

# Network for Energy Efficiency in the Building Sector

STANDARDS, EDUCATION AND INFORMATION TECHNOLOGY

*(Workshop Report)*

2-3 February 2010

at India Habitat Center, Lodhi Road, New Delhi

## ***Organized by***

USAID ECO-III Project, in association with

Vienna University of Technology, Austria

Bureau of Energy Efficiency (BEE) and

Renewable Energy and Energy Efficiency Partnership (REEEP)

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# 1. FINAL AGENDA

<b>DAY 1- February 2, 2010</b>			<i>Casuarina Hall</i>
<b>Inaugural Session</b>			
9:00-9:30 am	Registration		
9:30-9:50 am	Welcome Address	Dr. Archana Walia, COTR, USAID India	
9:50-10:10 am	Inaugural Address	Mr. Binu Parthan, Deputy Director General, REEEP	
10:10-10:30 am	Plenary Address	Dr. Ajay Mathur, Director General, BEE	
10:30-11:00 am	Tea		
<b>Technical Session Track 1- Building Energy Efficiency</b>			
11:00-11:45 am	Session 1	The User perspective: understanding occupants' requirements, actions, and impact in buildings	Dr. Ardeshir Mahdavi, Director & University Prof., Vienna University of Technology
11:45-12:30 pm	Session 2	Building energy codes and standards: ECBC and Beyond	Dr. Satish Kumar, Chief of Party, USAID ECO-III Project
12:30-1:15 pm	Session 3	Highlighting a methodology to design, construct and operate energy efficient buildings in India	Dr. Chandrashekhar Hariharan, CEO, ECOBCIL
1:15-2:15 pm	Lunch		
<b>Technical Session Track 2- Capacity Building</b>			
2:15-3:00 pm	Session 4	Role of traditional skills and trades in delivering sustainable buildings	Mr. Nimish Patel, Abhikram
3:00-3:45 pm	Session 5	Towards architecture curricula that meet the sustainability challenges in the building sector	Dr. Kristina Orehounig, Vienna University of Technology & Mr. Aalok Deshmukh, USAID ECO-III Project
3:45-4:00 pm	Tea		
<b>Technical Session Track 3 - Information &amp; Technology Processes for Energy Efficiency</b>			
4:00-4:45 pm	Session 6	Application opportunities of Information & Communication Technologies (ICT) in the building design and operation process	Dr. Ardeshir Mahdavi
4:45-5:30 pm	Session 7	Incorporating ICT to facilitate the demand, supply of energy and to manage energy consumption patterns – Integration of building sector with Smart Grids	Mr. Dipayan Mitra, Senior Principal, Infosys
5:30-6:00 pm	Closing Remarks		

<b>DAY 2- February 3, 2010</b>		<i>Maple Hall</i>
9:00-9:30 am	Welcome Address	Dr. Satish Kumar
<b>Workshop 1- Energy efficiency implementation through standards and capacity building</b>		
9:30-10:00 am	Introduction (Overview & Objectives)	
10:00-11:30 am	<b>Breakout session 1 a</b>	<b>Breakout session 1 b</b>
	The need for energy efficiency standards: An update on ECBC and discussion on the implementation process	Discussion on the state of architecture/engineering curriculum and the potential for developing/enhancing skill set for energy efficiency
	<b>Facilitators:</b> Mr. Tanmay Tathagat, Advisor, Environmental Design Solutions & Dr. Jyotirmay Mathur, Professor, Malaviya National Institute of Technology	<b>Facilitators:</b> Dr. Ardeshir Mahdavi, TUV
11:30-12:30 pm	Roadmap Discussion (Summary & Outcomes)	
12:30-1:30 pm	Lunch	
<b>Workshop 2- Role of information &amp; technology processes in building delivery and operation</b>		
1:30-2:00 pm	Introduction (Overview & Objectives)	
2:00-3:30 pm	<b>Breakout session 2 a</b>	<b>Breakout session 2 b</b>
	Overview of energy simulation tools and their incorporation in the building delivery process	Overview of building diagnostics and building post occupancy performance (available tools and reference)
	<b>Facilitators:</b> Dr. Vishal Garg, Asst. Professor, International Institute of Information Technology & Prof. Rajan Rawal, Center for Environmental Planning and Technology	<b>Facilitators:</b> Dr. Ardeshir Mahdavi, TUV & Mr. Rohan Parikh, Head-Green Initiatives, Infosys
3:30-4:30 pm	Roadmap Discussion (Summary & Outcomes)	
4:30-5:30 pm	Closing Remarks	
<b>DAY 3- February 4, 2010</b>		
9:00-16:00 pm	Core group workshop for road map and proposal development	

## 2. REPORT INCLUDING OUTCOME

### Event Summary and Outcomes

The USAID ECO-III project and Bureau of Energy Efficiency (BEE) in association with the Renewable Energy and Energy Efficiency Partnership (REEEP) and Vienna University of Technology (VUT), organized the workshop on “Network for Energy Efficiency in the Building Sector: Standards, Education and Information Technology” at the India Habitat Center, New Delhi on Feb 2-4, 2010. The workshop was structured to provide a platform for key invited stakeholders (see Chapter 4 for the participant list) from diverse backgrounds to participate in a focused discussion covering critical facets of imminent importance in the energy efficiency arena; energy efficiency standards, capacity building at various levels and information technology processes. The event contributed to the dissemination of standard-based technical and regulatory information regarding energy efficiency measures in building industry. As an outcome of the workshop, the stakeholders worked together to highlight key concrete activities that could and will be initiated to maximize the opportunities to ensure implementation and incorporation of energy efficiency as appropriate and applicable to relevant stakeholders in India’s building sector.

The event was structured over a two day period. Day 1 included three technical session tracks, which provided an opportunity to the participants to get updates on standards, research, tools and processes from key experts in each track (see ECO 3 webpage for uploaded presentations: <http://eco3.org/popup/REEEP%20Workshop.html>). The tracks included; building energy efficiency standards, capacity building and information technology processes. The presentations successfully covered the breadth and depth of the track topics by disseminating information in Track 1 (Building energy efficiency standards) on understanding the user perspective as the focus of designing sustainable buildings, getting a current status update on ECBC (Energy Conservation Building Code) and its implementation process and a case study of a real residential development in Bangalore that incorporated sustainability measures. Track 2 (Capacity building) discussed the need through real building examples for understanding, capturing and evolving existing traditional skills, knowledge and trade and the need to evolve existing architecture and engineering curriculum to incorporate energy efficiency and sustainability. Track 3 (Information technology processes) highlighted the availability and use of simulation tools in the building delivery process and demonstrated the benefits of the upcoming technology on smart grids to enhance, manage and optimize energy supply and demand patterns. The presentations on Day 1 provided the background and thereby set the platform for the workshop discussions conducted on Day 2.

Day 2 included workshops with parallel breakout sessions, providing the invited stakeholders an opportunity to be involved in interactive sessions on key topics with a focused group. Each workshop session was designed to include two breakout sessions covering parallel and synergistic facets of the workshop theme. The participants from each breakout session worked together to arrive at objectives, outcomes and next steps for that theme. Workshop 1 discussed the status of energy efficiency standards and the evolution of curricula to respond to these standards, Workshop 2 discussed tools and the process of their incorporation in the building delivery process. A key outcome of the workshop sessions was the development of a roadmap identifying and highlighting the opportunities and challenges in the implementation process and the creation of a network of interested technical experts to participate in the implementation process.

A detailed summary of the outcomes of the event are outlined below, the team has also identified 3 critical next steps from each workshop that would be potentially taken up as a part of future activities:

### 2.1. Day 1 (Technical presentations)

#### **Track-1: Building Energy Efficiency**

Focus- Provide an overview to the process of developing sustainable buildings, from understanding the occupant perspective, using energy efficiency standards to developing a business case for their implementation through case studies.

- Discussed the user/occupant perspective and the pivotal role that plays in defining the goals of the project and translating it into a sustainable one
- Highlighted energy codes from other countries



- Discussed the need and the potential path of making the ECBC mandatory
- Highlighted compliance methodology
- Presented available technical resource material for practitioners
- Discussed a developers perspective through a real examples and the need to develop sustainable buildings
- Identified the strategies for natural resource management

### **Track-2: Capacity Building**

Focus- Discuss the status of technical expertise, skills and knowledgebase available and required to meet the sustainability challenge; identify methods of evolving and developing the curriculum to meet these requirements.

- Discussed the role of traditional knowledge in building design through real examples
- Discussed methods of capturing, evolving and adapting existing knowledge, engaging local craftsmen and traditional construction & design processes
- Evaluated global examples of curricula that incorporates building physics, sustainability and simulation
- Identified and highlighted progress in architecture/engineering curriculum enhancement to develop technical expertise in the field of energy efficiency and sustainability

### **Track-3: Information & Technology Processes for Energy Efficiency**

Focus- Provide an overview of the information technology processes available and in development to support the development of energy efficient and sustainable buildings from conception to operations.

- Discussed the need to embrace building simulation processes to develop sustainable buildings
- Highlighted the stages in which IT could be used in the building delivery process from design to operation and how this could translate into energy optimization
- Discussed the smart grid concept, and how Energy Information Systems can be used in managing energy supply and demand from a macro to micro level

## **2.2. Day 2 (Workshop Sessions)**

### **Workshop 1: Energy efficiency implementation through standards and capacity building**

#### **Breakout Session 1 a- Discussion on the need for energy efficiency standards: An update on ECBC and discussion on the implementation process**

- Develop a comprehensive implementation path for mandatory implementation of ECBC in accordance to BEE's scheduled timeline (6-12 months). This would include developing ECBC implementation roadmap, code compliance software, identification and capacity building of ECBC evaluators/inspectors and code compliance officials along with building design professionals and consultants and developers through standardized training materials, harmonization of ECBC with other related codes and standards, and suggesting a timeline for ECBC revision/enhancements.
- A comprehensive implementation path needs to be developed to make the code mandatory, which will include several measures, key one being linking/harmonizing it with other codes and standards, such as LEED India, Griha, National Building Code
- The various involved stakeholders such as the building owners, municipalities could be given financial benefits such as tax breaks, incentives etc. for adopting ECBC till its mandatory
- A clear compliance process needs to be developed that will include performance and prescriptive paths and also provides simulation software and compliance check tools.
- An ECBC implementation committee needs to be established that would consist of diverse stakeholders to ensure that all gaps are addressed for implementation and adoption
- Technical reference material needs to be developed, disseminated that covers India specific issues such as adaptive thermal comfort, natural ventilation etc.
- Mobilize industry groups to provide performance labeling and information through accredited means

- Identify ECBC evaluators through an organization such as BEE, who will be responsible for ensuring compliance

**Next Steps:**

- ✓ Form a diverse stakeholder committee to develop the implementation process
- ✓ Develop the ECBC compliance check tool
- ✓ Organize focused dissemination activities for diverse stakeholders; industry, architects, consultants, government

**Breakout Session 1 b- Discussion on the state of architecture/engineering curriculum and the potential for developing/enhancing skill set for energy efficiency**

- The existing architecture curriculum needs to be enhanced and evolved keeping in mind the need to incorporate the skill set of energy efficiency and sustainability
- NIASA/COA is a critical partner that needs to be involved from the initial stages of curriculum discussion
- There is a need to review the existing curriculum structure and develop supportive training material for key courses that could be used by the faculty
- Provide training workshops such as Train the Trainer for the faculty, which should cover the basics of climatology, building physics and simulation
- Develop a process to incorporate energy efficiency principles in the design studio, the studio should the incorporation of these in its evaluation metrics
- Develop course material for the studio that highlights a progression of knowledge and expertise through levels and increases in its technical depth through the years
- Establish a committee that will work towards developing white paper highlighting the need and the way to enhance the architectural curricula for discussion with NIASA/COA
- Expand the partner institution network and provide them with technical reference material as applicable and appropriate as teaching aid

**Next Steps:**

- ✓ Increase the partner institution network
- ✓ Establish a partnership with COA/NIASA and develop training material for technical coursework
- ✓ Develop web-based training material for supporting teaching of technical courses associated with energy efficiency and sustainability

**Workshop 2: Role of information & technology processes in building delivery and its operation**

**Breakout Session 2 a- Overview of energy simulation tools and their incorporation in the building delivery process**

- At present most architects use simple tools such as Google Sketchup or Ecotect for basic shading analysis, for further detailed simulation especially needed for third party rating systems architects employ external consultants
- There is strong apprehension in using whole building energy analysis tools by architects due to the lack of training and the complicated interfaces
- There is a lack of India specific information, especially with respect to the weather data, construction materials, HVAC systems and applicable passive design strategies
- More workshops should be organized focused towards design professionals at different levels, such as providing them with the knowledge of tools, the basic ability to learn these tools and the means of interpreting the results
- There should be a wider dissemination of support material for using energy simulation for the performance compliance methodology

**Next Steps:**

- ✓ Organize building physics/energy simulation workshops for design professionals and students
- ✓ Develop training material for design professionals
- ✓ Develop India specific database of support material needed for energy analysis- such as material, construction, weather, mechanical systems

**Breakout Session 2 b-Overview of building diagnostics and building post occupancy performance (available tools and reference)**

- Monitoring has significant payback and should be incorporated in buildings
- There should be a guide developed, potentially as a part of the ECBC that provides guidance on the level of metering required by installed power of the building
- Monitoring could produce significant amount of data, and there should be guides available that could help building owners or facility managers in sorting, assessing and using that data to optimize and monitor the building performance
- To ensure and check the performance of the building, performance data from other buildings should be made available through organization such as the BEE
- Sub-metering could be made a mandatory requirement in the ECBC so that the building level utility data is available, especially for benchmarking exercises
- Support systems for highly advanced metering systems are required
- There is a need to develop a guide on post-occupancy data collection and evaluation
- There is a significant benefit in involving the occupants as a part of the post occupancy monitoring either by displaying the information through interactive dashboards or intranet or by allowing them to make choices of energy use and thereby observing the impact on energy consumption
- Monitoring building energy consumption can also play a significant role in DSM programs through opportunities of demand aggregation
- It is important to create a committee of interested stakeholders

**Next Steps:**

- ✓ Develop a database for building performance, to be used as benchmarking
- ✓ Provide support material, activities to stakeholders capturing the opportunities and challenges of sub-metering, this could also be developed as a guide on metering/sub-metering, which provides levels of metering requirements based on connected load

### 3. LIST OF PARTICIPANTS

S. No.	Organization	Name
1	M.N. Ashish Ganju Architects	Prof Ganju
2	Abhikram	Nimish Patel
3	AEEE	Koshy Cherail
4	Alliance to Save energy	Pradeep Kumar
5	Ashok Lal & Architects	Ashok Lall
6	BCIL	Chandrashekhar Hariharan
7	Bureau of Energy Efficiency	Saurabh Yadav
8	Bureau of Energy Efficiency	Ajay Mathur
9	CEPT	Rajan Rawal
10	CII-ITC Centre of Excellence for Sustainable Development	Shagufta Kamran
11	Consolidated Construction Consortium Ltd.	Aadesh Garg
12	Consulting Engineers Association	Pradeep Chaturvedi
13	Eco Design	Amit Mendiratta
14	Eco Design	Ayari Carrillo
15	ECO-III	Satish Kumar
16	ECO-III	Aalok Deshmukh
17	ECO-III	Ravi Kapoor
18	ECO-III	Sanyogita Manu
19	ECO-III	Ankur Tulsyan
20	ECO-III	Nims Sharma
21	ECO-III	Vidhi Kapoor
22	ECO-III	Shruti Narayan
23	EDS Consultants	Tanmay
24	EDS Consultants	Anamika
25	Ernst & Young Pvt. Ltd.	Joseph Prakash
26	Ernst & Young Pvt. Ltd.	Apurba Mitra
27	Green Tree	Anurag Bajpai
28	IIIT	Vishal Garg
29	IIT Roorkee	P.S. Chani
30	Indian Institute of Architects	Ar. Vijay Garg
31	Infosys	Rohan M. Parikh
32	Infosys	Dipayan Mitra
33	Kalpakrit	Neeraj Kapoor
34	Mani chowfla architects	Gaurav Sanan
35	McD BERL	Mahesh
36	MNIT	Jyotirmay Mathur
37	NDPL	Shruti Mahajan
38	NDPL	Sameeksha Raina
39	NDPL	R Pillai
40	Neeraj Manchanda Architects	Neeraj Manchanda

S. No.	Organization	Name
41	NTPC	Ms. Manjusha Pillai
42	NTPC	Ms.Akanksha Jain
43	Owens Corning	Abdul Bengali
44	Paharpur business center	Vikas Makkar
45	Rachna Sansad	Roshni Udyavar
46	REEEP	Binu Parthan
47	Schneider Electric	Amit Chadha
48	Schneider Electric Conzerv India Pvt Ltd	Hema Hattangady
49	Space Design Consultants	Vinod Gupta
50	Spectral Services Consultants Pvt. Ltd	Ankur Kulkarni
51	Spectral Services Consultants Pvt. Ltd	Rajat Tiwari
52	Spectral Services Consultants Pvt. Ltd	Prem C Jain
53	Swiss Dev.	Dr. Sameer Maithel
54	The climate work foundation	Tara Parthasarathy
55	US Embassy	Mark Ginsberg
56	US Embassy	Sikander
57	USAID	Gaurav Bhatiani
58	USAID	Archana Walia
59	Vienna University of Technology	Ardeshir Mahdavi
60	Vienna University of Technology	Kristina Orehounig

## 4. PHOTOGRAPH DOCUMENTATION



Figure 1: Dr. Ajay Mathur



Figure 2: Mr. Binu Parthan



Figure 3: Dr. Archana Walia



Figure 4: Dr. Satish Kumar



Figure 5: Prof. Dr. Ardeshir Mahdavi



Figure 6: Dr. Chandrashekhar Hariharan



Figure 7: Architect Nimish Patel



Figure 8: Dr. Kristina Orehoung



Figure 9: Mr. Mark Ginsberg



Figure 10: Mr. Dipayan Mitra



Figure 11: Mr. Ravi Kapoor



Figure 12: Mr. Aalok Deshmukh



Figure 13: Tea Break



Figure 14: Roadmap Discussion



Figure 15: Roadmap Discussion



Figure 16: Tea Break



Figure 17: ECO-III Team



Figure 18: Breakout session





USAID ECO-III Project

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