs, international partners and donors |
| | 25 | Conduct research on population density and threshold limits for construction projects to ensure sustainable urban growth and mitigate risks related to overpopulation. | | | | Department of Urban and Regional Planning (BUET) | MoHPW, City Corporations, LGIs |
| | 26 | Implement a capacity-building programme for Government authorities on rights-based approaches to urban planning, enhancing knowledge and skills for inclusive planning. | | | | LGD | NGOs, professional bodies, LGIs |
| | 27 | Establish coordination frameworks among national and local institutions, and between central and local governments, to improve planning and implementation and ensure cohesive urban planning efforts. | | | | LGD | NGOs, professional bodies, LGIs |
| | 28 | Develop a digital platform for publicly accessible, digitized, and geolocalized land-use data to improve transparency and accessibility of land-use information. Ensure the digital platform includes comprehensive land-use data, vulnerability mapping, and early warning systems to enhance disaster preparedness and risk management. | | | | MoEFCC | DoE, NIPORT, BBS, professional bodies, UGC, international partners and donors |
| | 29 | Establish official guidelines for stakeholder engagement and participation of marginalized communities in the planning process, integrated into the digital platform. | | | | MoEFCC | DoE, NIPORT, BBS, professional bodies, UGC, international partners and donors |

# Existing and new buildings

Bangladesh's rapid urban development and the increasing prevalence of multi-storey buildings in cities have brought about significant changes in the urban landscape and living conditions. These developments have presented several challenges, particularly in terms of energy consumption, environmental impact and occupants' comfort and well-being.

There is growing concern within the country regarding energy efficiency, resilient construction, and equal access to housing. The Government has adopted policies, laws and regulations to respond to these concerns, yet stakeholders feel that existing initiatives are inadequate, especially in terms of funding, technical capacities and data management. Furthermore, it has been observed that there is a much stronger focus on new constructions compared to retrofitting of existing buildings, a trend that is hindering the country's efforts in embodied carbon reduction.

## Current status, projections and progress

The are 35,621,687 dwellings in Bangladesh of which 27,646,822 (78 per cent) are in rural zones and 7,974,865 (22 per cent) in urban areas.[1] The country has a rich history of architecture and construction, spanning from traditional Bengali houses to colonial-era bungalows, to post-colonial housing colonies, and multi-storied apartments. Over the past two decades, rapid urban development has led to a significant increase in the number of buildings in cities. Multi-storied apartments are frequently built on small plots with minimal setbacks, sacrificing daylight and natural ventilation, resulting in substandard living conditions and greater dependence on artificial lighting and air conditioning. The implementation of innovative technologies such as energy-efficient systems, green roofs, improved ventilation and rainwater harvesting systems in new buildings is currently limited by financial constraints and lack of technical expertise.

The Government's efforts to promote sustainable renovation of existing buildings are scarce, as the focus is more on new constructions. There are only limited attempts at regulating, monitoring and promoting energy efficiency and equal access to housing, while the issues of embodied carbon, recycling, adaptation, and accessibility pertaining the existing building stock are overlooked. Stakeholder engagement is considered inadequate, funding is very limited, public servants and professionals lack technical capabilities, and data management is poor.

With regard to new buildings, the situation is generally better but important gaps still remain. Institutional arrangements are centred around the Ministry of Housing and Public Works, which is responsible for approving construction codes and promoting sustainable construction. The policy framework is comprehensive, with the Bangladesh National Building Code of 2020 mainstreaming sustainability, resilience and accessibility, but there are serious lapses in its implementation and enforcement. Stakeholder engagement is considered inadequate. Funding options are greater than for renovation of existing buildings, but are still limited. Technical capacities are generally good in the field of operational carbon and energy efficiency, but there is little awareness of other issues, and data management is poor overall.

**Embodied carbon**

Annual emissions of embodied carbon released during construction and renovation of buildings in Bangladesh are estimated to be 12.7 billion tCO2e. They are projected to increase to 19.2 billion by 2030 and 46.7 billion by 2050 (see figure 15).[2] It has been estimated that 94.77 per cent of GHG emissions in the construction of buildings are released during the manufacture of building materials, with bricks accounting for 48.67 per cent of the total and concrete for 35.22 per cent (see figure 16).[3] The use of high-carbon materials, such as concrete, bricks and metal has grown significantly over the past decade, at the expense of less durable but more sustainable alternatives such as mud, unburnt bricks, hay, straw, bamboo and leaves. Currently, the most

used materials for walls are cement, concrete, brick, terracotta (46.66 per cent of households), and metal sheets and corrugated iron sheets (42 per cent), while the most used materials for roofs are tin and corrugated iron sheets (76 per cent).[4]

**Operational carbon**

Bangladesh's annual energy consumption is of 42 Mtoe, with the residential sector as the dominant consumer, accounting for 22.7 Mtoe. Of these, 14.99 Mtoe are produced by biofuels, that is firewood for cooking, while only 3.11 Mtoe are produced through electricity (see figure 17).[7] Electricity consumption in residential buildings is mostly related to fans (29.2 per cent), refrigerators (18.5 per cent), lighting (14.9 per cent), television (11.9 per cent) and air conditioning (11.7 per cent).[8] Although air conditioning usage is relatively low, it is worth noting that it has increased by around 20 per cent from 2018 to 2022 and keeps growing.[9] Appliances and systems are often not up to high-energy efficiency standards, and an upgrade in this respect would lead to

**Figure 15:** Annual building stock embodied carbon emissions in Bangladesh (billion tCO2e)[5]

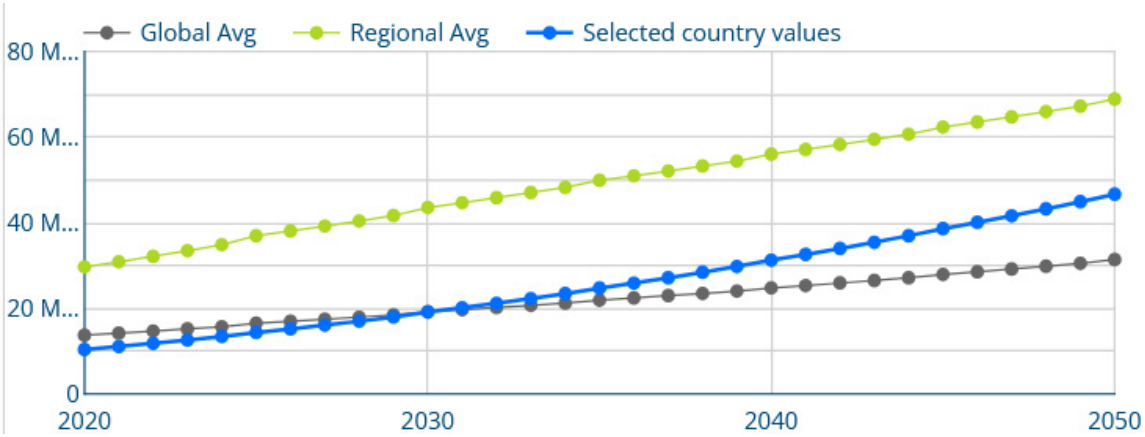
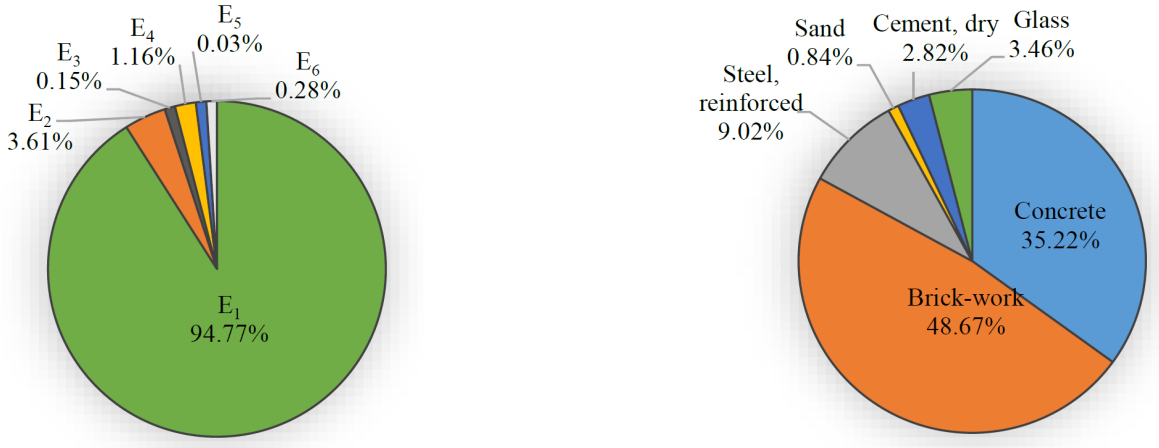



**Figure 16:** Contributing factors (left) and emission sectors (right) in total GHG emissions of Student Welfare Centre building, Khulna University of Engineering & Technology (KUET), Khulna[6]



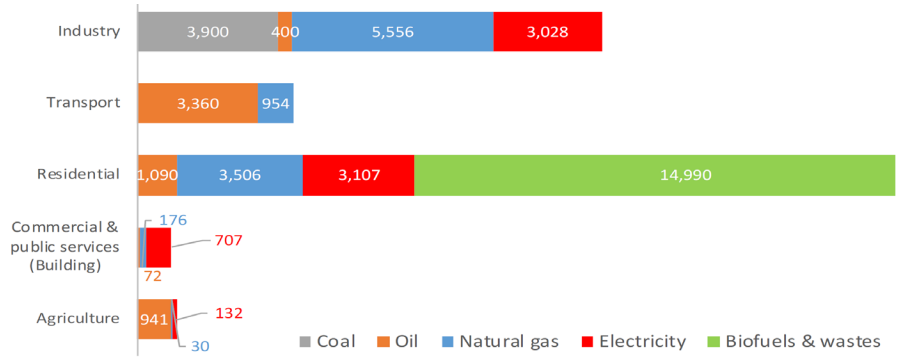

*E1. Embodied GHG emissions due to the manufacture of building materials; E2. GHG emissions from transportation for building materials; E3. GHG emissions from fuel combustion of construction equipment; E4. GHG emissions due to electricity used for construction equipment; E5. GHG emissions from fuel combustion of transportation for construction waste; and E6. GHG emissions from burning of wooden wastes.*

a 28.8 per cent reduction of electricity consumption in residential buildings.[10] Overall, the annual emissions of operational carbon associated with energy consumption of Bangladesh's building stock are estimated to be of 29.8 million tCO2e. They are projected to increase to 45.1 million by 2030 and 109.8 million by 2050 (see figure 18).[11] It is also worth mentioning that presently only 3.04 per cent of Bangladesh's electricity is produced by renewable sources (mostly solar and hydropower).[12]

**Adaptation**

A large portion of Bangladesh's buildings are vulnerable to natural hazards. This is especially true of informal constructions and slums. Factors that contribute to increase their vulnerability include non-compliance with building codes, inadequate foundations, use of substandard construction materials and poor maintenance. However, some measures are being incorporated in new buildings to improve their resilience, such as raised plinths and cyclone-resistant materials and designs.

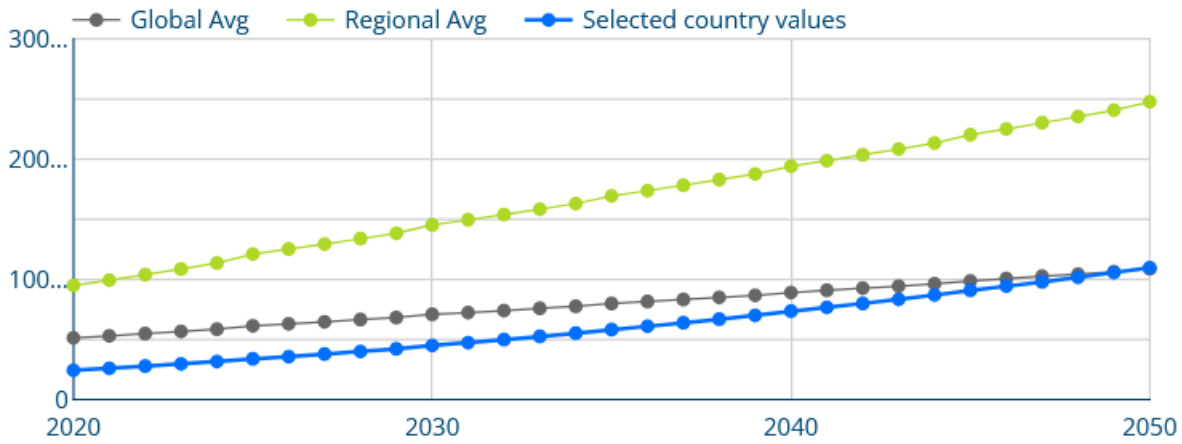
**Figure 17:** Energy Consumption in Bangladesh by Sector and Source (unit: ktoe)[13]




Unit: ktoe

Note: * Commercial and public services (building) sector includes "commercial" and "others".
Source: Compiled by SREDA from HCU, BPC, Petrobangla, ERL, BCMCL, RPGCL and BPDB data

**Figure 18:** Annual building stock operational carbon emissions in Bangladesh (million tCO2e)[14]



**Well-being and inclusion**

Bangladesh faces significant challenges in ensuring equal access to housing, with large numbers of people living in informal settlements or non-permanent conditions. The housing deficit in urban areas is about 4.6 million units. Housing finance is limited, with housing loans constituting less than 10 per cent of total loans, and 57 per cent of middle-income individuals in Dhaka are currently unable to afford housing.[15] Furthermore, only 9.75 per cent of persons with disabilities have access to special sanitation facilities in their homes.[16]

## Existing buildings: challenges and opportunities

| Challenges | Related GlobalABC objective | | | | |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| **Dense urban environments** in major cities, compromising adequate provisions for daylight and natural ventilation and misaligned with infrastructure provision. | | | | | |
| **Low share of energy generated from renewable sources**, being only 3.04 per cent of Bangladesh's total energy generation. | | | | | |
| **Large housing deficit**, estimated to be of 4.6 million units and to affect 10 per cent of the population living in Bangladesh's urban areas. | | | | | |
| **High vulnerability to climate change** of the existing building stock. | | | | | |
| **Lack of adequate structures for persons with disabilities**, with less than 10 per cent of the affected population having access to special sanitation facilities in their homes. | | | | | |
| **Focus on new constructions** rather than renovation of existing buildings among stakeholders and Government institutions. | | | | | |
| **Lack of entities** responsible for promoting the sustainable renovation of existing buildings and for defining policies and regulations for decommissioning and recycle or reuse of construction materials. | | | | | |
| **Lack of enforcement** of policies and regulations on construction waste management. | | | | | |
| **Lack of knowledge and technical capacities** on sustainable renovations of existing buildings and recycle or reuse of construction materials. | | | | | |
| **Limited financial resources and funding** for retrofitting existing buildings to make them more energy efficient and resilient and lack of Energy Service Companies. | | | | | |
| **High upfront costs** of appliances and technologies that enhance energy efficiency and resilience of buildings. | | | | | |
| **Lack of data** on decommissioning practices and construction waste management. | | | | | |

| Opportunities | Related GlobalABC objective | | | | |
|---|---|---|---|---|---|
| |  | | | | |
| **Demonstrated potential to reduce energy consumption** in existing residential buildings by 28.8 per cent through energy efficient appliances. | | | | | |
| **Existence of comprehensive regulations and labelling guidelines** on energy-efficient appliances and cooling systems. This regulatory environment allows to scale up the adoption of energy-efficient technologies in existing buildings. | | | | | |
| **Existence of a widespread informal recycling market** encompassing indigenous technology, manpower, and materials. If enhanced and appropriately regulated, this has the potential to scale up circular construction practices across the country. | | | | | |
| **Cooperation and funding from international organizations** for initiatives that aim to improve the resilience of existing buildings (e.g. CRIIP, URP). The success of these initiatives could lead to further collaboration and resources from multilateral organizations, development agencies, and private foundations interested in climate change. | | | | | |
| **Ongoing data collection** on the vulnerability of the housing stock to natural disasters through the OpenDRI initiative. This data could be crucial for tackling specific vulnerabilities and optimizing the process of adaptation to climate change of Bangladesh's building stock. | | | | | |

## Existing buildings: the way forward

### Goals and targets

The vision for existing buildings is a low-carbon, energy-efficient, and inclusive building stock adapted and resilient to shocks and impacts of climate change. This will be achieved through the following objectives:

- Reduce emissions from household energy saving of 19 per cent by 2030 (as per the NDCs)[17] and of 50 per cent by 2050. *(Operational carbon)*
- Reduce ozone depleting HCFCs in air conditioning and refrigeration as per Montreal Protocol targets by 2025 (as per the NDCs)[18] and enforce a ban on HCFCs by 2035. *(Operational carbon)*
- Reduce the number of persons directly affected by disasters to less than 2,000 per 100,000 population by 2025 (as per the United Nations Sustainable Development Cooperation Framework 2022–2026, Indicator 3.1 of Strategic Priority 3)[19] and to less than 1,000 by 2050. *(Adaptation)*
- Ensure equitable access to adequate, safe, healthy and affordable housing and amenities to all persons (as per the National Housing Policy of 2016)[20] by 2050. *(Inclusion and well-being)*

| Effect on | Country Strategic Goals | Outcome | Baseline | 2030 Target | 2040 Target | 2050 Target |
|---|---|---|---|---|---|---|
|  | **Reduce embodied carbon emissions from existing buildings.** | Improved decommissioning and waste management practices across Bangladesh. | Limited | Promote the sustainable renovation of existing buildings, including high-performance fabric systems.<br><br>30% of decommissioned materials are recycled or reused.<br><br>Implementation of waste management protocols in 25% of renovation projects. | Provide training for architects, engineers, contractors, owners, and other stakeholders on sustainable renovations of existing buildings and recycling or reuse of construction materials.<br><br>50% of | Defining mandatory policies and regulations for decommissioning and recycling or reuse of construction materials during renovation work.<br><br>100% of decommissioned materials are recycled or reused.<br><br>Implementation of waste management protocols in 100% of renovation projects. |
| | | Strong entities to support sustainable renovation and material reuse efforts. | Weak or non-existent institutions focused on material reuse in renovation projects. | Establishment of strong entities or organizations promoting sustainable renovation and material reuse. | 50% of renovation projects supported by entities focusing on reuse and low-carbon construction materials. | 100% of renovation projects are supported by entities promoting sustainable renovation and reuse. |
|  | **Reduce emissions from household energy saving of 19 per cent by 2030 and of 50 per cent by 2050. Reduce ozone depleting HCFCs in air conditioning and refrigeration as per Montreal Protocol targets by 2025 and enforce a ban on HCFCs by 2035.** | Promotion of energy-efficient appliances to reduce energy consumption in existing buildings. | Low market penetration of energy-efficient appliances in existing buildings. | Improve data collection and management processes on energy-efficient appliances in existing buildings.<br><br>50% of existing buildings are retrofitted with energy-efficient appliances. | Instead of subsidising energy, subsidise appliances and technologies that enhance energy efficiency.<br><br>75% of existing buildings are retrofitted with energy-efficient appliances. | Develop proposals and implementation strategies for financing and funding for retrofitting existing buildings to make them more energy-efficient and resilient.<br><br>Phase out of old in-efficient appliances.<br>100% of existing buildings are retrofitted with energy-efficient technologies, significantly reducing operational carbon. |

| Effect on | Country Strategic Goals | Outcome | Baseline | 2030 Target | 2040 Target | 2050 Target |
|---|---|---|---|---|---|---|
|  | **Reduce the number of persons directly affected by disasters to less than 2,000 per 100,000 population by 2025 and to less than 1,000 by 2050.** | Improvement of data collection and analysis on housing vulnerabilities for prioritisation and decision-making. | Limited data on housing vulnerability, resulting in inadequate prioritization. | Improve data collection and management process on embodied carbon emissions associated with different construction materials and processes used during renovation works.<br><br>A nationwide data collection system is established.<br><br>50% of vulnerable buildings are identified for adaptation. | Collect detailed data on specific vulnerabilities of the housing stock to natural disasters to optimize the process of adaptation to climate change.<br><br>Establish a data collection and management system to track the flow of demolition waste.<br><br>75% of vulnerable buildings identified and prioritized for adaptation interventions. | Ensure accountability and transparency through regular monitoring and reporting.<br><br>100% of vulnerable buildings identified, prioritized and adapted to withstand environmental stresses. |
| | | Enhancement of the climate resiliency of existing buildings to withstand environmental stresses. | Existing buildings have low resilience to climate impacts such as flooding, storms, and heatwaves. | 50% of existing buildings retrofitted or adapted to improve climate resilience. | 75% of existing buildings adapted for resilience to withstand climate risks. | 100% of existing buildings are climate-resilient and capable of withstanding extreme weather events. |
|  | **Ensure equitable access to adequate, safe, healthy and affordable housing and amenities to all persons by 2050.** | Renovation and maintenance of existing buildings to deal with the housing deficit. | Significant housing deficit, with existing buildings in need of renovation and upgrades. | Encourage renovation and refurbishment of existing buildings among stakeholders and Government institutions to enhance resilience and accessibility rather than opting for demolition and new construction.<br><br>30% of the housing deficit reduced through a renovation of existing buildings. | Ensure a "low-impact construction site" chart is included in the bid for assessing and selection process.<br><br>50% of the housing deficit was reduced by improving the existing building stock. | Housing deficit eliminated through strategic renovation and improvement of existing buildings. |

| Effect on | Country Strategic Goals | Outcome | Baseline | 2030 Target | 2040 Target | 2050 Target |
|---|---|---|---|---|---|---|
| | | Improved accessibility in existing buildings for persons with disabilities. | Many existing buildings lack accessible features, making them unsuitable for persons with disabilities. | Renovate structures for persons with disabilities, including having access to special sanitation facilities in their homes.<br><br>30% of existing buildings were retrofitted to improve accessibility for persons with disabilities. | 75% of existing buildings were retrofitted or renovated to adapt the features of accessible designs. | 100% of existing buildings retrofitted or renovated to be fully accessible for persons with disabilities. |

**Prioritized actions**

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
| | 1 | Implement routine surveys and audits of construction waste management practices to maintain oversight and identify areas for improvement. These assessments will help in understanding current practices, compliance levels, and opportunities for enhancement. | | | | DoE | Industry, academia |
| | 2 | Develop a centralized database to track decommissioning and waste management practices across the country. The database should include information about waste generation, source separation, recycled amount, landfill amount, waste-to-energy, amount in landfill, number of informal workers involved in SWM, number of trainings provided to informal workers, and safety and well-being of informal labour. Based on the database, analyse trends and pinpoint areas for improvement in waste management, enabling the development of targeted interventions to enhance waste management practices. | | | | MoHPW | Academia, industry, PWD, LGED, RHD, railway, private developers, municipalities |
| | 3 | Invest in the development of facilities specifically designed to process and recycle construction waste. | | | | LGD (including municipal bodies + city corporations) | Industry, Government, international partners and donors, NGOs |
| | 4 | Formalize and certify the informal recycled materials market to ensure quality and safety. Offer government incentives to encourage adoption and support sustainable demolition and decommissioning of existing buildings. | | | | LGD (including municipal bodies + city corporations) | Industry, Government, international partners and donors, NGOs |

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
| | 5 | Establish a National Body for Sustainable Renovation Practices, responsible for promoting and coordinating sustainable renovation and material reuse efforts. | | | | MoHPW | Academia, industry, professional bodies, international partners and donors. NGOs, DoA, PWD, HBRI, Development Authorities |
| | 6 | Strengthen existing regulations (i.e. National 3R Strategy for Waste Management, 2010) on construction waste management, decommissioning, recycling and reuse of construction materials. Introduce and enforce strict penalties for non-compliance. | | | | HBRI, DoE, Development Authorities | Academia, professional bodies, MoLJPA, City Corporations, municipalities, LGIs, HBRI |
| | 7 | Provide training programmes for construction companies on best practices in waste management to promote compliance through education and awareness. | | | | HBRI | Academia, Department of Mass Education, PWD, LGED, professional bodies, industry |
|  | 8 | Launch demonstration projects to showcase sustainable renovation practices and material reuse efforts as well as the advantages of energy-efficient appliances. These projects can serve as real-world examples and provide valuable data on energy savings, cost benefits, and consumer satisfaction, further encouraging the adoption of energy-efficient technologies. | | | | Development Authorities, SREDA | DoA, City Corporations, industry, academia, international partners and donors, NGOs, professional bodies |
| | 9 | Create and maintain online resources and toolkits that provide accessible information on sustainable renovation techniques and practices. | | | | BBRA, MoHPW | Academia, professional bodies, industry, Government, NGOs |
| | 10 | Conduct post-occupancy energy evaluations of existing buildings to create a comprehensive database and baseline for various building types across different regions in Bangladesh. Ensure periodic energy audits and retrofitting programmes to maintain zero-emission performance. Use the collected data to refine energy performance standards and policies. | | | | SREDA | International partners and donors, industry, NGOs |
| | 11 | Offer financial incentives and subsidies to households for replacing old, inefficient appliances with energy-efficient ones. This can include direct rebates, tax credits or discounts at the point of sale, making the transition more affordable and attractive. Collaborate with appliance manufacturers to create discount programmes or trade-in initiatives for energy-efficient appliances. | | | | SREDA | International partners and donors, industry, NGOs |

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
| | 12 | Establish certification programmes for energy-efficient appliances to build consumer trust and ensure quality. Certified products should meet stringent energy-efficiency standards and be promoted through a recognisable labelling system, helping consumers make informed purchasing decisions. | | | | BSTI | Industry, international partners and donors, NGOs, SREDA |
| | 13 | Boost the installation of solar panels (or other systems for producing clean, renewable energy, rainwater harvesting, waste management systems) by providing financial incentives, revising building codes, and streamlining approval processes. Drive partnerships and launch educational campaigns to accelerate the installation of solar panels nationwide. | | | | SREDA | Industry, academia, development partners and donors, NGOs, professional bodies |
|  | 14 | Perform comprehensive risk assessments to identify buildings that are most vulnerable to climate impacts, also leveraging data from the OpenDRI (Open Data for Resilience Initiative). Use this data to prioritize retrofitting efforts and allocate resources effectively to the structures that need it most. | | | | PWD | Government, NGOs, international partners and donors, HBRI, academia, PWD, Development Authorities, RAJUK, professional bodies, industry, LGD |
| | 15 | Based on the findings from the data analysis, create targeted adaptation strategies that tackle the specific vulnerabilities identified. These strategies should be tailored to the unique challenges and needs of different regions and building types, ensuring effective and efficient adaptation efforts. | | | | PWD | Government, NGOs, international partners and donors, academia, LGED, HED, EED, NHA, LGD |
| | 16 | Disseminate the data and analysis findings to relevant stakeholders, including Government agencies, policymakers, construction professionals, and community organizations. | | | | HBRI, MoHPW | Academia, professional bodies, Government, NGOs, industry |
| | 17 | Establish a system for the continuous updating of data collection processes to capture new and emerging vulnerabilities. | | | | New organization to be set up | Academia, NGOs, international partners and donors |
| | 18 | Implement financial support mechanisms such as grants, subsidies, or low-interest loans to assist property owners and developers in retrofitting vulnerable buildings. | | | | BB (SFD) | International partners and donors, industry, NGOs, PWD, LGED |

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
| | 19 | Develop, encourage, support and implement programmes to retrofit existing buildings, improving their ability to endure extreme weather events such as cyclones and floods. This can include strengthening structures, improving flood defences, improving drainage systems, the use of more durable materials, and upgrading roofing and windows to withstand severe weather conditions better. | | | | PWD, LGED | Industry, professional bodies, NGOs, new national body |
|  | 20 | Promote the retrofitting and renovation of existing buildings supported by the Government to increase housing availability. This involves upgrading current structures to make them more habitable, energy efficient, and resilient, thereby utilising existing assets more effectively. | | | | PWD | Industry, NGOs, international partners and donors, NHA, PWD, LGD, RAJUK, HBRI |
| | 21 | Encourage local communities to take an active role in managing and maintaining housing projects. This can involve training community members in property management and providing them with resources and support to ensure long-term sustainability. | | | | LGD, MoHPW | NGOs, Government, industry |
| | 22 | Offer financial incentives, such as subsidies, tax breaks, or low-interest loans, to low-income homeowners who make modifications to their properties, increasing their energy efficiency, resilience or accessibility. | | | | BB (SFD) | PWD, LGD, new national body, banks, NBR, homeowners |
| | 23 | Conduct public awareness campaigns to highlight the importance of incorporating accessibility features into building design. This can include workshops, seminars, and information materials aimed at educating the construction industry and the general public. | | | | HBRI, MoHPW | Government, academia, professional bodies, PWD, NGOs, LGD |
| | 24 | Integrate accessibility and inclusive design principles into architectural and construction education curricula. | | | | MoE | Academia, Government, professional bodies |
| | 25 | Develop and enforce building codes (i.e. BNBC, 2020) that mandate accessibility features in all renovated buildings. This should include requirements for ramps, lifts (i.e. elevators), wide doorways, accessible restrooms, and other essential accessibility features. | | | | HBRI | Academia, NGOs, professional bodies, industry |
| | 26 | Initiate programmes to retrofit existing public buildings to include essential accessibility features. This includes adding ramps, elevators, accessible restrooms, tactile indicators, and other modifications necessary to make these spaces fully accessible to persons with disabilities. | | | | PWD, MoHPW | Industry, Government, HED, EED, LGED, building owners, universities |

## New buildings: challenges and opportunities

| Challenges | Related GlobalABC objective | | | | |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| **Trend of increasing use of high-carbon materials** (e.g. concrete, bricks, metal) and decreasing use of low-carbon materials (e.g. soil, mud, bamboo). | | | | | |
| **Absence of sustainable practices in construction sites**, specifically regarding waste disposal, and limited enforcement of existing regulations. | | | | | |
| **Lack of affordable housing** within newly constructed buildings, with affordable housing constituting less than 2 per cent of the housing market. | | | | | |
| **Lack of coordination** among different Government agencies and departments responsible for land-use planning, disaster management, and sustainable development. | | | | | |
| **Limitations of existing regulations and codes**, including lack of recognition and endorsement of local, low-carbon, innovative and recycled materials. | | | | | |
| **Inadequate National Housing Policy** that needs to be improved to ensure a more inclusive approach, meet current needs and accommodate future development scenarios including rapid urbanisation and climate change adaptation. | | | | | |
| **Lack of adequate controlling mechanisms** and weak enforcement of existing regulations. | | | | | |
| **Lack of knowledge and technical capacities** on sustainable and resilient design and construction. | | | | | |
| **Shortage of skilled labour** in the construction sector, leading to reliance on unskilled labour, which can impact the quality of construction and safety standards. | | | | | |
| **High upfront costs** of appliances and technologies that enhance energy efficiency and resilience of buildings. | | | | | |
| **Limited access to housing finance** due to high interest rates, so much that housing loans constitute less than 10 per cent of total loans in the country. | | | | | |
| **High land values and high debt to equity ratios for housing loans**, hindering housing affordability in urban areas. | | | | | |
| **High land and house registration fees** and lack of incentive mechanisms for sustainable construction. | | | | | |
| **Lack of reliable data** on embodied carbon emissions associated with different construction materials and processes, and low awareness about embodied carbon among stakeholders in the construction industry. | | | | | |
| **Limited implementation of life cycle assessment methodologies** to evaluate the embodied carbon footprint of construction materials and processes. | | | | | |
| **Lack of a comprehensive database on indigenous, traditional and sustainable materials** and lack of incentives for using traditional knowledge and materials. | | | | | |

| Opportunities | Related GlobalABC objective | | | | |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| **Rapidly growing construction sector**, providing an opportunity to scale up sustainable and circular practices. | | | | | |
| **Rich heritage of traditional knowledge**, materials and construction techniques. If retrieved and revived, this could contribute to designing and constructing environmentally, socially and culturally appropriate buildings. | | | | | |
| **Availability of local natural resources**, such as mud, bamboo and jute. These can be used to develop sustainable construction materials. | | | | | |
| **Existence of policies** that support sustainable and resilient design and construction (e.g. BNBC). This regulatory environment allows to scale up the construction of sustainable and resilient buildings. | | | | | |
| **Cooperation and funding from international organizations (e.g. Green Climate Fund) and national institutions (e.g. BCCTF)** for sustainable construction and presence of tax incentives and loans. The widespread interest in this area could lead to increased resources available and scaled up implementation of sustainable construction practices. | | | | | |

## New buildings: the way forward

### Goals and targets

The vision for new buildings is a low-carbon, energy-efficient and inclusive building stock, adapted and resilient to shocks and impacts of climate change. This will be achieved through the following objectives:

- Reduce emissions from household energy saving of 19 per cent by 2030 (as per the NDCs)[21] and of 50 per cent by 2050. (*Operational carbon*)
- Reduce ozone depleting HCFCs in air conditioning and refrigeration as per Montreal Protocol targets by 2025 (as per the NDCs)[22] and enforce a ban on HCFCs by 2035. *(Operational carbon)*
- Reduce the number of persons directly affected by disasters to less than 2,000 per 100,000 population by 2025 (as per the United Nations Sustainable Development Cooperation Framework 2022–2026, Indicator 3.1 of Strategic Priority 3)[23] and to less than 1,000 by 2050. *(Adaptation)*
- Ensure equitable access to adequate, safe, healthy and affordable housing and amenities to all persons (as per the National Housing Policy of 2016)[24] by 2050. *(Inclusion and well-being)*

| Effect on | Country Strategic Goals | Outcome | Baseline | 2030 Target | 2040 Target | 2050 Target |
|---|---|---|---|---|---|---|
|  | **Reduce embodied carbon emissions from new buildings.** | Increased use of low-carbon, local and recycled materials in the design and construction of new buildings. | Limited use of low-carbon, local, and recycled materials in new buildings; lack of incentives for sustainable materials. | Establish a comprehensive system for recycling and reusing building materials and components, as well as waste disposal and the removal of harmful substances.<br><br>30% of new buildings use low-carbon, local, and recycled materials. | Encourage the adoption of modular and prefabricated building systems that facilitate material reuse and minimize waste and construction time.<br><br>50% of new buildings use low-carbon, local, and recycled materials. | Implement sustainable procurement policies for building materials and construction services, mandating the use of recycled and reused materials in new construction projects.<br><br>100% of new buildings are constructed using low-carbon, local, and recycled materials. |
| | | Institutional framework to provide support and guidance to sustainable design and construction initiatives. | Limited or informal institutional support for sustainable design in new construction. | Collaborate with academic institutions and research organizations to advance knowledge and practices in building energy management.<br><br>Establishment of a national framework with guidelines for sustainable design and construction. | Conduct research and innovation on the reduction of embodied carbon in new buildings. Framework integrated into all relevant regulatory bodies and standard practices. | Enable the institute to make data-driven decisions to maintain sustainable development.<br><br>Comprehensive institutional support with mandatory sustainable design guidelines and certification processes. |
| | | Enhanced sustainable and circular construction practices in new building design and construction. | Circular construction practices not widely implemented; weak regulatory environment. | Circular construction standards established. 30% of new projects follow circular economy principles. | Scale up circular construction practices across the country by enhancing the recycling market and regulating appropriately.<br><br>50% of new buildings follow sustainable and circular construction practices. | 100% of new buildings are constructed using sustainable and circular practices. |

| Effect on | Country Strategic Goals | Outcome | Baseline | 2030 Target | 2040 Target | 2050 Target |
|---|---|---|---|---|---|---|
| | | Demonstration projects on zero emissions buildings with life-cycle cost analyses. | No zero emissions building demonstration projects are currently implemented. | Establish design, construction, and supervision teams with architects and engineers to implement pilot projects.<br><br>At least one Government building and school in each district on demonstration projects on zero emissions buildings with life-cycle cost analyses completed. | All new government buildings as part of the zero emission implementation project in suburban and rural areas. | 100% of new buildings are zero emissions buildings. |
|  | **Reduce emissions from household energy saving of 19 per cent by 2030 and of 50 per cent by 2050. Reduce ozone depleting HCFCs in air conditioning and refrigeration as per Montreal Protocol targets by 2025 and enforce a ban on HCFCs by 2035.** | Improved design strategies to ensure that new buildings meet high standards for reducing energy consumption and carbon emissions. | High operational energy consumption in new buildings; limited energy-efficient technologies; high reliance on HCFCs in cooling. | Develop a methodology of life cycle assessment (LCA) to evaluate the embodied carbon footprint of construction materials and processes.<br><br>20% reduction in household energy use through efficient design (e.g. passive cooling strategies).<br>98% reduction of HCFCs in cooling. | Recognise projects that demonstrate exceptional sustainability, energy efficiency, and resilience in LCA beyond the baseline requirements.<br><br>50% reduction in operational energy use across new buildings.<br>Complete ban on HCFCs. | Invest in innovative technologies for sorting, cleaning, and repurposing demolition waste.<br><br>100% reduction in operational energy use across all new buildings with 100% renewable energy integration. |
| | | Integration of energy-efficient appliances and technologies to reduce energy demands of newly constructed buildings. | Energy-efficient technologies and appliances are not mandatory in new building projects. | Explore strategies and devise proposals for financial support to adapt high upfront costs of appliances and technologies that will enhance energy efficiency.<br><br>50% of new buildings use energy-efficient appliances and technologies. | 75% of new buildings incorporate energy-efficient systems. | 100% of new buildings use state-of-the-art energy-efficient appliances and technologies. |

| Effect on | Country Strategic Goals | Outcome | Baseline | 2030 Target | 2040 Target | 2050 Target |
|---|---|---|---|---|---|---|
| | | Enhanced financial support for low-carbon initiatives and sustainable building design and construction. | Limited financial incentives for low-carbon building projects. | Design schemes that offer financial and tax incentives and loans for the adoption and scale-up implementation of sustainable construction practices, use of green building materials and reuse of materials from demolition.<br><br>Introduction of tax incentives and low-interest loans for low-carbon building projects. | Implement mechanisms to support developers and building owners who demonstrate a commitment to exceeding the baseline standards and achieving higher levels of energy efficiency and sustainability.<br><br>50% of new building projects receive financial incentives for sustainable construction. | Determine the subsidy amount based on the achieved energy and carbon efficiency levels compared with the pilot projects or the calculated efficiency estimated by the developed website and software.<br><br>100% of new building projects supported by financial incentives for low-carbon construction. |
| | | Energy Labelling System for Zero Operational Carbon Sites and New Building Design and Construction. | No existing energy labelling system for operational carbon performance in new buildings. | Establish primary target-based standards for maximum utilisation of natural light and ventilation for new buildings by reviewing national and international standards, codes, and rating systems incorporating energy efficiency requirements and green building principles.<br><br>Energy labelling system introduced; 30% of new buildings voluntarily certified as zero operational carbon. | Transfer primary standards to a performance-based rating system aligned with the global green building network, which verifies the achievement of net zero goals in existing buildings.<br><br>50% of new buildings are voluntarily certified as zero operational carbon. | Update thresholds and criteria based on the actual consumption data obtained from pilot projects and model buildings constructed. Certifications are mandatory for 100% of new buildings as Zero operational carbon.<br><br>Develop proposals and strategies for periodic enhancement of the standard. |

| Effect on | Country Strategic Goals | Outcome | Baseline | 2030 Target | 2040 Target | 2050 Target |
|---|---|---|---|---|---|---|
|  | **Reduce the number of persons directly affected by disasters to less than 2,000 per 100,000 population by 2025 and to less than 1,000 by 2050.** | Utilisation of traditional knowledge in new building design and construction processes to enhance resilience. | Traditional knowledge of building design is not widely integrated. | Develop a comprehensive database on indigenous, traditional and sustainable materials.<br><br>30% of new buildings incorporate traditional knowledge for climate resilience. | Retrieved and revive the rich heritage of traditional knowledge, materials and construction techniques for designing and constructing environmentally sensitive buildings.<br><br>50% of new buildings integrate traditional knowledge in design. | Explore strategies and devise proposals for financial support to incentivize buildings that consume less energy by using traditional knowledge and materials.<br><br>100% of new buildings designed with traditional knowledge for climate resilience. |
| | | Improved resilience in new building design and construction to withstand extreme weather events. | The current building design is not optimized for extreme weather events. | Integrate sustainability, resilience, and inclusivity considerations into the planning and design of new buildings from the outset.<br><br>50% of new buildings are designed to withstand extreme weather conditions. | 75% of new buildings are designed with advanced resilience measures. | 100% of new buildings designed to be climate-resilient, capable of withstanding extreme events. |
|  | **Ensure equitable access to adequate, safe, healthy and affordable housing and amenities to all persons by 2050.** | Updated policies and regulations for new building design and construction to attend to current and future needs. | Outdated policies that do not meet current well-being needs, accessibility, or inclusivity. | Building code (BNBC) updated to incorporate well-being, accessibility, and future design needs. | Scale up the construction of sustainable and resilient buildings under the regulatory environment of existing codes (BNBC) and policies.<br><br>50% of new building designs follow updated, inclusive policies. | Accommodate future development scenarios, including climate change adaptation in housing policy.<br><br>100% of new buildings adhere to policies that ensure well-being and inclusion. |

| Effect on | Country Strategic Goals | Outcome | Baseline | 2030 Target | 2040 Target | 2050 Target |
|---|---|---|---|---|---|---|
| | | Overcoming the housing deficit by immediate and long-term affordable housing development. | Significant housing deficit, lack of affordable housing programmes in urban areas. | Develop proposals and implementation strategies for financing in the housing sector by customer-friendly loan packages.<br><br>30% reduction in housing deficit through affordable housing projects. | Ensure that the greater part of newly constructed buildings in urban areas are affordable by reducing construction costs and profits.<br>50% reduction in housing deficit. | Develop healthy homes programme to improve health and well-being for people of all ages and abilities.<br><br>Housing deficit eliminated through nationwide affordable housing initiatives. |
| | | Enhanced access to affordable housing finance by redressing financial and capacity challenges. | Limited financial instruments and capacity for affordable housing. | Encourage investments in energy-efficient designs, renewable energy systems, and green building materials.<br><br>Introduction of affordable housing finance programmes; 30% of housing projects receive support. | Develop proposals and implementation strategies for securing major or full subsidies of sustainable construction costs from Government or international donors.<br><br>50% of affordable housing projects benefit from financial support. | Establish dedicated funding mechanisms to mobilize investment in zero-energy projects.<br><br>100% of affordable housing projects supported by finance programmes attending to capacity challenges. |

**Prioritized actions**

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
|  | 1 | Revise building codes (e.g. BNBC) to mandate the use of sustainable and low-carbon materials in construction projects. Ensure that the updated codes provide clear guidelines on the use of these materials and promote their adoption across the industry. | | | | HBRI | Academia, industry, professional bodies |
| | 2 | Launch marketing and awareness campaigns to highlight the benefits of using low-carbon materials. This includes showcasing successful projects, educating the public and industry professionals on the advantages of these materials, and promoting their widespread adoption. | | | | NGOs | Government, industry |
| | 3 | Introduce subsidies, tax benefits, and other financial incentives to encourage the use of low-carbon materials in new constructions. | | | | MoHPW | International partners and donors |
| | 4 | Formulate and implement comprehensive new policies and regulations that focus on sustainability in construction that has not been adequately dealt with in BNBC. This includes setting clear standards for the use of low-carbon materials, energy efficiency, waste management, and other sustainable practices in the building sector. | | | | MoHPW | Academia, industry, professional bodies |
| | 5 | Launch pilot projects to showcase successful examples of sustainable buildings, demonstrating the practical benefits and encouraging broader industry adoption. Collaborate with local communities, NGOs, and private sector partners to identify suitable demonstration sites and secure necessary resources. Start with one Government building or school in each district, then gradually expand the initiative to all public buildings, especially in suburban and rural areas. | | | | SREDA, DoA (Rules of Business updating) | Academia, industry, international partners and donors, professional bodies, BACI, REHAB |
| | 6 | Based on the performance and learning from pilot projects, create web-based tools for the design, validation, and post-occupancy evaluation of buildings. These tools will help objectively assess the energy demand and carbon footprint of new buildings for different sites and contexts before construction begins. | | | | Academia | Industry, professional bodies, Government |

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
| | 7 | Based on insights from pilot projects, develop proposals and implementation strategies to make it a legal requirement for all new buildings to adhere to updated energy standards. This will ensure that new constructions follow best practices in energy efficiency and carbon reduction. | | | | MoHPW | Industry, professional bodies, NGOs |
| | 8 | Create and disseminate comprehensive guidelines for sustainable and circular construction practices. These guidelines should cover aspects such as material selection, energy efficiency, and waste reduction and should be promoted to builders, architects, and developers. Develop and integrate guidelines for life cycle assessments into building codes to evaluate the long-term environmental impacts of construction projects and promote the benefits of these assessments through case studies. | | | | Academia, HBRI | Government, industry, NGOs, professional bodies |
| | 9 | Implement training programmes for construction workers and professionals on low carbon materials, sustainable practices and circular economy principles. Establish certification regimes for construction sites that adhere to these sustainable practices to encourage widespread adoption and compliance. | | | | New Organization / Academy / Wing in PWD/HBRI | NGOs, academia, professional bodies, industry |
| | 10 | Strengthen enforcement of regulations related to waste disposal and management at construction sites. Embed sustainability criteria into building permits and approval processes. | | | | National Building Regulation Body (a multidisciplinary separate wing there),LGD | Industry, NGOs |
| | 11 | Promote building designs that utilise passive cooling and heating systems. This includes optimising building orientation, thermal mass, shading devices and green roofs to minimize the need for mechanical heating and cooling, thereby reducing energy use. | | | | Professional bodies (awarding professionals, competitions) | Academia, NGOs, Government |
| | 12 | Support innovative design practices that maximize natural light and ventilation within buildings. This includes designing layouts that enhance daylight access and airflow, which can reduce the need for artificial lighting and mechanical ventilation, further lowering energy consumption. | | | | Professional bodies (awarding professionals, competitions) | Academia, NGOs, Government |

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
| | 13 | Encourage the integration of renewable energy sources, such as solar panels and rainwater harvesting, into building designs. Provide incentives or subsidies for the installation of these systems to offset operational energy use and lower carbon emissions. | | | | Industry | Professional bodies, academia, Government |
| | 14 | Foster the adoption of cutting-edge design strategies that contribute to energy efficiency and carbon reduction. This can involve encouraging the use of advanced building materials, smart building technologies, and energy modelling tools to optimize building performance and sustainability. | | | | Professional bodies (awarding professionals, competitions) | Academia, industry, Government |
| | 15 | Revise building codes and energy labelling to include stringent energy efficiency standards. These updates should set clear requirements for insulation, window performance, and energy-efficient systems to ensure that new buildings meet high standards for reducing energy consumption. Promote understanding of the BNBC. | | | | HBRI | Academia, professional bodies, industry, international partners and donors |
| | 16 | Incorporate carbon-capturing mechanisms in new buildings through the inclusion of urban forests, biodiversity-enhancing landscape designs, and other sustainable initiatives. | | | | Development Authorities, LGIs | DoA, professional bodies |
| | 17 | Develop and enforce policies that provide financial incentives for adopting energy-efficient appliances and technologies. These could include tax rebates, grants, or subsidies for residential and commercial buildings to encourage the use of energy-efficient products. | | | | SREDA, NBR | International partners and donors, industry, NGOs |
| | 18 | Offer subsidies or low-interest loans to help offset the upfront costs of purchasing energy-efficient equipment. Create and promote financing schemes that allow for the gradual payment of energy-efficient appliances and technologies. | | | | SREDA, MoF, Financial Institutions, MoPEMR | International partners and donors, NGOs, financial institutions (NBR, BB) |
| | 19 | Review national and international standards, codes, and rating systems (e.g., BEER, HBRI, DoE, BNBC, LEED, EDGE, nZEB) to establish primary targets. Prioritize zero-carbon construction sites and energy efficiency in new buildings, using SMART criteria (Specific, Measurable, Attainable, Relevant, Timely) to formulate objective measures and standards. | | | | Academia, HBRI | International partners and donors, industry, professional bodies |

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
| | 20 | Motivate developers and real estate companies to exceed minimum standards, preparing the industry for zero-emission design and development. Provide incentives, recognition, capacity-building programmes, and technical support to developers for adopting advanced sustainable practices and technologies in their projects. | | | | SREDA, REHAB | Industry, professional bodies, NGOs |
| | 21 | Update thresholds and criteria for standards based on actual consumption data from model buildings. Transition to a performance-based rating system aligned with global Green Building networks (e.g., LEED Zero by USGBC) to verify net zero goals for new buildings. Develop tailored standards for urban, suburban, and rural areas, as well as different building typologies, to ensure flexibility and practicality in implementation. | | | | Academia, HBRI | International partners and donors, industry |
| | 22 | Introduce Energy Labelling for New Buildings: Introduce voluntary energy labelling options for new buildings post-construction, with labels such as GREEN (100–80% renewable energy), YELLOW (79–60%), ORANGE (59–40%), and BROWN (below 40%). Allow upgrading of labels by incorporating additional renewable features or reducing energy demands. Determine subsidy amounts based on achieved energy and carbon efficiency levels compared with pilot projects or estimated efficiencies from developed websites and software. Eventually introduce mandatory energy labelling for new buildings after construction to ensure adherence to energy efficiency standards. | | | | MoHPW, National Building Regulation Authority (New) | Industry, international partners and donors, NGOs, professional bodies |
|  | 23 | Encourage the adoption of traditional techniques by promoting them through industry publications, conferences, and professional networks. Highlight successful case studies and examples of how traditional methods have been effectively integrated into modern designs. Create new housing concepts for Bangladesh by holding an international housing design competition that includes architects from around the world. | | | | Academia, DoA, HBRI | PWD, Development Authorities, Government, industry, NGOs, professional bodies |

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
| | 24 | Integrate traditional knowledge and techniques into the curricula of architectural and construction programmes. This ensures that future professionals are familiar with these methods and can apply them in their practice. | | | | Academia | Government, professional bodies |
| | 25 | Organize workshops and training sessions for architects, engineers, and builders on traditional construction techniques. These sessions should focus on integrating these techniques into modern building practices to enhance resilience. | | | | Professional bodies, HBRI | Academia, industry, NGOs |
| | 26 | Create and disseminate comprehensive guidelines and best practices for climate-resilient construction. | | | | Academia, DoA, HBRI | PWD, Development Authorities, Government, industry, international partners and Donors, NGOs |
| | 27 | Encourage the adoption of materials and construction techniques that enhance the climate resilience of buildings. This can be achieved through subsidies, incentives, and awareness campaigns that highlight the benefits of using such materials and techniques. | | | | Industry | Government, NGOs, MoPHW |
| | 28 | Conduct a comprehensive review of the existing National Housing Policy and update it to meets current and future needs. This includes guidelines for accessible design, affordable housing, and environmental sustainability to attend to diverse needs and promote equitable development. This revision should integrate inclusive and sustainable practices, ensuring the policy reflects modern standards and requirements. Involve a broad range of public and private stakeholders in the policy revision process. Benchmark the updated policy against international best practices and standards. This alignment will ensure that the policy meets global and regional expectations for housing quality, inclusivity, and sustainability, and enhances its effectiveness. | | | | NHA, academia | NGOs, international partners and donors, industry, professional bodies |

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
| | 29 | Develop and implement a robust monitoring and evaluation framework to assess the impact and effectiveness of the updated policy. This framework should include performance indicators, regular assessments, and feedback mechanisms to ensure continuous improvement and responsiveness to emerging issues. | | | | NHA | Industry, NGOs, IMED, Development Authorities, DoA, academia |
| | 30 | Engage local communities in the planning and construction phases of housing projects. This can be achieved through participatory planning sessions and workshops to ensure that the housing solutions focus on local needs and preferences. Organize public consultations to gather feedback from community members about housing projects. Use this feedback to make adjustments and improvements to project designs, ensuring that developments align with community expectations and requirements. | | | | NHA | BHBFC, CBOs, NGOs, LGIs, PKSF, Government, academia, professional bodies, international partners and donors |
| | 31 | Create and implement strategies for the development of temporary and emergency housing solutions. These should cater to displaced populations and individuals in urgent need of shelter, providing immediate relief while long-term housing solutions are being developed. | | | | NHA | Industry, NGOs, international partners and donors, professional bodies, LGIs, DoA, academia, HBRI |
| | 32 | Identify and allocate Government-owned land for the development of affordable housing projects. This approach can reduce costs and expedite the construction of new housing units, ensuring that more people have access to affordable housing. | | | | NHA | NGOs, professional bodies, DoE, academia, LGIs |
| | 33 | Develop policies to stabilize land prices and reduce speculation, making land more accessible for affordable housing projects. Support the establishment of community land trusts to secure land for long-term affordable housing development. | | | | NHA, MoL | NGOs, industry, Development Authorities, UDD |
| | 34 | Initiate Government-led and public-private partnership projects aimed at constructing large-scale affordable housing units. These projects should focus on increasing the supply of housing to meet the growing demand, particularly in urban areas. | | | | NHA | Industry, professional bodies, international partners and donors, NGOs, academia, DoA, UDD |

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
| | 35 | Implement policies that require new construction projects to include a certain percentage of affordable housing units. Provide financial incentives, such as subsidies and low-interest loans, to developers who incorporate affordable housing into their projects. | | | | NHA | NGOs, DoA, Development Authorities, BBS, UDD |
| | 36 | Develop and enforce policies that incentivize private sector investment in affordable housing developments. This could include tax breaks, subsidies, and streamlined approval processes for developers who commit to building affordable housing. | | | | NHA | Academia, international partners and donors, industry, NGOs, BB, NBR, Development Authorities |
| | 37 | Establish a local-level mechanism that enables easy and affordable access to design services for the public. | | | | DoA | Professional bodies. |
| | 38 | Launch financial literacy programmes to educate the public on housing finance options and effective management of housing-related expenses. | | | | NGOs | Academia, financial institutions, Grameen Bank |
| | 39 | Develop and promote Government-backed loan programmes to enhance access to affordable housing finance. Encourage private banks to offer diverse housing loan products tailored to various income levels to improve financing options. | | | | MoF (BB) | International partners and donors, NGOs, BB, BHBFC, Grameen Bank |
| | 40 | Introduce microfinance schemes specifically designed for low-income families to support their ability to secure housing. Promote cooperative housing finance models that enable communities to pool resources and invest in affordable housing collectively. | | | | NGOs, NHA | International partners and donors, NGOs, Grameen Bank |
| | 41 | Collaborate with construction companies to provide on-the-job training for new workers. Promote career opportunities in the construction sector to attract skilled labour and overcome the shortage of qualified professionals. | | | | Industry | NGOs, Government, REHAB |
| | 42 | Strengthen enforcement of existing housing regulations by increasing the capacity of regulatory bodies through targeted training and resources. Implement regular audits and inspections of housing projects, develop a reporting system for violations, and introduce penalties for non-compliance to ensure adherence to standards. | | | | Development Authorities, LGD | NGOs, IMED |

# Construction supply chain

The construction sector in Bangladesh has seen rapid growth, with a significant increase in demand and price of materials. However, it relies mostly on high-carbon materials such as cement, bricks and metal, with little innovation in sustainable alternatives. Furthermore, the supply chain is vulnerable to disruptions caused by climate hazards and political issues, and workers in some cases suffer serious human rights violations. In this context, the Government has adopted policies for promoting sustainability, resilience and equity, but enforcement is weak due to widespread informality in the construction sector.

## Current status, projections and progress

Bangladesh produces cement, sand, bricks, stone, steel, timber and bamboo. The most relevant export is cement,[1, 2] while steel and stone are in large part imported.[3] The demand for affordable housing is currently of 6 million units, projected to grow to 10.5 million by 2030.[4] The demand of steel and cement has increased steadily in recent years, driven by the Government's large infrastructure projects.[5] The demand of bricks is also growing, although at a slower pace.[6] These trends may lead to the depletion of the non-renewable material stock of Bangladesh, including sand, coal and clay, by 2050, causing an increase in importations and loss of autonomy. The management of renewable materials, such as wood, is also problematic due to illegal felling, over-harnessing and lack of plantation.

The country has an adequate institutional framework, with the Ministry of Land overseeing raw material extraction and the Bangladesh Standards and Testing Institution setting standards for construction products and monitoring imports. However, this is severely hindered by scarce coordination and ineffective implementation of existing regulations at the ground level, with a large portion of the construction sector operating informally. Furthermore, there are gaps in Bangladesh's policies and processes. While standards, certifications and labelling systems exist, there are no regulations on the carbon footprint of construction materials (except bricks), nor on adaptation and resilience of the supply chain. Other weaknesses of the construction sector in Bangladesh include lack of research and innovation, inadequate engagement of stakeholders, low awareness of available funding opportunities, lack of skills related to low-carbon materials (both innovative and vernacular) and lack of transparency in data management and reporting.

**Embodied carbon**

It has been estimated that construction materials nationally produced and consumed in Bangladesh yearly emit 36.0 million tCO2e, while imported construction materials emit 1.0 million tCO2e. These figures are projected to increase respectively to 54.6 and 1.6 million tCO2e by 2030 and 133.0 and 3.9 million tCO2e by 2050 (see figures 19 and 20).[7] At the moment, research and development on innovative low-carbon materials is mostly focused on burnt-clay brick alternatives, such as autoclaved aerated concrete blocks, but the entry of new products in the market is difficult. Furthermore, Bangladesh has a wealth of sustainable vernacular construction practices, but this heritage is gradually disappearing as the number of skilled workers is declining.[8] Another relevant data is that only 2 per cent of construction waste is recycled through official channels, while a significant amount is recycled or reused informally.[9] Metal and timber are very often recycled or reused, while 70 per cent of cement-based construction waste is left unrecycled and ends up in landfills.[10]

**Figure 19:** Carbon emission of construction materials nationally produced and consumed in Bangladesh (million tCO2e)[11]

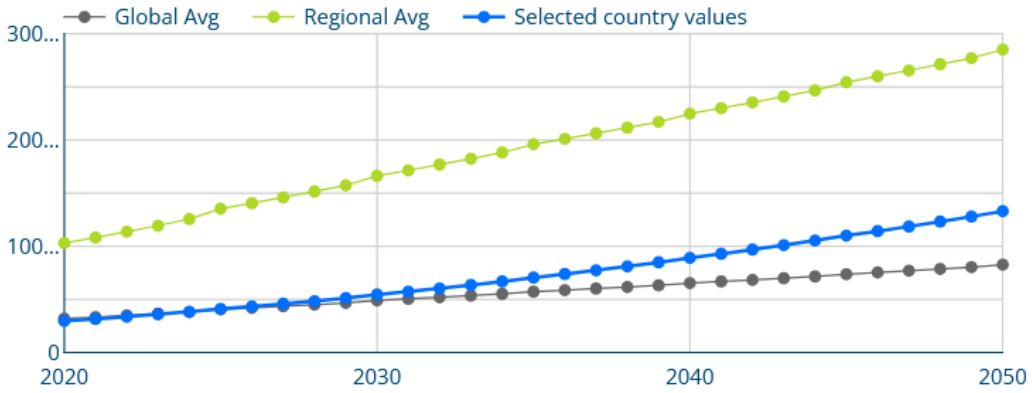
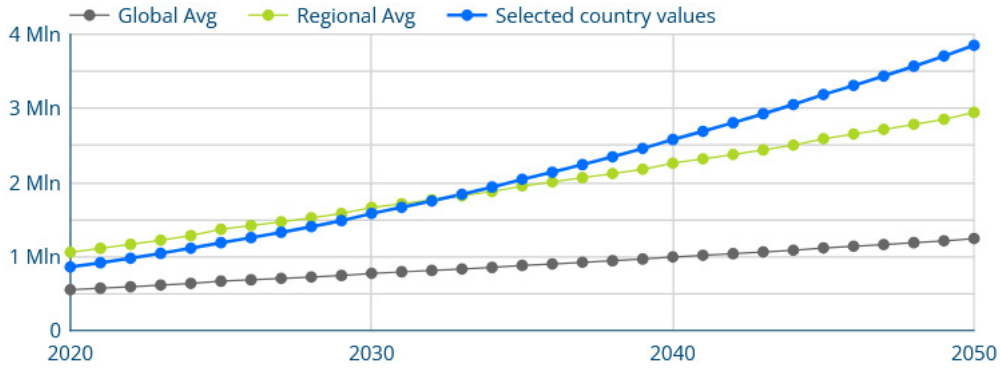



**Figure 20:** Carbon emissions of imported construction materials in Bangladesh (million tCo2e)[12]




**Operational carbon**

In 2023, about 6.5 million fans and 0.5 million air conditioners were produced in Bangladesh, representing 95 per cent and 60 per cent of their respective total sales.[13, 14] A review of four prominent local brand websites shows that approximately 6 per cent of 56 fans and 58 per cent 2-ton air conditioners are energy efficient. Compared with non-efficient fans and air conditioners, the price of energy efficient models is respectively 100 per cent and 10 per cent higher. However, the lack of demand for innovative and energy-efficient systems and appliances leads to scarce investments and lack of research and innovation in this area.

**Adaptation**

The construction supply chain is vulnerable to heavy rainfall, flooding, heat stress and dry spells, that affect extraction, production and transport processes, impacting availability and quality of materials. Other factors that may disrupt supply or increase costs include refugee crises, illegal toll collection by police and local mafia, inflation, political issues with neighbouring countries and global crises such as pandemics or wars.

**Well-being and inclusion**

Extraction and production of building materials and systems in Bangladesh is often informal and causes various forms of environmental degradation and pollution, including riverbank erosion, loss of fertile land, deforestation, biodiversity loss, e-waste generation,

air and water pollution, and reduction of basin water retention capacity. These phenomena raise serious health concerns. At the same time, the widespread informality of the construction sector facilitates the perpetration of human rights violations, with instances of bonded labour and child labour being reported by stakeholders.

Furthermore, the significant increase in price and demand of construction materials of the last years raises concerns of sustainability and affordability. In fact, Bangladesh still has a severe housing deficit, as the lower- and lower-middle income population struggles to obtain adequate homes. With Bangladesh's aspiration to become a high-income country by 2041, and with steady economic growth, it is possible that the focus on ensuring affordability for everyone will cause major damage to the environment, with an increasing use of cheaper high-carbon materials.

## Challenges and opportunities

| Challenges | Related GlobalABC objective | | | | |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| **Low demand** for sustainable construction materials and energy-efficient systems and appliances. | | | | | |
| **Increasing use of high-carbon materials**, including concrete, bricks and metal. | | | | | |
| **High cost of market entry** for new materials, including expenses for certification and promotion and investments for production facilities and skills building. Furthermore, the market is already saturated with conventional materials, and workers and designers do not have the time to acquire new skills. | | | | | |
| **Disruptions of the supply chain** due to natural hazards and political issues, compromising the amount and quality of available materials and products. | | | | | |
| **Prevalence of road-based transport** over more sustainable alternatives such as railway and water transport. | | | | | |
| **Decline in knowledge of vernacular materials**, with continuously more skilled workers and craftsmen switching professions, emigrating or adopting imported materials and techniques. | | | | | |
| Widespread **illegal and unsustainable extraction** practices and widespread informality across the construction sector. | | | | | |
| **Increasing prices** of construction materials and appliances, hindering affordability of sustainable materials for low-income populations. | | | | | |
| **Scarce coordination** between institutions regulating the extraction and quality assurance of construction materials and appliances, particularly in the enforcement of regulations. | | | | | |
| **Inadequate institutional capacity** to enforce existing laws and regulations pertaining to the construction supply chain. | | | | | |
| Absence of a specific entity in charge of controlling and monitoring mining and extraction of materials, leading to **inadequate capacity to monitor mining** and extraction of sand after the issuance of permits. | | | | | |
| **Lack of regulations on the carbon footprint** of construction materials and appliances. | | | | | |
| Serious **human rights violations** in the construction sector, including bonded and child labour. | | | | | |

| Challenges | Related GlobalABC objective | | | | |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| **Limitations in the Grievance Redressal System**, as this is only for grievances in service delivery by public officials. | | | | | |
| **Lack of awareness of NGOs and marginalized communities** on the legal tools available for asserting the rights of workers in the extraction and construction industries, such as public interest litigation. | | | | | |
| **Lack of research and development** on sustainable building materials and energy-efficient systems and appliances, and specifically on improving the durability of bio-based material. | | | | | |
| **Lack of skills of workers and designers** on innovative materials, and specifically lack of skills of bricklayers in handling and constructing with alternative materials. | | | | | |
| **Lack of awareness on green financing opportunities** among private sector investors and stakeholders. | | | | | |
| **Lack of reliable data on resource extraction** due to widespread illegal and informal extraction practices. | | | | | |
| **Lack of data on the carbon footprint** of construction materials and appliances, partially due to the lack of institutional framework mandating disclosure of this information. | | | | | |
| **Lack of data on climate change impacts** on the construction supply chain. | | | | | |

| Opportunities | Related GlobalABC objective | | | | |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| General **growth of the construction sector** in Bangladesh. This presents great opportunities for investing in alternative, sustainable materials and appliances. | | | | | |
| **Research carried out on alternatives to burnt-clay bricks**. With appropriate support in terms of funding, regulations and capacity-building, the use of these materials could spread across the country, thus reducing carbon emissions. | | | | | |
| Existence of a widespread **informal recycling market** encompassing indigenous technology, manpower, and materials. If enhanced and appropriately regulated, this has the potential to scale up circular construction practices across the country. | | | | | |
| **Rich heritage of traditional knowledge**, materials and construction techniques. If retrieved and revived, this could contribute to designing and constructing environmentally, socially and culturally sensitive buildings. | | | | | |
| Ongoing processes of drafting **rating and certification systems for assessing the carbon footprint** of construction materials. | | | | | |
| Existence of (limited) **financing options** for sustainable materials and appliances. | | | | | |

## The way forward

### Goals and targets

The vision for the construction supply chain is to ensure an uninterrupted supply of low carbon building materials and energy efficient systems and appliances resilient to shocks and well adapted to climate change impacts, extracted and produced with the lowest adverse impacts on the environment and society. This will be achieved through the following strategic goals:

- Increase the usage of low carbon and renewable materials in buildings and construction. *(Embodied carbon)*

- Reduce carbon emissions in building material extraction and production through a 47 per cent emission reduction in brick production by 2030 (as per the NDCs)[15] and a 100 per cent reduction by 2050 by transitioning to non-fired blocks and a substantial reduction in emissions from cement manufacture. *(Operational carbon)*

- Ensure reliable supply of building materials throughout the year. *(Adaptation)*

- Minimize environmental degradation in extraction and manufacturing of building materials. (*Inclusion and well-being*)

  - Support transition to safe and green jobs for persons engaged in unstainable extraction and manufacturing in the construction supply chain. *(Inclusion and well-being)*

  - Support persons and communities engaged in the burnt brick industry to transition to green jobs. *(Inclusion and well-being)*

  - Improve occupational safety among workers in extraction and manufacturing of construction materials. (*Inclusion and well-being)*

| Effect on | Country Strategic Goals | Outcome | Baseline | 2030 Target | 2040 Target | 2050 Target |
|---|---|---|---|---|---|---|
|  | **Increase the usage of low carbon and renewable materials in buildings and construction.** | (a) Replacement of high-embodied carbon materials; (b) Availability of a new line of sustainable materials; (c) Professional education and knowledge building on sustainable materials. | High-clinker concrete and brickwork are the primary contributors to overall carbon footprint, as these two are responsible for approximately 84% of total embodied emission.<br><br>Low use of new materials.<br><br>Sporadic presence of sustainable materials in syllabi. | 25% new buildings are constructed using sustainable (low carbon and recycled etc.) building materials like low-carbon cement and concrete (UNIDO defined), CSEB, organic and renewable materials like timber.<br><br>100% undergrad academic syllabi and programme accreditation criteria contain courses on vernacular materials and technologies. | At least 50% buildings are constructed using sustainable (low carbon and recycled etc.) building materials like low-carbon cement and concrete (UNIDO defined), CSEB, organic and renewable materials like timber. | At least 75% buildings are constructed using sustainable (low carbon and recycled etc.) building materials like low-carbon cement and concrete (UNIDO defined), CSEB, organic and renewable materials like timber. |
| | | Financial instruments to support the promotion of low carbon, sustainable and renewable materials for the market. | Only a handful of financial instruments are presently available like those of Bangladesh Bank and SREDA, without material focus. | 25% tax levied on all high-carbon materials (local, imported).<br><br>100% commercial banks to have soft loans and start-up incubation loan provisions for low-carbon, sustainable and renewable materials. | 50% carbon tax levied on all high carbon materials (local, imported). | 75% carbon tax levied on all high carbon materials (local, imported). |

| Effect on | Country Strategic Goals | Outcome | Baseline | 2030 Target | 2040 Target | 2050 Target |
|---|---|---|---|---|---|---|
| | | Legal instruments to promote and facilitate low-carbon construction. | Very few legal instruments for the promotion of low-carbon construction. | BNBC to have dedicated sections on low-carbon materials and specifications.<br><br>Schedule of rates (by PWD, LGED) to have low-carbon materials and specifications.<br><br>Development control and local government agencies to have used BNBC and PWD/LGED's low-carbon directives in 25% of their approved and implemented projects. | Development control and local government agencies to have used BNBC and PWD/LGED's low-carbon directives in 50% of their approved and implemented projects. | Development control/local government agencies to have used BNBC and PWD/LGED's low carbon directives in 75% of their approved and implemented projects. |
| | | Knowledgeable and technically improved and updated (on low-carbon materials) construction sector personnel. | Little knowledge and low technical competence of sustainable construction personnel. | Professional bodies (IAB, IEB) to have conducted capacity and knowledge building OJTs, CPDs and workshops on low carbon materials for at least 30% of their members.<br><br>20% site personnel (technicians, artisans) have attended at least one training or sensitizing session on low-carbon construction. | Professional bodies (IAB, IEB) to have conducted capacity and knowledge building OJTs, CPDs and workshops on low carbon materials for at least 50% of their members.<br><br>40% site personnel (technicians, artisans) have attended at least one training or sensitizing session on low carbon construction. | Professional bodies (IAB, IEB) to have conducted capacity and knowledge building OJTs, CPDs and workshops on low-carbon materials for at least 100% of their members.<br><br>60% site personnel (technicians, artisans) have attended at least one training or sensitizing session on low carbon construction. |

| Effect on | Country Strategic Goals | Outcome | Baseline | 2030 Target | 2040 Target | 2050 Target |
|---|---|---|---|---|---|---|
|  | **Reduce carbon emissions in building material extraction and production through a 47 per cent emission reduction in brick production by 2030 and a 100 per cent reduction by 2050 by transitioning to non-fired blocks and a substantial reduction in emissions from cement manufacture.** | Increased knowledge of and access to new, diverse, alternative low-carbon materials. | Low knowledge on global and regional development and current status in sustainable construction and building materials. | HBRI and BFRI to have signed MoU with key regional institutes and 100% technical universities and programmes in Bangladesh to conduct joint research on low carbon materials.<br><br>FBBCI to have demonstrated that at least 20% of all imported materials are low carbon.<br><br>30% MSMEs have required technical competence in the commercial production of low carbon sustainable materials (brick and cement alternatives). | FBBCI to have demonstrated that at least 40% of all imported materials are low carbon.<br>50% MSMEs have required technical competence in the commercial production of low carbon and sustainable materials (brick and cement alternatives). | FBBCI to have demonstrated that at least 60% of all imported materials are low carbon.<br>75% MSMEs have required technical competence in the commercial production of low carbon and sustainable materials (brick and cement alternatives). |
| | | Immediate reduction in use of conventional materials (brick, cement) and availability of alternative materials for emission cut. | Conventional materials hold the lion's share of all building materials. Apart from cement blocks, no new materials are coming up. Green business development in this sector is very slow. | 30% MSMEs and start-ups have received subsidy and soft credit for green business development (alternative to brick and cement as well as appliances) and their products are available in market. | 50% MSMEs and start-ups have received subsidy and soft credit for green business development (alternative to brick and cement as well as appliances) and their products are available in market. | 80% MSMEs and start-ups have received subsidy and soft credit for green business development (alternative to brick and cement as well as appliances) and their products are available in market. |
| | | (a) Available legal and financial instruments leading to emission cut; (b) Standardization of carbon embodiment of materials; (c) Promote low-carbon building materials by creating positive examples in the public sector. | Carbon emission-focused legal and financial instruments are low. Public building designers and builders are not guided by these instruments due to their unavailability. | BSTI, with support from HBRI, BFRI and SREDA to have published regulations on environmental impact labelling (and certification) of alternative low-carbon building materials.<br><br>25% public buildings to have demonstrated the use of low-carbon building materials. | 50% public buildings to have demonstrated the use of low-carbon building materials. | 75% public buildings to have demonstrated the use of low-carbon building materials. |

| Effect on | Country Strategic Goals | Outcome | Baseline | 2030 Target | 2040 Target | 2050 Target |
|---|---|---|---|---|---|---|
| | | (a) Improved institutional arrangement for efficient decision-making centred around shared goals; (b) Improved and sustainable data management for better decision-making. | Lack of coordination and a strong, dynamic coordination body is still a concern. Data management is inadequate. | GoB to have created a strong, well-resourced and dynamic focal agency to lead and coordinate all agencies enforcing energy standards.<br><br>GoB to have created a data dissemination platform focusing on operational carbon and emissions from materials and appliance manufacturing.<br><br>Data collection agency to have collected 100% baseline data. | Data collection agency to have continued the collection of 100 per cent data for this 10-year interval period.<br><br>Data collection agency to have integrated all data with the SDG tracking platform for real-time dissemination. | Data collection agency to have continued the collection of 100 per cent data for this 10-year interval period. |
|  | **Ensure reliable supply of building materials throughout the year.** | (a) Improved adaptive capacity and resilience of the construction supply chain; (b) Improved and sustainable data management for resilience research and decision-making. | There is no research organization within GoB focusing on climate resilience and its relation with construction supply chain. | GoB to have created a new organization or upgrade an existing one (like DoE or HBRI) for systematic data collection on climate change risks, impacts and adaptation in relation with CSC and promote adaptation and resilience (best) practices.<br><br>Data collection agency to have collected 100% baseline data. | Data collection agency to have continued the collection of 100% data for this 10-year interval period.<br><br>Data collection agency to have integrated all data with the SDG Tracking platform for real-time dissemination. | Data collection agency to have continued the collection of 100% data for this 10-year interval period. |

| Effect on | Country Strategic Goals | Outcome | Baseline | 2030 Target | 2040 Target | 2050 Target |
|---|---|---|---|---|---|---|
| | | Strong adaptation policy, planning and fiscal provisioning for lower (implementation) level plans and project preparation. | Policy presence and necessary fiscal provisioning for CSC is absent in national level plans. | National strategic (development) plans like the PP, 9th FYP or BDP 2100 etc. to have included CSC considerations National Adaptation Plan of Bangladesh (2023–2050) to have amended and elaborated with CSC considerations in general, sustainable material extraction and building materials manufacturing practices in particular.<br><br>25% lower-level plans (various DAPs, Master Plans) and DPPs to adhere to the amended strategic plans. | 50% lower-level plans (various DAPs, Master Plans) and DPPs to adhere to the amended strategic plans. | 75% lower-level plans (various DAPs, Master Plans) & DPPs to adhere to the amended strategic plans. |
| | | Competent, environmentally (especially climate change) sympathetic and cognizant public servants, technical personnel and grassroots involved in the extraction as well as manufacturing of building materials. | There is a dearth of capable human resources that affect the adaptive capacity of raw material extraction and building material manufacturing sector. | GoB to have drafted policy and legal frameworks on sustainable raw material extraction and building material manufacturing. Capacity (institutional and human) and awareness building of 25% actors as well as stakeholders in this sector. | 50% lower-level plans (various DAPs, Master Plans) and DPPs to adhere to the amended strategic plans. Policy and legal framework to be reviewed and updated within a 10-year span.<br><br>Capacity (institutional and human) and awareness building of 50% actors as well as stakeholders in this sector. | Policy and legal framework to be reviewed and updated within a 10-year span.<br><br>Capacity (institutional and human) and awareness building of 75% actors as well as stakeholders in this sector. |

| Effect on | Country Strategic Goals | Outcome | Baseline | 2030 Target | 2040 Target | 2050 Target |
|---|---|---|---|---|---|---|
| | **Minimize environmental degradation in extraction and manufacturing of building materials.**<br><br>**Support transition to safe and green jobs for persons engaged in unsustainable extraction and manufacturing in the construction supply chain. Support persons and communities engaged in the burnt brick industry to transition to green jobs.**<br><br>**Improve occupational safety among workers in extraction and manufacturing of construction materials.** | Improved institutional capacity and legal instruments for preventing environmental degradation from extraction and manufacturing. | There is a lack of institutional capacity that contribute to environmental degradation from extraction and manufacturing. | Capacity-building of 25% central and local government institutions as well as resource provisioning (skilled manpower, funding, equipment) dealing with environmental pollution (focus on extraction and manufacturing). | Capacity-building of 50% central and local government institutions and resource provisioning dealing with environmental pollution (focus on extraction and manufacturing). | Capacity-building of 75% central and local government institutions and resource provisioning dealing with environmental pollution (focus on extraction and manufacturing). |
| | | Available green jobs through a sustainable transition. | Almost no green jobs are presently available. | 25% MSMEs to have received incentives (credit, tax exemption), technical training and business development support for their transition to green business and create or switch to green jobs. | At least 50% MSMEs to have received incentives (credit, tax exemption), technical training and business development support for their transition to green business and create or switch to green jobs. | 75% MSMEs to have received incentives (credit, tax exemption), technical training and business development support for their transition to green business and create or switch to green jobs. |
| | | (a) Available legal instruments to support the preparation and enforcement of OHS (occupational health and safety) in all phases of the construction supply chain; (b) Institutional arrangement that uphold inclusiveness, equity and human rights; (c) Competent, cognizant employers and workers regarding human rights and OHS; (d) Improved and sustainable data management for better decision-making. | There is a lack of institutional and legal provisioning around material extraction and manufacturing workers' well-being (including OHS, human rights). No dedicated data management is available for this area too. | GoB has drafted policy and OHS law (including minimum wage law, especially for women) on for extractive & building materials manufacturing industries.<br><br>Capacity (human) building of extraction and manufacturing Trade Unions and 25% workers in this sector.<br><br>Data collection agency to have collected 100% baseline data on informal employment, OHS hazards and human rights violation. | Capacity (human) building of 50% extraction and manufacturing workers in this sector.<br><br>Data collection agency to have continued the collection of 100% data for this 10-year interval period. | Capacity (human) building of 75% extraction and manufacturing workers in this sector.<br><br>Data collection agency to have continued the collection of 100% data for this 10-year interval period. |

### Prioritized actions

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
|  | 1 | Allocate dedicated funds for research and innovation in low carbon, local, vernacular and recycled building materials (considering durability, aesthetic appearance etc). | | | | MoF | Academia, Governmental research institutes (HBRI, BFRI), UGC, PWD, industry |
| | 2 | Develop and maintain a comprehensive database documenting indigenous and traditional materials. This database should be accessible to builders, architects, and policymakers and integrated into building codes and standards to ensure the proper use of these materials in construction. | | | | Academia | Industry, NGOs |
| | 3 | Mainstream low carbon, renewable and vernacular materials and technologies in academic syllabi and undergraduate academic programme accreditation criteria. | | | | Universities, polytechnic institutes | UGC, Technical Education Board |
| | 4 | Provide subsidies and soft loans for private sector investors and incubation funds for start-ups in the area of low carbon and sustainable materials. | | | | MoF | NBR, HBRI |
| | 5 | Incentivize low carbon materials (including vernacular) with simultaneous imposition of incremental carbon taxes for all conventional high carbon materials (local, imported). | | | | MoF | NBR, HBRI |
| | 6 | Include and periodically update BNBC and other schedules of rates (PWD, LGED) with new low carbon materials and specifications. | | | | PWD, LGED | HBRI, academia |
| | 7 | Build skills and knowledge of site-level technicians (e.g. diploma engineers) and construction artisans and workers on low-carbon material benefits and associated construction techniques. | | | | MoLE | IDEB, Private Sector |

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
|  | **8** | Establish regional networks with academia, research institutions and private sector on researching, developing, marketing of brick alternatives and appropriate low carbon construction materials. | | | | Governmental research institutes (HBRI, BFRI), FBCCI | Technical universities and technical academic institutions, programmes |
| | **9** | Build capacity of the private sector in commercial production of low-carbon, sustainable materials as alternatives to brick, cement etc. by promoting and marketing alternative materials, exposing to regional best practices (practical tours) and arranging trainings and CPDs. | | | | Academia | Governmental research institutes (HBRI, BFRI), FBCCI |
| | **10** | Promote green businesses (of alternative low-carbon materials like brick and cement, and appliances) by facilitating market entry and adequate supply, (soft) credit and start-up's realization of green business opportunities. | | | | MoEFCC, MoIND | Local banks and financial institutes, microcredit NGOs, FBCCI, international partners and donors |
| | **11** | Formulate regulations on environmental impact labelling (and certification) of alternative low-carbon materials. | | | | BSTI | HBRI, PWD, DoE |
| | **12** | Incentivize procurement of locally produced and sourced low-carbon materials in public procurements (e.g. megaprojects, PWD, LGED works). | | | | PWD, LGED | HBRI, NBR, MoF |
| | **13** | Improve coordination among agencies enforcing energy standards by creating a cross-agency platform like Bangladesh's SDGs Implementation and Monitoring Committee with clear goals, alignment with political commitments and led by a strong, well-resourced and dynamic focal agency. | | | | PMO | Urban-level coordination body, MoEFCC, SREDA |
| | **14** | Implement systematic data collection and dissemination on operational carbon and emissions from systems and appliances manufacturing using an online platform like Bangladesh's SDG Tracker. | | | | BBS | Technical universities, Governmental research institutes (HBRI, BFRI) |
| | **15** | Support local manufacturing of energy-efficient appliances and systems to reduce costs and increase availability. Additionally, promote bulk purchasing agreements to lower prices for developers and consumers, making energy-efficient products more affordable. | | | | SREDA, NBR | Industry, international partners and donors, MoPHW |

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
|  | 16 | Create a well-resourced and dedicated research cell within relevant GoB structure (like WARPO) for systematic data collection (and free dissemination) on climate change risks, impacts and adaptation pertaining to construction supply chain. | | | | DoE, HBRI | Academia, Governmental research institutes (BBS, BFRI), MoF |
| | 17 | Implement systematic data collection and reporting on adaptation and resilience (best) practices in the construction supply chain. | | | | HBRI | Academia, Governmental research institutes (BBS, BFRI), PWD |
| | 18 | Systematically document traditional construction methods and materials that have proven effective in enhancing resilience. This includes creating detailed records of techniques, materials, and their applications in different contexts in Bangladesh. Create a centralized database of traditional knowledge and materials. This database should be open and accessible to construction professionals and serve as a reference for incorporating traditional practices into new building projects. | | | | Academia, HBRI, MoHPW | Government, industry, NGOs, professional bodies |
| | 19 | Mainstream construction sector (supply chain) adaptation and resilience concepts in the national strategic (development) plans like the PP, NDC, BDP 2100 & FYP etc., that govern lower level, (local) plans, rules, laws and acts. | | | | MoP | GED |
| | 20 | Formulate adaptation frameworks (plans) focusing on sustainable material extraction and manufacturing of building materials with necessary policy integration. | | | | MoP, MoEFCC | GED |
| | 21 | Develop regulations (acts, laws) on sustainable extraction and manufacturing of building materials and enforce them. | | | | MoEFCC | Bangladesh Navy, international partners and donors (e.g. ADB, GIZ), NGOs, MoLJPA |
| | 22 | Build institutional capacity to improve technical skills, resource mobilization capacity and competence to develop and enforce sectoral regulations focusing on climate adaptation and resilience. | | | | MoEFCC | Academia, NGOs, international partners and donors |
| | 23 | Improve stakeholder (especially present brickfield owners and informal grassroots workers) knowledge and awareness of sustainable extraction and manufacturing pertaining to climate change risks/impacts and adaptation needs. | | | | MoEFCC | NGOs, SME Foundation, MoIND, international partners and donors |

| Effect on | # | Name of action | Short | Med | Long | Leading actor | Other actors |
|---|---|---|---|---|---|---|---|
| | 24 | Build institutional capacity with necessary resource provisioning (skilled manpower, funding, equipment) and competence to enforce regulations to prevent degradation from extraction and production of building materials. | | | | MoHPW | NGOs, SME Foundation MoIND, international partners and donors |
| | 25 | Incentivize MSMEs (especially present brickfield owners) in the gradual transition to green businesses. Assist them in developing green business models (introduce brick alternatives, provide market information, connect with financial institutions). | | | | MoIND, MoHPW | NGOs, SME Foundation, international partners and donors, MoF |
| | 26 | Provide knowledge of alternatives and techniques and skill trainings to MSMEs, technical personnel and workers, while showcasing examples of successful initiatives (like EU's SWITCHASIA project) and piloting. | | | | MoIND | NGOs, SME Foundation MoIND, international partners and donors |
| | 27 | Formulate new policies and review existing policies in light of OSHA, ILO, ISO etc., standards for effective OHS implementation in extractive (mining) and building material manufacturing industries, with insurance provisioning and stricter compensation mechanism. | | | | MoLE | MoL, CBOs, MoSW, insurance companies |
| | 28 | Improve the present minimum wage law, by highlighting extraction and manufacturing sector to ensure equitable benefits and human rights for marginalized groups including women. | | | | MoLE | ILO, MoWCA, international partners and donors (e.g. GIZ, Amnesty), NGOs (ASK, Human Rights Watch), MoSW |
| | 29 | Build capacity of grassroots-level construction workers' trade unions to raise awareness and advocate for human rights and OHS among workers and employers. | | | | MoLE | ILO, MoWCA, international partners and donors (e.g. GIZ), DCE BUET, ESCB, ESAB, NGOs (ASK, Human Rights Watch) |
| | 30 | Build capacity of employers and workers to implement OHS best practices. | | | | MoLE | ILO, MoWCA, international partners and donors (e.g. GIZ), DCE BUET, ESCB, ESAB, NGOs (ASK, Human Rights Watch), UNOPS |
| | 31 | Implement systematic data collection and reporting on informal employment, OHS hazards and human rights violation in the construction sector. | | | | BBS | MoSW, academia |

# Project concepts for implementation

The previous chapters of this roadmap provided details on the current status quo of the building and construction sector in Bangladesh and suggested actions moving forward across the five key action areas. The following chapter presents 15 prioritized projects that are considered essential for advancing the decarbonization of the building and construction sector in Bangladesh.

These projects are described using a one-page concept note to communicate key information that will be critical to developing and implementing the projects in Bangladesh. Beyond the details of each project, these concept notes contain key pieces of information typically required by potential financiers, such as alignment with global agendas, alignment with national development objectives, and social impact, among others. Bangladesh can use these project concepts to communicate its project plans to donors, showing how the projects contribute to broader development goals and the anticipated impacts on carbon emissions, adaptation, well-being and inclusion.

| PROJECT TITLE | Objective |
|---|---|
| **1. Comprehensive Green Construction Initiative for Eco-Friendly Building Practices.**<br><br>This project aims to reduce GHG emissions in the construction sector by developing and enforcing low-carbon building codes, establishing a central database for monitoring carbon footprints, and revising the Bangladesh National Building Code (BNBC). | Embodied carbon reduction; operational carbon reduction. |
| | Link to national and global agendas |
| | NDCs, Perspective Plan of Bangladesh 2021–2041, 8th Five Year Plan. |
| Enabling environment recommendations | Institutions |
| – Lack of enforcement of existing building codes.<br>– Insufficient monitoring and reporting of carbon emissions in the construction sector.<br>– Outdated BNBC that does not adequately address embodied and operational carbon. | Leading: MoHPW. Implementing: MoEFCC, RAJUK, construction industry associations, academia. |
| | Potential funding sources |
| | National budget allocations, international climate funds (e.g. Green Climate Fund), private sector investments. |
| Expected outputs and impacts | Capital/upfront costs |
| – Reduction in embodied carbon by 20% in new construction projects.<br>– Establishment of a centralized carbon monitoring system. | Moderate |
| Supporting actions | Operational costs |
| – Conduct training sessions for Government officials on the new building codes.<br>– Engage with stakeholders to ensure compliance, realization of green business opportunities. | Medium |
| | Implementation time |
| | Medium |

| PROJECT TITLE | Objective |
|---|---|
| **2. Strategic Resilience Enhancement Plan for Future-Ready Cities.**<br>This project focuses on strengthening the adaptive capacities of urban areas by developing climate-resilient infrastructure and integrating climate adaptation into local and regional development plans. It emphasizes community-based participatory planning in vulnerable regions. | Adaptation. |
| | Link to national and global agendas |
| | SDG 11, SDG 13, SDG 17. |
| Enabling environment recommendations | Institutions |
| – Limited integration of climate adaptation into urban planning.<br>– Lack of community involvement in climate resilience initiatives.<br>– Inadequate infrastructure to withstand climate impacts. | Leading: MoEFCC. Implementing: LGIs, NGOs, Development Authorities. |
| | Potential funding sources |
| | National budget allocations, Adaptation Fund, international climate resilience funds, local government contributions. |
| Expected outputs and impacts | Capital/upfront costs |
| – Enhanced resilience in urban areas.<br>– Increased community engagement and ownership of climate adaptation strategies. | Moderate |
| Supporting actions | Operational costs |
| – Continuous training for local government officials.<br>– Regular community consultations and participatory planning sessions. | Medium |
| | Implementation time |
| | |

| PROJECT TITLE | Objective |
|---|---|
| **3. Inclusive Urban Development Platform for Equitable and Sustainable Growth in Bangladesh.**<br>This project aims to enhance the participation of marginalized communities in urban planning by developing a digital platform for data transparency, establishing formal mechanisms for participation, and launching public awareness campaigns. | Well-being and inclusion. |
| | Link to national and global agendas |
| | |
| Enabling environment recommendations | Institutions |
| – Enhance digital infrastructure for transparent and accessible urban planning data.<br>– Strengthen stakeholder engagement processes. | Leading: MoLGRDC. Implementing: NGOs, NHA, professional bodies, academia. |
| | Potential funding sources |
| | National budget allocations, donor agencies, international development funds, private sector contributions. |
| Expected outputs and impacts | Capital/upfront costs |
| – Improved data transparency with a fully functional digital platform.<br>– Increased participation of marginalized communities in urban planning processes.<br>– Strengthened data-driven decision-making in urban planning.<br>– Greater inclusivity in urban development processes. | Moderate |
| Supporting actions | Operational costs |
| – Regular updates to the digital platform.<br>– Ongoing stakeholder engagement and public awareness initiatives. | Medium |
| | Implementation time |
| | Medium |

| PROJECT TITLE | Objective |
|---|---|
| **4. Integrated Framework for Sustainable Urban Growth and Development in Bangladesh**<br>This project focuses on developing and implementing a sustainable urban growth framework that integrates low-carbon zoning, high-density development, and renewable energy systems. The project addresses gaps in current zoning practices and the lack of integration of renewable energy into urban planning. | Embodied carbon reduction; operational carbon reduction. |
| | Link to national and global agendas |
| | SDG 9, SDG 11, SDG 13. |
| Enabling environment recommendations | Institutions |
| – Update zoning guidelines to incorporate low-carbon requirements.<br>– Strengthen capacity building in urban planning for sustainable growth.<br>– Revise zoning guidelines to include low-carbon building zones.<br>– Develop a comprehensive spatial plan for rapidly growing cities.<br>– Integrate renewable energy systems into urban planning for residential and commercial areas. | Leading: MoHPW. Implementing: City Corporations, LGIs, UDD, private sector. |
| | Potential funding sources |
| | National budget allocations, international development funds, private sector investments. |
| Expected outputs and impacts | Capital/upfront costs |
| – Improved zoning practices that promote low-carbon urban development.<br>– Increased adoption of renewable energy in urban areas. | Moderate |
| Supporting actions | Operational costs |
| – Regular training for urban planners on low-carbon zoning.<br>– Ongoing monitoring and evaluation of zoning practices. | Medium |
| | Implementation time |
| | Medium |

| PROJECT TITLE | Objective |
|---|---|
| **5. Coastal Resilience and Sustainable Urban Development Initiative in Bangladesh**<br>This project focuses on developing and implementing a sustainable urban growth framework that integrates low-carbon zoning, high-density development, and renewable energy systems. The project addresses gaps in current zoning practices and the lack of integration of renewable energy into urban planning. | Adaptation. |
| | Link to national and global agendas |
| | SDG 11, SDG 13, SDG 14. |
| Enabling environment recommendations | Institutions |
| – Lack of a comprehensive coastal urban development plan.<br>– High vulnerability of coastal cities to climate impacts.<br>– Limited integration of low-carbon strategies in coastal urban planning. | Leading: MoHPW. Implementing: Coastal Development Authorities, LGIs, NGOs. |
| | Potential funding sources |
| | National budget allocations, Green Climate Fund, international development funds. |
| Expected outputs and impacts | Capital/upfront costs |
| – Develop a comprehensive coastal urban development framework.<br>– Strengthen institutional capacity for climate-resilient planning.<br>– Develop a Low-Carbon Coastal Urban Development Masterplan.<br>– Integrate climate resilience measures into urban infrastructure.<br>– Engage local communities in the planning process. | High |
| Supporting actions | Operational costs |
| – Continuous training for local governments on climate-resilient planning.<br>– Regular monitoring and updating of the coastal urban plan. | High |
| | Implementation time |
| | Medium |

| PROJECT TITLE | Objective |
|---|---|
| **6. Advanced Digital Platform for Urban Governance and Smart Management in Bangladesh**<br>This project focuses on enhancing data transparency and citizen participation in urban planning through the development of a Digital Urban Governance Platform. The platform will provide real-time access to land-use data, facilitate stakeholder engagement, and ensure that marginalized communities are included in the planning process. | Well-being and inclusion.<br>Link to national and global agendas |
| Enabling environment recommendations | Institutions |
| – Poor data transparency and accessibility in urban planning.<br>– Limited participation of marginalized communities in decision-making processes.<br>– Lack of digital infrastructure for inclusive urban governance.<br>– Strengthened data-driven decision-making in urban planning.<br>– Enhanced inclusivity and transparency in governance processes. | Leading: MoLGRDC. Implementing: NGOs, NHA, professional bodies, academia.<br>Potential funding sources<br>National budget allocations, international development funds, private sector contributions. |
| Expected outputs and impacts | Capital/upfront costs |
| – Improved transparency and accessibility of urban planning data.<br>– Increased participation of marginalized communities in the planning process. | Moderate |
| Supporting actions | Operational costs |
| – Regular updates and maintenance of the digital platform.<br>– Ongoing stakeholder engagement and public awareness initiatives. | Medium<br>Implementation time<br>Medium |

| PROJECT TITLE | Objective |
|---|---|
| **7. nearly Zero Emission Communities Research Institute (neZECoRI)**<br>[The Bengali meaning of "neZECoRI" is "do it by myself"]<br>Development of an institutional framework dedicated to providing support and guidance for sustainable design and construction initiatives. The institute will comprise relevant experts and stakeholders from Government, academia, professional bodies, industry and NGOs. It will engage in partnerships and community outreach. | All objectives.<br>Link to national and global agendas<br>EECMP 2030, SDG 3, SDG 6, SDG 7, SDG 9, SDG 11, SDG 12, SDG 13, SDG 16, SDG 17. |
| Enabling environment recommendations | Institutions |
| – Responsible for promoting, regulating, and overseeing sustainable practices.<br>– Enhance inter-agency coordination.<br>– Provide training for architects, engineers, and contractors.<br>– Implement monitoring and evaluation frameworks.<br>– Develop comprehensive policies and regulations.<br>– Secure funding and develop financial incentives. | MoHPW.<br>Potential funding sources<br>Financial institutions (BB), NBR, MoF, RAJUK, MoPEMR, international donors (e.g. BMZ and World Bank). |
| Expected outputs and impacts | Capital/upfront costs |
| – Coordinated approach in implementing sustainability measures and support to the construction industry. | Moderate |
| Supporting actions | Operational costs |
| – Demonstration projects on zero energy buildings with life-cycle cost analyses.<br>– Energy labelling system for zero operational carbon sites and new building design and construction. | Medium<br>Implementation time<br>Low |

| PROJECT TITLE | Objective |
|---|---|
| **8. nearly Zero Emission Communities (neZECom)**<br>[The Bengali meaning of "neZECom" is "Reduce self-need"]<br>Construction of showcase projects for zero emission buildings, incorporating life-cycle cost analyses. Initiate the design of all new Government buildings as part of the zero emission implementation project in suburban and rural areas to showcase the feasibility and benefits of low-carbon construction. | All objectives. |
| | Link to national and global agendas |
| | National Housing Policy 2016, EECMP 2030, Detailed Area Plan (DAP 2022-2035), SDG 3, SDG 6, SDG 7, SDG 9, SDG 11, SDG 12, SDG 13, SDG 15, SDG 17. |
| Enabling environment recommendations | Institutions |
| – Establish design, construction, and supervision teams.<br>– Develop design, validation, and post-occupancy evaluation tools.<br>– Secure funding and investment for zero-energy projects.<br>– Mandate updated energy standards for new buildings. | DoA and nearly Zero Emission Communities Research Institute (neZECoRI) |
| | Potential funding sources |
| | GoB, international donors (e.g. BMZ and World Bank). |
| Expected outputs and impacts | Capital/upfront costs |
| – Demonstrations and installations of pilot projects, including at least one Government building and school in each district, with a life-cycle cost analysis. | High |
| Supporting actions | Operational costs |
| – Energy labelling system for zero operational carbon sites and new building design and construction. | Low |
| | Implementation time |
| | Moderate |

| PROJECT TITLE | Objective |
|---|---|
| **9. Design for Environment and Sustainable Habitations (DESH)**<br>[The Bengali meaning of "DESH" is "country", as reflected in the last part of the country's name, BANGLA-DESH]<br>Establishment of an energy labelling system for zero operational carbon sites and zero emissions building design and construction. The objectives of DESH are: to ensure that the Design concept is appropriate to the local context; to eliminate Environmental impact over the life cycle; to ensure Sustainability for future generations; and to minimize energy demands throughout the life cycle of Habitation development. | All objectives. |
| | Link to national and global agendas |
| | BNBC, BEER, ARCH, LEED, EDGE, nZEB, SDG 3, SDG 6, SDG 7, SDG 9, SDG 11, SDG 12, SDG 13, SDG 15, SDG 17. |
| Enabling environment recommendations | Institutions |
| – Set primary targets based on existing standards.<br>– Encourage and support developers to exceed minimum standards.<br>– Update and transfer standards to a performance-based rating system.<br>– Allow upgrading of labels by incorporating additional renewable features or reducing energy demands.<br>– Determine subsidy amounts based on achieved energy and carbon-efficiency levels compared to pilot projects. | nearly Zero Emission Communities Research Institute (neZECoRI) |
| | Potential funding sources |
| | Financial Institutions (BB), NBR, MoF, RAJUK, MoPEMR, international donors (e.g. BMZ and World Bank). |
| Expected outputs and impacts | Capital/upfront costs |
| – Mandatory labelling of all existing buildings. [GREEN Leaf: 100–80%; YELLOW Leaf: 79–60%; ORANGE Leaf: 59–40%; BROWN Leaf: below 40%] | Moderate |
| Supporting actions | Operational costs |
| – Demonstration projects on zero energy buildings with life-cycle cost analyses. | Moderate |
| | Implementation time |
| | Moderate |

| PROJECT TITLE | Objective |
|---|---|
| **10. nearly Zero Emission Communities Renovation Body (neZECoRBo)**<br>[The Bengali meaning of "neZECoRBo" is "I will do it myself"]<br><br>Establishment of a body dedicated to providing support and guidance for sustainable renovation and material reuse efforts initiatives under neZECoRI. | All objectives. |
| | Link to national and global agendas |
| | EECMP 2030, SDG 3, SDG 6, SDG 7, SDG 9, SDG 11, SDG 12, SDG 13, SDG 16, SDG 17. |
| Enabling environment recommendations | Institutions |
| – Foster partnerships with international organizations.<br>– Involve local communities in decision-making processes.<br>– Train building managers and maintenance personnel.<br>– Enhance regulations.<br>– Provide training.<br>– Implement penalties for non-compliance. | nearly Zero Emission Communities Research Institute (neZECoRI) |
| | Potential funding sources |
| | Financial Institutions (BB), NBR, MoF, RAJUK, MoPEMR, international donors (e.g. BMZ and World Bank). |
| Expected outputs and impacts | Capital/upfront costs |
| – A unified approach and leadership in implementing sustainable renovation practices across the country. | Low |
| Supporting actions | Operational costs |
| – Demonstration projects for existing buildings.<br>– Energy labelling system for existing buildings. | Low |
| | Implementation time |
| | Low |

| PROJECT TITLE | Objective |
|---|---|
| **11. nearly Zero Emission Communities Renovation and Adaptation (neZECoRA)**<br>[The Bengali meaning of "neZECoRA" is "do it myself"]<br>Implementation of pilot projects focused on sustainable renovation and adaptation towards zero emissions buildings as part of neZECom. | All objectives. |
| | Link to national and global agendas |
| | National Housing Policy 2016; DAP 2022-2035, SDG 3, SDG 6, SDG 7, SDG 9, SDG 11, SDG 12, SDG 13, SDG 15, SDG 17. |
| Enabling environment recommendations | Institutions |
| – Promote the retrofitting and renovation of existing buildings supported by the Government to increase housing availability.<br>– Develop comprehensive building management and maintenance plans.<br>– Regular energy audits and retrofits.<br>– Upgrade current structures to make them more habitable, energy-efficient and resilient.<br>– Promote community management and maintenance.<br>– Provide financial incentives for homeowners. | nearly Zero Emission Communities Research Institute (neZECoRI) |
| | Potential funding sources |
| | Financial Institutions (BB), NBR, MoF, RAJUK, MoPEMR, international donors (e.g. BMZ and World Bank). |
| Expected outputs and impacts | Capital/upfront costs |
| – Retrofitting of existing buildings to include essential low-energy and accessibility features. | High |
| Supporting actions | Operational costs |
| – Energy labelling system for existing buildings. | Low |
| | Implementation time |
| | Moderate |

| PROJECT TITLE | Objective |
|---|---|
| **12. Addition, Modification and Retrofitting DESH (AMaR DESH)**<br>[The Bengali meaning of "AMaR DESH" is "my country"]<br><br>Development of a comprehensive energy labelling system to assess and improve the performance of existing buildings towards zero emissions. | All objectives. |
| | Link to national and global agendas |
| | BNBC, BEER, ARCH, LEED, EDGE, nZEB, SDG 3, SDG 6, SDG 7, SDG 9, SDG 11, SDG 12, SDG 13, SDG 15, and SDG 17. |
| Enabling environment recommendations | Institutions |
| – Conduct post-occupancy energy evaluation and energy audits.<br>– Provide financial incentives and subsidies.<br>– Partner with appliance manufacturers.<br>– Promote the use of renewable energy. | nearly Zero Emission Communities Research Institute (neZECoRI) |
| | Potential funding sources |
| | Financial institutions (BB), NBR, MoF, RAJUK, MoPEMR, international donors (e.g. BMZ and World Bank). |
| Expected outputs and impacts | Capital/upfront costs |
| – Mandatory labelling of all existing buildings. [GREEN Leaf: 100–80%; YELLOW Leaf: 79–60%; ORANGE Leaf: 59–40%; BROWN Leaf: below 40%] | Moderate |
| Supporting actions | Operational costs |
| – Demonstration projects for existing buildings. | Moderate |
| | Implementation time |
| | Low |

| PROJECT TITLE | Objective |
|---|---|
| **13. Subsidies & soft loans for private sector investors & incubation funds for start-ups in the area of low carbon/sustainable materials.** | Embodied carbon reduction. |
| | Link to national and global agendas |
| | NDCs, SDG 13. |
| Enabling environment recommendations | Institutions |
| A. Provisioning of financial incentives (tax exemption, direct monetary subsidies etc.) for the private sector (including corporate producers, importers, SMEs etc).<br>B. Soft loans (low interest, long term) and direct monetary subsidies for start-ups and entrepreneurs for business development. | MoF/NBR, HBRI. |
| | Potential funding sources |
| | GoB, international donors (BMZ, World Bank etc.). |
| Expected outputs and impacts | Capital/upfront costs |
| – Strong and capable private sector including the start-ups.<br>– More private sector investment and confidence on green business.<br>– Higher use of low-carbon, sustainable materials leading to reduced embodied carbon. | Low |
| Supporting actions | Operational costs |
| – Incentivize MSMEs (especially present brickfield owners) in gradual transition to green businesses.<br>– Assist MSMEs to develop business models (introduce brick alternatives, provide market information, connect with financial institutions).<br>– Establish regional network with academia, research institutions and private sector on researching, developing, and marketing of brick alternatives and appropriate low-carbon construction materials.<br>– Private sector's capacity-building in commercial production of low carbon, sustainable materials as alternatives to brick, cement e by promoting and marketing alternative materials, exposing to regional best practices (practical tours) and arranging trainings and CPDs.<br>– Promote green business (of alternative low-carbon materials like brick, cement and appliances) by facilitating market entry and adequate supply, (soft) credit and start-up's realization of green business opportunities.<br>– Provide knowledge of alternatives, techniques, and skills training to MSMEs, technical personnel and workers, while showcasing examples of successful initiatives. | High |
| | Implementation time |
| | Medium |

| PROJECT TITLE | Objective |
|---|---|
| **14. Formulate regulations on environmental impact labelling (& certification) of alternative low-carbon materials.** | Operational carbon reduction. |
| | Link to national and global agendas |
| | NDCs, SDG 13. |
| Enabling environment recommendations | Institutions |
| A. Issuance of environmental impact labels, providing details about all construction materials' and products' low-carbon sustainability attributes and ecological impact.<br>B. Issuance of environmental certificates (similar to BSTI standard certification or US EPD) for all construction materials and products. | BSTI/HBRI, PWD, DoE. |
| | Potential funding sources |
| | GoB. |
| Expected outputs and impacts | Capital/ upfront costs |
| – Recognition and increased use of low-carbon sustainable construction materials to provide and promote brick and cement alternatives.<br>– Availability of certified materials helping the formulation of other regulations, codes and specifications.<br>– Greening of public procurement (through PWD/LGED schedules). | Low |
| Supporting actions | Operational costs |
| – Incentivize low-carbon materials (including vernacular) with simultaneous imposition of incremental carbon taxes for all conventional high-carbon materials (local, imported).<br>– Include and periodically update BNBC and other schedule of rates (PWD, LGED) with new low-carbon materials and specifications.<br>– Incentivize procurement of locally produced and sourced low-carbon materials in public procurements (e.g. megaprojects, PWD, LGED works).<br>– Incentivize low-carbon materials (including vernacular) with simultaneous imposition of incremental carbon taxes for all conventional high-carbon materials (local, imported). | Low |
| | Implementation time |
| | Medium |

| PROJECT TITLE | Objective |
|---|---|
| 15. Mainstream construction sector (supply chain) adaptation/resilience concepts in the national strategic (development) plans like the PP, NDC, BDP 2100 & FYP etc. that govern lower-level/local plans, rules, laws & acts. | Adaptation. |
| | Link to national and global agendas |
| | NDCs, SDG 13. |
| Enabling environment recommendations | Institutions |
| A. Formulation of national strategic (development) plans containing dedicated sections on the sustainable management of carbon construction (supply chain).<br>B. Integration of resilience concepts in CSC sector.<br>C. Making statutory arrangements for its adaptation in lower-level plans, rules, laws and acts of all relevant sectors and ministries. | MoP/GED. |
| | Potential funding sources |
| | GoB. |
| Expected outputs and impacts | Capital/upfront costs |
| – Presence and recognition of CSC and its climate change impact and resilience issues in all national strategic (development) plans.<br>– Trickle-down effect of national CSC strategies over and into all lower-level (local) plans, rules, laws and acts used in implementation.<br>– Lower-level (local) plans, rules, laws and acts of all relevant sectors and ministries with CSC awareness, leading to lower carbon emission and enhancing sector's resilience. | Moderate |
| Supporting actions | Operational costs |
| – Mainstream low carbon and renewable (including vernacular) materials and technologies in academic syllabi as well as undergraduate academic programme accreditation criteria.<br>– Formulate adaptation frameworks and plans focusing on sustainable material extraction and manufacturing of building materials.<br>– Develop regulations (laws, acts) on sustainable extraction and manufacturing of building materials as well as their implementation.<br>– Formulate policies to draft and enforce OHS laws for extractive and mining industries as well as manufacturing of building materials.<br>– Institutional capacity-building to improve technical skills, resource mobilization capacity and competence to develop and enforce sectoral regulations focusing on climate adaptation and resilience.<br>– Create a well-resourced, dedicated research cell within relevant GoB structure for systematic data collection and dissemination on climate change risks, impacts and adaptation pertaining to the construction supply chain.<br>– Systematic data collection and dissemination on operational carbon and emissions from systems and appliance manufacturing using an online platform like Bangladesh's SDG Tracker.<br>– Capacity-building of grassroots-level construction workers' trade unions to raise awareness, advocate for human rights and OHS among workers and employers. | Low |
| | Implementation time |
| | Medium |

# Annexes

1. List of members of the Steering Committee.
2. Stakeholder mapping.
3. Baseline assessment.
4. Stakeholders survey on the enabling environment for existing and new buildings.
5. Problem trees with challenges, opportunities and goals.

# References


**Overview of the roadmap**

1 With the exception of the Action Area Strategic Priorities. As it refers to the enabling environment, no quantitative data is readily available to assess the gap

**Introduction**

1. Bündnis Entwicklung Hilft and IFHV, *WorldRiskReport 2023*, Berlin, Bündnis Entwicklung Hilft, 2023, p. 7, <https://weltrisikobericht.de/wp-content/uploads/2024/01/WorldRiskReport_2023_english_online.pdf>.
2. Asian Disaster Reduction Center, 'Information on Disaster Risk Reduction of the Member Countries: Bangladesh', <www.adrc.asia/nationinformation.php?NationCode=50&Lang=en#>, accessed 11 June 2024.
3 United States Agency for International Development, *Fragility and Climate Risks in Bangladesh*, USAID, Washington, DC, September 2018, pp. 3-4, <https://pdf.usaid.gov/pdf_docs/PA00TBFJ.pdf>.
4 Eckstein, David, Vera Künzel and Laura Schäfer, *Global Climate Risk Index 2021: Who Suffers Most from Extreme Weather Events? Weather-Related Loss Events in 2019 and 2000-2019*, Germanwatch, Bonn, January 2021, <www.germanwatch.org/sites/default/files/Global%20Climate%20Risk%20Index%202021_2.pdf>.
5 Coalition for Disaster Resilient Infrastructure, 'GIRI & Key Figures', <https://giri.unepgrid.ch/facts-figures/multi-hazards>, accessed 20 June 2024.
6 United Nations Office for Project Services, *GlobalABC Gap Analysis & Projections*, UNOPS, 2024, <https://lookerstudio.google.com/u/0/reporting/851785c6-458d-453b-8793-28c78a468fca/page/p_dothf3xtfd>, accessed 24 July 2024.
8 World Bank Group, *Bangladesh Country and Climate Development Report*, WBG, Washington, DC, October 2022, p. 12, <https://openknowledge.worldbank.org/server/api/core/bitstreams/6d66e133-e49d-5ad9-b056-7b1a6c6206ed/content>.
United Nations Environment Programme, *Global Status Report for Buildings and Construction: Beyond foundations: Mainstreaming sustainable solutions to cut emissions from the buildings sector*, UNEP, Nairobi, 2024, p. 17, <https://wedocs.unep.org/bitstream/handle/20.500.11822/45095/global_status_report_buildings_construction_2023.pdf?sequence=3&isAllowed=y>.
9 Ibid.
12 *Ministerial Declaration: Buildings and Climate Global Forum – Declaration de Chaillot*, Paris, 8 March 2024, <www.ecologie.gouv.fr/sites/default/files/documents/declaration-de-chaillot-forum-batiments-climat.pdf>.
11 Ibid., p. 6.
12 Ibid., p. 7.
13 Bangladesh, Bangladesh National Building Code, Act No. 55 of 2020, <https://mccibd.org/wp-content/uploads/2021/09/Bangladesh-National-Building-Code-2020.pdf>.
14 Ministry of Environment, Forest and Climate Change, *Nationally Determined Contributions (NDCs) 2021: Bangladesh (Updated)*, MoEFCC, Dhaka, 26 August 2021, <https://unfccc.int/sites/default/files/NDC/2022-06/NDC_submission_20210826revised.pdf>.
15 Ministry of Environment, Forest and Climate Change, *National Adaptation Plan of Bangladesh (2023-2050)*, MoEFCC, Dhaka, October 2022, <https://moef.portal.gov.bd/sites/default/files/files/moef.portal.gov.bd/npfblock/903c6d55_3fa3_4d24_a4e1_0611eaa3cb69/National%20Adaptation%20Plan%20of%20Bangladesh%20%282023-2050%29%20%281%29.pdf>.
16 Ministry of Power, Energy and Mineral Resources, *Integrated Energy and Power Master Plan (IEPMP) 2023*, MoPEMR, Dhaka, 2023, p. 45, <https://powerdivision.portal.gov.bd/sites/default/files/files/powerdivision.portal.gov.bd/page/4f81bf4d_1180_4c53_b27c_8fa0eb11e2c1/IEPMP%202023.pdf>.
17 General Economics Division (Ministry of Planning), *Making Vision 2041 a Reality: Perspective Plan of Bangladesh 2021-2041*, GED, Dhaka, March 2020, <http://oldweb.lged.gov.bd/uploadeddocument/unitpublication/1/1049/vision%202021-2041.pdf>.
18 As proposed in Yunus, Muhammad, *A World of Three Zeros: The New Economics of Zero Poverty, Zero Unemployment, and Zero Net Carbon Emissions*, PublicAffairs, 2017.

**Country overview**

1 Bangladesh Bureau of Statistics, *Population & Housing Census 2022: Preliminary Report*,

BBS, Dhaka, August 2022, p. 12, <https://sid.portal.gov.bd/sites/default/files/files/sid.portal.gov.bd/publications/01ad1ffe_cfef_4811_af97_594b6c64d7c3/PHC_Preliminary_Report_(English)_August_2022.pdf>.

2 Hossain, Babul, Md. Salman Sohel and Crispin Magige Ryakitimbo, 'Climate change induced extreme flood disaster in Bangladesh: Implications on people's livelihoods in the Char Village and their coping mechanisms', *Progress in Disaster Science*, vol. 6, 21 March 2020, p. 2, <https://doi.org/10.1016/j.pdisas.2020.100079>.

3 World Bank, 'Climate Change Knowledge Portal: Bangladesh', <https://climateknowledgeportal.worldbank.org/country/bangladesh/climate-data-historical>, accessed 6 August 2024.

4 *Population & Housing Census 2022: Preliminary Report*, p. 5.

5 United Nations Department of Economic and Social Affairs, *World Population Prospects: The 2022 Revision*, UNDESA, 2022, <https://population.un.org/wpp/>, accessed 11 June 2024.

6 Ibid.

7 Ibid.

8 *Population & Housing Census 2022: Preliminary Report*, p. 6.

9 Ibid., p. 6.

10 Ibid., p. 9.

11 World Bank Data, 'Bangladesh', <https://data.worldbank.org/country/bangladesh>, accessed 11 June 2024.

12 *Population & Housing Census 2022: Preliminary Report*, pp. 10-11.

13 *World Population Prospects: The 2022 Revision*; elaboration by *The Business Standard*, 12 July 2022, <www.tbsnews.net/bangladesh/low-fertility-keep-bangladesh-population-20-crore-2045-457258>, accessed 11 June 2024.

14 United Nations Department of Economic and Social Affairs, 'Least Developed Country Category: Bangladesh Profile', <www.un.org/development/desa/dpad/least-developed-country-category-bangladesh.html>, accessed 11 June 2024.

15 World Bank Data, 'Bangladesh'.

16 World Bank Group, 'Data: Bangladesh Overview', <www.worldbank.org/en/country/bangladesh/overview>, accessed 11 June 2024.

17 United Nations Development Programme, 'Human Development Reports: Bangladesh', <https://hdr.undp.org/data-center/specific-country-data#/countries/BGD>, accessed 11 June 2024.

18 World Bank Group, 'Data: Bangladesh Overview'.

19 World Bank Group, 'Data: Unemployment', <https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS>, accessed 6 August 2024.

20 World Bank Group, 'Data: Bangladesh Overview'.

21 Ministry of Environment, Forest and Climate Change, *Bangladesh First Biennial Update Report to the United Nations Framework Convention on Climate Change*, MoEFCC, Dhaka, June 2023, <https://unfccc.int/sites/default/files/resource/Updated%20BUR1%20Report_15_11_2023.pdf>.

22 International Energy Agency, 'Bangladesh: Emissions', <https://www.iea.org/countries/bangladesh/emissions>, accessed 20 September 2024.

23 Ibid.

24 *Bangladesh First Biennial Update*.

25 Bündnis Entwicklung Hilft and IFHV, *WorldRiskReport 2023*, Berlin, Bündnis Entwicklung Hilft, 2023, p. 7, <https://weltrisikobericht.de/wp-content/uploads/2024/01/WorldRiskReport_2023_english_online.pdf>.

26 Asian Disaster Reduction Center, 'Information on Disaster Risk Reduction of the Member Countries: Bangladesh', <www.adrc.asia/nationinformation.php?NationCode=50&Lang=en#>, accessed 11 June 2024.

27 Eckstein, David, Vera Künzel and Laura Schäfer, *Global Climate Risk Index 2021: Who Suffers Most from Extreme Weather Events? Weather-Related Loss Events in 2019 and 2000-2019*, Germanwatch, Bonn, January 2021, <www.germanwatch.org/en/cri>.

28 World Bank Group, *Bangladesh Country and Climate Development Report*, WBG, Washington, DC, October 2022, p. 12, <https://openknowledge.worldbank.org/server/api/core/bitstreams/6d66e133-e49d-5ad9-b056-7b1a6c6206ed/content>.

29 Ali, S. M. Zulfiqar, Badrun Nessa Ahmed and Rizwana Islam, *Labour Market and Skill Gap Analysis for the Construction Sector in Bangladesh*, Bangladesh Institute of Development Studies, Dhaka, August 2022, p. 22, <https://seip-fd.gov.bd/wp-content/uploads/2023/06/5.-Labour-Market-and-Skill-Gap-Analysis-for-the-Construction-Sector-in-Bangladesh-1.pdf>.

30 Ibid., p. 27.

31 Ibid., p. 9.

32 *Construction Industry in Bangladesh Size &*

*Share Analysis - Growth Trends & Forecasts (2024 - 2029)*, Mordor Intelligence, 2023, <www.mordorintelligence.com/industry-reports/bangladesh-construction-market>.
33 Ibid.
34 International Finance Corporation, *Understanding the Housing Sector in Bangladesh Market Study*, IFC, 11 March 2020, <https://it.scribd.com/document/495854806/UNDERSTANDING-THE-HOUSING-SECTOR-IN-BANGLADESH-MARKET-STUDY-by-UnSy-March2020>.
35 Statista, 'Real Estate – Bangladesh', <www.statista.com/outlook/fmo/real-estate/bangladesh>, accessed 2 July 2024.
36 Ovee, Saddif, 'What is the actual number of Bangladeshi migrant workers?', *Dhaka Tribune*, 15 December 2023, <www.dhakatribune.com/bangladesh/migration/333923/what-is-the-actual-number-of-bangladeshi-migrant>, accessed 24 July 2024.
37 Ministry of Environment, Forest and Climate Change, *National Adaptation Plan of Bangladesh (2023-2050)*, MoEFCC, Dhaka, October 2022, <https://moef.portal.gov.bd/sites/default/files/files/moef.portal.gov.bd/npfblock/903c6d55_3fa3_4d24_a4e1_0611eaa3cb69/National%20Adaptation%20Plan%20of%20Bangladesh%20%282023-2050%29%20%281%29.pdf>.

**Strategic priorities**

1 General Economics Division (Ministry of Planning), *Making Vision 2041 a Reality: Perspective Plan of Bangladesh 2021-2041*, GED, Dhaka, March 2020, <http://oldweb.lged.gov.bd/uploadeddocument/unitpublication/1/1049/vision%202021-2041.pdf>.
2 General Economics Division (Ministry of Planning), *8th Five Year Plan July 2020 – June 2025: Promoting Prosperity and Fostering Inclusiveness*, GED, Dhaka, December 2020, <www.prb.org/wp-content/uploads/2022/03/8th-Five-Year-Plan-compressed.pdf>.
3 General Economics Division (Ministry of Planning), *National Sustainable Development Strategy 2010-21*, GED, Dhaka, May 2013, <https://plancomm.gov.bd/sites/default/files/files/plancomm.portal.gov.bd/files/7ab46c78_0eaf_4538_8fbf_33ec533e3d07/National-Sustainable-Development-Strategy.pdf>.
4 Ministry of Power, Energy and Mineral Resources, *Integrated Energy and Power Master Plan (IEPMP) 2023*, MoPEMR, Dhaka, 2023, p. 45, <https://powerdivision.portal.gov.bd/sites/default/files/files/powerdivision.portal.gov.bd/page/4f81bf4d_1180_4c53_b27c_8fa0eb11e2c1/IEPMP%202023.pdf>.
5 Ministry of Environment, Forest and Climate Change, *National Adaptation Plan of Bangladesh (2023––2050)*, MoEFCC, Dhaka, October 2022, <https://moef.portal.gov.bd/sites/default/files/files/moef.portal.gov.bd/npfblock/903c6d55_3fa3_4d24_a4e1_0611eaa3cb69/National%20Adaptation%20Plan%20of%20Bangladesh%20%282023-2050%29%20%281%29.pdf>.
6 Bangladesh, Sand and Soil Management Act, Act No. 62 of 2010, <https://faolex.fao.org/docs/pdf/BGD224951.pdf>.
7 Bangladesh, Sand and Soil Management (Amendment) Act, Act No. 35 of 2023, <https://faolex.fao.org/docs/pdf/BGD224954.pdf>.
8 Ozone Cell (Department of Environment, Ministry of Environment, Forest and Climate Change), *Bangladesh National Cooling Plan for the Implementation of the Montreal Protocol*, MoEFCC, Dhaka, December 2021, <www.undp.org/sites/g/files/zskgke326/files/2022-06/Bangladesh%20National%20Cooling%20Plan%20for%20the%20Implementation%20of%20the%20Montreal%20Protocol.pdf>.
9 Ministry of Environment, Forest and Climate Change, *Nationally Determined Contributions (NDCs) 2021: Bangladesh (Updated)*, MoEFCC, Dhaka, 26 August 2021, <https://unfccc.int/sites/default/files/NDC/2022-06/NDC_submission_20210826revised.pdf>.
10 Ministry of Environment, Forest and Climate Change, *Solid Waste Management Rules*, MoEFCC, Dhaka, 2021, <https://file-chittagong.portal.gov.bd/uploads/f39f7057-6518-42cc-9940-fd10a95363a7//625/f19/af5/625f19af5b498955912439.pdf>.
11 Bangladesh, Bangladesh National Building Code, Act No. 55 of 2020, <https://mccibd.org/wp-content/uploads/2021/09/Bangladesh-National-Building-Code-2020.pdf>.
12 *Making Vision 2041 a Reality*.
13 Bangladesh, Bangladesh Standards and Testing Institution Act, Act No. 67 of 2018, <https://faolex.fao.org/docs/pdf/BGD214483.pdf>.
14 Bangladesh, Labour Act, Act No. 42 of

2006, <https://mccibd.org/wp-content/uploads/2021/09/Bangladesh-Labour-Act-2006_English-Upto-2018.pdf>.
15 Bangladesh, Labour (Amendment) Act, Act No. 14 of 2018, <https://blfbd.com/wp-content/uploads/2021/05/5.-Labour_LawAmendment2018.pdf>.
16 Ministry of Environment, Forest and Climate Change, *National Environment Policy*, MoEFCC, Dhaka, 2016, <https://faolex.fao.org/docs/pdf/bgd213996.pdf>.
17 Sustainable and Renewable Energy Development Authority, *SREDA Standard and Labeling (Appliances & Equipment) Regulation*, SREDA, Dhaka, 2018, <https://sreda.portal.gov.bd/sites/default/files/files/sreda.portal.gov.bd/download/d253d794_5fbf_4ec6_93f7_50ff4b889eeb/2020-06-02-16-42-5e6678ad364e4ff600a17db30d4461cf.pdf>.
18 Bangladesh Forest Department (Ministry of Environment and Forests), *National Forest Policy*, MoEF, Dhaka, 2016, <https://bforest.portal.gov.bd/sites/default/files/files/bforest.portal.gov.bd/page/238fc41d_700a_489d_9758_e80b7efdb2ef/Forest%20Policy%20English%20version%20%28%20update%29.PDF>.
19 National Housing Authority, *National Housing Policy 2016*, NHA, Dhaka, 2016, <https://nha.portal.gov.bd/sites/default/files/files/nha.portal.gov.bd/law/76f125dc_8e5e_4095_b03d_7d9ac29f842d/National%20Housing%20Policy%202016_English%20Version.pdf>.
20 Bangladesh, Brick Manufacturing and Brick Kilns Establishment (Control) Act, Act No. 59 of 2013, <https://it.scribd.com/document/248176947/Brick-Kiln-Act-2013>.
21 Power Division (Ministry of Power, Energy and Mineral Resources), *Country Action Plan for Clean Cookstoves*, MPEMR, Dhaka, November 2013, <https://powerdivision.portal.gov.bd/sites/default/files/files/powerdivision.portal.gov.bd/page/f6d0e100_e2d8_47e7_b7cd_e292ea6395d3/13.%20CAP%20Final.pdf>.
22 Bangladesh, Public Procurement Act, Act No. 24 of 2006, <http://bdlaws.minlaw.gov.bd/upload/act/2021-11-17-11-55-47-45.-The-Procurement-Act,-2006.pdf>.
23 Bangladesh, Premises Rent Control Act, Act No. 3 of 1991, <www.commonlii.org/bd/legis/num_act/prca1991260/>.
24 *Making Vision 2041 a Reality*.
25 *8th Five Year Plan*.
26 *Nationally Determined Contributions*.
27 *Integrated Energy and Power Master Plan*, p. 45.
28 Ministry of Finance and United Nations Resident Coordinator, *United Nations Sustainable Development Cooperation Framework 2022-2026*, UNRC, Dhaka, 2022, p. 78, <https://bangladesh.un.org/sites/default/files/2022-03/UNSDCF%202022-2026.pdf>.
29 *National Housing Policy*.

**Spatial and urban development**

1 Bangladesh Bureau of Statistics, *Population & Housing Census – 2011, National Volume-3: Urban Area Report*, BBS, Dhaka, 2011, p. 55, <http://203.112.218.65:8008/WebTestApplication/userfiles/Image/National%20Reports/Population%20%20Housing%20Census%202011.pdf>.
2 Bangladesh Bureau of Statistics, *Population & Housing Census 2022: Preliminary Report*, BBS, Dhaka, August 2022, p. 9, <https://sid.portal.gov.bd/sites/default/files/files/sid.portal.gov.bd/publications/01ad1ffe_cfef_4811_af97_594b6c64d7c3/PHC_Preliminary_Report_(English)_August_2022.pdf>.
3 World Bank Data, 'Bangladesh', <https://data.worldbank.org/country/bangladesh>, accessed 11 June 2024.
4 Kazi Masel, Ullah and Kabir Uddin, 'The relationships between economic growth and cropland changes in Bangladesh: An evidence based on annual land cover data', *Environmental Challenges*, vol. 5, December 2021, p. 6, <https://doi.org/10.1016/j.envc.2021.100252>.
5 United Nations Office for Project Services, *GlobalABC Gap Analysis & Projections*, UNOPS, 2024, <https://lookerstudio.google.com/u/0/reporting/851785c6-458d-453b-8793-28c78a468fca/page/p_dothf3xtfd>, accessed 24 July 2024.
6 Ibid.
7 *Population & Housing Census 2022: Preliminary Report*, p. 25.
8 World Health Organization of the United Nations, 'Data: Global Health Observatory – Household Air Pollution Data', <www.who.int/data/gho/data/themes/air-pollution/household-air-pollution>, accessed 20 June 2024.

9 Dewan, Ashraf, et al., 'Surface urban heat island intensity in five major cities of Bangladesh: Patterns, drivers and trends', *Sustainable Cities and Society*, vol. 71, August 2021, p. 4, <https://doi.org/10.1016/j.scs.2021.102926>.
10 Bangladesh Bureau of Statistics, *Population and Housing Census 2022: National Report (Volume I)*, BBS, November 2023, p. 128, <https://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/b343a8b4_956b_45ca_872f_4cf9b2f1a6e0/2024-01-31-15-51-b53c55dd692233ae401ba013060b9cbb.pdf>.
11 Ibid., p. 5.
12 United States Agency for International Development, *Fragility and Climate Risks in Bangladesh*, USAID, Washington, DC, September 2018, pp. 3-4, <www.strausscenter.org/wp-content/uploads/Country-Brief-Fragility-and-Climate-Risks-in-Bangladesh-2018.pdf>.
13 Coalition for Disaster Resilient Infrastructure, 'GIRI & Key Figures', <https://giri.unepgrid.ch/facts-figures/multi-hazards>, accessed 20 June 2024.
14 *GlobalABC Gap Analysis*.
15 *Fragility and Climate Risks in Bangladesh*, p. 6.
16 *Population and Housing Census 2022: National Report (Volume I)*, p. 127.
17 World Bank Group, 'Data: Population living in slums – Bangladesh', <https://data.worldbank.org/indicator/EN.POP.SLUM.UR.ZS?locations=BD>, accessed 24 June 2024.
20 Ministry of Environment, Forest and Climate Change, *National Adaptation Plan of Bangladesh (2023-2050)*, MoEFCC, Dhaka, October 2022, p. 9, <https://moef.portal.gov.bd/sites/default/files/files/moef.portal.gov.bd/npfblock/903c6d55_3fa3_4d24_a4e1_0611eaa3cb69/National%20Adaptation%20Plan%20of%20Bangladesh%20%282023-2050%29%20%281%29.pdf>.

**Existing and new buildings**

1 Bangladesh Bureau of Statistics, *Population and Housing Census 2022: National Report (Volume I)*, BBS, November 2023, p. 127, <https://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/b343a8b4_956b_45ca_872f_4cf9b2f1a6e0/2024-01-31-15-51-b53c55dd692233ae401ba013060b9cbb.pdf>.
2 United Nations Office for Project Services, *GlobalABC Gap Analysis & Projections*, UNOPS, 2024, <https://lookerstudio.google.com/u/0/reporting/851785c6-458d-453b-8793-28c78a468fca/page/p_dothf3xtfd>, accessed 24 July 2024.
3 Anowar, Sayed, et al., 'Assessment of greenhouse gas emissions in building construction: A case study of SWC building at Kuet in Bangladesh', *Journal of Construction Engineering, Management & Innovation*, vol. 2, no. 4, 2019, pp. 215-229, <https://doi.org/10.31462/jcemi.2019.04215229>.
4 *Population and Housing Census 2022: National Report (Volume I)*.
5 *GlobalABC Gap Analysis*.
6 Anowar et al., 'Assessment of greenhouse gas emissions'.
7 Sustainable and Renewable Energy Development Authority, 'Home', <https://solar.sreda.gov.bd/>, accessed on 30 March 2024.
8 Sustainable and Renewable Energy Development Authority, *Campaign Plan for National Energy Efficiency and Conservation (EE&C) Awareness Raising*, SREDA, Dhaka, 2020, <https://reeep2.sreda.gov.bd/projects/Final%20Report_Campaign%20Plan%20for%20EEC%20Awareness%20Raising.pdf>.
9 'Cooling devices making city hotter', *The Daily Star*, 22 October 2022, <www.thedailystar.net/news/bangladesh/news/cooling-devices-making-city-hotter-3148776>, accessed 25 November 2022.
10 *Campaign Plan for National Energy Efficiency*.
11 *GlobalABC Gap Analysis*.
12 Al Mahbub, Md. Abdullah, et al., 'Different Forms of Solar Energy Progress: The Fast-Growing Eco-Friendly Energy Source in Bangladesh for a Sustainable Future', *Energies*, vol. 15, no. 18, 16 September 2022, <www.mdpi.com/1996-1073/15/18/6790>.
13 Sustainable and Renewable Energy Development Authority, 'Home'.
14 *GlobalABC Gap Analysis*.
15 Rashid, Adnan (Ed.), 'Affordable Housing: Capturing Bangladesh's Missing Market', *IDLC Monthly Business Review*, vol. 14, no. 9, September 2018, <https://idlc.com/mbr/images/public/UPI7iFYxIqKfhlK7H9Xf5r.pdf>.
16 Bangladesh Bureau of Statistics, *Report on National Survey on Persons with Disabilities (NSPD) 2021*, BBS, Dhaka, December 2022, <https://reliefweb.int/report/bangladesh/report-national-survey-persons-disabilities-nspd-2021-december-2022-enbn>.
17 Ministry of Environment, Forest and Climate

Change, *Nationally Determined Contributions (NDCs) 2021: Bangladesh (Updated)*, MoEFCC, Dhaka, 26 August 2021, pp. 9-12, <https://unfccc.int/sites/default/files/NDC/2022-06/NDC_submission_20210826revised.pdf>.

18 Ibid.

19 Ministry of Finance and United Nations Resident Coordinator, *United Nations Sustainable Development Cooperation Framework 2022-2026*, UNRC, Dhaka, 2022, p. 78, <https://bangladesh.un.org/sites/default/files/2022-03/UNSDCF%202022-2026.pdf>.

20 National Housing Authority, *National Housing Policy 2016*, NHA, Dhaka, 2016, <https://nha.portal.gov.bd/sites/default/files/files/nha.portal.gov.bd/law/76f125dc_8e5e_4095_b03d_7d9ac29f842d/National%20Housing%20Policy%202016_English%20Version.pdf>.

21 *Nationally Determined Contributions*, pp. 9-12.

22 Ibid.

23 *United Nations Sustainable Development Cooperation Framework 2022–2026*, p. 78.

24 *National Housing Policy*.

**Construction supply chain**

1 'Bangladesh exports more cement to northeast India, Nepal and Sri Lanka', *Maritime Gateway*, 6 April 2023, <www.maritimegateway.com/bangladesh-exports-more-cement-to-northeast-india-nepal-and-sri-lanka/>, accessed 15 July 2024.

2 Bangladesh Cement Manufacturers Association, 'Overview of Cement Industry', <www.bcma.com.bd/cement-industry>, accessed 15 July 2024.

3 The Observatory of Economic Complexity, 'Bangladesh', <https://oec.world/en/profile/country/bgd>, accessed 15 July 2024.

4 International Finance Corporation, *Understanding the Housing Sector in Bangladesh Market Study*, IFC, 11 March 2020, <https://it.scribd.com/document/495854806/UNDERSTANDING-THE-HOUSING-SECTOR-IN-BANGLADESH-MARKET-STUDY-by-UnSy-March2020>.

5 Bangladesh Investment Development Authority, *Construction Materials Industry*, BIDA, Dhaka, July 2019, <https://bida.gov.bd/storage/app/uploads/public/616/6c3/877/6166c3877dabe508473704.pdf>.

6 Department of Environment (Ministry of Environment, Forest and Climate Change), *National Strategy for Sustainable Brick Production in Bangladesh*, MoEFCC, Dhaka, May 2017, p. 3, <www.ccacoalition.org/sites/default/files/resources/2017_strategy-brick-production-bangladesh.pdf>

7 United Nations Office for Project Services, *GlobalABC Gap Analysis & Projections*, UNOPS, 2024, <https://lookerstudio.google.com/u/0/reporting/851785c6-458d-453b-8793-28c78a468fca/page/p_dothf3xtfd>, accessed 24 July 2024.

8 Roy, S. Dilip, 'Bamboo crafts on decline', *The Daily Star*, 25 June 2017, <www.thedailystar.net/country/bamboo-crafts-decline-1350334>, accessed 15 July 2024.

9 Chara, Asmaul Husna, et al., 'A Systematic Study on Bangladesh's Construction Waste Management: Past, Present and Future'. In Mesut Barış, Öğr. Üyesi (Ed.), *8th International Student Symposium Proceedings Book – 9: Civil Engineering*, Istanbul, 2023, <www.researchgate.net/publication/371248915>.

10 Islam, Rashidul, et al., 'An empirical study of construction and demolition waste generation and implication of recycling', *Waste Management*, vol. 95, 15 July 2019, pp. 10-21, <https://doi.org/10.1016/j.wasman.2019.05.049>.

11 *GlobalABC Gap Analysis*.

12 Ibid.

13 Islam, Rafikul, 'Bangladesh on track to become self-sufficient in fan production', *Business Post*, 23 August 2021, <https://businesspostbd.com/trade/bangladesh-on-track-to-become-self-sufficient-in-fan-production-24931>, accessed 15 July 2024.

14 Chakma, Jagaran, 'AC sales soar as mercury spikes', *The Daily Star*, 17 April 2023, <www.thedailystar.net/business/economy/news/ac-sales-soar-mercury-spikes-3298656>, accessed 15 July 2024.

15 Ministry of Environment, Forest and Climate Change, *Nationally Determined Contributions (NDCs) 2021: Bangladesh (Updated)*, MoEFCC, Dhaka, 26 August 2021, p. 12, <https://unfccc.int/sites/default/files/NDC/2022-06/NDC_submission_20210826revised.pdf