Pakistan Engineering Council (PEC)
2023

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The Green Building Code of Pakistan—2023 is dedicated to the hundreds of innocent people who were injured, displaced or died due to the heavy rainfalls and devastating flash floods of August 2022 in Pakistan.

Preface

Pakistan Engineering Council (PEC) is a Statutory Regulatory Body established under PEC Act 1976 and regulating the Engineering Profession and Education in totality across Pakistan. The Government of Pakistan has mandated PEC to act as a national "Think Tank" and provide necessary assistance to the Federal Government on various national policies, development plans, engineering disciplines, engineering codes, and allied standardization. Similarly, PEC, in collaboration with the technical assistance of reputed international organizations, successfully developed and published the following national Codes:

- Green Building Code of Pakistan (GBCP-2023)
- Rainwater Harvesting Provisions for Building Code of Pakistan (RWHP-BCP-2023)
- Building Code of Pakistan (2021)
- Standardization of Building Codes, Standards, and Specifications for Low-Cost (Affordable) Units (2021)
- Building Code of Pakistan — Fire Safety Provisions (2016)
- Pakistan Electric and Telecommunication Safety Code (2014)
- Building Code of Pakistan — Energy Provisions (2011)
- Building Code of Pakistan — Seismic Provisions (2007)

Currently, Pakistan prevails as the world's 5th largest country, with a population size of 230 million, including 35% urban and 65% rural populations, which increase as high as 2% annually. Thirty-five percent of people are associated with the housing and construction industry. As per housing estimates, 700,000 new housing units are required to be built annually in the country, but the existing conventional-construction capacity is limited to 300,000 units per year. Therefore, in the last 20 years, the shortage of housing units accumulated an enormous deficit of 12 million housing units. To address this situation, and as a measure of comprehensive socio-economic uplift, the Government of Pakistan envisioned and initiated a Pakistan Housing Program (PHP) to deliver affordable housing units with allied amenities to all citizens, especially focusing on the financially underserved and middle-income communities. It was realized that this national challenge of acute shortage of houses could be converted into an opportunity. The PEC Think Tank realized that it needed to transform conventional construction by adding the new green-housing interventions. For this purpose, PEC went one step further and collaborated with the Ministry of Climate Change, UN-Habitat, NED-University, Karachi and the World Bank. A PEC Technical Committee—headed by Prof. Dr. Engr. Sarosh H. Lodi, Vice Chancellor, NED University, Karachi—was formed to develop the first-ever *Green Building Code of Pakistan—2023*. The technical committee held its first meeting on 13 May 2022 and selected the *2021 International Green Constriction Code (IgCC 2021)* as the base document to be used for the development of the *Green Building Code of Pakistan—2023*. Green economies are rapidly transforming green construction technologies, which, in turn, are helping to reduce the adverse impacts of buildings on the environment due to existing conventional construction practices. Green construction technologies focus on energy efficiency, water conservation, waste reduction, and the use of sustainable green design and materials having the following salient features:

i. ***Passive solar design****: Passive solar design uses the sun's energy to heat and cool buildings. It involves the placement of windows, walls, and floors in a way that maximizes natural light and minimizes the need for heating and cooling systems as integrated advanced green technologies.*
ii. ***Green roofs****: Green roofs, or bio-roofs, are special roofs that are covered with vegetation or bio-films. They help to reduce the urban heat island effect, improve air quality, and provide insulation. This green intervention can easily be adapted and implemented on existing buildings as well.*
iii. ***Energy-efficient lighting****: Energy-efficient lighting uses less electricity and lasts longer than traditional lighting. This includes LED and compact fluorescent bulbs as per global competitiveness towards LEED/ EDGE-certified buildings as approved by AHJ.*
iv. ***Renewable energy:*** *Sources of renewable energy include solar, wind, geothermal power, bio-gas, waste to energy, and allied Alternative and Renewable Energy (ARE) technologies, which can be used in energy-efficient buildings.*
v. ***Water-saving technologies****: Water-saving technologies include low-flow toilets, faucets, and showers, as well as rainwater harvesting systems, and reuse of grey water by maintaining a balance between groundwater extraction and harvested rainwater recharge technologies, etc.*
vi. ***Sustainable materials:*** *Sustainable materials such as bamboo, recycled steel, recycled plastics, reclaimed wood and fly ash can be used in construction to reduce adverse environmental impacts.*
vii. ***Building Information Modeling (BIM):*** *It is a collaborative digital tool for planning designing, constructing, and managing building projects systems. It can help to optimize energy usage and reduce waste. These systems can control lighting, heating, cooling, and ventilation systems based on occupancy and environmental conditions.*

Overall, green construction technologies offer a range of benefits, including reduced energy costs, improved indoor air quality, and a smaller carbon footprint.

GBCP-2023—2023 is an internationally recognized integration of all building codes developed so far to reduce the adverse impacts of buildings on environment by transforming modernized green products and efficient technologies. The principal aim is sustainable production and consumption of natural resources starting from building design, construction, operation, maintenance, renovation or demolition. The scope of GBCP-2023 is to use environmentally responsible and resource-efficient processes throughout the life cycle of the building, i.e., (1) Energy efficiency and the use of renewable energy; (2) Water efficiency; (3) Use of environmentally friendly building materials; (4) Waste and toxic reduction; (5) Smart and sustainable growth; and (6) Enhancement of air quality.

GBCP-2023—2023 is a major step towards a green-economy. It provides green eco-friendly practices for building design, construction and operation stages; and ensures the utilization of sustainable sites, green construction materials to save energy, conserve water, improve indoor environmental quality, and lower GHG emissions in line with the Sustainable Development Goals 7, 11, 12, 13 for developing green buildings and cities. It has been determined that a National Action Plan be developed for strengthening Pakistan's national policy frameworks to promote a green-economy and ensure sustainable consumption and production of natural resources. The main objectives of green buildings are to minimize environmental disturbances and waste generation, minimize energy and other resources utilization, boost renewable energy usage, improve human health and comfort, and reduce the negative impacts of buildings on human health/natural environment. Substantial savings can be achieved through integrated planning and adopting environmentally friendly designs in terms of materials and energy savings.

The principal purpose of the Commentary is to provide a basic volume of knowledge and facts relating to building construction as it pertains to the regulations set forth in the GBCP-2023. The person who is serious about effectively designing, constructing and regulating buildings and structures will find the Commentary to be a reliable data source and a reference to almost all components of the built environment.

The Commentary provides thorough coverage of many issues likely to be dealt with when using the *GBCP-2023* and then supplements that coverage with historical and technical background. Reference lists and information sources are also included.

Throughout, effort has been made to keep the vast quantity of material accessible and its method of presentation useful. With a comprehensive yet concise summary of each section, the Commentary provides a convenient reference for regulations applicable to the construction of buildings and structures. In the chapters that follow, discussions focus on the full meaning and implications of the code text. Illustrations are provided to enhance understanding; they do not necessarily illustrate the only methods of achieving code compliance.

The format of the Code and Commentary includes the full text of each section, table and figure in the code, followed immediately by the commentary applicable to that text. Each section's narrative includes a statement of its objective and intent and usually includes a discussion about why the requirement commands the conditions set forth. Code text and commentary text are easily distinguished from each other. All code text is shown as it appears in the GBCP-2023, and all commentary starts immediately below the code text. The Commentary begins with the symbol ❖ and is highlighted for the convenience of the reader.

Users should note that the Commentary is to be used in conjunction with the GBCP-2023 and not as a substitute for the code. **The Commentary is advisory only.** The code official alone possesses the authority and responsibility for interpreting the code.

Comments and recommendations are encouraged, for through your input, we can improve future editions. Please direct your comments to the Registrar, Pakistan Engineering Council.

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