Draft Highlights of

Two-day Workshop on

Energy Conservation Building Code - Business and Policy Development

29, 30 June 2010

Energy Management Centre- Kerala (EMC)

Department of Power, Government of Kerala

Environment Management Agency Kerala

Department of Environment, Government of Kerala

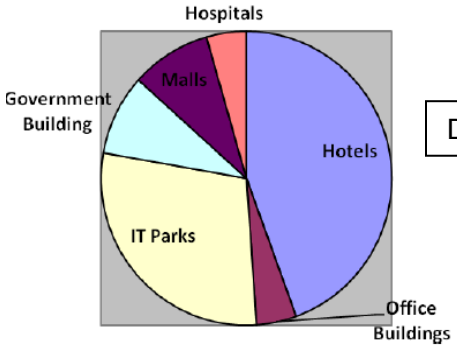
Preamble

The programme was designed to transform behavior by educating and motivating the professionals involved in building transactions to alter their course toward improved energy efficiency in buildings through Energy Conservation Building Code (ECBC).

Further to detail discussions between Environment Management Agency Kerala and Energy Management Centre regarding Energy Conservation Building Code (ECBC) during January to June 2010, as part of implementing Energy Conservation Building Code in Kerala State, Energy Management Centre- Kerala (EMC) & Environment Management Agency Kerala (EMAK) jointly organized a two day Workshop on Energy Conservation Building Code Business and Policy Development at Thiruvananthapuram for Policy makers and Design engineers and execution agency representatives in the State.

Kerala has the third highest overall population density of 819 persons per sq.km. (next only to west Bengal and Bihar) in 2001. But the density pattern in our major cities and towns shows that, the increase in density is due to the overall population increase over the entire spread of Kerala, which is occasionally accentuated in the urban areas with nominal variations. Urbanisation trend in the state of Kerala shows marked peculiarities.

In Kerala, total commercial sectoral energy sales is 1900 MU which is about 15.7% of gross electricity sales in the State and consumption of 45 energy intensive Commercial Buildings amounts to 506 MU.



Different Categories of Commercial Buildings

Energy saving potential in commercial category is about 20% with the growth of commercial sector the quanta of savings are bound to increase further.

EMC has already identified buildings as a potential area for energy efficiency improvement and the first workshop on ECBC was held in 2007 and the second in 2010 intended to implement ECBC with the inputs from the various stakeholders. Prior to the programme a copy of ECBC was send to all the implementing agencies to equip and orient with the ECBC compliance matrix.

Background

The Energy Conservation Act 2001 (Central Act 52 of 2001) empowers the Central Government under section 14 (p) read with Section 56(2)(1) to prescribe Energy Conservation Building Code(ECBC). The Code defines norms and standards for the energy performance of building and their components based on the climate zone in which they are located. ECBC provides minimum requirements for energy – efficient design and construction of buildings. ECBC covers building envelope, heating, ventilation, and air conditioning system, interior and exterior lighting system, service hot water, electrical power system and motors.

Chapter VI of the EC Act 2001 in Section 15 (a) provides the State Government to amend the energy conservation building codes to suit the regional and local climatic conditions and may , by rules made by it, specify and notify energy conservation building codes with respect to use of energy in the buildings. It also allows the state government to direct every owner or occupier of a building or building complex being a designated consumer to comply with the provisions of the ECBC. Section 15 (b) of the EC Act also gives powers to direct every owner or occupier of a building or building complex being a designated consumer to comply with the provisions of Energy Conservation Building Code.

Date and Venue of programme

- 29th & 30th June 2010: Government Guest House, Thycaud, Thiruvananthapuram

Inauguration of Workshop

The Workshop inauguration was held on 29th June 2010 at Government Guest House, Thycaud, Thiruvananthapuram. **Mr. Dharesan Unnithan, Director, EMC** gave the welcome speech in which he briefed and spoke on necessity of Energy Conservation Building Code. The session was presided by **Dr S. K. Khanduri, IFS, Director, EMAK** and emphasized on

the necessity of ECBC. **Mr. Paul Antony, IAS, Principal Secretary, Power Department**, **Government of Kerala** formally inaugurated the programme and **Mr. A. M. Narayanan, Head Energy Efficiency Division, EMC** proposed vote of thanks.

Faculty and resource support

The programme faculties and resource support professionals comprised of the following:

- Mr. Narayanan A M, EMC
- Mr. Fahid Rahim, Saint Gobain Glass India
- Mr. Anand, CII
- Mr. Steve Belkin, Sunflower Solutions
- Mr. R. Harikumar, EMC
- Mr. Vivek Jain, Philips Electronics India Ltd
- Mr. Rajeev R V, Schneider Electric India Pvt. Ltd.
- Mr. Sivakishan, TERI
- Mr. Salim, TCS
- Mr. Shivakumar & Mr. Shanavaz, KSPC
- Ms. S Kumar Deepa, EMC
- Mr. Johnson Daniel, EMC
- Mr. Subash Babu, EMC
- Mr. Sandeep T R, EMC
- Mr. Sandeep K, EMC
- Mr. Viju P M, EMC

Summary of interactive deliberations

Mr. A.M. Narayanan, EMC

The presentation spoke on all the aspects of ECBC, from its relevance to the various criteria as well as the compliance checking options. The entire presentation covered a gist of ECBC, providing a glance to the participants of all the sessions that were to follow. The session as it was meant provided the right mood and spirit to the participants. The building envelope, the heating ventilation and air conditioning, the electric power systems, lighting systems with respect to the compliance matrix were deliberated in detail.

Mr. Fahid Rahim, Saint Gobain Glass India

The presentation touched upon the contents of ECBC with respect to fenestration and spoke on the mandatory requirements explaining the terms such as Wall to Window ratio, the Solar Heat gain, the U factor as well as the whole body performance method, prescriptive method and trade-off method in the ECBC. He spoke on glass as a fenestration material its scope as well as the solution Saint Gobain as a company will be able to provide.

Mr. Anand, CII

The Indian Green Building Council Rating systems and minute intricacies of the same were introduced. The presentation covered every aspect which a building comprises of and also the requirements and benefits of such a rating system. The major areas in IGBC rating are Sustainable Sites, Water efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental quality and Innovation and Accredited Professional points. There is a varying weightage for each of these six points are given for rating from IGBC.

Mr. Steve Belkin, Sunflower Solutions

The increase in efficiency in roof top systems solar photovoltaic systems with tracking systems with emphasis to manual tracking system which is more user friendly was discussed. It was also explained that the manual tracking system is less expensive at the same time very easy to use as well. The tracking system was reported to increase the efficiency of the system by 30-40 %.

Mr. R. Harikumar, EMC

The Indian Scenario as applicable to the building sector on renewable energy and the government policies and programme towards the various renewable options viz. solar thermal, wind solar hybrid and biogas were explained.

Mr. Vivek Jain, Philips Electronics India Ltd

The session covered the various aspects of illumination systems such as Lighting Controls, Space Control, Control in day lighted areas, Exterior Lighting Control, Additional Control for Display/Accent Lighting, Case Lighting, Hotel and Motel Guest Room Lighting, Task Lighting, Non Visual Lighting, Demonstration Lighting, Interior Lighting Power, Building Area Method and Space Function Method were discussed. The session was focused on Energy Conservation Building Code, with a through explanation not only the retrofits but also the illumination system as a science.

Mr. Rajeev R V, Schneider Electric India Pvt. Ltd.

The various aspects of Building Management System and their relevance on ECBC were detailed. The systems that come under the subtitle of electrical power in ECBC were well covered in the session.

Mr. Sivakishan, The Energy & Resource Institute

GRIHA, an acronym for Green Rating for Integrated Habitat Assessment, is the National Rating System of India. It has been conceived by TERI and developed jointly with the Ministry of New and Renewable Energy, Government of India. It is a green building 'design evaluation system', and is suitable for all kinds of buildings in different climatic zones of the country. The session covered indepth aspects of (GRIHA) rating.

Walk through of a Green Building - Peepul Park, Tata Consultancy Limited (TCS), Technopark, Thiruvananthapuram - Mr. Salim, AGM, TCS.

On the second day of the workshop, the participants were taken to TCS, Peepul Park, Technopark, Thiruvananthapuram for site visit and further discussions. Mr. Salim,

TCS gave a brief idea about the TCS facility, LEED star rating in buildings, regarding their “Silver rated” building and procedures and criterion for attaining LEED rating for buildings. After the presentation, the participants were taken for a comprehensive walk through of the “Silver rated” building to show them the design & practices.

Mr. Shiva kumar & Mr. Shanavaz, Kerala State Productivity Council

The session covered the various aspects of Energy Audit with a focus on Energy Conservation Building Code (ECBC). The session took the crowd towards the compliance matrix in a manner sufficient to orient the group into ECBC compliance check & implementation. The session covered energy audit case studies in detail.

Break-out session

After the interactive sessions, the participants were divided into six groups for group discussion. Mr. A M Narayanan, Head of Energy Efficiency Division, EMC briefed the participants on the session. After the group discussions, each group came up with recommendations/ inferences on how to implement Energy Conservation Building Code in the State. Each group leader presented their inferences. The session had Mr S K Khanduri, IFS, Director, Environment Management Agency Kerala and Mr Shivakumar, Director, Kerala State Productivity Council as panelist.

Salient points emerged from the break-out sessions

The major points brought up in the brain storming of breakout sessions are listed down below group wise.

Group 1

1. Buildings with contract demand greater than 600 kVA are part of the ECBC limit. However considering the large numbers of building are coming up in the range of 100-200kVA contract demand in Kerala, all HT and EHT building consumers may be brought under ECBC.
2. Monitoring Committee

- Yearly compliance audit to be done by a third party assessor and not the agency who gives building permit or certification such as the local self government agency or Electrical Inspectorate.

3. ECBC Implementation Phases

   Phase 1: Intensive awareness campaign for all building sector professionals ie; all stakeholders in ECBC

   Phase 2: Voluntary Implementation for 1 year in Energy Intensive Buildings (ie; buildings with more than or equal to 500kW connected load or 600kVA contract demand) and to be made mandatory from the second year

   Phase 3: Voluntary implementation for 5 years for all commercial buildings (other than the energy intensive buildings mentioned above) and to be made mandatory from the sixth year onwards.

4. Incentives & subsidy to be introduced during the voluntary implementation phase.
5. If existing Buildings are made into ECBC complaint subsidies & incentives should be allowed.
6. Standardization of basic energy efficiency requirements in electrical equipments such as Standards and Labeling Programme of Bureau of Energy Efficiency
7. Training and certification of concerned officials of Local self government Institutions (LSGI) involved and responsible for building scheme in ECBC compliance verification. Training and certification may be preferably conducted by the State Designated Agency (SDA).

Group 2

1. ECBC code may be implemented as such. Any modifications required may be treated in a case to case basis.
2. During the compliance all electrical systems may be inspected by Electrical Inspectorate; and all other aspects including building envelope by the Chief Town Planner/ District Town Planner. Inspection report should be filed to the SDA with a copy to the LSGI.

- LSGI should scrutinize these compliance reports and attach with their pre commission/ commission approval. A copy of the compliance reports by these agencies may also be forwarded to the SDA.

Group 3

1. Training and certification of concerned officials of Local self government Institutions (LSGI) involved and responsible for building scheme verification and approval shall be conducted preferably by the State Designated Agency (SDA) under the Bureau of Energy Efficiency.
2. A similar code for the residential building segment may also be taken up subsequently.
3. Embodied energy assessment & material used in the construction also should be taken into account.

Group 4

1. The ECBC may be reviewed further with respective to the geoclimatic conditions in the various regions in the state.
2. The applicant may send the building scheme with ECBC compliance matrix to the building verification and approval authority with a copy to EMC. Approving authority's trained personal may confirm the compliance or furnish deficiency report if any for resubmission. EMC will also undertake compliance verification and preparation of report. EMC will forward its report/approval to the applicant as well as to the approving authority. EMC will provide compliance certificate to the approving authority with a copy to the owner within a period of one month. In the wake of no deficiency in the compliance matrix provided by the applicant, EMC will provide compliance certificate to approving authority with a copy to the building owner.
3. Necessary inclusion may be made in Kerala Building Rule regarding ECBC.
4. Compliance Auditing shall be done in 3 stages
    - Scheme Submission - Preliminary stage
    - Compliance Check - Intermediately stage
    - Building Construction - Execution stage

5. Training and certification of concerned officials of Local self government Institutions (LSGI) involved and responsible for building scheme verification and approval shall be conducted preferably by the State Designated Agency (SDA) under the Bureau of Energy Efficiency ie; Energy Management Centre in case of Kerala.

Group 5

1. Local climate variations should be accounted in ECBC. There may be multiple zones in Kerala like coastal, plateau and high range.
2. Due consideration shall be made for local traders and locally available materials while undertaking ECBC compliance check.
3. Regional local committee shall be constituted with stakeholders of Govt. like LSGI, TP, PWD, KSEB, Electrical Inspectorate, EMC etc. for periodical review.
4. Green building concept may be incorporated in Building rules.
5. Use of energy intensive materials to be discouraged.
6. Energy Performance Index in terms of units per square meter may be benchmarked for small. Medium and even large buildings and incentives based on the same may be proposed / given.
7. The benchmark of 500kW shall be brought down to 100kVA contract demand in Kerala.
8. ECBC complaint materials may be included in the Government material schedule.

Group 6

1. ECBC Compliance: Modifications to be made
    - Due considerations for climate of Kerala
    - Check to be in place at the design stage rather than large scale retrofit at later phase.
2. All buildings above 1000m^2/10000sqft built-up area to mandatorily follow ECBC without connected load consideration.
3. Tax rebate/incentives to be given to motivate.
4. Initiative to implement in government buildings.

5. All developments below 1000m^2 to be taken up for energy conservation on voluntary basis with tax rebates & incentives. Prioritize requirements & give incentives that consider such applicants.
6. Architects to ensure that basic planning comply with energy & environment friendly design.
7. For buildings up to 1000m^2 KBR to be amended for ECBC compliance and approval check to be at local body level. For buildings above 1000m^2 approval from EMC to be mandatory. EMC to develop a core body competent to certify energy efficiency.
8. Retrofit to be provided within a specified compliance period- phase out period. Penalty to be imposed, for exceeding time limit for compliance.

Emerged Specific Recommendations & Way Forward

The workshop was intended to be an eye opener to the fact that energy efficiency can be substantially improved with existing technologies. Also with an understanding that progress must be made well in time to vastly improve the energy efficiency of both new and existing buildings.

The two day deliberations were intended to create awareness on the various aspects of ECBC compliance and also to equip the licensing and designing architects and engineers for the enforcement of the Energy Conservation Act, 2001. The Workshop as per the feedback of the participants enabled to develop a basic system wise understanding on ECBC and compliance matrix.

The recommendations of the Workshop can be summarized as

- Implement ECBC in the State
- ECBC needs to be amended to include all HT Commercial Buildings
- ECBC compliance may be issued by LSGI in consultation with EMC. The compliance approval shall be within one month from the date of submission of the plan and compliance matrix.
- Developing accredited professionals for ECBC compliance check in LSGs needs to be taken up by EMC; LSGIs may have budgetary provision to impart training and certifying

its concerned personnel.EMC shall train the existing building scheme verifying team for compliance check.

- A similar code for the residential building segment may also be taken up subsequently.

In addition to the above recommendations the followings may also be included in the preview of the ECBC.

- Harnessing Renewable Energy for Electricity Generation in the building.
- Energy Efficiency of IT Hardware may also be included in the ECBC compliance check list.

Kerala has been able to provide leadership in almost all aspects of sustainable development and building sector provides yet another means to improve the energy efficiency. The Kerala's economy is also dependent of service industry such as IT industry, Hotel Industry, Hospitals etc. With more than 100 MU of identified savings (NPC Study in 2009) through retrofitting of existing buildings and an even higher from energy efficiency at design stage (which is exactly the aim of ECBC), the state can definitely pave its own path in the field.

The programme enabled to encourage interdependence by adopting holistic, integrated approaches among the stakeholders that assure a shared responsibility and accountability toward improved energy performance in buildings and their communities.

Annexure

The following are given as Annexure for reference and records:

A. Program schedule

B. List of Participants

C. Photograph

Annexure A

Program Schedule - Workshop on Energy Conservation Building Code Business and Policy Development jointly organized by Energy Management Centre-Kerala & Environment Management Centre-Kerala

DAY 1 29 June 2010		
Registration 9.30 am – 10.00 am		
Session	**Handled by**	**Time**
Morning Session 10.45 am - 1.00 pm		
Introducing ECEC	Mr. A. M. Narayanan, EMC	
Fenestration	Mr. Fahid Rahim, Saint Gobain Glass India	
Green Building and LEED Certification	Mr.Anand, CII	
Renewable Energy Application_ BIPV, Solar Roof tops systems	Mr. Steve Belkin, Sunflower Solutions, USA	
Other Renewable Energy Application	Mr. R. Harikumar, EMC	
Afternoon Session 2 pm - 5.15 pm		
Illumination System	Mr.Vivek Jain, Philips	
Electrical Power	Mr. Rajeev R V, Schneider Electric	
GRIHA Rating	Mr. Sivakishan, TERI	

DAY 2 30 June 2010		
Morning Session 10.00 am – 12.00 pm		
Session	**Handled by**	**Time**
Site Visit and Discussions at TCS, Technopark, Trivandrum	Mr. Salim, TCS	
Afternoon Session 1.45 pm – 4.00 pm		
Energy Audit in ECBC Perspective & Compliance	Mr. Shanavaz, KSPC	
Break Out Session and Group Presentation	Chair: Mr. A.M. Narayanan, EMC	

Annexure B

List of Participants for the Workshop

SN	Name	Designation & Organization	Telephone	Email ID
1	Ramesh R	Assistant Executive Engineer, KSEB	9447110750	
2	Sreekumar M B	Executive Engineer, KSRTC		
3	Unnikrihnan Nair K	Assistant Engineer, National Games Secretariat	9497570481	
4	Haridas H V	Team Head, National Games Secretariat	0471-243000	
5	Raveendranath T C	Superintendent Engineer, National Games Secretariat	9446568181	
6	Priyalal J	Assistant Executive Engineer, LSGD	9567364254	josephpriyalal@yahoo.com
7	Dharmakeerthi P P	Assistant Executive Engineer, LSGD	9447001127	gopalppd@yahoo.co.in
8	Ansar m	Assistant Engineer, National Games Secretariat	9446553310	mkanzar@gmail.com
9	G Vijayakumar	Director, Ajit Associates	999586874	ajit@ajitassociates.com
10	Dr. Salim A	Professor & Head, Govt. Engg. College, Tvm	9447119307	profasalim@yahoo.co.in
11	Renjith C	Dy. Project Manager, CES, Trivandrum	9847572147	Renjithc_75@yahoo.com
12	Sarikala D	DPM, CES, Trivandrum	9444170286	cestrivandrum@yahoo.com
13	Sasikumar T	Executive Engineer, PWD	8086395176, 0487-2330010	
14	Sadananda Pai	Executive Engineer, PWD	8086395215	
15	Chandrachoodan	Executive Engineer, PWD	9447101819	gcp8888@gmail.com

	Pillai			
16	Manoj Kumar Mahapatra	Manager (Admin-Ele), The Federal Bank Ltd.	9847914490	manojmahapatra@federalbank.co.in
17	Suma P Surendran	Assistant Engineer, Kochi Municipal Corporation	9447127668, 0484-2369007	
18	Mohankumar M A	PWO I, Kollam Municipal Corporation	9446112813	
19	Ajayakumar P	PWO I, Kollam Municipal Corporation	9447334860	
20	Sarojadevi T O	PWO I, Kollam Municipal Corporation	9446256442	
21	Chinchu S	PWO I, Kollam Municipal Corporation	9847047161	
22	Jayakumar K	PWO I, Kollam Municipal Corporation	9349892031	
23	Unnilrishnan V	EE (Planning), KSHB	9447048509	
24	Padmakumar R S	AEE (Electrical), KSHB	9446144771	
25	Navakumar S R J	Chief Engineer (BOT-Projects), KTDFC	9446007571	srjnavakumar@gmail.com
26	Anitha Selin A B	Lecturer, Marian Engineering College	9446750083	anithanavakumar@yahoo.com
27	Salihan	Assistant Engineer, LSGD	9446706816	
28	Bijimole E R	Assistant Engineer, LSGD	9656372569	bijishanti@gmail.com
29	Sherin Joseph	Senior Architect, L&T Global Engineering Services	9841075367, 044-22433905	sherin.joseph@Lnties.com
30	Mercy Star Parimalam	Senior Architect, L&T Global Engineering Services	044-22337034	MERCY.PERIMALAM@LNTIES.COM
31	Aparna Sathish	Assistant Engineering Manager, L&T Global Engineering Services	9952016524, 044-22337027	aparna.sathish@LNTies.com
32	Shailaja S	Senior Manager (Utilities), SFS	9847741546	shailaja@sfstvm.com
33	Radhamohan P K	Secretary, Payyannur Municipality Corporation	04985-2202067	secpynr@gmail.com

34	Vinayan K P	Secretary, Koothuparambu Municipality Corporation		
35	Radhakrishnan P	Secretary, Thaliparambu Municipality Corporation	9447964037, 0460-2205340	secthaliparamba@gmail.com
36	Vijayakumar A	Secretary, Varkala Municipality Corporation	0470-2609358	secyvarkala@yahoo.com
37	Liya E	Assistant Engineer, LSGD	9447696866	
38	Indu R	Chief Engineer, KSRTC	944707193	
39	Rajendra Babu K	AEE, KSPCB	9446557504	
40	Anilkumar P S	Assistant Professor, Govt. Engineering College, Thrissur	9847302217	
41	Sathish K	Secretary, NGO TVM	0471-2435207	
42	Dr. Venugopal Reddy S		9497758595	
43	Kannan K	G M, Voltech Global Trading (P) Ltd, Chennai	9566002303	
44	Rdhakrishnan P	Advisor, Voltech Global Trading (P) Ltd, Chennai		
45	Chandra Shekaran K G	Consultant		
46	Sunilkumar B	Lecturer, TKM College	9387313924	beesunil@gmail.com
47	Bismi Mani	AE, LSGD	9895830032	bismimani@gmail.com
48	Shobana Kumari	Assistant Executive Engineer, LSGD	9447795388	Sobha.maniveena@gmail.com
49	Rose Milan Daniel	AE, LSGD	9497781492	
50	Elizabeth A Baby	AE, LSGD	9496252395	
51	Joy Ashok	AE, LSGD	9447961947	
52	Radhakrishnan Nair	AE, LSGD	9446564113	
53	Ashraf Khan	AE, LSGD	9387778886	khansetagon@yahoo.co.in
54	Gopakumar V S	AE, LSGD	9447245862	
55	Vinod M K	AE, LSGD	9895192550	Vinod.m.krishnan@gmail.com
56	Dileep M S	Assistant Executive Engineer, LSGD	9497568277	

57	Antony M Vattoly	AE, LSGD	9447577020	
58	Ajith Kumar G S	Assistant Executive Engineer, LSGD	9446968050	
59	Krishnankutty N	BI, Corporation of Kochi	9995522616	
60	Arun T S	Public Relations Officer, High Court of Kerala	0484-2562020, 9447090134	khcpro@rediffmail.com
61	Krishnamoorthy T A	General Manager, KSIDC Ltd.	9847064348, 0471-2318922	krishnamoorthy@ksidc.com
62	Padmakuar R D	Deputy Chief (Projects), HUDCO Ltd.	9446551260	rdpadma@gmail.com
63	Beena Philipose	DGM, HUDCO Ltd.	9446810860	beena.philipose@gmail.com
64	Sudhamony S V	Assistant Executive Engineer, KSEB	9745180779, 0471-2514282	
65	Sreedevi R	Assistant Executive Engineer, KSEB	9495975238	
66	Rajeev Kumar K	Executive Engineer, KSEB	9447124847	
67	Sheeja T C	Executive Engineer, KSEB	9446008970	
68	Salim M	Executive Engineer, KSEB	944652712, 0471-2514282	
69	Sreekumar K	Assistant Engineer, KSEB	9447696479	sreekseb@gmail.com
70	Abdul Malik K V	Deputy Town Planner, Town Planning Department	9447193838	kvmalik69@gmail.com
71	Anil Kumar P	Town Planner, Town Planning Department	9496412181	anilkumarp111@gmail.com
72	Isha P A	Deputy Town Planner, Town Planning Department	9846247448	ishahaneef@gmail.com