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NEECA

Transformation of the Construction Sector to Promote Energy Efficiency in Buildings in Pakistan

Promoting Energy-Efficient Buildings for a Sustainable Construction Sector in Pakistan

The Challenge

Pakistan experienced the highest rate of urbanisation in Asia, with the share of the population living in urban areas increasing from 32.5% in 1998 to 36.44% in 2017 and 38.82% in 2023. This rapid growth created a substantial demand for new housing, particularly in cities. The country required around 700,000 new housing units annually, yet only half of this demand was being met, resulting in a housing deficit of about 10 million units.

Globally, the construction sector accounts for nearly 40% of energy-related greenhouse gas (GHG) emissions. Around 28% of these occur during the operational lifetime of buildings, mainly from energy-intensive processes such as heating, cooling and dehumidifying. In Pakistan, the residential sector reflected this pattern, consuming upto 53% of the country's electricity. In addition, the extraction, production and use of building materials (referred to as "grey energy") accounted for roughly 11% of emissions. This underscored the growing need for energy-efficient, net-zero and green building solutions across both public and private sectors.

Our Approach

On behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ), the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH supported the Government of Pakistan and private sector stakeholders to initiate the transformation of the construction sector. The project, titled 'Transformation of the Construction Sector to Promote Energy Efficiency in Buildings in Pakistan (Bauwende)', focused on capacity development and sustainable solutions for the construction industry related to material and energy flows, supply chains, emission data, building stock, the functional lifespan of buildings, and planned construction projects.

Project name	Transformation of the Construction Sector to Promote Energy Efficiency in Buildings in Pakistan
Commissioned by	Federal Ministry for Economic Cooperation and Development (BMZ)
Project region	Pakistan, South Asia
Lead executing agency	National Energy Efficiency and Conservation Authority (NEECA)
Duration	10.2022 – 06.2025

The project supported the **Strategic Plan 2020–2023** of the National Energy Efficiency and Conservation Authority (NEECA), promoting climate- and resource-friendly building methods for relevant actors in the energy and construction sectors.

It worked towards ensuring that:

- Policy instruments incorporated sustainability in the buildings and construction sector.
- Stakeholders had access to evidence-based data for sustainable construction and energy efficiency in buildings.
- Pilot schemes demonstrated the techno-economic feasibility of selected measures to transform Pakistan's construction sector.

Pg. 1, Left: Managing Director of NEECA at the launch event of the Energy Conservation Building Code (ECBC-2023) in Islamabad.

Right: MoU signing between UET Peshawar and Peshawar Development Authority to support PDA to incorporate the Energy Conservation Building Code (ECBC-2023) in the by laws.

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Pg. 2, Left: Participants during hands-on training on sustainable construction techniques, practising Rammed Earth construction.

Right: Conceptual design of the "Power Tower", PPIB's flagship sustainable office building.

Our Achievements

Policy instruments for sustainability in the buildings and construction sector.

The project identified gaps in the political, legal and regulatory framework and developed recommendations for updating national and provincial regulatory documents. It supported NEECA in revising the Building Code of Pakistan, introducing green building provisions to promote energy efficiency and sustainable construction practices. This led to the development of the **Energy Conservation Building Code (ECBC-2023)**, which the Government of Pakistan, through Ministry of Energy (MoE), officially notified via the Gazette of Pakistan in 2024.

In a major regulatory milestone, the Khyber Pakhtunkhwa Government, through the **Peshawar Development Authority (PDA)**, passed a Gazette notification incorporating ECBC-2023 into its revised building control regulations. ECBC compliance certification became mandatory alongside other building plan approvals within PDA's jurisdiction.

With the support of the German development cooperation, the **Capital Development Authority (CDA)** also developed a **net-zero roadmap** and a **building rating system** which is currently under review.

In parallel, the project worked with the **Sindh Building Control Authority (SBCA)**, under the Sindh Green Building Initiative, to integrate ECBC-2023 into its by-laws. It promoted dynamic stakeholder engagement and capacity building for SBCA staff. The Director General of SBCA formed a review committee, and recommendations for amending the by-laws were submitted.

Evidence-based data for sustainable constructions and energy efficiency in buildings.

The project partnered with the University of Engineering and Technology (UET) Peshawar, which inaugurated the **Building Energy Research Centre (BERC)** with support from the German Development Cooperation. The Centre helped generate reliable data on sustainable construction and supported the roll-out of ECBC-2023.

To facilitate implementation, BERC developed an ECBC Implementation Manual and checklist. It also introduced a set of free online tools that help users assess building energy efficiency, estimate material requirements and consumption, and ensure ECBC-2023 compliance. These include:

- Central Building Database Tool
- ECBC-2023 Compliance Checking Tool
- Life Cycle Analysis Tool
- Building Load Calculation Tool

In addition, BERC conducted detailed **Life Cycle Assessments** for three typical house sizes (151, 303 and 605 square yards) in collaboration with stakeholders.

The project provided hands-on training in sustainable construction techniques, including the promotion of low-carbon and alternative construction materials such as rammed earth and unburnt clay bricks. It also strengthened the capacities of around **2,400** practitioners from regulatory authorities, private sector, architects, engineers, and development professionals through training sessions, workshops, and webinars on sustainable building practices.

Pilot scheme to transform Pakistan's construction sector.

The project demonstrated the practicality and economic viability of climate- and resource-friendly construction methods. It carried out:

- **Techno-economic feasibility studies** for 5 Marla, 10 Marla and 1 Kanal ECBC-compliant houses for Paradise Housing in Nowshera.
- **Energy modelling** of the Rehman Baba Residential Complex for Pakhtunkhwa Housing Authority (PHA).
- **Conceptual design of the "Power Tower"**, a flagship sustainable office building for the Private Power & Infrastructure Board (PPIB), Ministry of Energy (MoE), showcasing sustainable and energy-efficient design.

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