ADOPTION, COMPLIANCE, ENFORCEMENT for ENERGY EFFICIENCY in BUILDINGS

Newsletter

Date Mar 2019 | Issue 4 | Position Paper 4 - EPBD and Building Energy Codes - The role of EU and national technical standards

ECBC India

ECBC 2017 (Energy Conservation Building Code) was launched by Hon'ble Minister (IC) for Coal, Mines, NRE and Power on 19thJune, 2017 at Delhi and is applicable for large commercial buildings with connected load of 100 kW and above or 120 kVA and above. ECBC focuses on building envelope, mechanical systems and equipment including heating, ventilating, and air conditioning (HVAC) system, interior and exterior lighting systems, electrical system and renewable energy, and also takes into account the five climates zones (Hot Dry, Warm Humid, Temperate, Composite and Cold) present in India.

The ECBC was developed by an Expert Committee, set up by India's Bureau of Energy Efficiency, with support and guidance from United

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Position Paper 4 - EPBD and Building Energy Codes - The role of EU and national technical standards

This position paper **summarises the contextual positioning, status, functional role and features of European Standards (EN) relating to the energy performance of buildings** (EPB), and work leading to the establishment of a hierarchical suite of technical standards. Arising from collaboration between the standards bodies CEN and ISO, several of the key standards have been published under a new label as the ISO 52000 series. A driving force in the development of the overall suite of over 50 standards has been the need to provide a coherent consistent technical framework to support implementation of the EU Energy Performance of Buildings Directive (EPBD) (both the original and recast directive).

The standards have been published as a hierarchical and modular framework. This hierarchy spans from a holistic level to sub-system level to individual component level. Holistic standards relate to matters such as overall energy and CO2 emissions performance calculations, calculation of heating or cooling demand, techno-economic evaluation and format of building energy certificates, and thermal comfort, whereas component items include U-value calculation methods, product testing methods, thermal bridging analysis, heating and cooling system efficiency, and various ventilation and lighting issues. The modular structure allows selective use of the standards and incorporation of alternative methods, subject to defined input/output protocols being applied.

It is important to appreciate that for EU Member States, these EN standards are not in themselves a calculation methodology. **The official national methodology for calculating and demonstrating compliance with energy performance requirements generally involves a calculation engine incorporating various calculation algorithms and is typically embedded in a user-friendly software**, all of which are aligned to the relevant EN standards. Thus, for example, several EU countries have used a methodology and software called **SBEM** - Simplified Building Energy Model (developed in the UK but also applied in adapted form in Cyprus, Malta, Ireland and some other States) to enable Energy

Elements

- ***Regulatory support need, context and pre-EPBD status of technical standards***

- The EU Energy Performance of Buildings Directive (EPBD): Key requirements on EU Member States
- Implementing the EPBD
- Building energy code documents arising from legal transposition process
- Purpose, positioning and prior status of European, international and national Standards

- ***New or improved technical standards supporting EPBD: Development, scope, structure and features***

Performance assessment of non-domestic buildings. In Portugal a national methodology and associated software has likewise been developed by the national energy agency in Portugal, ADENE. Such overall calculation methods will still employ or reference a range of EN standards for individual sub-systems or components. Compatible with this framework, and assisting a holistic approach, implementation of the EU Ecodesign Directive also involves application of such individual mechanical and electrical component standards for boilers, air conditioning systems, lighting etc.

The ultimate role of the EN standards is to provide an integrated suite of procedures, criteria and options which provide a robust foundational support to Member State authorities and building industry practitioners in catering for ever more stringent energy performance requirements and encourage more harmonised regulatory and market practices across the EU, while offering an appropriate level of flexibility for national adaptation to local conditions.

It is to be expected that much of the philosophy and the content and features contained in this suite of EPB technical standards could also be beneficially applied in the circumstances of India. Such application would have the co-benefit of assisting the free movement of energy efficient goods between India, the EU and elsewhere.

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- Overall, the new suite of CEN technical standards for EPB, including the ISO 52000 series, contains a systematic, comprehensive, coherent body of authoritative reference guidance covering methods of assessing energy performance as the total primary energy used for heating, cooling, domestic hot water, ventilation and lighting of buildings. It has internally consistent protocols (Excel input/ output templates) in relation to linkages between the modules, avoiding both duplication and discrepancies. It is applicable to the processes of designing, specifying and evaluating the performance of both new buildings and building renovations, and their components.
- The series is expected to help accelerate progress in building energy efficiency utilizing new materials, technology and approaches to building design, construction and management. This includes a capacity to address novel concepts in the fields of thermal insulation, windows/ glazing, heating, cooling, lighting, ventilation, domestic hot-water systems, building automation and control, and renewable energy sources. Such innovations likely to become more significant factors as the regulatory building energy codes in EU countries become ever more stringent, progressing to NZEB standards (by no later than 2021).
- It can be expected to facilitate greater regulatory convergence across EU Member States in relation to building energy codes (and their sub-systems), as well a gradual adaptation of existing national methodologies as further refinements may be required in the short term to meet the needs generated following the adoption of NZEB performance standards. This adaptation can be greatly assisted by the optional step by step adoption facility within the overall modular framework, whereby Member States may 'pick and mix' other standards or methods (e.g. ASHRAE, ISHRAE), subject to adhering to the consistency spreadsheet protocols.
- It is thus expected to be able to cater much better for future needs than had previously been the case. Similarly, with the modular structure, the internal consistency, the facility for localisation, the shared

- The EU Commission mandates to CEN
- Effective principles
- The suite of EPB standards including ISO standards – scope, structure and features

- ***Practical role and application of the standards***

- Holistic building energy performance calculation
- Software
- Complementarity of EPBD with Ecodesign and Energy Labelling Directives

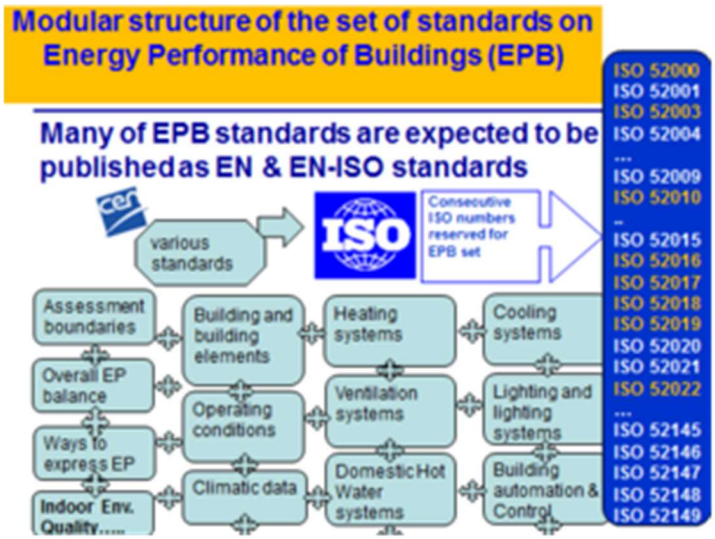
standards with ISO and the role of related standards (and policies) in relation to Ecodesign **it is considered that individual standards from the overall suite have the potential to be adopted or adapted for application in India**, for example. This can most readily be the case with standards relating to building components or subsystems. In the case of overall or holistic energy performance of a building, the standards will require conversion into working methodologies in the form of tightly defined calculation methods and facilitating software. In relation to this requirement, their role can thus be seen as one of providing a robust foundational support to Member State authorities and building industry practitioners in catering for ever more stringent energy performance requirements. **The overall suite encourages more harmonised regulatory and market practices across the EU, while offering an appropriate level of flexibility for national adaptation.**

- Overall**, the EN and EN-ISO suite of standards thus have a key role in serving the needs of EU Member States in advancing their EPB agenda**, whether in relation to improving holistic energy performance standards, energy certification or labelling of buildings or standards for constituent building systems and components. While taking time to be finalised, they are now expected to play a growing

beneficial support role in relation to consistent and efficient implementation of the EPBD, and on allied Directives on Ecodesign and on Energy Labelling of energy using products. For timing reasons, their role had sometimes inevitably been an indirect one, and some national variations are inevitable for traditional reasons, but the application of the EPB suite of standards is expected to become deeper and more direct over the coming years.

- Finally, it is to be expected that **much of the philosophy and the content and features contained in this suite of EPB technical standards could also be beneficially applied in the circumstances of India**. Such application would have the co-benefit of assisting the free movement of energy efficient goods between India, the EU and elsewhere.

Modular structure and interaction of European standards on energy performance of buildings



Project Partners:

eXergia	EXERGIA Energy & Environment Consultants
pwc	PricewaterhouseCoopers Private Limited India
CEPT UNIVERSITY	Center for Environmental Planning and Technology University (CEPT)

Main Beneficiary:

BEE	Bureau of Energy Efficiency (BEE), Government of India, Ministry of Energy

(Cont'd from page 1) States Agency for International Development (USAID) and significant inputs from various other stakeholders such as practicing architects, consultants, educational institutions and other government organizations. The successful implementation of the code requires development of compliance procedures (compliance forms and development of field-test compliance forms and procedures), in addition to building capacity of architects/designers/builders/contractors and government official in States and Urban and Local Bodies (ULBs). It is also dependent on availability of materials and equipment that meet or exceed performance specifications specified in ECBC.
The ECBC provides design norms for:

- ***Building envelope, including thermal performance requirements for walls, roofs, and windows;***
- ***Lighting system, including daylighting, and lamps and luminaire performance requirements;***
- ***HVAC system, including energy performance of chillers and air distribution systems;***
- ***Electrical system; and***
- ***Water heating and pumping systems, including requirements for solar hot-water systems.***