

India

Building Code Implementation - Country Summary

Prepared for the IPEEC Building Energy Efficiency Taskgroup – Project 3: International Collaboration for Building Energy Code Implementation

Section I: Code Development

History

India's national building energy code, Energy Conservation Building Code (ECBC), is voluntary; however, it establishes minimum energy efficiency requirements for commercial buildings' envelope, lighting, HVAC, electrical, water heating and pumping systems. ECBC was the first standalone national building energy code and was launched in 2007 by the Ministry of Power and the Bureau of Energy Efficiency (BEE), in response to the requirement of Energy Conservation Act, 2001. To develop ECBC, BEE collaborated with a diverse group of domestic and international technical experts. Several states, such as Rajasthan and Andhra Pradesh, have adopted ECBC with amendments. In the future, the code might be adopted by all Indian states (Evans et al., 2009; Yu et al., 2014).

Residential buildings are not covered by ECBC; however, BEE offers guidelines for residential buildings (see "Design Guidelines for Energy-Efficient Multi-Storey Residential Buildings: Composite and Hot-Dry Climates" at <http://www.beepindia.org/resource/Residential-guidelines>).

The previous attempt to address building energy efficiency was the 1998 National Housing and Habitat Policy, which recognized that energy use and air pollution are important issues in India's buildings and emphasized that the government should specify energy efficiency levels for different categories of buildings.

In 2005, the Bureau of Indian Standards (BIS) issued the National Building Code of India (NBC 2005), which covered a range of structural, safety and other design issues, but only marginally addressed energy efficiency.

Existing codes

Structural coverage

	Scale (National, regional, local, etc.)	Building size threshold
Residential buildings		
New buildings		
Existing buildings for retrofits		
Commercial buildings		
New buildings	State/local	Buildings with a connected electrical load of 500 kW or more, or a contract demand of 600 kVA or more. Generally, buildings or complexes having a conditioned area of 1,000 m ² or more will fall under this category.
Existing buildings for retrofits	State/local	Where the addition plus the existing building has a conditioned floor area of 1,000 m ² or more, the additions shall comply with the provisions of Chapter 4 through Chapter 8. Compliance may be demonstrated in either of the following ways: <ul style="list-style-type: none"> • The addition alone shall comply with the applicable requirements, or • The addition, together with the entire existing building, shall comply with the requirements of this code that would apply to the entire building, as if it were a new building.

ECBC is a national code to be voluntarily adopted (with variations or additions) by states and local governments (called urban local bodies, or ULBs). After adoption, it becomes mandatory at the state or local levels; several states and ULBs have adopted it to date. To comply with the code, buildings can choose between the prescriptive approach with a trade-off option and the performance-based approach. Compliance is checked at design stage, but a few jurisdictions started to explore and develop enforcement mechanisms for the construction stage, but this has not been implemented yet.

Measures covered

- Envelope
- HVAC
- Service water heating

- Lighting
- Electric power

Prescriptive, trade-off and performance-based approaches are alternative methods to comply with the code.

Correction /new codes

Section II: Code Implementation

Administration

Administrative/enforcement structures

Model 1: Government agency

The roles of stakeholders (what do they do at each stage)

	Design	Construction	Pre-occupancy check
The role of federal/central government			
The role of state/provincial and local government	The enforcement authority is generally the building department or other agency that approves and issues building permits. The local building department has jurisdiction for determining the administrative requirements relating to permit applications. It also has the final word on interpretations, claims of exemption and rights of appeal.	A few jurisdictions started to explore and develop mechanisms to enforce the code during the construction stage, but this has not been implemented yet.	
Involvement of third parties and their role		A few states, such as Andhra Pradesh and Rajasthan, are discussing the possibilities of using third-party inspectors. But no state has	

		formally adopted this.	
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Requirements for commissioning before occupancy

Only minimal completion and commissioning are required by the Code.

Tools used for compliance checking

Software used for compliance checking

The ECONirman Prescriptive Tool was developed to assess compliance with ECBC using the prescriptive approach.

The whole building performance (WBP) method requires an approved computer software program to model a Proposed Design, determine its annual energy use and compare it with the Standard Design of the building. The ECONirman Whole Building Performance Tool is an energy simulation software tool provided by BEE to perform this analysis (see http://eetools.in/ECONirman_WBP_UserManual.pdf).

Capacity building and education

Education and capacity building programs that support code implementation

- The ECBC Knowledge Exchange Web Portal: Indian Building Energy Code Community (IBECC) focuses on policies, technological adaptive changes and challenges related to code implementation.
- The United Nations Development Programme (UNDP) Global Environment Facility (GEF) project of BEE is conducting a Master Training program for ECBC professionals
- Various organizations like the Centre for Environmental Planning and Technology University (CEPT University), the Glazing Society of India, the India Insulation Forum, the International Institute of Information Technology, Hyderabad, and Malaviya National Institute of Technology conduct training programs.
- SDC project is also conducting charrettes.

Target groups for programs

Engineers, architects and developers

Best-practice example of capacity building

UNDP GEF program of BEE

Section III: Compliance & Enforcement

Penalties, incentives and other mechanisms for improving compliance

Penalties for non-compliance with energy provisions in codes

Decided at the state level. Currently, no state has penalties for non-compliance.

Incentives/rewards to go beyond minimum required performance level

There are no incentive schemes to go beyond the minimum standard. There is a labelling program for rating buildings based on actual performance, and there are other voluntary rating systems such as LEED India and the Green Buildings Rating System India (GRIHA), which recognise performance that is higher than performance required by the code.

Compliance assessment

Number of code compliant permits issued per year

Currently, the majority of buildings in India are not ECBC-compliant. There is no data on compliance rate.

Airtightness testing required prior to compliance

Fenestration Air leakage test, but no building blower door test

Section IV: Building Materials & Energy Performance Certificates

Building materials (e.g. windows, insulation, HVAC, lighting)

Energy Performance Certificates

Building codes and energy performance certificate

The BEE/GRIHA Star Rating System exists independently of the code. It evaluates buildings based on operational energy use and is the only energy-use-specific building label used in India (Williams and Levine, 2012).

Number of certified buildings and the percentage

550 GRIHA registered projects along with REFER of the Indian Green Building Council IGBC projects.

References:

Evans, M, B Shui, and S Somasundaram. 2009. Country Report on Building Energy Codes in India. PNNL-17925. Pacific Northwest National Laboratory (PNNL).

Williams, C and M Levine. 2012. Gauging Improvements in Urban Building Energy Policy in India. Proceedings of the 2012 ACEEE Summer Study on Energy Efficiency in Buildings, pp4414-4425; Pacific Grove, CA.

Yu, S, M Evans, and A Delgado. 2014. Building Energy Efficiency in India: Compliance Evaluation of Energy Conservation Building Code. Pacific Northwest National Laboratory (PNNL).