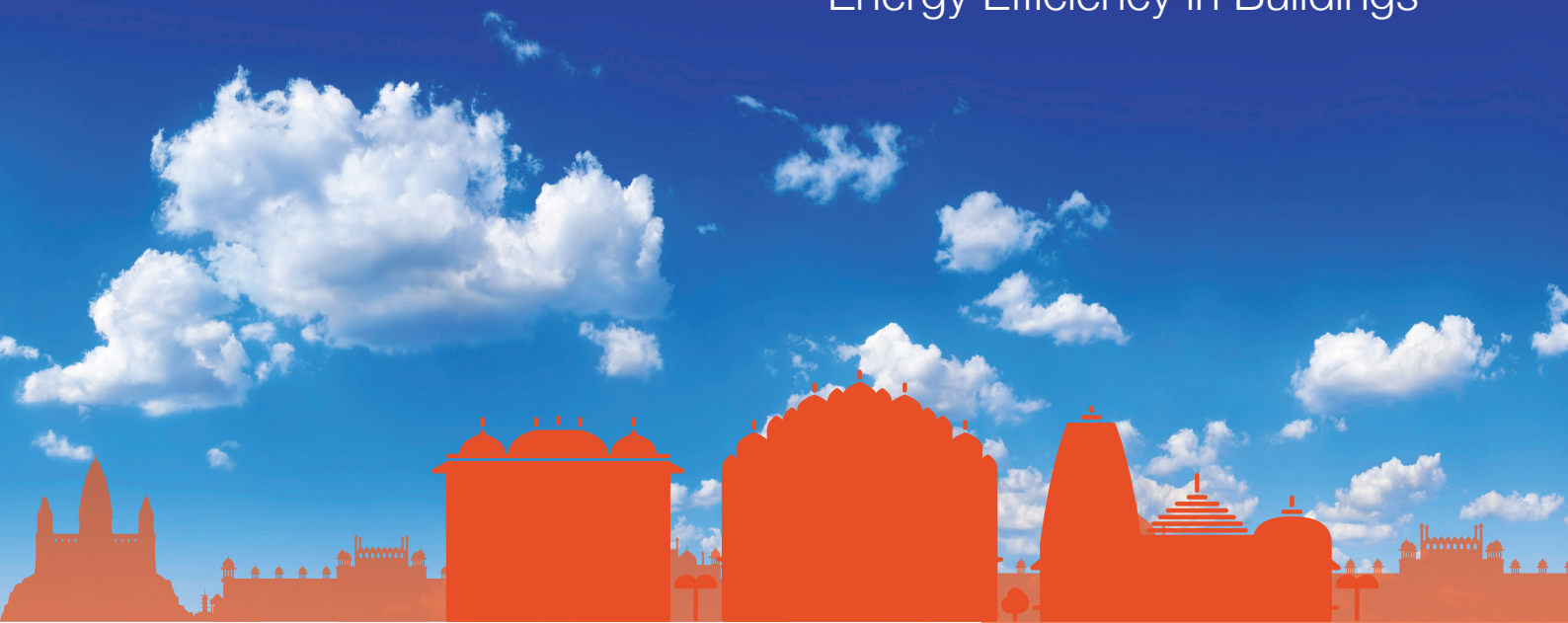


EEB Laboratory **Jaipur**

Energy Efficiency in Buildings



Partners of the Jaipur EEB lab



About the WBCSD and WBCSD India

The World Business Council for Sustainable Development (WBCSD), a CEO-led organization of some 200 forward-thinking global companies, is committed to galvanizing the global business community to create a sustainable future for business, society and the environment. Together with its members, the council applies its respected thought leadership and effective advocacy to generate constructive solutions and take shared action. Leveraging its strong relationships with stakeholders as the leading advocate for business, the council helps drive debate and policy change in favor of sustainable development solutions.

The WBCSD provides a forum for its member companies - who represent all business sectors, all continents and a combined revenue of more than \$8.5 trillion, 19 million employees - to share best practices on sustainable development issues and to develop innovative tools that change the status quo. The council also benefits from a network of 70 national and regional business councils and partner organizations, a majority of which are based in developing countries.

The WBCSD India office provides a resource base to the India offices of the WBCSD member companies, enabling them to become more engaged in the work programs and products of the WBCSD.

www.wbcسد.org

WBCSD - EEB 2.0 project members:

LafargeHolcim (co-chair)

United Technologies (co-chair)

AkzoNobel

Arcadis

ArcelorMittal

ENGIE

Infosys

Schneider Electric

SGS

Siemens

Skanska

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Summary



THE EEB LAB

The Energy Efficiency in Buildings Laboratory (EEB Lab) in Jaipur – a private sector-led initiative – brought together a diverse group of building sector stakeholders in September 2015 to define a set of ambitious, practical strategies for substantially reducing building energy consumption. Thought leaders and subject matter experts took part in the two-day workshop convened by the World Business Council for Sustainable Development (WBCSD) in association with SGS India. It followed a similar event in Bangalore in March 2015.

The EEB Labs address the challenge that globally, buildings are responsible for more than one-third of all final energy use and approximately 30% of global carbon emissions. In India, the building sector accounts for about 35% of energy consumption and this share is rising.

THE JAIPUR MARKET

The Jaipur market is very dynamic and has significant energy saving potential. Jaipur is the largest city in Rajasthan. Its population increased from 2.3 million in 2001 to 3.1 million in 2011 and is projected to double to 6.5 million by 2025. This will generate demand for approximately 650,000 new residential units.

The building stock includes large-scale integrated townships and group housing projects, commercial property, IT/ITeS offices, shopping complexes, hotels, and medical facilities. The enormous investing potential has attracted prominent Indian real estate developers, such as, Omaxe, Aaashiana, Vatika, Mahinhdra Lifespaces and Ansals. Energy efficient buildings offer great socio-economic and environmental value. However, several factors limit wider EEB adoption.

GROWING AWARENESS OF THE BENEFITS OF ENERGY EFFICIENCY BUT LACK OF CONFIDENCE IN PREDICTED PERFORMANCE

Over the last five years, building market participants have become increasingly aware of the value of energy efficiency. Strong examples demonstrate the benefits, from companies such as ITC and MNIT Aranya Bhawan, Prabha Bhawan. However, energy efficiency solutions are still often ignored in favor of other drivers such as aesthetics or maximizing short term profits for investors. Confidence in energy efficiency performance and the long term business case along the building lifecycle is still low, especially in the absence of an independent platform providing up-to-date information on industry standards and credible case studies.

UNMET TRAINING NEEDS

Energy efficiency needs to be fully integrated in workforce skills. Building stakeholders (from designers to building operators) need training to stay up to date with market technologies, policy and regulation.

FINANCING GAP

There is a language gap between banks and building stakeholders on the value of energy efficiency projects. Banks are not familiar with technical aspects of energy saving and use standard financial metrics such as return on investment to evaluate projects. It is necessary to demonstrate the value of energy efficiency in monetary terms and build bankers' confidence in assessments of savings and performance measurement. Energy efficiency needs to be integrated in risk evaluation by translating forecasts into financial language. This would demonstrate that investment in energy efficient buildings can be less risky and offer increased value.

POLICIES THAT DO NOT TRANSLATE INTO ACTION ON THE GROUND

Although the Rajasthan Energy Conservation Building Code provides policy and regulation on energy efficient building construction, it needs to be fully enforced. In addition, some measures to boost the market for energy efficiency not having the intended impact. For instance, developers do not always capitalize on the potential to extend the floor area ratio (FAR) if they attain a 4 or 5 star GRIHA (Green Rating for Integrated Habitat Assessment) because local government timelines for authorization do not match the speed with which developers need to move.



KEY ACTIONS FROM THE EEB LAB

During the EEB Lab, a team of experts representing the WBCSD member companies, regional stakeholders and global partners interviewed a cross section of Jaipur’s real estate market. They included developers, investors, designers, engineers, construction companies/contractors, facility operators and building users/tenants.

Discussions confirmed four key areas for action required to transform energy efficiency in buildings:

- Awareness and understanding of the multiple benefits
- Workforce capacity – training and skills
- Financing energy efficiency solutions
- Policy and regulation

The EEB Lab discussions identified market barriers to energy efficiency in Jaipur in each of these four areas, leading to recommendations for tackling these problems:

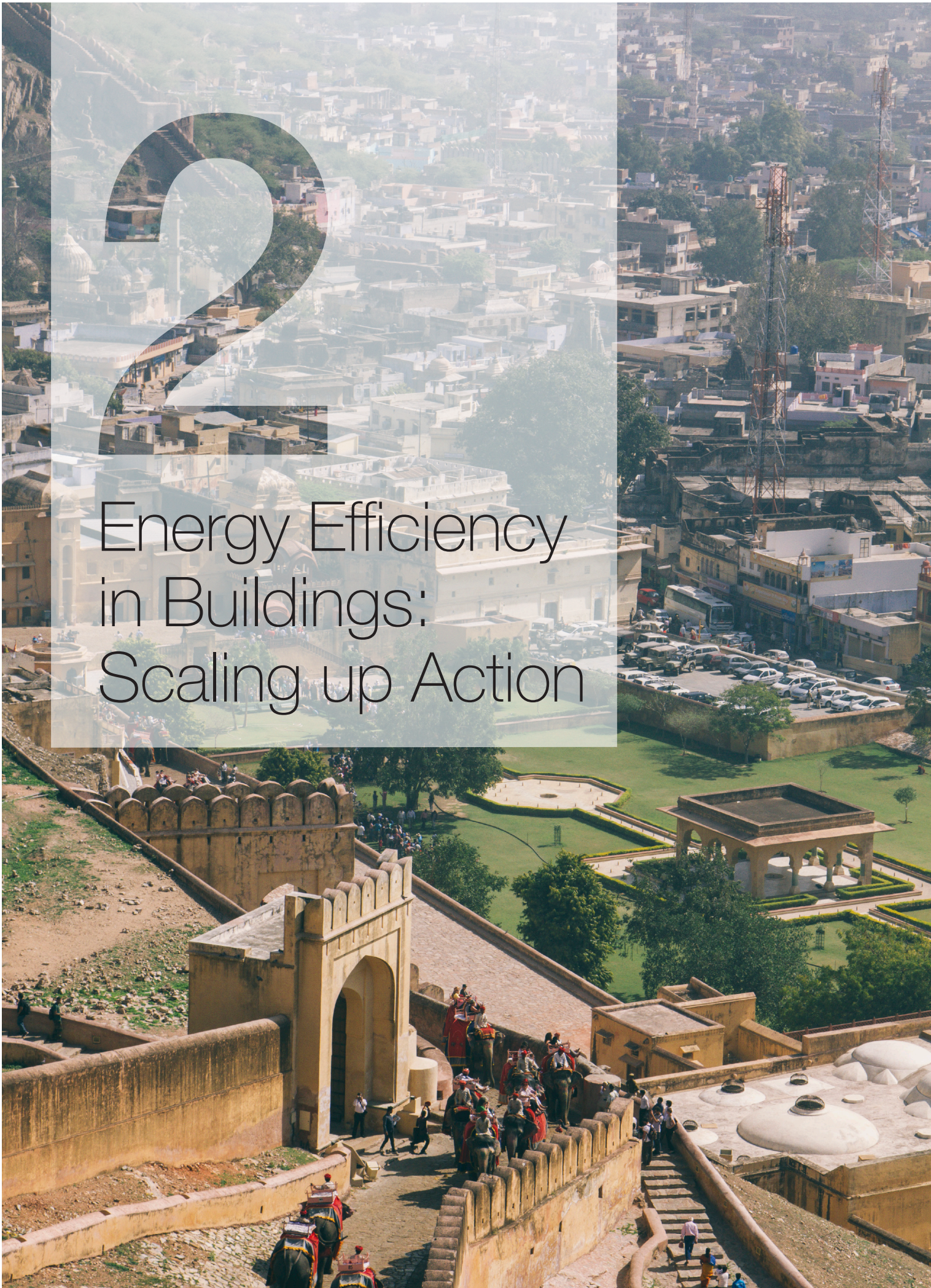
FOCUS AREA 1	FOCUS AREA 2	FOCUS AREA 3	FOCUS AREA 4
<p>RAISING AWARENESS</p> <ul style="list-style-type: none"> • Demonstrate the benefits and value of energy efficiency with building life cycle assessments and cost-benefit analysis (supported by case studies to emphasize success stories). • Mainstream recognition and awards for energy efficient buildings • Facilitate access to trusted information (print, media, website). 	<p>WORKFORCE CAPACITY AND SKILLS</p> <ul style="list-style-type: none"> • Organize training and collect case studies targeted to the specific focus of interest of different building stakeholders. • Develop professional level skills (in partnership with Rajasthan Skill Development Corporation); • Encourage capacity development at the academic level (through competitions in colleges, for example). 	<p>FINANCING EEB SOLUTIONS</p> <ul style="list-style-type: none"> • Translate technical language in energy efficiency into banking terms to demonstrate financial benefits (case studies of energy efficiency for risk assessments and interest rate calculations). • Introduce innovative financing mechanisms (energy efficiency loans for commercial buildings, decreased interest rates on green buildings) 	<p>POLICY AND REGULATION</p> <ul style="list-style-type: none"> • Clarify and simplify the Energy Conservation Building Code (ECBC) • Support stronger enforcement of ECBC • Develop incentives for projects on energy efficiency (property tax rebates)

The WBCSD is managing a program in 2016 to create a stakeholder network which will drive these activities in Jaipur, with a priority on Focus Area 1: Awareness (see Next Steps). Additional support will continue these initiatives beyond 2016.

Both the Bangalore and Jaipur EEB Labs recommended sharing best practices and challenges between organizations to improve the stakeholders’ understanding (buildings users, professionals, government officials). Workshops, cost-benefit analysis, access to information, and collection and sharing of cases studies are all relevant. This awareness raising effort will encourage more organizations to take action in their buildings to reduce energy consumption.



Energy Efficiency in Buildings: Scaling up Action



BUILDINGS ARE CENTRAL TO ENERGY SECURITY AND CLIMATE CONCERNS

Buildings are the largest energy consumers in the world, accounting for more than one-third of all final energy use and approximately 30% of global carbon emissions. In India, the building sector accounts for about 35% of energy consumption and this share is rising.

Energy-intensive sectors such as transport and heavy industry are more visible, but buildings have a major role to play in any corporate or national strategy to tackle climate change. This is why the WBCSD created the Energy Efficiency in Buildings (EEB) project – it is one of the key areas for action on energy security and man-made contributions to climate concerns.

Implementing energy efficiency measures in the Jaipur commercial sector could result in overall energy savings of 6,290 million kWh, approximately 30 percent of total electricity consumption of Rajasthan State in FY 2014-15, according to India's Bureau of Energy Efficiency.

BENEFITS OF ENERGY-EFFICIENT BUILDINGS

Energy efficiency in buildings is a key contributor to the imperative of keeping global warming below 2°C. But improving energy efficiency in buildings has many additional benefits. Until recently, the calculated return on investment for energy efficiency in buildings was limited to the energy saved and associated cost savings. More effort is now underway to understand and monetize a wider range of benefits of energy efficiency, including :

- For building owners: higher property values, stable rents, improved durability, reduced maintenance, increased space at lower costs.
- For occupants: lower operating costs, greater comfort, increased productivity, improved health and safety.
- For financiers: risk reduction and increased deal flow.
- For governments: improved local air quality, reduced health costs, an improved tax base and lower budget variation, higher GDP and enhanced energy security.
- For utilities: cost and operational gains due to reduced customer turnover, reduced emissions and reduced system capacity constraints.

OVERCOMING BARRIERS TO TRANSFORM THE MARKET

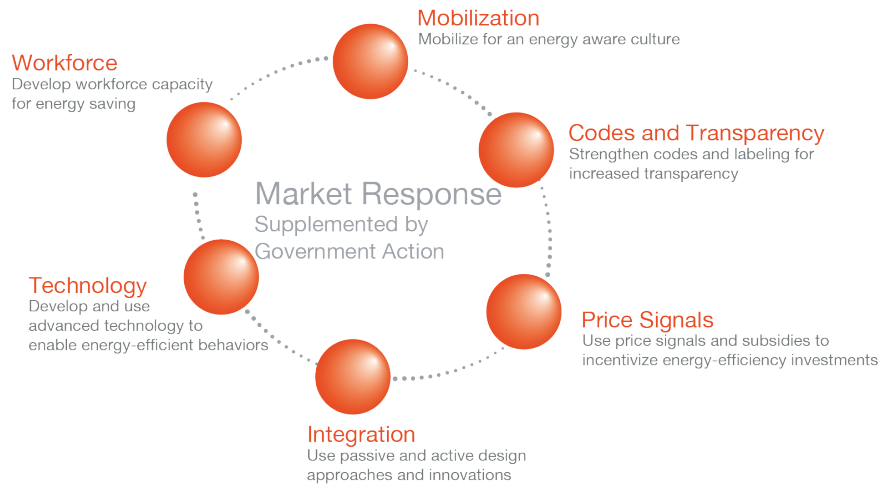
The first EEB project identified how to overcome barriers to energy efficiency in buildings, following a four-year research project. The [Transforming the Market](#) report made recommendations and created a roadmap to transform energy use in buildings. Research showed that transformation requires action across the building industry, from developers and building owners to policymakers

FROM RESEARCH TO ACTION IN EEB 2.0

The second EEB project (EEB 2.0) began in 2013 to implement the recommendations and stimulate change. Its goal is to unlock financially viable energy-efficiency investments that are not being realized because of financial, regulatory, organizational and other non- technical barriers. EEB 2.0 is working with local and international stakeholders to develop the business case for energy efficiency in buildings for different groups of decision-makers and to provide recommendations for action.

¹ Source : Extract from Energy Efficiency Market Report 2015, IEA adapted from IEA (2014a), Capturing the Multiple Benefits of Energy Efficiency, OECD/IEA, Paris

Figure 1: How to transform energy use in buildings



Source: Transforming the Market, WBCSD, 2009

ENGAGING TO ACTIVATE THE MARKET THROUGH EEB LABORATORIES

EEB 2.0 has developed a structured, replicable stakeholder engagement process to diagnose and tackle key barriers to energy efficiency in urban areas where commercial buildings are most concentrated. It is pioneering 10 market engagements:

1. Houston/US
2. Warsaw/Poland
3. Bangalore/India
4. Jaipur/India
5. Rio de Janeiro/Brazil
6. The Netherlands & Belgium
7. Kuala Lumpur/Malaysia
8. Jakarta/Indonesia
9. Singapore
10. Shanghai/China

EEB 2.0 acts as a convener and facilitator, especially through the Energy Efficiency in Buildings Laboratory (EEB Lab), a three day workshop which aims to:

- Build a clear understanding of the market, identifying local barriers and enablers that could drive change;
- Define actions to overcome barriers and catalyze enablers to assist market transformation;
- Recruit key stakeholders to develop and implement an action plan for market-wide deployment.

The EEB Lab brings together local stakeholders and technical experts to pinpoint issues and priorities and create a coalition of actors who will drive transformation.

Check the EEB webpage for further information and Why and How to engage in Market engagements through the [EEB labs](#).

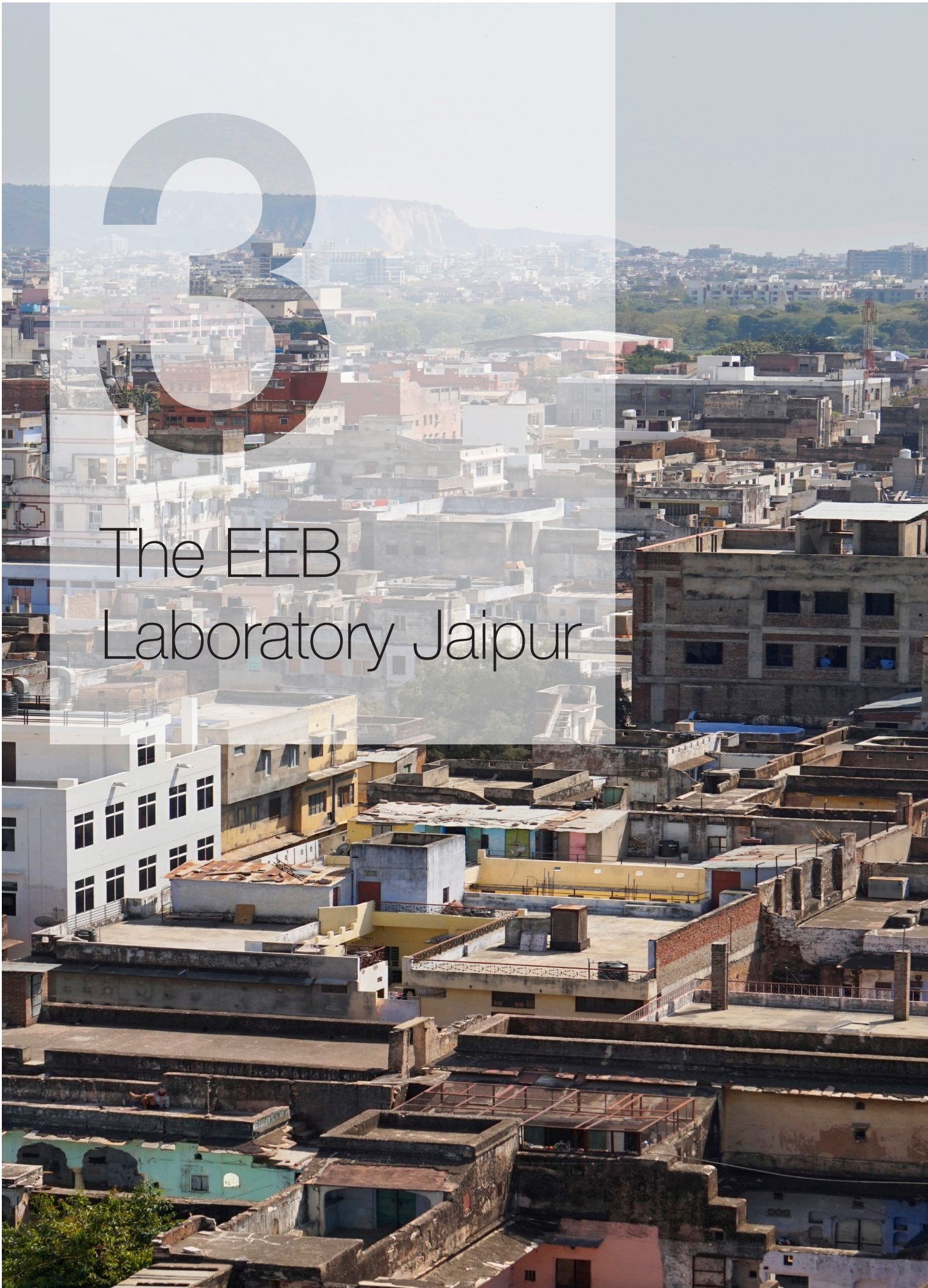
This report presents the activities and outcomes of the EEB Lab in Jaipur on September 15-16, 2015.





3

The EEB
Laboratory Jaipur



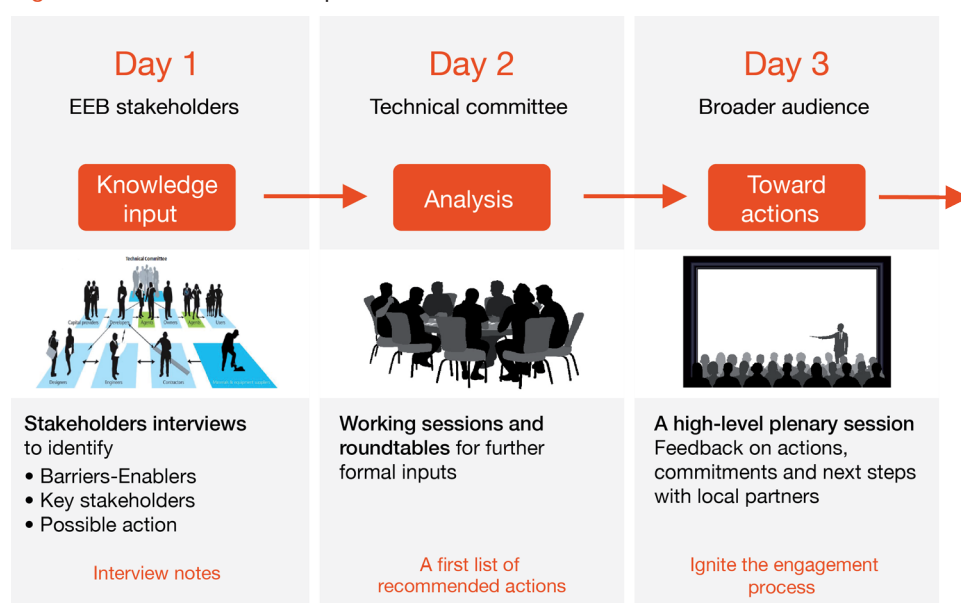
THE EEB LAB PROCESS

Overview

The EEB Lab aims to get a clear understanding of the market situation and, with the help of a panel of experts, recommend and initiate action. It benefits from extensive preparation and the involvement of national and local partner organizations.

On day 1, a panel of experts (the Technical Committee) interviewed 46 stakeholders and analyzed their contributions to identify common themes. This work fed into Roundtable discussions on day 2. On Day 3 all participants and other invited guests came together in a closing plenary session. They discussed conclusions and sought commitments from participants to take action on the opportunities for improvement identified during the Lab.

Figure 2: The EEB Lab concept



Preparation for the EEB Lab

Several months ahead of the event, a Steering Committee began to identify relevant stakeholders, recruit experts and “thought leaders” and plan the event.

MEMBERS OF THE STEERING COMMITTEE:

Shivananda Shetty, SGS India Private Limited	Mili Majumdar, TERI
Samit Ray, UTC India	S Raghupathy, CII IGBC
Aalok Deshmukh, Schneider Electric	Prashant Salvi, Siemens
Vishal Bhavsar, Mahindra Lifespaces	Alok Goyal, WBCSD India
Guruprakash Sastry, Infosys	Joe Phelan, WBCSD India
Gautam Eunny, Lafarge	Roland Hunziker, WBCSD Geneva
Dipankar Sanyal, TERI BCSD	Delphine Garin, WBCSD Geneva



MARKET REVIEW

Jmohanco Constructions was commissioned to carry out a market review. It describes the current state of energy efficiency in the Jaipur real estate market and provides background information for the Lab. The Market Review will be made available to download from the [WBCSD website](#).

KICK-OFF MEETING

Representatives of the Steering Committee and other key stakeholders met to plan the Lab in August 2015. They agreed the following objectives:

- Cover Jaipur office buildings, large-scale residential buildings, hotels and hospitals, malls and large-scale retail, industrial buildings, townships and institutional buildings (the educational segment)
- Deliver a tangible action plan for energy efficiency in buildings articulated around:
 1. Awareness (multiple benefits of EEB)
 2. Workforce capacity
 3. Business models/Investing and Financing
 4. Policy and regulation

TECHNICAL COMMITTEE

A Technical Committee – which is an extension of the Steering Committee – is central to an EEB Lab. It brings together national and international experts who are involved throughout the market engagement. The members conduct interviews with local stakeholders and consolidate findings into meaningful recommendations for commitments and action. The Technical Committee in Jaipur consisted of experts from organizations listed in Table 2.

Table 1: Organizations represented on the EEB Lab Technical Committee

Architects, CII IGBC MNIT ITC Rajputana S.E., JCC, JVVNL RREC, Jaipur	Design2Occupancy ISHARE Electric Consultant & Infrastructure MWC, Jaipur Schneider Electric	Fenesta Building Systems Lafarge United Technologies Rajcom info services LafargeHolcim RSEB Jaipur Civil
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Day 1 – Interviews

On September 15, the Technical Committee members held one-hour interviews with stakeholders from across the building value chain. These interviews are a key element of every Lab, providing crucial insights into barriers, enablers and actions.

Table 2: Organizations interviewed

Architects, design consulting	MWC Anukampa Builders Nagar engineering works	NGOs/Govt. CII CII-IGBC JVNL RREC ISHARE Uttam Bharat Amber Trust
Developers/ Consultancy	NGOs ILCAN (Indonesia Life Cycle Assessment Network) National Fire Protection Association	
Owner Occupiers	Construction, Material/ components providers Fenesta Building Systems Lafarge/LafargeHolcim;	Academia MNIT
Design2Occupancy Electric Consultant & Infrastructure.	Oberoi Rajvilas Hotel The Fern ITC Rajputana Fortis Hospital	

Day 2 – Analysis, Discussion

ANALYSIS OF THE BARRIERS AND RECOMMENDATIONS FOR ACTION

In the morning of September 16, the Technical Committee consolidated the interview results. Roundtable discussions identified the main perceived and known barriers to energy efficiency investment for each central theme developed by the EEB2.0 project: Awareness, Workforce capacity, Financing, and Policy.

In the afternoon, the Technical Committee split into four groups (one for each theme) to propose solutions that would eliminate or reduce Jaipur's market barriers within a reasonable timeframe.

ROUNDTABLE 1: RAISING AWARENESS OF THE MULTIPLE BENEFITS OF ENERGY EFFICIENCY

Chaired by Jyotirmay Mathur, Professor, MNIT

ROUNDTABLE 2: WORKFORCE CAPACITY

Chaired by Ashu Gupta, Design2Occupancy, Jaipur

ROUNDTABLE 3: FINANCING EEB SOLUTIONS

Chaired by Sunil Gangwar, SE, PWD Rajasthan

ROUNDTABLE 4: POLICY

Chaired by Sunil Kurian, Mahindra World City

Day 3 – Plenary

EEB Lab participants and external guests gathered for a plenary session to report back on the workshop findings.

Table 3: Jaipur EEB Lab Plenary agenda

PLENARY OPENING

Speakers: Roland Hunziker, WBCSD; Jaimni Uberoi, CII-IGBC
Jyotirmay Mathur (Professor, MNIT), Ashu Gupta (Design2Occupancy), Sunil Gangwar (PWD Rajasthan), Sunil Kurian (Mahindra World City)

THE BUSINESS CASE FOR ENERGY EFFICIENCY – WHY GET ENERGY SMART?

Sanjay Malhotra (Principal Secretary, Energy & Power)

PRIVATE SECTOR CALL TO ACTION

Apurv Kumar (Clarks group of hotels), Dharendra Madan (Mahima Group), Alka Batra (FLO Jaipur), Sanjay Srivastava (Mahindra World City), Prateem Tamboli (Fortis Escort Hospital)

WRAP UP AND NEXT STEPS

Bill Sisson (United Technologies)

VOTE OF THANKS

Anand Mishra, (Vice Chairman CII-IGBC Jaipur)



4

Analysis and Recommendations



The Jaipur market for energy efficiency

DRIVERS OF JAIPUR’S ECONOMIC GROWTH

Jaipur, the “Pink City”, is the state capital of Rajasthan. It is the political, administrative, educational, cultural, commercial and industrial hub of the state. During the last two decades, the real estate sector in Jaipur has emerged as a major player in the economic growth of the city. Tourism, education, industries and service providers have driven its rapid development. Specific infrastructure projects are also factors in the city’s envisaged growth trajectory:

- The Special Economic Zone and the emergence of multi-national companies in several sectors;
- Development of residential and non-residential property around the ring road;
- A metro train network which will cover the whole city.

ENERGY CONSERVATION POTENTIAL

Residential and commercial consumers accounted for 70% of electricity consumption in 2013-14. According to the 18th electric power survey report for mega cities, by the end of the Thirteenth Plan (2018-2022) the energy requirement of the commercial sector will increase to 2,000MU – 7% compound growth from 2013-14.

Table 2: Economically viable efficiency measures could reduce energy consumption by almost a fifth²:

CATEGORY	ENERGY CONSUMPTION (MU)	ENERGY SAVINGS POTENTIAL AS PER STUDY	
		Percentage	MU
Domestic	1587.23 (46%)	20%	317.40
Commercial	803.96 (24%)	19%	152.57
Public Street Lights	76.14 (2%)	75%	57.105
Public Water Works	111.6 (3%)	20%	22.32
Industries	838.38 (25%)	10%	83.83
TOTAL	3417.31		633.225

² WBCSD, Jaipur Market Review

Focus areas

The Technical Committee analyzed the information gathered in the stakeholder interviews to pinpoint the main barriers and develop recommendations for each of the roundtable focus areas: awareness, workforce capacity, financing, policy and regulation.

Focus area 1 Awareness

MARKET BARRIERS

- **ENERGY EFFICIENCY IS NOT SEEN AS A PRIORITY THROUGHOUT THE BUILDING VALUE CHAIN**

Although the level of awareness has greatly improved over the last five years, energy efficiency in buildings is not a priority in most of the corporate or residential buildings of Jaipur for several reasons:

- Architects and designers focus on the aesthetic aspect of the building rather than considering energy efficiency.
- Developers are driven by the maximization of (short term) profits with minimum possible capital expenditure.
- Builders' priority is to capture the immediate profit on their investments. There is no consideration of the total life cycle of a building.
- End-users (owners and tenants), unaware of the benefits of energy efficiency, do not demand it. In addition, government subsidies on electricity and water prevent consumers from facing the real cost of energy. As a result, they are not motivated to reduce consumption by adopting energy efficient solutions.
- Government employees' inadequate knowledge of energy efficiency helps to maintain subsidized electricity. Subsidizing energy efficient equipment instead could be a major boost for energy efficiency.

- **LACK OF ACCESS TO RELIABLE DATA**

Although awareness is growing, there is still little confidence in what energy efficiency solutions can deliver. There is no dependable resource on green building data. Information that is available is difficult to access and interpret for non-professionals, and can be misleading. A dependable dataset from an authorized body is a priority.

GENERAL PUBLIC AWARENESS PROGRAMS

(Extract from the market review)

Programs and communication campaigns aimed at the general public have been run by various national and state government organizations, such as the Bureau of Energy Efficiency (BEE), Rajasthan Renewable Energy Corporation (RREC) and electricity distribution utility (DISCOM). For instance, RREC runs advertisements on buses and in newspapers and magazines, and has held workshops on implementing the Energy conservation Building Code. Jaipur DISCOM informs its consumers about the advantages of using energy efficient appliances and solar water heating systems, through meter readers and linemen who visit customer premises. BEE has set up the National Energy Conservation Award to promote energy conservation.

THE FERN HOTEL, ENVIRONMENTALLY RESPONSIBLE BUSINESS HOTEL

The Fern Hotels & Resorts have implemented a series of environmental initiatives. For instance, the hotels have been designed to protect against heat (double-glazed windows, and insulated roofs) and use natural light. Air-conditioning systems are linked to stored thermal latent tanks which store excess cooling. They take over cooling the hotel during off-peak hours.

In centrally cooled buildings, hot water is a by-product of the generators used to create the cool air. A novel process uses the heat generated by the air-conditioning to meet all hot water needs.

The hotel also engages with their guests – A Master Control Panel in guest rooms incorporates a unique feature known as the ECO button. It raises the air-conditioning thermostat by two degrees. The guest receives a certificate of appreciation for participating in energy conservation.

RECOMMENDATIONS FOR ACTION

DEMONSTRATE THE BENEFITS AND VALUE OF ENERGY EFFICIENCY

Building life cycle assessments (with a focus on life cycle costing) and cost-benefit analysis should be presented and communicated widely and in a simplified format. This would raise awareness of energy efficiency throughout the building value chain (from designers and builders to end-users).

More case studies should be produced, confirming the accuracy of EEB claims. Customers currently have some awareness of energy efficient technology but do not have sufficient confidence to make investments. Cases studies could be documented from ITC, Infosys, Aranya Bhawan, Prabha Bhawan (MNIT) and others.

IMPROVE RECOGNITION OF ENERGY EFFICIENT BUILDINGS

Several recognition schemes and awards promote energy efficiency in buildings. These awards need to be promoted more effectively. More visibility and popularity of the awards would kick start progress towards wider EEB practice adoption.

FACILITATE ACCESS TO INFORMATION

Information must be trustworthy and easy to access through simple means. Events are needed to enlighten non-professionals on the benefits of going green, while print and visual media could be a great asset in communicating to households. A common platform or website is required for reliable information on energy efficient buildings.

INCLUDE EEB IN THE GENERAL EDUCATION CURRICULUM

EEB should be introduced into the curriculum for college students, leading to new ideas and increased innovation in energy efficiency thinking.

CONDUCT CAPACITY BUILDING WORKSHOPS FOR GOVERNMENT OFFICIALS

The town planning authority should run workshops for non-professionals on the benefits of green practices. Refresher programs for government officials would update them on new and emerging practices.

Focus area 2 Workforce Capacity

MARKET BARRIERS

Many building market stakeholders are not educated in EEB issues, making it difficult to implement green projects without delays and overspends.

- **LACK OF SKILLED WORKFORCE**

The local Jaipur workforce is not skilled enough to plan and implement modern energy efficiency improvements, with a significant shortage of skilled workers. In addition, few managers have good knowledge of energy efficiency and they do not cascade their skills and experience to technicians. This situation is exacerbated by public authorities failing to define a standardized skill set for energy efficiency roles.

- **LACK OF LIFE LONG TRAINING**

Technologies evolve quickly. Lifelong training is hugely important to ensure that professional knowledge does not become obsolete - a particularly important problem for senior professionals.

Lack of training for senior practitioners

Senior practitioners are not trained in implementing new technologies and tend to apply a “business as usual” approach. This presents a challenge for younger workers to get innovative ideas on energy efficiency trialed and accepted.

Mid-career trainings

Since technology evolves rapidly, practitioners need to stay up to date with the latest innovations. Continuing professional education is lacking, which creates a skill gap especially between senior and junior practitioners.

- **COMPLEMENTARY SKILLS ARE NOT DEVELOPED**

Building stakeholders usually share a core set of skills and have an additional specific area of expertise. Relatively few have energy efficiency as that specialist skill but it is needed to complement the core skill base. For instance, architects with knowledge of energy efficiency can integrate EEB solutions at the design stage.

- **LACK OF OPERATORS' TRAINING**

Building operators do not always have the knowledge and skill to install and /or maintain equipment properly, ensuring that it delivers its full energy efficiency potential.

RECOMMENDATIONS FOR ACTION

IMMEDIATE ACTIONS

- Training and workshops are needed to promote interest and skill development in EEB:
 - I. An interactive workshop on energy efficiency in buildings organized by the private sector for architects and consultants.
 - II. Energy Conservation Building Code (ECBC) experts or master trainers to train stakeholders involved in EEB.
 - III. Institutes such as MNIT to play a significant role in training partnerships.
- Case studies on energy efficiency should be documented, adapted and presented to stakeholders across the building value chain (architects, consultants, developers, contractors, facility managers and end-users) to demonstrate local success stories in the city.

MID TERM ACTIONS

- Create training modules specific to different groups of building market stakeholders.
- Coordinate with Rajasthan Skill Development Corporation (RSLDC) and other training providers to push EEB Skill development.
- Launch an energy efficiency design competition in colleges with the support of EEB project member companies. Such competitions may uncover new innovative techniques and will spread skills and experience for future architects, engineers, construction managers and entrepreneurs to start careers in clean energy and generate creative solutions to real-world problems.

Focus area 3 Financing

MARKET BARRIERS

- **LANGUAGE BARRIERS: BANKS DO NOT UNDERSTAND TECHNICAL INFORMATION ON ENERGY SAVINGS**
Banks and financiers understand financial metrics and return on investment but not measures such as kWh/sqm savings. Financial terminology needs to be adopted when communicating with banks in order to gain their confidence in the assessment of energy savings and the measurement of performance. This would be facilitated by creating a repository of business cases and case studies to demonstrate the financial sense in investing in energy efficient projects.
- **LACK OF INNOVATIVE FINANCING MECHANISMS OR INCENTIVE SCHEMES**
There are no innovative financing mechanisms such as an interest rate subsidy to encourage or mainstream financing of energy efficiency projects.
- **MISCONCEPTION OF THE INITIAL AND LIFECYCLE COST OF ENERGY EFFICIENCY PROJECTS**
There is a common perception across the building value chain that the cost of energy efficient buildings is much higher than conventional building projects without energy efficiency components. In addition, builders currently look at the initial cost and not at the overall reduced operational costs and other savings to be realized over the building's lifecycle.

RECOMMENDATIONS FOR ACTION

ADAPT TECHNICAL LANGUAGE TO DEMONSTRATE THE FINANCIAL BENEFITS OF EEB TO BANKS
Case studies on successful energy efficiency projects should be developed describing how to translate building data so it is more relevant for investors (e.g. energy efficiency for risk assessments and interest rate calculations).

INTRODUCE INNOVATIVE FINANCING MECHANISMS
Energy efficiency loans for commercial buildings are a good example of an innovative finance mechanism. Lower interest rates on green buildings would additionally help to attract applicants from the building sector. Energy Efficiency Services Limited (EESL) is a potential stakeholder to further develop innovative financing of new EEB projects.

Geographic mapping of available financing models would also prove a valuable resource for encouraging potential financing applicants. Showcasing energy efficiency financing mechanisms from other parts of India and abroad, including examples to demonstrate proof of concept, could stimulate the development of local and national financing mechanisms.



Focus area 4 Policy and Regulation

MARKET BARRIERS

- **LACK OF WELL-DEFINED ENFORCEMENT MECHANISM OF THE ECBC**

The implementation of the Energy Conservation Building Code (ECBC) is not uniform:

- The building sector is not familiar with the provisions, partly because the Code is too technical.
- Although the ECBC is mandatory, it is not strictly enforced and there is no penalty for not complying.

- **LACK OF FOCUS ON RESIDENTIAL SECTOR IN THE BUILDING ENERGY CODE**

The ECBC focuses primarily on the commercial sector, while Jaipur's buildings are mainly residential.

- **THE COMPLEXITY OF HAVING MANY CODES AND LACK OF CORRELATION BETWEEN THEM**

There are too many independent codes such as the ECBC code, Electricity Act and Energy Act. Architects and consultants have to consider multiple codes which can become confusing. The requirements overlap, but they are poorly cross referenced and integrated.

- **MIS-MATCH OF ADMINISTRATIVE PROCESSES VS COMMERCIAL TIMELINES**

Government administration processes in construction and refurbishment are generally slower than developers, who are under pressure to put capital to work. Government departments have no set timeframe for clearing any documentation, which creates uncertainty and deters applications.

Rajasthan became the first state in India to notify the Energy Conservation Building Code in 2011, for all buildings that have a connected load of 100KW or greater, a contract demand of 120KVA or greater, or having a 500 sq.m or greater conditioned area used for commercial purposes.

JAIPUR DEVELOPMENT AUTHORITY, a body constituted under the Government of Rajasthan's Department of Urban Development and Housing, has notified that buildings constructed on a plot area more than 5,000 m² will be eligible for an additional 5% floor area ratio (FAR) free of charge if they are rated gold and above as per IGBC's Green Building Rating Programs, or if they achieve 4 or 5 star rating from GRIHA. We find that in most cases developers are aware of these incentives, but don't always use them. One reason is that the timing of development decisions and the response time of local government don't always match. Developers need to make quick decisions, and the Indian local government prefers to move more slowly to observe "due process."

RECOMMENDATIONS FOR ACTION

- Clarify and simplify ECBC regulations so that building stakeholders can understand the provisions.
- Seek developers' input into the government's incentive process so they are more likely to buy in to the programs and use the incentives.
- Make rebates on property tax an incentive to promote EEB (which could be valid for a term period and subject to renewal).
- Form a team to study the contradictions/duplications in Indian Energy Efficiency legislation. It would compare the codes and find conflicted clauses.
- Create a single window clearance facility (including a single point of contact) for energy efficient buildings in all major cities, preferably linked to the state level facility.

NEXT STEPS

Following the EEB Labs in Bangalore and Jaipur, the Steering Committee (see page 11) launched an Action Plan in 2016 with a focus on raising awareness of the benefits of EEB. In both cities, lack of awareness is a major barrier to wider adoption of EEB. There is a strong mindset against energy efficiency technologies at different organizational levels. This is primarily due to a lack of understanding of the benefits of energy efficiency, in turn attributed to lack of data on potential savings. To overcome this challenge and as recommended during the EEB Lab, Energy Efficiency Networks are being set up in the two cities to share best practices and promote a data driven approach through effective collaboration. The objective of these networks is to demonstrate the business case for EEB and motivate organizations to take ambitious steps to reduce the energy consumption of their buildings. They will use two tools developed by the EEB2.0 project to raise awareness:

- The Energy Efficiency in Buildings Manifesto is a pledge for organizations to measure, set energy reduction targets and report on progress (see the appendix). It has been signed by 140+ companies.
- The Energy Efficiency Toolkit for Buildings, released in December 2015, is an online guide to making the business case for saving energy in building portfolios. It focuses on the business case and is illustrated with good practices from companies.

Two steps are proposed in each city:

- 1) Engage organizations to share their stories to motivate others to take action
- 2) Convince and support other organizations to take action on energy reduction in their buildings – setting up the baseline and reporting energy consumption.

The Energy Efficiency Networks:

- Are technology neutral and include experienced experts
- Offer guidance to organizations that want to save energy in a financially viable manner
- Focus on the business case

Members of the Networks include sustainability professionals, facility managers, energy efficiency consultants and real estate stakeholders from the public and private sectors. The Energy Efficiency Networks are open to any interested organizations that want to share their experiences with others or source recommendations on how to plan and implement an energy efficiency program in their building portfolio.

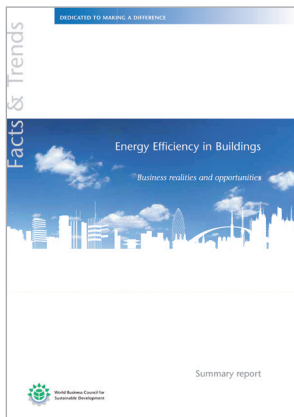
Please contact phelan@wbcsd.org for more information.

“The Government of Rajasthan has set a clear direction for our energy use to be clean and efficient. By bringing together Jaipur’s architects and builders, engineers and academicians, investors, small shopkeepers and all others in the building value chain, this EEB lab has revealed the strong commitment there is in the building sector to adopting energy efficiency and work together to share learning and to drive change.”

Jaimni Uberoi, Chairman CII-IGBC, Jaipur Chapter

APPENDIX

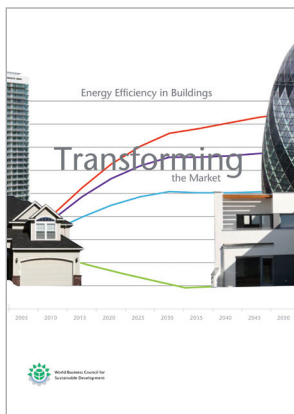
The WBCSD's EEB project



In response to climate and development challenges in the building sector, the World Business Council for Sustainable Development (WBCSD) initiated the cross-industry Energy Efficiency in Buildings (EEB) project. In the first phase, from 2006 to 2010, the EEB project sought to create an understanding of both the challenges and the opportunities within the global building sector.

The project's first achievement was the publication of the [Facts & Trends](#) summary report, which combines the findings from research existing at the time of the project and stakeholder dialogues during hearings, workshops and forums with a breakthrough market research study that measures the stakeholder perceptions of sustainable buildings around the world.

The project's second milestone was the publication of its second report, [Energy Efficiency in Buildings: Transforming the Market](#), launched in 2009. The report is based on a unique simulation model that analyzes the energy use of thousands of building types and millions of existing and new buildings, both commercial and residential. This model shows how energy use in buildings can be cut by 60% by 2050, which is essential to meeting global climate change targets. But this will require immediate action to transform the building sector.

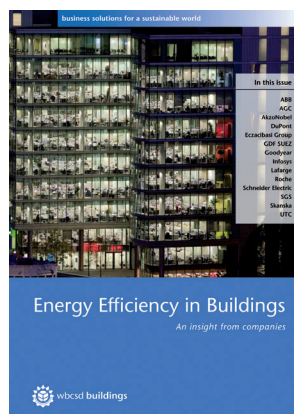


Finally, the EEB project also developed a roadmap setting out the key actions in the short and medium term for the seven groups that can contribute to meeting this challenge, ranging from investors to government authorities. The roadmap is an addendum to the main report, Transforming the Market. Available [here](#).

WBCSD'S VISION 2050 SEES "9 BILLION PEOPLE LIVING WELL, WITHIN THE RESOURCE LIMITS OF THE PLANET BY 2050."

As this 2050 timeline is too distant for businesses to plan against, the WBCSD launched a stepping stone initiative, Action 2020, which has identified priority areas for business action that are based on scientific facts and social trends. A societal "Must-Have" has been set for each priority area that business solutions should work towards achieving by 2020.

The Energy Efficiency in Building 2.0 project will contribute to the climate change "Must-Have" by working with member companies to dramatically reduce the energy consumption of new and existing buildings.

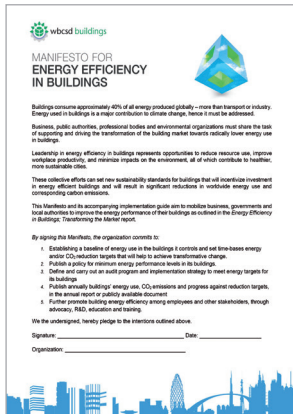


CLIMATE CHANGE "MUST-HAVE"

With the goal of limiting global temperature rise to 2°C above pre-industrial levels, by 2020 the world must have energy, industry, agriculture and forestry systems that simultaneously:

- Meet societal development needs;
- Are undergoing the necessary structural transformation to ensure that cumulative net emissions do not exceed one trillion tonnes of carbon;+ peaking global emissions by 2020 keeps this goal in a feasible range;
- Are becoming resilient to expected changes in climate.

+ Anthropogenic CO₂ emissions from pre-industrial levels as outlined in the IPCC Working Group I Fifth Assessment Report. One trillion tonnes carbon = 3.67 trillion tonnes CO₂.



As part of the EEB project, the WBCSD decided to bring a Manifesto for Energy Efficiency.

Buildings to all its members, calling on them to take voluntary action. By signing the **Manifesto**, companies “walk the talk” and send a strong message to the market, stakeholders and employees.

The Manifesto and its accompanying **Implementation Guide** outline five actions for companies:

1. Create a baseline for the company’s commercial buildings and set time-based energy and/or CO₂ reduction targets in line with transformative change;
2. Publish a company policy for minimum energy performance levels in the company’s commercial buildings;
3. Define and carry out the company’s audit program and implementation strategy to meet energy targets for its commercial buildings;
4. Publish buildings’ energy use, CO₂ emissions and progress against reduction targets annually in the company’s corporate social responsibility or other report;
5. Further promote energy efficiency in buildings among suppliers, employees and other stakeholders through advocacy, marketing activity, R&D, education and training.



140+ member companies, non-member companies and regional network partners have signed the Manifesto.

For more information on the WBCSD Manifesto for Energy Efficiency in Buildings, please see:

Available [here](#).

In 2014, WBCSD issued two magazines which describe the successes and challenges of companies implementing the EEB Manifesto

An [insight from companies](#), April 2014 and [A call to action](#), September 2014

In December 2015, an Energy Efficiency Toolkit for Buildings was released - A web guide for organizations to plan and initiative programs on energy efficiency. It focuses on the business case and illustrated with good practices from companies.

www.eeb-toolkit.com



Check the WBCSD website <http://www.wbcscd.org/buildings.aspx>

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Disclaimer

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