

ENERGY MANAGEMENT CENTRE -KERALA

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TERMS OF REFERENCE (TOR)

Empanelment of Building Energy Efficiency Experts in Kerala

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Contents

1. Abstract.....	3
2. Introduction.....	3
3. Objectives	5
4. Expected Outcome.....	5
5. Benefits to qualified BEEE.....	5
6. BEEE Empanelment Process	6
7. Guidelines for empanelment	6
8. Conclusion.....	7
9. Annexure-A.....	8

1. Abstract

As India is poised to become the fifth-largest economy in the world, building stock is being added at a healthy rate of 8% per year, and building energy use is increasing exponentially. Although the buildings sector provides a challenge due to the extraordinary amount and pace of building construction, it also represents the most promising opportunities for fast and deep greenhouse gas emission mitigation. Improving energy efficiency in buildings is a priority of Government and has to be implemented by joint efforts of both central and state governments. Kerala as a State is committed to achieve coherence between the strategies and implementations being done at national and international levels.

Kerala has seen a rapid growth in urbanization and infrastructure in the last few years owing to high population density, tourist influx, several development programs and funding from government. This has also led to sharp decadal growth of commercial buildings (about 251% from 2001-2009) in the State of Kerala along with increasing energy demands. An efficient and cost effective way to deal with this situation is mandating ECBC for commercial buildings having 100kW or greater connected load or a contract demand of 120kVA or greater. The Kerala ECBC has been integrated into the state level planning process so that all commercial buildings under the prescribed category, implement the identified adaptation measures to achieve the sustainability goals of the state government.

Empanelment of Building Energy Efficiency Expert (BEEE) professionals targets at creation of a pool of building professionals in the State of Kerala, to implement the concepts and actions of energy efficiency and conservation in building sector. The promotion of such an expert team is expected to be the spine of the ECBC implementation in the State of Kerala, providing assistance for the design and construction of ECBC compliant buildings.

2. Introduction

The Energy Conservation Building Code (ECBC) was launched in May 2007 by the Bureau of Energy Efficiency (BEE), Ministry of Power. Its main objective is to establish minimum requirements for energy efficient design and construction of buildings. Recognizing the energy and cost savings of efficient buildings and to help address growing energy needs, Government of Kerala has notified Kerala Energy Conservation (Building Code) Rules 2017- (G.O. (P) No.3/2017/PD dated 11th April 2017 vide Kerala Gazette Vol VI, No. 936 dated 8th May 2017). KSECBC states that, any building or building complex in the state of Kerala having a connected load of 100kW or greater or a contract demand of 120kVA or greater or having an air conditioned area of 500 m² or above and buildings that are intended to be used for commercial purposes including office buildings except for buildings with residential purpose or warehouse are accounted under the scope of ECBC compliance. Correspondingly, the ECBC clauses has been incorporated in the Kerala Municipality Building Rules (KMBR) vide G.O (P) No. 77/2019/LSGD dated 2/11/2019 and Kerala Panchayat Building Rules (KPBR) vide G.O.(P) No.

78/2019/LSGD dated 2/11/2019. The ECBC stipulates mandatory requirements and prescriptive directives for building components and systems.

The ECBC compliance procedure requires the building to fulfil a set of mandatory provisions related to energy use as well as show compliance with specified requirements stipulated for different building components and systems. The ECBC specifies prescriptive requirements for building components and systems. However, to maintain flexibility for the design and construction team, the Code compliance requirements can be met by following one of two methods:

Sl. No.	Approach	Characteristics
1	Prescriptive Method	<ul style="list-style-type: none"> • Specifies prescribed minimum energy efficiency parameters for various components and systems of the proposed building • Requires little energy expertise, provides minimum performance requirements, no flexibility
2	Whole Building Performance (WBP) Method	<ul style="list-style-type: none"> • It allows for Code compliance to be achieved by optimizing the energy usage in various building components and systems (Envelope, HVAC, Lighting, Electrical and Renewable Energy systems) in order to find the most cost-effective solution. • Allows flexibility in meeting or exceeding energy efficiency requirements.

Use of energy simulation software is necessary to show compliance with KSECBC via “Whole Building Performance Method”. Computer-based energy simulation programs model the thermal, visual, ventilation and other energy-consuming processes taking place within the building to predict its energy performance throughout a year. A simulation mechanism takes into account the building geometry and orientation, building materials usage, building envelope characteristics, climatic parameters, indoor environmental conditions, occupant activities and schedules, HVAC and lighting systems and other parameters to analyze and predict the energy performance of buildings of multiple proposes and usages. It also helps to quantify the annual cost of the building with appropriate utility rate structures applied to the results of the respective simulation or specifying within the model to calculate its cost breakups. Design modifications are then developed based on the inferences from multiple iterations of simulation and applied to the proposed building model for optimum efficiency, in which suitable Energy Conservation Measures for better performances are followed. The difference in energy costs between the cases of Standard Design, Actual Design and the Proposed Design, shows the maximum savings that can be realized for the building using off-the-shelf components.

3. Objectives

1. The EMC-Kerala, vide the empanelment of BEEE, creates a special cadre of building professionals who would help building owners, architectural firm, builders & consultants to design ECBC compliant building incorporating necessary measures in the design before the building is constructed.

Note: EMC is in the process of accrediting architectural firm, builders & consultants, as eligible for providing services related to ECBC compliant building design. In this accreditation process there would be a mandatory provision for a prescribed number of BEEEs available with accredited firms.

2. The EMC-Kerala, vide the empanelment of BEEE, also ensures availability of building professionals who are capable of doing ECBC compliance check for upcoming buildings in the State till Certified Energy Auditors (Building) is notified by BEE.

4. Expected Outcome

Creation of sufficient number of experts, in such a way that the requirements expected in the state for energy efficient building design can be met. The BEEE can also take up the requirements expected once the Eco Niwas Samhita (ECBC-Residential) is mainstreamed in the state.

5. Benefits to qualified BEEE

- Publication of list of Building Energy Efficiency Experts (BEEE) in the Energy Management Centre-Kerala online-portal to help professional development.
- A wide knowledge among the builders about BEEE through the publication
- Encouragement of professionals to initiate services on Energy efficient building design as a career
- Readily available contact details of BEEE to help the customers to identify the best and proximate location of BEEE professional
- Rewarding BEEE by giving recognition for the selected professionals for active participation & providing committed services for multiple projects, for ECBC compliance probably through a Kerala State Energy Conservation Awards (to be decided by monitoring committee).

6. BEEE Empanelment Process

6.1 Application

Who can apply

Architects, Licensed Engineers, Certified Energy Auditors / Managers and MEP Professionals who meet the following qualifications can apply to become a BEEE:

1. Should have successfully completed the online certificate course on ECBC compliance check through Energy Simulation organized by EMC- Kerala
2. Green building professionals like LEED-AP, IGBC-AP, GRIHA-Evaluator will be given relaxation on point 1, except appearing for and clearing the online exam.
3. Minimum 2 years of relevant work experience in buildings sector or energy sector or professional teaching experience - must furnish proof of experience.
4. Architects & MEP consultants shall provide the Council of Architecture (COA) registration number/relevant membership details.
5. Shall not be involved in any major litigation that may have an impact affecting or compromising the delivery of services as required under this empanelment.
6. EMC holds right to admit other practising Engineers based on their professional expertise/experience.

6.2 Intensive training and evaluation

a. Training - cum - evaluation test

- The building professionals meet the qualification criteria as per para. 6.1, who want to get empanelled by EMC must attend the BEEE training organised by EMC.
- At the end of the training programme, the applicant has to clear the online BEEE qualification test including topics related to ECBC in Kerala Municipality Building Rules & Kerala Panchayat Building Rules, conducted by EMC.
- Failing to clear the above test, the applicant can attend for a re-test and get qualified by the EMC on payment of requisite fee.
- Maximum of only 'two' re-test can be availed to the applicant in a year subject to a maximum of four attempts.

b. Interview & Empanelment

- Applicant has to attend the online interview by the Expert Team of EMC-Kerala.
- Empanelment of BEEE is for a period of 2 years and the applicant has to renew the empanelment after the expiry of tenure.

7. Guidelines for empanelment

- The applicant must submit the online application form <https://forms.gle/kByByNUNtUJppodu7> after remitting the application fee of Rs.15,000

+ 18%GST+1% Flood Cess (Total amount of Rs. 17,850) for professionals . This fee is inclusive of the expenditure towards the training of professionals.

- The applicant is expected to furnish all the details mentioned in the selection criteria clauses and submit the copy along with the application.
- Original certificates are to be provided for verification by applicants at the time of interview. Applicants failing to submit the said documents will not be considered for the evaluation.
- Confirmation towards BEEE Empanelment will entirely be at the discretion of EMC-Kerala.
- Over the confirmation, the annual renewal fees may be specified to the applicant.
- Even though applicant can show preference for constituency/location of practice at the time of interview, so as to enable EMC to allocate applicants availability for specific locations. Allocations of such location of practice do not restrict BEEE to practice in other locations.

8. Conclusion

The proposal of Building Energy Efficient Expert (BEEE) professionals, is to ensure the availability of ECBC Technical Assistance to every locations of the State of Kerala - at least one professional in all 140 constituencies of the State, including sufficient availability in Municipalities and Corporations. This empanelment ensures a decentralised service support of professional expertise in the field of energy efficiency throughout the State and to reduce the energy demand projected by the building sector.

9. Annexure-A

Syllabus for Intensive Training of BEEE professionals

MODULES	DURATION
Module 1	
ECBC Awareness & Overview	
World Energy Scenario&Energy scenario in India	15
About ECO-III Project, Milestones, EC Act,	10
Introduction to ECBC	15
Impact of ECBC Compliance	10
Q & A Session	10
Total Duration (Minutes)	60
Module 2	
ECBC Scope, Administration	
ECBC Scope, Applicability	5
ECBC Compliance approach Kerala ECBC Rules 2017	15
ECBC Compliance Process in Kerala	20
Administration and Enforcement	10
ECBC Documents in force	10
Q & A Session	10
Total Duration (Minutes)	70
Module 3	
Envelope Design Considerations	
Design & details of opaque construction, Fenestration, Shading devise, cool roofs	30
Heat transfer principles - Material Properties - Moisture & Infiltration - Design methods Calculations	30
Code requirements - Mandatory & Prescriptive- ECBC Compliance forms	15
Q & A Session	15
Total Duration (Minutes)	90
Module 4	
Heating Ventilation & Air-Conditioning - basics ECBC	
Whole building design approach and role of HVAC	15
Refrigerative cooling, system types and details	25
HVAC System components &Efficiency	25

Cooling load reduction	15
System Balancing & Building Commissioning overview	10
Mandatory & Prescriptive- ECBC Compliance forms	15
Q & A Session	15
Total Duration (Minutes)	120
Module 5	
Lighting Basics	
Lighting Principles, Light Quality optimisation	20
Energy Efficient Lighting Systems	15
Lighting control design, BAM, SFM	15
Whole building approach, Concept of LPD	10
Mandatory & Prescriptive -ECBC Compliance forms	15
Q & A Session	15
Total Duration (Minutes)	90
Module 6	
Daylighting Analysis	
Significance of Daylighting Analysis, DEF, Surface Reflectance, UDI Code Requirements	20
Daylighting Analysis Simulation Method	55
Q & A Session	15
Total Duration (Minutes)	90
Module 7	
Electrical Power	
Power Distribution, Transformers, Electric Motors	10
Types- selection criteria- Sizing	10
Losses- PF & PFC- Efficiency	10
Mandatory & Prescriptive- ECBC Compliance forms	10
Service Hot Water & Pumping - basics	
Types of water heaters - Source type and system details	10
Solar water heater sizing- Efficiency- Supplementary water heating	10
Energy loss- piping Insulation- heat traps	10
Mandatory & Prescriptive- ECBC Compliance forms	10
Q & A Session	10
Total Duration (Minutes)	90
Module 8	
Hands-on Compliance Check	

Prescriptive requirements	50
Trade- off compliance	30
Q & A Session	15
Total Duration (Minutes)	95
Module 9	
Hands-on Compliance Check	
Whole Building Performance using software	180
Q & A Session	15
Total Duration (Minutes)	195
Module 10	
Report Generation & Assessments	
Guidance on Report Generation as per the ECBC	30
Assessment on ECBC Compliance	30
Total Duration (Minutes)	60
Total Course Duration	960 minutes
Total Course Duration in Hours	16 hrs.