

www.pwc.com

***Proceedings of Fourth
Regional Workshop to
Implement Energy
Conservation Code (ECBC)
in India***

Held on 17th October 2019 at Hotel Ashok, Delhi,
India



1.1. Background of the workshop

To improve the energy efficiency in the new commercial buildings, the Energy Conservation Building Code (ECBC) was drafted. The first version of ECBC was launched by Ministry of Power (MoP), Government of India, in May 2007, as the first step towards promoting energy efficiency in the commercial building sector. Later on, including latest technologies, refined administrative requirements and clear guidelines, the revised version of code was launched in June 2017. The implementation of the code is expected to reduce energy demand in commercial buildings by 25% - 40%. As on date the status of ECBC implementation in India is presented below:

STATUS	NAME OF STATES
States that have notified the Code (12 states and 1 Union Territory (UT))	Andhra Pradesh, Karnataka, Odisha, Punjab, Haryana, Rajasthan, Telangana, West Bengal, Uttarakhand, Uttar Pradesh, Himachal Pradesh, Kerala, Puducherry (UT),
States that have amended the code (18 States and 5 UT)	Assam, Gujarat, Tamil Nadu, Maharashtra, Bihar, Madhya Pradesh, Jharkhand, Goa, Tripura, Arunachal Pradesh, Meghalaya, Nagaland, Mizoram, Manipur, Sikkim, Jammu & Kashmir, Chhattisgarh, Delhi and UTs of Daman Diu, Lakshadweep, Chandigarh, Andaman & Nicobar, Dadra & Nagar Haveli.

Out of 29 states & 7 Union Territories (UTs) in India, 12 states & 1 UT have notified the code, and 11 states & 1 UT have amended it. The code was created in the year 2007, however due to following challenges it is still under the voluntary phase. The list of challenges/barriers are mentioned as below:

- Limited awareness among the state officials, limited number of on-ground activities to implement the code are witnessed.
- There is limited rather negligible communication between the notified & amended states.
- There is no platform for the notified states to share their experience with other states.
- There is no action plan in place to implement a code in the state

1.2. The need

Gauging the acuteness of the challenges mentioned above, Bureau of Energy Efficiency (BEE) in association with Delegation of European Union to India launched a Common Implementation Forum for Energy Conservation Building Code (ECBC) on 22nd September 2017, in Hotel Taj Mahal, Delhi. Creation of a National Level forum/workshop is to discuss the approach to implement ECBC in all the states of India.

Delegation of European Union to India supported the workshop, within the framework of the "Clean Energy Cooperation with India" (CECI) programme, and in particular the ACE: E2 project (Adoption, Compliance, and Enforcement for Energy Efficiency). This project aims at providing legal and policy support to the development and implementation of energy efficiency legislation for the building sector in India, in collaboration with the Bureau of Energy Efficiency (BEE). The technical assistance for this project ACE:E2 is being provided by PricewaterhouseCoopers India Private Limited and Exergia S.A (a Greece based consultancy firm).

Importance of creating regional level groups was emphasized in order to ensure successful implementation of ECBC across various states of India. Four regional level groups, viz. East, West, North and South were proposed. Each group is having at least one state that has notified and one state that has amended the code. This is expected all the states in implementation of ECBC. In order to ensure regular participation and harmonization within the region workshops, webinars and study tours were proposed to be organized for various stakeholders involved in the implementation of ECBC.

1.2.1. Brief of previously conducted regional workshops

The first regional workshop was held on 19th May 2018 at Hotel Novotel, Pune and the second regional workshop was held on 29th August 2018 at Hotel Kakatiya, Hyderabad with the kind support of BEE and SDAs (MEDA and TSREDCO respectively). The third regional workshop was held on 30th Oct 2018 at Hotel Maurya, Patna with the kind support of BEE and BREDA (Bihar Renewable Energy Development Agency).

These were interactive workshops with different topics and discussions involving all the stakeholders. There was representation of the various government departments including works department, energy department, municipal corporations, urban local bodies, distribution companies, state designated agencies (falling in the region), roads and building department, practicing architects and consultants, CREDAI etc. The key outcomes of these workshop are listed as below.

- The state experience was shared with other state for implementation approach and lessons shared with each other were very useful for all the states.
- The capacity building programs for specific stakeholder is to be designed and delivered for effective implementation.
- More number of demonstration projects are identified, and states volunteered their upcoming buildings to be ECBC compliant
- Approach for the ECBC clearances is discussed and there was an agreement to simplify building clearance at state process
- The stakeholder should be trained for ensuring compliance and for the same the capacity building should be done.

1.3. Fourth regional workshop to implement ECBC

To take forward the agenda of having a common discussion/implementation forum on implementation of ECBC, the fourth regional workshop was organized on 17th Oct 2019.

Nominated and relevant officials from the following list of identified stakeholders attended the fourth regional workshop:

- Officials from Bureau of Energy Efficiency
- Officials from other government departments like works department, urban local bodies, NAREDCO etc.
- Representatives from state designated agencies
- ECBC Master Trainers
- ECBC Empanelled firms and Architects
- ECBC Cell Agencies
- Practicing architects and consultants

1.3.1. Objective of the fourth regional workshop

The overall objective of the workshop were as mentioned below:

1. Learning to other states from the leading states in ECBC implementation
2. Review of ECBC implementation in states who have notified the code
3. Review the work of various ECBC implementing agencies in various states
4. Discussions on challenges/drivers for ECBC implementation
5. Discussion on various market instruments required for the quick implementation of ECBC
6. Devise an efficient action plan for further effective implementation ECBC in the state.
7. Discussion on the status of various policy instruments like integration of ECBC in bye-laws, building approval process and schedule of rates (SOR)

Proceedings for fourth regional workshop

1.4. Opening Session

Mr. Saurabh Diddi, Director BEE, began the session with welcoming of all attendees of the workshop & briefed about the agenda of the workshop that the leading states (Maharashtra, Himachal Pradesh, Karnataka, Kerala, , Uttar Pradesh, Telangana, Punjab, Uttarakhand & Puducherry) will present their success stories for ECBC implementation in the state. The objective of the workshop is to devise state specific action plan with clear timelines for all the states to increase adoption of ECBC to achieve energy efficiency in buildings.

1.5. Presentations on Status, Success Story of ECBC in states

1.5.1. Telangana

Mr. Reddy spoke about the status of ECBC in Telangana. To strengthen the ECBC implementation in the region, the SDAs formed a technical committee headed by TSREDCO that conducted a series of discussions with all the stakeholders & suggested a certification program with support of BEE to develop a pool of local expertise for effective code compliance. The technical committee also suggested a 3-point formula, first is creating awareness among government officials & ULBs, second is building capacity by conducting workshop with assessment & awarding certificates to the attendees of the workshop who clear the assessment enabling them to be third part assessors. As of today, 42 professionals are certified third party assessors. The third is creating online DPMS (Development, Permission Management System) in the municipal areas a two-stage process where in clearances are awarded to those buildings that are ECBC compliant in design stage & there is a regular review process in place for effective implementation of ECBC.

Additionally, Mr. Raj Kiran presented the success story of ECBC in the state. He emphasized on the fact that the top dynamic leadership in the state along with local experts were key to the success of ECBC implementation in the state. The key points from the detailed presentation are as below:

- Success Drivers for implementation- Active support from Government, Institutions, Developers, Energy Efficiency material suppliers, Third Party assessors, experts etc.
- Inclusion of ECBC in new municipal act 2019 & its scope
- Impact of Inclusion -Building Capacity- 900 professionals were trained & 200 green jobs created
- Total Buildings that are ECBC Compliant in the State with estimated energy savings achieved
- Steps taken to further strengthen the ECBC Implementation
- Creation of resource materials on ECBC
- Incorporation of ECBC in online building approval system in municipal areas
- TPA License Format & ECBC Compliance Certificate format for design & construction stage of the new building

1.5.2. Maharashtra

Ms. Smitha spoke on the ECBC journey & the success achieved in the state of Maharashtra. Key points from the detailed presentation are as below:

- Situational Analysis of the state- gave the clear picture of saving potential by implementing ECBC in the state
- ECBC journey over the years in the state- training and capacity building awareness program conducted by MEDA, development of roadmap for implementation.
- ECBC notification & enforcement status
- Status on inclusion of ECBC for both commercial & residential buildings in the building bye laws
- Inclusion in SOR & demonstration projects of government buildings

- Plans, Outcomes & targets in the ECBC Implementation
- Review of Demonstration Project: MEDA Building- Energy Efficiency measures taken, saving estimated & ROI
- Review of Demonstration Project: NCI, Nagpur
- Integration of Tip Sheet for ECBC 2017

1.5.3. Uttarakhand

Mr. Neeraj covered the following key points during his presentation while presenting success story of the state:

- Situational Analysis & Climatic zones in the state
- Methodology Adopted for ECBC implementation- formation of committee, stakeholder consultation to revise the code as per local conditions & seeking cabinet approval for adoption of ECBC by Housing Department of the state under bye laws
- Inclusion of ECBC in building bye laws & its scope
- Procedure for seeking ECBC compliance certificate for all the applicable projects in the state
- Details on the Demonstration Projects
- Details on the Stakeholder training programs

1.5.4. Puducherry

Mr.Murganeshan, began with brief on introduction of ECBC in his UT. The following key points were highlighted, while presenting the success story of the state:

- Key ECBC Cell activities undertaken in the UT
- Notification process adopted by ECBC cell & the scope of ECBC in the region
- Highlighted the challenges in obtaining notification due to lack of clarity in governmental stipulations (EC Act) for Union Territories
- Analysis on region-wise existing building typologies & their energy consumption pattern to derive at the number of buildings that come under the purview of ECBC
- Details on the Demonstration Projects carried out
- Details on the awareness & training programs

1.5.5. Uttar Pradesh

Mr. Ashok mentioned the following key points during his presentation on success story of state:

- Introduction on the various governmental agencies involved in the state
- Snapshot of notification of ECBC 2017- UPECBC 2018 & incorporation in the bye-laws
- Highlighted the working committee & its structure responsible for ECBC implementation
- Details on the scope of UPECBC 2018
- Highlighted the work done for the ECBC implementation
- Details of the Demonstration Project: UPERC- with estimated saving % obtained along with the incremental cost incurred to achieve ECBC compliant.

1.5.6. Himachal Pradesh

Mr. Deepak Jastolia presented the success story of Himachal Pradesh. The key points from the detailed presentation are as below:

- Journey of ECBC adoption in the state
- List of all the administrative departments considered for stakeholder consultation for amending ECBC 2017 to incorporate local factors in the code
- Details on the suggested amendments in HPECBC 2018 from stakeholder meeting

- Notification & Enforcement roadmap for HPECBC
- HPECBC Adoption methodology & plan- To ensure simplified process for easy adoption
- Details of ECBC workshops & Training programs conducted for capacity building with snapshots
- Details on the Demonstration projects carried out
- Challenges faced by the ECBC cell in the State
- Other achievements- submission of bye law review report to the concerned agency, inclusion of HPECBC in the construction approval process, shortlisting government buildings for ECBC compliant designs & submitting them to the concerned authority, Inclusion of energy efficient materials in SOR, ensuring energy data repository of commercial & residential buildings, development of ECBC app
- Way forward- Capacity Building, creation of committee, TPA in the State, ECBC inclusion in building bye laws

1.5.7. Kerala

Mr. Johnson Daneil, highlighted the following key points from the detailed presentation:

- Activities carried out for the ECBC implementation in the state such as stakeholder meetings & training programs
- Scope of the notified Kerala ECBC 2007 - KSECBC
- List of new amendments in the KSECBC 2018 & the tasks undertaken for its notification
- Milestones, Deliverable status of the ECBC Cell till date & challenges faced.
- Proposed action plan for ECBC implementation for the next term such as Development of online approval system for ECBC compliance, incentives for ECBC compliant buildings, Updating SORs, benchmark study & conducting more training programs

1.5.8. Punjab

Mr. Balkar Singh, AGM PEDDA (Punjab Energy Development Agency), said that the ECBC 2007 was notified in their state in 2016 & since then they have focused towards the capacity building activities in which 56 training programs were carried out for all the stakeholders along with holding multiple exhibition at district level on the energy efficiency materials. Their efforts created an awareness amongst all the government officials which led to formation of design cell in the state PWD office that is responsible for designing ECBC compliant government buildings and inclusion of energy efficient materials in the SOR.

Post this, Mr. Money Khanna, Energy Consultant, PEDDA, presented the status & success story of the ECBC implementation in their state. Key points from the detailed presentation are as below:

- Scope of the notified punjab ECBC 2007 & its impact on approval of new construction in the state
- Steps taken for ECBC Implementation-formation of steering committee, notification of code, formation of design cell in PWD & creating awareness among all stakeholder
- 3 Stage Approval process for ECBC Compliance in the state, list of all the administrative departments that ensure ECBC compliance & the support provided by SDA to achieve ECBC compliance.
- Scope of ECBC in the Building Bye Laws
- Common Schedule of Rates (SOR) prepared by ECBC cell
- List of Demonstration projects carried out in the state
- Details & Snapshots of the training program, workshops & exhibitions conducted in the state

Apart from above points, Mr. Khanna stated that Punjab is proactive in providing incentive such as rebates in property tax to augment ECBC adoption.

1.5.9. Karnataka

On behalf of SDA Karnataka, Ms. Purva Keskar presented a case study of a ECBC compliant building KK Guesthouse which was taken as the first demonstration project in Bangalore in the state of Karnataka. She said that initially the stakeholder felt that inclusion of the ECBC codes would reduce the aesthetic features of the building but by adopting methodology that provided varied mix & match of strategies to make the building ECBC

compliant made them realize that ECBC compliance did not hinder with aesthetic feature & yet reduces the energy consumption of the building which derived the success of the project . Key points from the detailed presentations are as below:

- Features of the building undertaken for the demonstration
- Study of building typology & the climatic analysis of the region
- The Approach adopted- 3 key approach- Passive design, Active Design & Advanced method to recover & offset cost
- Details on the Passive design strategy adopted- A low cost solution for demand reduction
- Cost & estimated saving of various passive strategies listed
- Details on the active strategies adopted- reducing operational cost
- Cost & estimated saving of various active strategies listed
- List of Advanced method such as renewable energy, energy metering along with cost
- List of multiple options with mix & match of all the 3 strategies along with estimation of energy consumption
- Comparison of multiple options with “As is” case on cost & saving estimated & taking the final decision.

1.6. Summary on the key results achieved, learnings in the ECBC implementation & agenda of the session – Mr. Rajeev Ralhan

Mr. Rajeev Ralhan complimented all the SDA on taking active steps on the ECBC implementation. He talked about the challenges faced in the India in the implementation of ECBC over the years and the solutions of these challenges in different states. He briefed the agenda and idea behind the regional workshops.

Under ACE:E2 project, PwC India was working as implementing partner in four states Bihar, Maharashtra, Orissa & Madhya Pradesh and providing technical assistance for implementation of ECBC in states. There are issues faced related to adoption, compliance and enforcement of ECBC in each state, so the idea is to create a common implementation forum where all the states come forward and share their views and learning. The design of the workshop is to have discussions on the real issues, share the experience among the states and decide the right strategy.

He emphasized on the fact that sometimes bureaucratic procedures have been major roadblock for quick adoption of the ECBC implementation as states have been struggling to notify the codes & he insisted that steps need to be taken towards speeding this process. He highlighted the key results of the activities that PwC in all the above-mentioned state such as procedures undertaken for notification of ECBC codes, developing state specific code, developing business case on energy saving opportunity to various government stakeholders, number of stakeholder meetings conducted with outcomes achieved & training programs developed & conducted, webinar sessions, demonstration projects carried out in the states. He cited example of MEDA building, where management declined non-ECBC compliant design & advocated for an ECBC compliant design.

He then listed key learnings from the ECBC implementation to speed up its adoption & effective implementation not only in commercial but also in the residential buildings to achieve energy efficiency in the sector.

1.7. EU Energy Performance of Building Directive (EPBD) journey & its learnings for India and nearly Zero Energy Buildings in EU its policy, roadmap & initiatives – Mr. Kevin O Rourke

Kevin discussed the journey of Energy Performance of Building Directive in EU & its current status in the first part of his presentation while in the second part he discussed about nearly Zero Buildings in EU its policy, roadmap & initiatives. Key points from his detailed presentation are as below:

- Introduction of EU, its members, its directives & structure
- Scope of EPBD
- EPBD implementation, governance system
- National calculation methodologies
- Energy performance certificates in Europe
- Enforcement model adopted in EPBD
- Energy labelling of buildings in Europe
- Loans and grants to builders for EPBD compliance
- Evolution of EPBD
- Policies & financial mechanism to Support EPDB
- EPDB implementation models & success factors
- Nearly zero energy building
- Policy & roadmap for nZEB
- Calculation methodologies & assessment standards for nZEB
- Cost optimal method for nZEB calculation
- Challenges & market barriers
- Mobilization of market barriers

1.8. Inauguration Session

1.8.1. Welcome Address – Edwin Koekkoek

Mr Edwin, began with greeting all the dignitaries & shared his gladness on the initiatives taken by the Indian government & its agencies towards achieving energy efficiency in the building sector. He acknowledged that active involvement of all the stakeholders that is support from government agencies & departments, SDAs, ECBC Cell, demonstration projects, capacity building with local experience are key for effective implementation of ECBC.

He then presented brief introduction of European Union, its members & how its diversity in culture, political landscape & climatic conditions are very similar to India. He stated that EU had set a target of reducing 20% by 2020 from the base year through energy efficiency, renewable energy, smart grids & clean technology to combat climate change. EU recognizes India a formidable partner, as both countries are strong advocator of Paris Agreement & are among the countries that are huge importers of energy & its consumption. He said that they are in discussion with BEE on projects such as net zero buildings, Smart Indicator pointer etc. wherein energy efficiency is of top priority & such workshops are key for follow up on the activities of such projects.

He finally concluded the speech by congratulating Ministry of Power, BEE & the SDAs for their work in the ECBC implementation & is hoping to organize such workshop bi monthly to enhance knowledge sharing & increase the adoption of ECBC.

1.8.2. Address by Abhay Bakre

Mr. Abhay Bakre, Director General of BEE, began his speech with details on the proceedings of the meetings that he had with Ministry of Power recently where he said that the ministry has directed all the state energy departments to scale up ECBC implementation. Post this he thanked all the working groups, architects & other who are driving factors of the ECBC implementation across the states for the work done so far.

He insisted the fact that state level agencies are of utmost importance for successful implementation of ECBC as national level agencies can only formulate policies & guide. He complimented the new ECBC 2017 which factors in different typologies of the buildings such as hospitals, schools etc. thereby providing more structured approach to the codes.

He said that when the codes are notified in the state, amendments are done to suit the local factors of the state, but this amendment are restricted to local regulatory requirements they do not consider the local climate, local materials available, culture & the inhabitants. So, the SDA agencies needs to work towards amending the codes considering all the factors as this would help in quick notification & effective implementation of the codes thereby building a sustainable habitat.

Also, he said the scalability of ECBC is possible if it is self-motivated that is the decision maker of new construction project should incorporate ECBC compliance as design feature not just a regulatory requirement, it should bring a sense of pride in them & this was the idea of creating ECBC + & Super ECBC. This will also improve the implementation for SDAs rather than suggesting relaxation in the codes which is the current scenario.

He concluded by saying the forum like this should be used as platform by all the agencies to devise a strategy to achieve scalability ECBC.

1.8.3. Key Note Address

Mr. Raj Pal, expressed his gratitude to all the attendees & spoke on the importance of energy efficiency for India. He said as India is rapidly growing & most of its energy demand is met through imports, energy efficiency is key to reduce strain on its critical resource. As energy consumption in building energy is significant, ECBC implementation becomes very important to reduce this energy demand.

He talked about the ECBC journey in India, net zero buildings & the latest Eco-Smिता along with star rating that is aimed for residential buildings. He said ECBC has the potential 15 GW of peak demand & 250 metric ton of CO₂ thereby combating climate change & achieve the targets set by India in the Paris Agreement. He said although the codes are developed by the national agencies, it is the state agencies that are key for its effective implementation.

He applauded BEE & SDAs for their work on the various energy efficiency projects at the state level along with ECBC & said that this workshop is a great platform for knowledge sharing, discuss challenges faced & devise a strategy for effective implementation of ECBC across the nation.

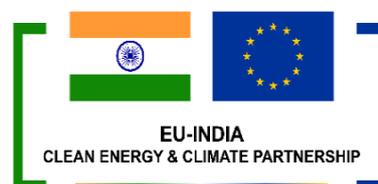
1.8.4. Vote of thanks

Mr. Saurabh Diddi, firstly thanked Mr. Raj Pal for honoring his presence & sharing his thoughts on the ECBC in India. He thanked Mr. Abhay Bakre for suggesting self-motivated approach to scale up the implementation of the ECBC rather than just using the regulatory stick to drive the implementation & he pledged to drive this workshop towards developing such approach.

He thanked EU delegation for their support & continued effort to partner in driving energy efficient projects in India. He then thanked SDA for their presence & said that they are the back bone of ECBC in the states.

He concluded the workshop by thanking PwC & Exergia was organizing this workshop.

1.9. Annexure 1: Agenda of the workshop



Regional workshop to Implement Energy Conservation Building Code (ECBC) in India

17th October 2019

Venue: Hotel Ashok, New Delhi

10:30 AM – 11:00 AM	Registration and Networking Tea		
Status update on current initiatives for ECBC implementation in India			
Session Moderator: Shri Saurabh Diddi, Director, BEE (BEE to present their vision)			
11:00 AM – 1:45 PM	Discussion to pace ECBC adoption in states and next steps		
	<ul style="list-style-type: none"> • Status of work • Success stories • Challenges • Recommendations and way forward 		
	11:00 AM – 11:10 AM	ECBC Support under CECI- Key results	Shri Rajeev Ralhan
	11:10 AM – 01:00PM	Success stories and learnings from states - SDA, Telangana - SDA, Himachal Pradesh - SDA, Maharashtra - SDA, Kerala - SDA, Karnataka - SDA, Uttarakhand - SDA, Uttar Pradesh - SDA, Puducherry	SDAs of states
	01:00 PM – 1:15 PM	Discussion on ECBC best practices adopted by these states.	Session Moderator
1:15 PM – 1:45PM	EU Best practices on ECBC implementation in Indian Scenario		Mr. Kevin O rourke
Networking Lunch (1:30 PM – 2:30 PM)			
Inaugural session			
2:30 PM – 3:00 PM	Welcome Address	Mr. Edwin Koekkoek, Counsellor – Environment, Energy and climate change	

	Address by	Shri Abhay Bakre, DG, BEE	
	Key note Address by	Shri Raj Pal, Joint Secretary, Ministry of Power, Government of India	
	Vote of thanks	Shri Saurabh Diddi, Director, BEE	
4:00 PM	Concluding Remarks and Group Photograph	Mr. Saurabh Diddi, Director, BEE and Mr. Rajeev Ralhan, Executive, PwC	