GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET

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February 08, 2011

Dear Council Member:

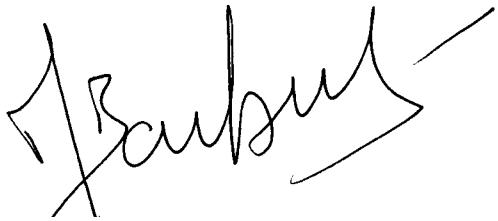
The UNDP as the Implementing Agency for the project entitled: ***India: IND Energy Efficiency Improvements in Commercial Buildings - under the Programmatic Framework for Energy Efficiency in India,*** has submitted the attached proposed project document for CEO endorsement prior to final Agency approval of the project document in accordance with the UNDP procedures.

The Secretariat has reviewed the project document. It is consistent with the project concept approved by the Council in January 2009 and the proposed project remains consistent with the Instrument and GEF policies and procedures. The attached explanation prepared by the UNDP satisfactorily details how Council's comments and those of the STAP have been addressed.

We have today posted the proposed project document on the GEF website at www.TheGEF.org for your information. We would welcome any comments you may wish to provide by March 09, 2011 before I endorse the project. You may send your comments to gcoordination@TheGEF.org .

If you do not have access to the Web, you may request the local field office of UNDP or the World Bank to download the document for you. Alternatively, you may request a copy of the document from the Secretariat. If you make such a request, please confirm for us your current mailing address.

Sincerely,



Attachment: Project Document

Copy to: Country Operational Focal Point
GEF Agencies
STAP
Trustee

REQUEST FOR CEO ENDORSEMENT/APPROVAL

PROJECT TYPE: FULL-SIZED PROJECT
THE GEF TRUST FUND

Date of submission: 21 June 2010
Date of resubmission: 11 January 2011

PART I: PROJECT IDENTIFICATION

GEFSEC PROJECT ID: 3555
GEF AGENCY PROJECT ID: 4043
COUNTRY(IES): India
PROJECT TITLE: Energy Efficiency Improvements in Commercial Buildings
GEF AGENCY(IES): UNDP
OTHER EXECUTING PARTNERS: BUREAU OF ENERGY EFFICIENCY (BEE)
GEF FOCAL AREAS: Climate Change
GEF-4 STRATEGIC PROGRAM(S): CC-SP2
NAME OF PARENT PROGRAM/ UMBRELLA PROJECT: PROGRAMMATIC FRAMEWORK FOR EE IN INDIA

INDICATIVE CALENDAR	
Milestones	**Expected Dates**
Work Program (for FSP)	Nov 2008
CEO Endorsement/Approval	February 2011
GEF Agency Approval	March 2011
Implementation Start	April 2011
Mid-term Review	March 2013
Implementation Completion	April 2015

A. PROJECT FRAMEWORK

Project Objective: Operationalization of the Energy Conservation Building Code (ECBC) for new commercial buildings

Project Components	Inv., TA or STA[2]	Expected Outcomes	Expected Outputs	GEF Financing[1]		Co-Financing[1]		Total ($)
				($) a	%	($) b	%	c=a+ b
1. Institutional Capacity Development	TA	Strengthened institutional capacities at various levels on the enactment and enforcement of ECBC for commercial buildings	1.1 Authorities and personnel of building departments at national, state and municipal level capable of implementing and enforcing the ECBC 1.2 Strengthened mechanisms and structures for ECBC implementation and gathered energy performance 1.3 Strengthened system of information dissemination to stakeholders	625,000	42	850,000	58	1,475,000
2. Technical Capacity Development	TA	Enhanced technical capacity and expertise of local building practitioners and service providers	2.1 Property managers, developers and owners who are aware of, and interested in, EE buildings 2.2 Completed specific training programmes for key stakeholders and certified practitioners 2.3 Training curricula and modules incorporated at training institutes 2.4 Tools in place for energy-efficient building design (guidelines, handbooks, software) 2.5 Set of specifications for EE building materials 2.6 Technically capable and equipped building materials testing laboratories	1,580,000	22	5,456,383	78	7,036,383

3. ECBC Compliance Demonstrations	Inv.	Increased number of new commercial buildings that are ECBC-compliant.	3.1 Completed ECBC demonstrations in 5 climatic zones 3.2 Demonstrated energy savings in model buildings (under public-private partnerships in 5 climatic zone areas)	2,146,000	20	8,608,681	80	10,754,681
4. Fiscal & Regulatory Frameworks for EE Buildings	TA	Enforced fiscal incentives & regulatory frameworks incentives for investors and developers of EE buildings	4.1 Fiscal and regulatory incentives for investors 4.2 Financing schemes designed with banks for investors to comply with ECBC 4.3 Award schemes for energy-efficient investments or improvements in commercial buildings	349,000	66	178,000	34	527,000
5. Information and Awareness Enhancement[1]	TA	Readily available and easily accessible information and knowledge products on best practices regarding EE buildings technologies and measures	5.1 In-depth end-of-project impact analysis 5.2 Knowledge sharing products developed on best practices	0	0	0	0	0
6. Project management				500,000	40	734,596	60	1,234,596
Total project costs				**5,200,000**	**25**	**15,827,660**	**75**	**21,027,660**

[1] List the $ by project components. The percentage is the share of GEF and Co-financing respectively of the total amount for the component.
[2] Inv. = Investments, TA = Technical Assistance; STA = Scientific & Technical Analysis.

B. SOURCES OF CONFIRMED CO-FINANCING FOR THE PROJECT (expand the table line items as necessary)

Name of Co-financier (source)	***Classification***	***Type***	***Project (USD)***	***%****
BEE	Government	Cash	2,299,174	14.53
		Kind	677,422	4.28
SDC	Bilateral agency	Cash	1,787,234	11.29
DLF Utilities	Private	Cash	11,063,830	69.90
Other private sector (investors, banks)**	Private	Cash & in-kind	-	-
Total co-financing			15,827,660	100.00

*Percentage of each co-financier's contribution at CEO endorsement to total co-financing.
** Not confirmed by co-financing letters

BEE co-financing is confirmed by signed co-financing letter. The expected co-financing by private sector (in 8 pilot demos in commercial buildings) is an estimated USD 22,414,000 in terms of incremental investments (investment in energy efficient measures and technologies vis-à-vis 'normal' building practice in India); see Annex B of the UNDP Project Document for more details.

C. FINANCING PLAN SUMMARY FOR THE PROJECT ($)

	Project Preparation	***Project***	***Total***	***Agency Fee***	***For comparison:***

[1] The Program Knowledge Management Unit under Programmatic Framework Project for Energy Efficiency in India (ID 3538) is an umbrella knowledge management and sharing unit for all the EE projects managed by the BEE and supported by the GEF. This covers all the sub-projects managed by the World Bank, UNIDO and UNDP. The US$ 1 million component on knowledge management under the Programmatic Framework covers all the projects under the program including this project. Therefore activities are retained as it is to provide clarity during implementation, however, budget will be sourced from the "Programmatic Framework Project for Energy Efficiency in India" (GEF project 3538).

	a	*b*	*c = a + b*		*GEF and Co-financing at PIF **
GEF Grant	90,000	5,200,000	5,290,000	529,000	USD 5,200,000
Co-financing (Cash & Kind)	90,000	15,827,660	15,917,660		USD 14,727,500
Total	180,000	21,027,660	21,207,660	529,000	USD 19,927,500

* Excluding Agency Fee

D. GEF RESOURCES REQUESTED BY AGENCY(IES), FOCAL AREA(S) AND COUNTRY(IES)[1] N.A.

E. CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS:

Component	*Estimated person weeks (GEF)*	*GEF amount($)*	*Co-financing ($)*	*Project total ($)*
*International consultants**	364	1,092,000		1,092,000
*Local consultants**	957	717,750	800,000	1,517,750
Total	1,321	1,809,750	800,000	2,609,750

* Details to be provided in Annex C.

F. PROJECT MANAGEMENT BUDGET/COST

Cost Items	*Total Estimated person weeks (GEF)*	*GEF amount ($)*	*Co-financing ($)*	*Project total ($)*
*Local consultants**	832	390,000	121,174	511,174
*International consultants**	0	0	0	0
*Office facilities, equipment, vehicles and communications**		74,900	538,422	613,322
*Travel**		35,100	75,000	110,100
Total	832	500,000	734,596	1,234,596

* Details to be provided in Annex C.

G. DOES THE PROJECT INCLUDE A "NON-GRANT" INSTRUMENT? yes ☐ no ☒

H. DESCRIBE THE BUDGETED M &E PLAN:

The following main project monitoring and evaluation activities will be carried out: (1) Measurement of means of verification for project progress and performance (baseline and impact analysis); (2) Annual project reporting, including project implementation review (PIR); (3) Tripartite review meetings; (4) Periodic status reporting; (5) Audits; (6) Mid-term external review; (7) Final (Terminal) external review; and, (8) Visits to field sites. These activities have been included in the budget under project management. GEF budget allocation for M&E (corresponding with output 5.2) is USD 200,000 (details are provided in Section 14 of the UNDP Project Document).

Type of M&E activity	Responsible Parties	Budget USD ($) *Excluding project team staff time*	Time frame
Inception Workshop and Report	▪ Implementing Partner (National Project Director and National Project Coordinator) ▪ UNDP CO	Indicative cost: $ 20,000	Within first three months of project start up

Type of M&E activity	Responsible Parties	Budget USD ($) *Excluding project team staff time*	Time frame
Measurement of Means of Verification of project results (baseline and end-of-project impact study)	▪ UNDP GEF RTA/Project Coordinator will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members.	Indicative cost: $ 90,000	Start, mid and end of project (during evaluation cycle) and annually when required.
Measurement of Means of Verification for Project Progress on *output and implementation*	▪ Oversight by National Project Coordinator ▪ Project team	Indicative cost: $ 7,000 (to be determined more precisely) as part of the Annual Work Plan's preparation.	Annually prior to ARR/PIR and to the definition of annual work plans
APR/PIR	▪ NPD, NPC and Project team ▪ UNDP CO ▪ UNDP RTA ▪ UNDP EEG	Already included in the PMU cost	Annually
Periodic status/ progress reports	▪ NPD, NPC and Project team	Already included in the PMU cost	Quarterly
Mid-term Evaluation	▪ NPD, NPC and Project team ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team)	Indicative cost: $ 40,000	At the mid-point of project implementation.
Final Evaluation	▪ NPD, NPC and Project team, ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team)	Indicative cost: $ 40,000	At least three months before the end of project implementation
Project Terminal Report	▪ Project Coordinator and team ▪ UNDP CO ▪ local consultant	None	At least three months before the end of the project
Audit	▪ UNDP CO ▪ Project Coordinator and team	Indicative cost per year: $ 3,000	Yearly
Visits to field sites	▪ UNDP CO ▪ UNDP RCU (as appropriate) ▪ Government representatives	For GEF supported projects, paid from IA fees and operational budget	Yearly
Total Indicative Cost Excluding project team staff time and UNDP staff and travel expenses		**US$ 200,000** (4% of Total Budget)	

PART II: PROJECT JUSTIFICATION:

A. STATE THE ISSUE, HOW THE PROJECT SEEKS TO ADDRESS IT, AND THE EXPECTED GLOBAL ENVIRONMENTAL BENEFITS TO BE DELIVERED:

The expected increase in energy demand, along with the predominance of coal in the energy mix, highlights the significance of promoting energy efficiency. Recent Five-Year Plans have emphasized the need for efficient use of energy resources to achieve sustainable development. Considering the vast potential for energy savings, the Indian government in 2001 enacted the Energy Conservation Act (EC Act). The Act provides for the legal framework, institutional arrangement and a regulatory mechanism at the Central and State level to embark upon energy efficiency drive in the country. The Bureau of Energy Efficiency (BEE) is the statutory body under Ministry of Power, Government of India to facilitate and coordinate energy efficiency initiatives at the central level.

According to the Construction Industry Development Council (CIDC), construction of commercial buildings has been growing at 8% per annum, which accounted for nearly 22 million square meters (m^2) in 2005.

Energy inefficiency in the commercial buildings sector is rampant. Most commercial buildings in India have an Energy Performance Index (EPI) of 200-400 kilowatt-hour (kWh) per m^2 per year, while similar buildings in North America and Europe have EPI lower than 150 kWh per m^2 per year. BEE has facilitated implementation of such initiatives in several government buildings. For new buildings, BEE has developed the Energy Conservation Building Code (ECBC). Energy-conscious building design has been shown to reduce EPI to 180 kWh per m^2 per year (national benchmark) and is considered as ECBC compliant. ECBC compliant means those buildings which meet the code and are considered as EE buildings. Further, star ratings are given to the commercial buildings as per their performance which ranges from 180 kWh per m^2 (one star) until about 100 kWh per m^2 per year (five star), refer figure 3 of ProDoc for more details. The case studies given in Box-3 of ProDoc show that employing environmentally sensitive designs can lead to savings of the order of 20-50%. Initial investment cost will increase by 10-15%, with payback period varying from 3 to 7 years.

To promote energy efficiency technologies and measures in new buildings under the Energy Conservation Act (EC Act) 2001, BEE has developed ECBC. The Code sets minimum energy performance standards for the design and construction of new commercial and public buildings. The ECBC is currently *voluntary*. State governments that choose to adopt ECBC can modify the code to adapt it to local climatic conditions, and inform BEE accordingly. India is still in the early stages of implementing the new building energy code. In practice, few (public and commercial) buildings in India today meet the code and none of the states have adopted it yet. *Mandatory* use of ECBC in commercial buildings is expected only after major informational, capacity, institutional and financial **barriers** related to ECBC implementation are suitably addressed.

UNDP-GEF's intervention aims to support the operationalization of the Energy Conservation Building Code (ECBC) for new commercial buildings by removing the barriers as described above (refer to section 3, barrier analysis, of UNDP ProDoc for more details) and assist the Government to implement and operationalize the ECBC, through a comprehensive and integrated **approach** that will focus on:

- Strengthened institutional capacities at various levels on the enactment and enforcement of ECBC for commercial buildings (Outcome 1).
- Enhanced technical capacity and expertise of local building practitioners and service providers (Outcome 2).
- Increased number of new commercial buildings that are ECBC compliant (Outcome 3).
- Enforced fiscal incentives & Regulatory frameworks incentives for investors and developers of EE buildings (Outcome 4).
- Readily available and easily accessible/shared information and knowledge products on best practices regarding EE building technologies and measures (Outcome 5).

The project will involve the enhancement of capacities of building departments not only at central government level, but at state and local level as well. The project will support BEE's on-going activities on monitoring and evaluation of the ECBC program through market surveys, studies and surveillance in order to be able to formulate benchmarks for different categories of buildings in various climatic zones as well as formulating easy to implement compliance procedures for the abovementioned state and local institutions.

The second component will focus on knowledge and expertise of key partners in the building sector through awareness raising, training programs and workshops for architects/design professionals, building material suppliers, builders/contractors/developers, building managers. It also aims to introduce courses on energy efficiency in academic institutions and capacity enhancement of test labs for building materials. Handbooks, guidelines and design software on energy efficiency standard design and technologies in buildings are expanded and/or formulated.

In the third component, at least 8 commercial buildings to serve as 'model' under the project identified and supported in their design to comply with ECBC under public-private partnership in the five climatic zones. The

tentative names of cities and the climatic zones where they are planned are, Hyderabad, Jaipur - Hot & Dry; Kolkata, Mumbai - Hot Humid; Bengaluru – Moderate; Shimla – Cold; and Ludhiana, New Delhi –Composite climate. An option to initiate an audit program for a portfolio of buildings in addition to single buildings will be considered after assessing results from the individual model buildings. In addition, the project will support periodic data collection and reporting on building materials available and sold in the Indian market, the energy efficiency status of new and existing commercial buildings and on observable trends in consumer attitudes towards energy efficient commercial buildings.

The fourth component of the project will support BEE to evaluate and recommend incentive options (e.g. fiscal and financial incentives) for the production, commercialization and/or purchase of energy efficient building materials, construction of new and retrofitting of existing buildings to be more energy efficient. The proposed incentives should be compatible with the ECBC program and/or other energy efficiency programs introduced by BEE. In addition, the project will help introduce rebates/ tariff discount schemes in coordination with regulators and utilities for commercial buildings that implement energy efficiency programs or comply with ECBC requirements. The last component of the project will support information dissemination and knowledge transfer on best practices regarding EE technologies and measures.

B. DESCRIBE THE CONSISTENCY OF THE PROJECT WITH NATIONAL AND/OR REGIONAL PRIORITIES/PLANS:

With the introduction of the Energy Conservation (EC) Act 2001, the Government of India in recent years has been promoting energy efficiency in different industrial, buildings and commercial sectors. The Bureau of Energy Efficiency (BEE) was established in March 2002 under the Ministry of Power (MoP) to implement the EC Act 2001. The Bureau of Energy Efficiency (BEE) with the support of the Ministry of Power (MoP) has launched the Energy Conservation Building Code (ECBC) in 2007. The ECBC has been developed by the International Institute for Energy Conservation (IIEC). The ECBC sets minimum energy performance standards for the design and construction of new commercial (on a voluntary basis) and public buildings. The National Action Plan on Climate Change (NAPCC) has focused on energy efficiency in commercial buildings in two of their eight missions directly namely; National Mission for Enhanced Energy Mission which reiterates the provisions and support to energy conservation Act of 2001 and it anticipates to avoid 10,000 MW by the end of 11th Five Year Plan in 2012 in which energy efficiency in commercial buildings is also expected to contribute (by accelerating shift to energy efficient appliances, finance demand side management, etc.), National Mission on Sustainable Habitat focus support to energy efficiency in buildings and ECBC implementation.

C. DESCRIBE THE CONSISTENCY OF THE PROJECT WITH GEF STRATEGIES AND STRATEGIC PROGRAMS:

The proposed project conforms to the Strategic Programme 1 (SP-1) on “Promoting Energy Efficiency in Residential and Commercial Buildings”.

D. JUSTIFY THE TYPE OF FINANCING SUPPORT PROVIDED WITH THE GEF RESOURCES:

Without support from GEF, BEE would continue implementing some energy efficiency initiatives in accordance with the Energy Conservation Act, as described in the Project Document (Sections 1 and 2) but at a low pace due to the prevailing barriers mentioned above. In the absence of the project’s interventions, the transition from voluntary to mandatory ECBC would meet long delays, and consequently, the uptake of new and emerging technologies and practices would be slow. Information dissemination on energy efficiency practices will remain hampered and developers and building owners will remain ignorant of the potential of energy efficiency, if no well- structured demonstration of best practices and monitoring of energy and financial savings are achieved. Institutional capacity to implement innovative energy efficiency measures will remain limited and fragmented over the various Indian states and municipalities.

E. OUTLINE THE COORDINATION WITH OTHER RELATED INITIATIVES:

This project has been selected under the "umbrella EE program" *Programmatic Framework Project for Energy Efficiency in India* (GEF project 3538) and has thus been prioritized by India's Bureau of Energy Efficiency (BEE) and Department of Economic Affairs (DEA).

BEE will ensure that the activities on ECBC for commercial buildings are properly coordinated with the other activities which BEE is undertaking or promoting, such as ECBC for residential buildings, appliance energy standards and labelling, renewable energy in buildings as well as linking with incentive programs with utilities. Especially, BEE is implementing partner of USAID´s ECO-III project and the project will exchange experiences in training courses (i.e., on ECBC compliance and green building design, energy simulation etc.) and building code development. Cooperation under the proposed project with USAID will serve as a platform to implement training courses for energy auditors and energy service companies, design and implementation of a certification scheme for building energy auditors and conduct awareness workshops on energy efficiency measures, ECBC and building regulations, and share their experiences towards such training programs design and implementation. The personnel at BEE dealing with USAID-BEE initiative were involved at project preparation stage (i.e., PPG Exercise) for GEF-UNDP-BEE initiative and hopefully continue during the implementation phase. On an as-needed basis, USAID representative will be asked to join PSC meetings. Project manager will closely interact and coordinate activities with ECO-III as ECO III project is expected to run until September 2011.

BEE is getting co-finance and cooperation from programs implemented by other agencies like Swiss Agency for Development Corporation (SDC), DLF (developer) and others in addition to contribution from BEE itself. The SDC is going to provide the support under the following areas;

- In partnership with BEE, organise building design workshops with private builders in India
- Provide technical assistance in developing building material testing infrastructure in India
- Develop building design guidelines and tools for the design of energy efficient residential buildings
- Production and dissemination of knowledge products

The DLF is going to provide the support in the following areas:

- Support in developing new building designs incorporating ECBC measures
- Implementation of ECBC in new buildings
- Implement innovative projects like Combined Heat and Power to achieve energy efficiency in new buildings

F. DISCUSS THE VALUE-ADDED OF GEF INVOLVEMENT IN THE PROJECT DEMONSTRATED THROUGH INCREMENTAL REASONING :

The industry estimates that incorporating energy efficiency measures and other "green" ways of construction escalates the construction cost of a building by about 14% (this is in the range of 10-15% depending upon the range of measures incorporated). Air-conditioning and lighting are the two most energy consuming end-uses in the commercial building sector. It is estimated that new buildings can lead to energy savings of the order of 20-50% by incorporating appropriate design interventions in the building envelope, lighting, heating, ventilation and air-conditioning system.

In the absence of the project's interventions, the transition from voluntary to mandatory building codes would meet long delays, and consequently, the uptake of new emerging technologies and practices would be slow. Information dissemination on energy efficiency practices will remain hampered and developers and building owners will remain ignorant of the potential of energy efficiency, if no well- structured demonstration of best practices and monitoring of energy and financial savings are achieved. Institutional capacity to implement innovative energy efficiency measures will remain limited and fragmented over the states and municipalities. No real incentive schemes to adopt energy efficient designs in buildings will be fully developed.

G. INDICATE RISKS, INCLUDING CLIMATE CHANGE RISKS, THAT MIGHT PREVENT THE PROJECT OBJECTIVE(S) FROM BEING ACHIEVED AND OUTLINE RISK MANAGEMENT MEASURES:

The main risks to the effective implementation of the proposed GEF project are related to:

- Failure to secure continuous support from state and municipal authorities for the ECBC efforts and other energy efficiency programmes – possible effects of this could be the slow implementation of ECBC (and other energy efficiency programmes) at sub-national level and the ineffective enforcement of ECBC or other energy efficiency standards.
- Frequent shifting/transfer of dedicated government staff across agencies and departments – a possible effect of this could be the loss of capacity that has already been built for the programme.
- Failure to trigger positive response from consumers and stakeholders (architects, design professionals, building material suppliers, builders, contractors, developers, building managers) – possible effects of this could be ineffective capacity building efforts and results a slower rate of market transformation.
- Unavailability of experts to deliver trainings – a possible effect of this would be related to the previous risk based on inefficient capacity building efforts.
- Failure to secure public and private sector support and resources for research and testing – possible effects of this include insufficient resources available for research and testing of new energy efficient materials and improved building designs and reduced availability of new improved materials and building designs for the programme.
- Failure to secure continuous support from regulators, utilities, state and municipal authorities for the ECBC efforts and other energy efficiency programmes – possible effects of this include an ineffective implementation of ECBC due to a lack in participation, delays in implementation and a subsequent slower rate of market transformation.
- Failure to secure consumer interest – possible effects here include a low demand for ECBC compliant buildings, slow rate of market transformation and reduced incentives for manufacturer to improve design. The demonstration project should deliver the expected savings to mitigate this risk. Lack of building material suppliers' access to credit for investing in energy efficient materials – possible effects here include unavailability of co-financing, slow rate of energy efficiency measures introduction in new commercial buildings and associated higher cost of new buildings with energy efficiency measures.

Risk	Level of Risk	Mitigating Actions
Failure to secure continuous support from state and municipal authorities for the support of ECBC compliance	M	o BEE is a statutory body under Ministry of Power, Government of India for implementing ECBC. Though it may not be possible to secure support from all the states but it is expected that most states would support the implementation. o Inception workshop is expected to help getting the state implementing authorities on board. o The awareness, training and capacity building programmes under the project will help authorities to appreciate the benefits of ECBC.
Frequent shifting/transfer of dedicated government staff across agencies and departments leads to loss of capacity built for the programme	H	o Transfer of officials with the authorities periodically is common practice. The project will choose such officials who are dedicated to building sector. Even if they are transferred it would be only from one place to other but they continue with same theme.
Failure to trigger positive response from consumer and stakeholders (architects, design professionals, building material suppliers, builders, contractors, developers, building managers) resulting into a slower rate of market transformation	L	o EE in buildings have inherent economic benefits in addition to energy reduction and emissions reduction which is expected to attract the stakeholder response. o It is expected that the project activities have provision to create awareness, training and capacity building of the stakeholders mentioning benefits of ECBC. o Mandatory ECBC regime will motivate the stakeholders' involvement

Risk	Level of Risk	Mitigating Actions
Unavailability of experts to deliver trainings may result into inefficient capacity building efforts	L	o Proper planning along with prior commitments from/agreements with national and international experts for their availability for trainings.
Failure to secure public and private sector support and resources for research and testing of new energy efficient materials and improved building designs	M	o Create suitable incentives (financial or regulatory) for investment in EE design and implementation. o Mandatory ECBC regime will also motivate effective penetration of ECBC
Failure to secure support from regulators, utilities, state and municipal authorities for Market transformation towards ECBC compliance	L	o Proper coordination with regulators, utilities, state and municipal authorities to establish ECBC enforcement mechanisms and structures. o Introduction of rebates and tariff discounts in coordination with utilities. o Introduction of tax incentives for ECBC compliant buildings.
Failure to secure consumer interest may result into low demand for ECBC compliant buildings and thereby slow rate of market transformation. This will also result into reduced incentives for manufacturer to improve design.	L	o EE in buildings have inherent economic benefits in addition to energy reduction and emissions reduction which is expected to attract the stakeholder response. o It is expected that the project activities have provision to create awareness, training and capacity building of the stakeholders mentioning benefits of ECBC. o Mandatory ECBC regime will motivate the stakeholders' involvement.

The above table is further described in detail in Annex A, Part C of the UNDP Project Document.

H. EXPLAIN HOW COST-EFFECTIVENESS IS REFLECTED IN THE PROJECT DESIGN:

The project aims at promoting the construction of new energy efficient buildings or use of EE technologies and equipment in existing buildings. It is considered that the ECBC compliant energy efficient buildings will be able to give same performance for over 25 years of estimated service life. Thus, energy efficient buildings will continue saving electricity and GHG emissions over their lifetimes of 25 years.

The GEF support is expected to result in annual GHG emission reductions of 181.38 kt CO_2 by the year 2014 and cumulative reductions of 2.267 million tCO_2, over the 25-year lifetime of pilot/model buildings. Given the GEF contribution of USD 5.2 million, the approximate unit abatement cost (UAC) attributable to the GEF project is USD 5.73/tCO_2. More details on the emission reduction calculation are provided in Annex D of the accompanying UNDP Project Document.

PART III: INSTITUTIONAL COORDINATION AND SUPPORT

A. INSTITUTIONAL ARRANGEMENTS:

The proposed project falls under the "Programmatic Framework Project for Energy Efficiency in India" (GEF project 3538) is an umbrella project. Five projects on energy efficiency are proposed under this program: (i) Energy Efficiency Improvements in commercial Buildings (UNDP); (ii) Chiller Energy Efficiency Project (World Bank); (iii) Financing Energy Efficiency in Small and Medium Enterprises (World Bank); (iv) Promoting Energy Efficiency and Renewable Energy in Selected SME Clusters in India (UNIDO); and, (v) Improving Energy Efficiency in the Indian Railways System (UNDP). The proposed project will establish the necessary communication and coordination mechanisms through its PMU and PSC (see further section 13 of UNDP ProDoc) with the Project Management Board[2] of the before-mentioned umbrella project.

B. PROJECT IMPLEMENTATION ARRANGEMENTS:

[2] Implementing Partners are Ministry of Environment and Forests (MoEF), Ministry of New and Renewable Energy (MNRE), Ministry of Power (MoP), Bureau of Energy Efficiency (BEE) and state governments and is co-chaired by UNDP and Department of Economic Affairs (DEA).

The project is co-financed with funding from the GEF and UNDP acts as the *GEF Executing Agency*. The project will be implemented by the Bureau of Energy Efficiency (BEE) and will assume the overall responsibility for the achievement of the project results as the *Implementing Partner (GEF Local Executing Agency).* UNDP provides overall management and guidance from its New Delhi Country Office and the Asia Pacific Regional Centre (APRC) in Bangkok, and is responsible for monitoring and evaluation of the project as per normal GEF and UNDP requirements. BEE will designate a senior official as the National Project Director (NPD*)* for the project, supported by a Project Management Unit (PMU). The Project Steering Committee (PSC*)* is responsible for making management decisions for the project.

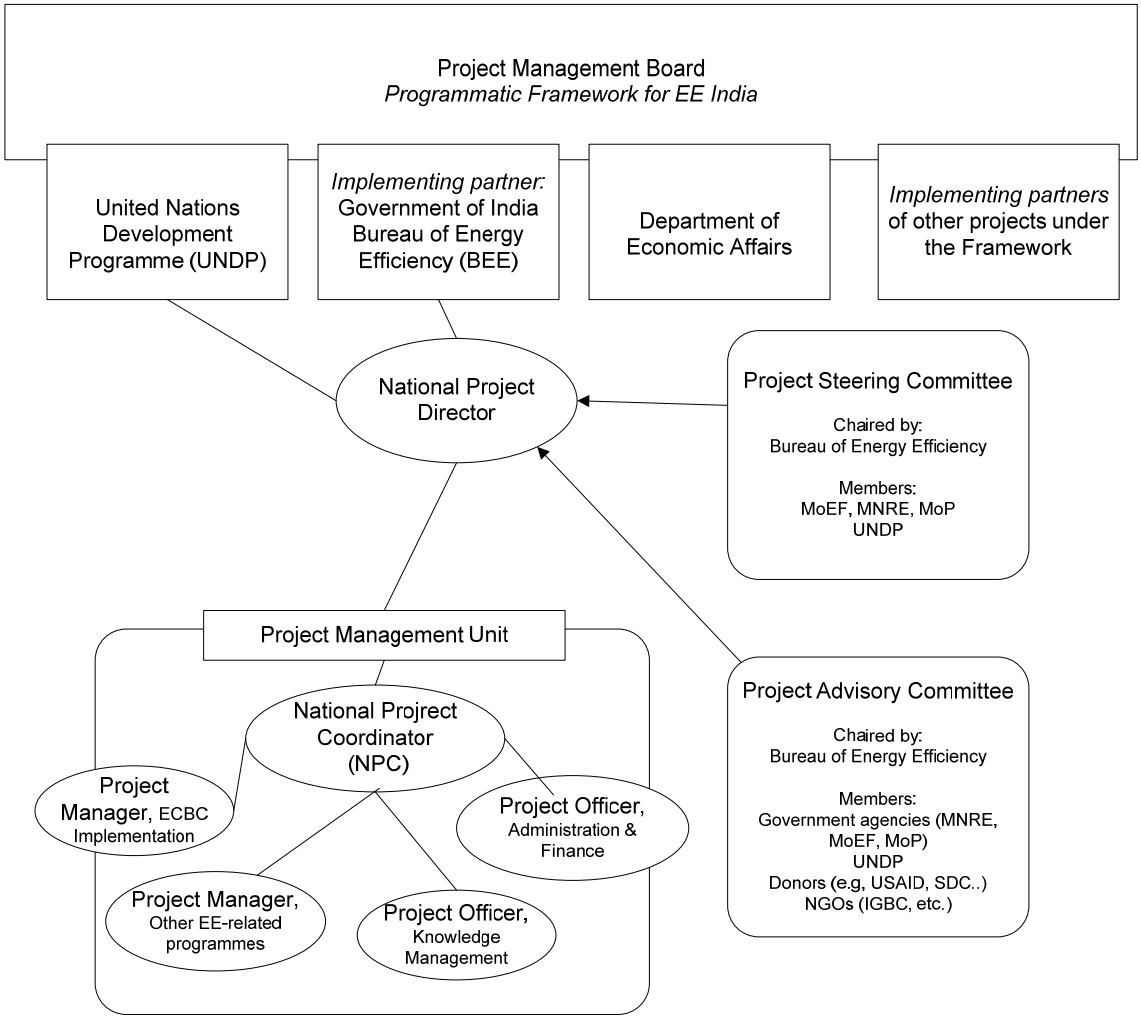


Figure 1: Project Implementation Organizational Chart

PART IV: EXPLAIN THE ALIGNMENT OF PROJECT DESIGN WITH THE ORIGINAL PIF:

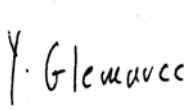
Based on the results of the LFA exercise, component 4 mentioned in PIF is merged with outcome 1 of this ProDoc. This had subsequently led to a change in related outputs. Also introduced a new component "Monitoring and evaluation; knowledge sharing and learning" under which new outputs are introduced as stated in the table below to share information and knowledge on best practices regarding EE technologies and measures. It is expected that the objective of ECBC operationalization fulfilled only when the information and knowledge dissemination is effective. All these changes are to bolster the realization of the expected outcome and address in detail the identified barriers. The nature of the initially identified barriers were further clarified and understood during the LFA exercise. Apart from these major changes, re-positioned, re-budgeted and edited the text of various outputs in the project framework.

Expected Outputs		Rationale for Changes in PIF Outputs/Activities in the ProDoc
GEF-Approved PIF	**Project Document**	
Component 1. Strengthen institutional capacities in the public sector	Component 1. Institutional Capacity Development	Rephrased
1.1 Capacities of Building Departments at centre, state, and municipal levels enhanced 1.2 Easy to implement compliance procedures formulated	1.1: Authorities and personnel of building departments at national, state and municipal level capable of implementing and enforcing the ECBC 1.2: Strengthened mechanisms and structures for ECBC implementation and gathered energy performance 1.3: Strengthened system of information dissemination to stakeholders	As the component 4 of PIF is merged in outcome 1, there is additional output introduced and modified the other two outputs. The new output 1.1 focuses on institutional strengthening (including implementation and enforcement of ECBC). Output 1.2 focuses on data gathering, benchmarking formulation and subsequent definition of mandatory ECBC. Change in budget: Subsequently to reflect the above changes, there is an increase in total budget. GEF funds allocation is slightly higher than previously anticipated in the PIF.
Component 2. Technical Training and awareness raising of key partners	Component 2. Technical Capacity Development	Rephrased
2.1 Specific training courses conducted for, architects/design professionals, building material suppliers, builders/contractors/developers 2.2. Training of Trainers courses/workshops/seminars arranged 2.3 Courses incorporated at vocational training institutes like SPA#, NID#, for training larger audience 2.4 Information disseminated and awareness raised on life cycle cost-benefit and return on investments for ECBC compliance	2.1: Property managers, developers and owners who are aware of, and interested in, EE buildings 2.2: Completed specific training programmes for key stakeholders and certified practitioners 2.3: Training curricula and modules incorporated at training institutes 2.4: Tools in place for energy-efficient building design (guidelines, handbooks, software) 2.5: Set of specifications for EE building materials 2.6: Technically capable and equipped building materials testing laboratories	The output 2.4 has been added in ProDoc (on tools for efficient buildings design, such as handbooks, guidelines, and design software). Output 2.4 of PIF is not a priority at the moment rather introduced output 2.5 “Set of specifications for EE building materials” in ProDoc as it needs to be focused initially. Also, in the PIF, the output on strengthening testing infrastructure is referred in the main text (in a whole paragraph), but was not referred in Table A. This has now been added as output 2.6 “Technically capable and equipped building materials testing laboratories” in the ProDoc. Change in budget: Subsequently to reflect the above changes (increased outputs), there is an increase in total budget. GEF funds allocation is more than double than previously anticipated in the PIF.
Component 3. Piloting ECBC technologies and measures	Component 3. ECBC Compliance Demonstrations	Rephrased
3.1 Model buildings identified and aided to comply with ECBC under public-private partnership in 5 climatic zones 3.2 Ensure availability of energy-efficient materials and equipment locally (i.e. windows)	3.1: Completed ECBC demonstrations in 5 climatic zones 3.2 Demonstrated energy savings in model buildings (under public-private partnerships in 5 climatic zone areas)	Demonstration buildings are 8 (hotels, office buildings, shopping malls, IT parks and hospitals) in various climatic zones of India with a total built area of 1.47 million m^2 and envisaged annual energy savings of 110.60 GWh (35%). This implies an energy performance index (EPI) of 135 $kWh/m^2/y$; In Component 3, the output 3.2 of the PIF (ensure availability of EE materials and equipment locally) has been put as part of Component 2. Change in budget: The total cost of pilot/model projects is over estimated in the PIF and with actual information during the PPG phase; the numbers are

Expected Outputs		Rationale for Changes in PIF Outputs/Activities
		revised in the ProDoc. GEF funds allocation is nearly half than previously anticipated in the PIF.
Component 4. Enforcement of building code	Component 4. Fiscal & Regulatory Frameworks for EE Buildings	As stated earlier, the component 4 of PIF is now merged with outcome 1 as both components deal with institutional-regulatory issues. Component 4 of ProDoc is equivalent to Component 5 of PIF.
4.1 Administration and enforcement structure of building codes developed 4.2 Monitoring and evaluation benchmarks developed	4.1: Fiscal and regulatory incentives for investors 4.2: Financing schemes designed with banks for investors to comply with ECBC 4.3: Award schemes for energy-efficient investments or improvements in commercial buildings	Introduced output 4.3 to motivate the investors those actively involved in energy efficient building design and compliant with ECBC. Change in budget: A slight decrease in the GEF funds allocation.
Component 5. Economic incentives for investors	Component 5. Information and Awareness Enhancement	Component 5 is newly introduced in the ProDoc.
5.1 Rebate/ tariff discount schemes with utilities discussed and designed for buildings compliant with ECBC 5.2 Financing schemes designed with commercial banks for investors to comply with ECBC 5.3 Compile and disseminate information on EE financing schemes	5.1: In-depth end-of-project impact analysis 5.2: Knowledge sharing products developed on best practices	The introduction of this component and related outputs are expected to contribute to the objective of ECBC operationalization fulfilled through information and knowledge dissemination. Budget: The US$ 1 million component on knowledge management under the "Programmatic Framework Project for Energy Efficiency in India" (GEF project 3538) covers all the projects under the program including this project. Therefore activities are retained so as to provide clarity during implementation.
OTHERS		
Project Management: Overall Budget	Project Management: Overall Budget	Change in budget: Increase is mainly due to higher than expected co-financing for project management activities. The GEF funds allocation remains the same.

PART V: AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF policies and procedures and meets the GEF criteria for CEO Endorsement.

Agency Coordinator, Agency name	Signature	Date *(Month, day, year)*	Project Contact Person	Telephone	Email Address
Yannick Glemarec UNDP/GEF Executive Coordinator		10 January 2011	Martin Krause, UNDP RCB, Bangkok	+66-2288-2722	martin.krause@undp.org

ANNEX A: PROJECT RESULTS FRAMEWORK

The project will contribute to achieve following country program Outcomes (as defined in CPD): **Project: Implementation of Energy Conservation Building Code (ECBC) efforts of BEE and other energy efficiency (EE) improvement programs by BEE for commercial buildings** **Outcome: Progress towards meeting national commitments under multilateral environmental agreements (CP, Outcome 4.3)** **Output: Supporting national development objectives with co-benefits of mitigating climate change (CP, Output 4.3)** **Output indicators: Number of clean technologies / mechanisms piloted**
Country program outcome indicators: **Outcome: Progress towards meeting national commitments under multilateral environmental agreements (CPAP, Outcome 4.3)** **Output: Partnerships and capacities developed to meet national commitments under multilateral environmental agreements** **Output indicators: (a)Annual reductions in greenhouse gas (GHG) emissions in India; (b) million USD flowing annually to India from Global Environment Facility (GEF) through UNDP for this program;(c) number of additional UNDP initiatives for achieving global and national targets under multilateral environmental agreements**
Primary applicable key environment and sustainable development result area: **Strengthening national capacities to mainstream environment and energy concerns into national development plans and implementation frameworks.**
Applicable GEF strategic objective and program: **Strategic Objective: To promote energy-efficient technologies and practices in building sector.** **Strategic Program: (SP-1) Promoting Energy Efficiency in Residential and Commercial Buildings.**
Applicable GEF expected outcomes: **Increased market penetration of energy-efficient building materials, technologies and establishment of energy-efficient practices in commercial buildings.**
Applicable GEF outcome indicators: **(a) Tonnes CO2eq avoided.** **(b) kWh or toe saved from adoption of energy-efficient technologies and practices.**

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
Project Goal: Reduction of GHG emissions from the Indian buildings sector	Cumulative CO_2 emission reductions from start of project to end-of-project (EOP), $ktCO_2eq$	0	181	M&E reports of the pilot/model projects. Reports and documents available with BEE related to ECBC compliance.	Risk: Energy performance reports may not be made available unless mandated and they may not be accurate Assumption: All the Energy performance reports are made available to BEE from the stakeholders.

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
Project Objective: Operationalization of the Energy Conservation Building Code (ECBC) for (new) commercial buildings.	New building space compliant with ECBC by Year 2014, million m^2	5[3]	At least 116.77[4]	ECBC compliance reports/documents from state authorities and then combined by BEE.	Risk 1: (a) ECBC is not taken up as envisaged and failure to secure continued support from state and municipal authorities. (b) Information on ECBC compliance is not available. (c) Failure to secure support from developers/building owners for buildings to be ECBC compliance. Assumption 1: continued support is available for ECBC compliance by all stakeholders and Information is available. Risk 2: Delay in the construction of demo projects. Inappropriate data monitoring. Assumption 2: Demo projects implemented as on time. Data are recorded and reported as needed.
	Average energy consumption in new buildings compared to baseline by Year 2014, $kWh/m^2/y$	210[5]	180.	Monitoring of ECBC compliance by state authorities and assessment studies by BEE.	
	Direct energy savings in the project by EOP, GWh/y	0	221.19[6]	Energy monitoring reports of demonstration buildings produced in the frame of the project.	
	CO_2 emissions avoided from 8 pilot demonstration buildings by EOP, tonne	0	181,379[7]	Monitoring of data collected during the actual operation of demo projects and calculated emission reductions on the basis of the available data & assumed baseline development	

[3] 250 buildings under ECBC (which are in various stages of construction) cumulating to 5 million m2 of commercial space since the date of launch of ECBC in May 2007.
[4] Increase in EE buildings in the buildings sector by the EOP will be 20% of total existing commercial building floor area i.e. 20%* 583,833,099 m^2.
[5] Range: 200-400 $kWh/m^2/yr$
[6] ECBC demonstrated in 8 commercial buildings cumulating to 1.47 million m^2 floor area consume 309,671 MWh in baseline and 199,074 MWh in the project scenario annually. The model pilot buildings demonstrated will save more energy than the benchmark SEC of 180 $kWh/m^2/y$ and the rationale for this is model buildings will implement all the energy efficiency measures as per the guidance provided under ECBC. Thus the SEC achieved is expected to be 135 $kWh/m^2/y$ and it is equivalent to 35% energy savings.
[7] Emission reduction (for details on calculation see Annex D): 90,689 tCO_2 annually or 181,379 tCO_2 during the project period (2011 to 2014) and 2.27 million tCO_2 cumulatively over 25 year period (demo projects)

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
	CO_2 emission avoided – indirect emissions by Year 2020, million tonne	0	2.7 – 49[8]	Declaration of energy consumption details by building space owners/users and assessment by BEE as part of the project.	Risk: The market growth rate of ECBC compliant buildings may not take place as estimated. Assumption: Market growth rate of new commercial buildings
Component 1. Institutional Capacity Development					
Outcome 1: Strengthened institutional capacities at various levels on the strengthened to enactment and enforcement of ECBC for commercial buildings					
Output 1.1: Authorities and personnel of building departments at national, state and municipal level capable of implementing and enforcing the ECBC	Number of state designated agencies and municipal bodies promote the implementation of ECBC by EOP	0	• 50[9] • 30[10]	Official notifications issued by state designated agencies and municipal bodies.	Risk: (a) Lack of continued commitment of the key public authorities and government entities to develop and implement effective EE buildings policies and practices. (b) Non availability of qualified staff to promote ECBC & other EE programmes. (c) Non availability of experts to deliver trainings. (d) Frequent shifting/transfer of dedicated government staff may result in loss of capacity that has already been built. Assumption: Key public authorities are aware of the need to learn on ECBC compliance needs and depute staff to attend the training programmes. Also continued commitment to promote ECBC & other EE programmes
	Number of prepared papers, promotional materials and training material for capacity building of policy & decision makers in government and private sector by Year 2014	0	5[11] and 6[12]	Produced papers, promotional and training material	

[8] Through a bottom-up approach 2.7 million tCO_2; in the top-down approach, from 2011 to 2020, assuming growth rate of 10% for 1st 3 years, 20% in year 4, 35% in year 5, 50% year 6, 65% in year 7, and 80% thereon over commercial space as in 2011 and a causality factor of 0.6 results in 49 million tCO_2.
[9] State designated agencies and municipal bodies that have adopted a policy to promote ECBC and other EE programs.
[10] State designated agencies that have dedicated resources for ECBC efforts and other EE programs
[11] Papers
[12] Types of promotional & training materials (power point slides, brochures, print ads (such as flyers etc), video for TV documentary/trainings, training manual/s and kits, and websites)

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
	Number of completed outreach programmes for government staff at various level of government by Year 2013	0	25[13]	• Workshop proceedings and evaluation reports. • Completion reports for training and capacity building workshops. • After-training evaluations completed by participants.	
	• Number of national and local government institutions with clearly defined roles and responsibilities of institutions that enforce the ECBC by Year 2014 • Number of states that carry out the mandatory implementation of ECBC through a clearly defined and effective institutional structure by Year 2014	• 0[14] • 0[15]	25 20	• A report is produced • Project progress reports • Government reports, guidelines and statements	Risk: ECBC may not be made mandatory and no clarity of ECBC compliance in voluntary regime Assumption: ECBC is mandated and states support its implementation
Output 1.2: Strengthened mechanisms and structures for ECBC implementation and gathered energy performance data	Number of states that actively participate in an officially established national energy audit information gathering system by Year 2014	0	20	• A online database is functional and energy audit reports information is available	Risk: Poor quality of energy audits and no flow of information to database. Assumption: Interest of the key stakeholders and ministries/departments to co-operate in the development of the audit database and benchmarking

[13] 750 participants from national, state and/or local governments participate to learn ECBC implementation and enforcement.
[14] No clarity in roles and responsibilities, and ECBC enforcement
[15] No effective structure is in place

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
	Number of energy audits that are carried out annually starting Year 2012	0	500	• Reports generated from database	Risk: Insufficient data collection. Too many variations in energy consumption/savings may hamper the objective of benchmarking. Assumption: Reporting of building energy performance is consistent and well-understood by key stakeholders
	Number of vetted energy audit reports that are prepared and submitted to the building owners each year starting Year 2012	0	500		
	Number of independent surveys carried out to gather information on building sector energy performance each year starting Year 2011	0	250		
	% annual increase in data volume in the building sector energy database starting Year 2011	0	80		
	Number of satisfied users of the building sector energy database each year staring Year 2011	0	100		
	Number of buildings covered in commercial buildings database by Year 2014	0[16]	1000	• Database outputs • Progress reports • Audit reports	
	Number of reports on benchmark information of energy efficiency in commercial buildings by Year 2014	0	5	Detailed reports are available and benchmarks defined for different types of commercial buildings for each of five climatic zones	
	Number of states carrying out the mandatory enforcement of the formulated ECBC roadmap by Year 2011	NA	1	A report on road map and sustainability plan is approved	Risk: Inability to state governments to adopt the ECBC Assumption: Government commitment to make ECBC mandatory and suggest road map which is actionable and acceptable to key relevant agencies

[16] Although there is a database of about 1,000 government and commercial buildings, but it is not detailed enough for defining benchmarks. The target set is to obtain detailed enough data for defining benchmarks.

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
	Number of annual energy consumption reports submitted by building owners that will be evaluated for ECBC implementation impact analysis starting Year 2011	0	1000	Annual reports submitted by building owners to BEE	
	Cumulative number of impact analyses of ECBC implementation and other buildings-relevant measures conducted, documented and disseminated by EOP	0	5	Annual impact analysis report is available of ECBC implementation and other buildings-relevant measures	
	Cumulative number of review meetings of BEE with key players in the buildings sector to discuss measures to address issues concerning improving the average SEC of the sector by EOP	0	5	Annual stakeholder meeting proceedings are available with BEE	
	Number of accredited local authorities (at municipality level) to validate and verify mandatory commercial buildings compliance with the ECBC by EOP Number of verified ECBC compliant buildings each year starting Year 2011	NA	50-100 250	Accredited local authorities list available with BEE	
Output 1.3: Strengthened system of information dissemination to stakeholders	• % of key stakeholders that use the information dissemination system on EE in buildings[17] each year starting Year 2011 • Number of users on the information system each year starting Year 2011	0 0	50 250	• Web portal • Survey results as it is planned by year 1 on web usage, awareness and attitudes of stakeholders	Risk: Web portal design is not user friendly Assumption: Use of web portal is consistent and large number of stakeholders will use that to obtain the information
	• Average percentage of building owners submitting reports annually for inclusion in the information system starting Year 2011, % • Percentage of building owners that rated the information system as useful by EOP, %	0 0	75 50	•	
Component 2: Technical Capacity Development					
Outcome 2: Enhanced technical capacity and expertise of local building practitioners and service providers					

[17] This is to be established as part of the BEE website by 2011.

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
Output 2.1: Property managers, developers and owners who are aware of, and interested in, EE buildings	Number of training workshops designed and conducted by Year 2014	0	10[18]	• Workshop proceedings and evaluation reports. • Completion reports for training workshops. • After-training evaluations completed by participants.	Risk: Failure to trigger positive response from architects, design professionals, building material suppliers, builders, contractors, developers, building managers. Assumption: Experts to deliver trainings are available and willingness of the targeted stakeholders to benefit from the training.
Output 2.2: Completed specific training programmes for key stakeholders and certified practitioners	Number of training of trainers workshops for creating awareness on ECBC and other EE programmes conducted by Year 2014 Number of trained architects and design professionals, developers and contractors and building material suppliers by Year 2014 Percentage of trainees that rated the training workshop training as good/excellent by EOP, % Proportion of trainees that are still providing training on ECBC and other EE programmes by EOP, %	0 0 NA NA	15 1500[19] 50 25	• Training manual/s and kits • Evaluations completed by participants. • Completion reports for training and capacity building workshops. • Brochures • List and profile of stakeholders	Risk: Failure to trigger positive response from key stakeholders and certified practitioners. Assumption: Experts to deliver trainings are available and willingness of the targeted stakeholders to benefit from the training. Accredited authorities willing to cooperate on EE in commercial buildings

[18] These are awareness raising workshops to be participated in by 300 professionals.
[19] 50 training workshops conducted with the participation of 1,500 professionals.

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
	Number of training courses conducted for energy auditors and energy service companies (ESCOs) by Year 2014	0	10[20]		
	Percentage of trainees that rated the training workshop training as good/excellent by EOP, %	NA	50		
	Proportion of trainees that are applying their training in the conduct of building energy audits and in the design and operation of EE buildings by EOP	NA	50%		
	Proportion of trainees still involved in the building industry by EOP, %	NA	75		
	Number of buildings practitioners that utilize design software for EE in buildings & understand and apply EE guidelines by EOP	Limited	2,500	• Workshop proceedings and evaluation reports. • Completion reports for training workshops. • After-training evaluations completed by participants.	
	Number of accredited building energy auditors, energy audit firms and energy service companies by EOP	NA	1000	After completion of training programmes, produced a report on list and profiling of accredited building auditors, energy audit firms and ESCOs	
Output 2.3: Training curricula and modules incorporated at training institutes	Number of developed course curricula and modules on ECBC and EE in buildings incorporated in academic institutions by Year 2014	0	At least 5	Course materials and curriculum from academic institutions like Centre for Environment Planning & Technology (CEPT), IITs and Indian Institute of Management, Ahmedabad	

[20] Training courses conducted with the participation of 300 certified energy auditors and participants from ESCOs

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
Output 2.4: Tools in place for energy-efficient building design (guidelines, handbooks, software)	Prepared Handbook on EE in buildings and requirements under ECBC by Year 2012	NA	1	Handbook on EE Buildings Design published	
	Number of building practitioners each year that use the handbook in their work starting Year 2012	NA	2500		
	% of building practitioners each year that are satisfied in using the handbook starting Year 2012	NA	50		
	Number of building projects that were designed based on the handbook by EOP	NA	2500		
	Number of sets of guidelines prepared on EE Buildings for developers and investors by Year 2012	1[21]	1[22]	Guidelines	
	% of building practitioners each year that are satisfied in using the guidelines starting Year 2012	NA	50		
	Number of building projects that were designed based on the guidelines by EOP	NA	2500		

[21] User guide on (voluntary) ECBC elaborated under USAID project
[22] Prepared guidelines with improved and expanded architectural guidance

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
	Appropriate design software package prepared for EE building design in compliance with ECBC by Year 2012	NA	1[23]	Software	
	Number of building practitioners each year that use the software package in their work starting Year 2012	NA	2500		
	% of building practitioners each year that are satisfied in using the software package starting Year 2012	NA	50		
	Number of building projects that were designed based on the software package by EOP	NA	2500		
Output 2.5: Set of specifications for EE building materials	Number of organized and conducted meetings and events for manufacturers to showcase energy efficient products and meet developers and construction companies as well as other stakeholders by EOP	0	Min 1 meeting/ year Min 2 events/year	• Market study report detailing the building materials and sale of energy efficient materials • Proceedings of the meeting prepared by BEE • Event summary prepared by BEE	
	Cumulative number of follow-up dialogue meetings held by EOP	NA	5		
	Average number of participating local building material manufacturers and suppliers in each dialogue meeting	NA	30-40		
	Percentage of EE buildings using new EE building materials that are locally available by end Year 2013	NA	50		

[23] Developed a Software for EE building design

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
Output 2.6: Technically capable and equipped building materials testing laboratories	Number of laboratories capable of doing R&D and testing of EE building materials by EOP	Limited[24]	• 5[25] • 5[26]	Data are available with National Accreditation Board for Testing and Calibration Laboratories (NABL) website (http://www.nabl-india.org/index.asp).	
	Number of EE building material specifications developed and enforced for compliance by EOP	NA	5		
	% of locally produced building material manufacturers that comply with EE building material specifications by EOP, %	NA	75		
	Percentage of local building material manufacturers that participated in the building material testing by EOP, %	NA	75		
	Percentage of local building material manufacturers that rated the building material testing as useful & good/excellent by EOP, %	NA	75		
	Proportion of building material manufacturers that made use of the product testing results in improving their building material products by EOP, %	NA	75		
Component 3: ECBC Compliance Demonstrations					
Outcome 3: Increased number of new commercial buildings that are ECBC compliant					

[24] Test labs like Central CPRI, Sri Ram Institute of Industrial Research, etc have limited capacity of testing building material
[25] In-house capacity increase of existing 5 research labs to conduct R&D on EE building materials
[26] 5 accredited third-party test labs available for testing

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
Output 3.1: Completed ECBC demonstrations in 5 climatic zones	Number of detailed technical and financial feasibility studies done for demonstration site selection by Year 2012	0[27]	8[28]	• Reports on model buildings planning and construction and results of evaluation • Documentary video of demo commercial building construction	Risk: Delay in the actual implementation and experiences from the demonstration building are not properly and accurately recorded Assumption: The model buildings are implemented as planned and all the process documentation carried out and documented lessons learned
	Number of finalized and approved demonstration project designs (engineering & construction) by Year 2012	NA	8		
	Number of financed demonstration projects confirmed and approved for implementation each year starting Year 2012	NA	8		
	Number of demo projects implemented each year starting Year 2013	NA	4		
Output 3.2: Demonstrated energy savings in model buildings (under public-private partnerships in 5 climatic zones)	Cumulative energy savings realized from ongoing demo projects, GWh by EOP	NA	90.7[29]	• Energy bills • Construction and operational cost of building	
	Cumulative CO_2 emission reductions from ongoing demo projects by EOP, million tonnes	NA	1.27		
	Number of demo projects that achieved its design SEC performance by EOP	NA	8		
	Number of demo projects that achieved its anticipated economic performance by EOP	NA	8		
Component 4: Fiscal & Regulatory Frameworks for EE buildings					
Outcome 4: Enforced fiscal incentives & Regulatory frameworks incentives for investors and developers of EE buildings					

[27] Only model public buildings demonstrated so far.
[28] At least 8 model commercial buildings with demonstrations covering an area of 1.47 million m^2 facilitated.
[29] Total energy savings of 90.7 GWh (leads to an annual savings of USD 5.7 million with payback period of around 3-5 years).

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
Output 4.1: Fiscal and regulatory incentives for investors	Number of completed satisfactorily acceptable fiscal and regulatory incentives policy researches/studies by EOP	None[30]	3-5	• Reports on incentive options • Utility and SDA reports • Builder/developer/investor surveys. • Published brochures and website information	Risk: • Lack of interest from builders' / developers' / contractors' access to credit for ECBC compliant buildings. • Lack of building material suppliers' access to credit for investing in energy efficient materials. Assumption: • Ministry / Department / Financial Institutions are convinced to create financing schemes. • There is good linkage between builders / users / manufacturers with financing agencies.
	Number of fiscal and regulatory incentives policy materials prepared, presented and disseminated to GOI policy makers by Year 2012	NA	3-5		
	Cumulative number of targeted policy coordination meetings conducted by EOP	NA	10		
	Number of fiscal and regulatory policy recommendations accepted for consideration of approval by the relevant GOI authorities by Year 2012 & 2013	NA	3-5		
	Number of approved fiscal and regulatory incentives for EE building initiatives that were approved and enforced by EOP	NA	3		
Output 4.2: Financing schemes designed with banks for investors to comply with ECBC	Number of financing mechanisms using partial risk guarantee and venture capital funds that are operational by EOP	None[31]	4	• Documents of approved financing schemes. • End of project impact report giving investments in ECBC compliant buildings • Report on schemes to support energy efficient materials	
	Number of financing schemes for EE building projects designed by EOP	NA	25		
	Percentage of banks and financial institutions that are committed to support EE building projects by EOP	NA	4		
	Number of financing schemes for EE building projects implemented by banks/financing institutions by EOP	NA	2500		

[30] Incentives for EE are available, but not particularly targeted to commercial buildings
[31] Bank loan schemes are not specifically geared towards ECBC compliance (green investments)

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
Output 4.3: Award schemes for energy-efficient investments or improvements in commercial buildings	Number of Green Building Awards scheme that is officially operational by Year 2012	1[32]	1[33]	• Case studies of award winners • Proceedings/publications of events in which awards are given	Risk: • Lack of interest from builders and developers, contractors for any such award. • Other awards already in place Assumption: • ECBC is run by BEE and the award from a statutory government agency attracts interest.
	Number of buildings participating each year in the Green Building Awards starting Year 2012	NA	25		
	Number of qualified awardees each year for the National Building EE Awards starting Year 2012	NA	5		
	Number of new EE building projects that are based on the design of green building awardees by EOP	NA	25		
Component 5: Information and Awareness Enhancement					
Outcome 5: Readily available and easily accessible/shared information and knowledge products on best practices regarding EE building technologies and measures					
Output 5.1: In-depth end-of-project impact analysis	Developed methodology for monitoring and impact assessment as per the requirements of ECBC by Year 2011	NA	1	A methodological tool is developed for monitoring and impact assessment of ECBC	Risk: All relevant parameters are not covered in the baseline study Assumption: • Available reliable information and data made available by building owners • Ongoing monitoring and recording of the impact of the project and barriers faced
	Final report consolidating results, impacts and lessons learned prepared by EOP	NA	1	A final report that consolidates the results and lessons learned of the ECBC operationalization	
	Impact study by the end of the project	NA	1	End-of-project impact report, giving a reliable snapshot of the formal and informal construction market impacts owing to EE and ECBC	

[32] LEED Green Building and IGBC schemes
[33] Official award scheme for ECBC compliant commercial buildings both at central and state level

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
Output 5.2: Knowledge sharing products developed on best practices	Number of sets of knowledge sharing products developed by Year 2014	NA	15[34]	These materials will also indicate the compliance procedure under ECBC climatic zone-wise, EE measures and their availability; and financial details	

[34] Produced at least one each (3 nos), leaflets/flyer/Video capsule, for five climatic zones depicting project impact and uploaded onto the web.

ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF)

RESPONSES TO THE GEF REVIEW COMMENTS ON CEO ENDORSEMENT (21 OCTOBER 2010)

Comments and Responses	Reference
COMMENTS ON CEO ENDORSEMENT (FSP)	
Comment [9.2]: *2. Coordination with US-AID.* *We understand from several exchanges and publications that US-AID has worked in India on ECBC.* *- Activities 1.2.2, 1.2.3 have been completed already (see US-AID publication:"performance based rating and energy performance benchmarking for commercial buildings in India") - please remove them from this project. Given that these tasks have been completed, we also question the utility of 1.2.1.* *[20-Oct-10] is not cleared and the answer is not considered as acceptable. There have been already 2 studies to collect information on the energy performance of several categories of commercial buildings in the different climatic zones of India, and to establish benchmarks. US-AID study appears to be solid, based on an important and representative sample (860 buildings). The study was done in 2010. We do not understand why 1.2.2 and 1.2.3 should be funded again by the GEF and we are not ready to accept such activities. In any case, the relevant information about these 2 activities is not currently provided: itemized cost, number of buildings and surface that you plan to survey for each category of buildings and for each climatic zone, timeframe of the survey etc.]* **Response**: - As mentioned earlier, the publications developed by the USAID study under ECO-III project are based on a relatively small sample size of buildings and limited to only few building types. It must be recognized that the building energy performance data have to be updated on a regular basis to reassess the benchmarks that are proposed. Therefore the more necessary and important for us to retain the proposed project activities "1.2.2. Gathering of information through survey, audit reports on EE in commercial buildings" on a regular basis and "1.2.3. Establishment of benchmarks: commercial building category-wise and climatic zone-wise". The implementation timeframe of this project is also strategic, inasmuch as it takes into consideration the timing for the transitioning of the ECBC from being voluntary to mandatory. - [20-Oct-10] As it was stated earlier, although the USAID study on benchmarking appears to be solid, in reality it is just an indicative study. Benchmarking is an ongoing activity and continued monitoring will enhance the quality of data. At this moment, the survey sample size is not clear; more clarity regarding the energy benchmarks based on more representative samples will only be realized once the proposed project is operational. The Activities 1.2.2 and 1.2.3 will involve the gathering of definitive energy performance related data that will strengthen mechanisms and structures for ECBC implementation. The budget for Component 1 is as mentioned below, which will be spent across a timeframe of	ProDoc, section 7, footnote in the table after Para 55, p 28

Comments and Responses	Reference
four years. **Atlas Budget Account Code** / **ERP/ATLAS Budget Description/Input** / **Year 1** / **Year 2** / **Year 3** / **Year 4** / **Total (USD)** 71200 / International Consultants / 40,000 / 40,000 / 40,000 / 24,000 / 144,000 71300 / Local Consultants / 40,000 / 40,000 / 30,000 / 31,375 / 141,375 71600 / Travel / 15,000 / 20,000 / 20,000 / 9,027 / 64,027 72100 / Subcontracts / 50,000 / 50,000 / 50,000 / 70,831 / 220,831 72200 / Equipment and furniture / 12,500 / 2,500 / 2,500 / - / 17,500 72500 / Supplies / 1,750 / 1,750 / 750 / 750 / 5,000 72800 / Info Tech Equipment / 2,000 / 2,000 / 500 / 500 / 5,000 73100 / Rental and Main Premises / 1,500 / 1,000 / 1,500 / 1,000 / 5,000 73400 / Rental and Main Equip / 1,500 / 1,500 / 1,000 / 1,000 / 5,000 74200 / Audio visual & Printing Prod.costs / 2,500 / 2,500 / 2,500 / 2,468 / 9,968 74500 / Miscellaneous / 1,538 / 1,500 / 1,600 / 2,661 / 7,299 **sub-total** / / **168,288** / **162,750** / **150,350** / **143,612** / **625,000** Apart from the above details, there are no specific itemized costs for each stated activity. *- Regarding activity 1.2.4, we note that USAID has already developed an "ECBC implementation strategy in India" - see their publication on the subject. How does 1.2.4 relate to this strategy?* **Response**: - Activity 1.2.4 has been revised to deal with the development of a plan for the practical implementation and monitoring of mandatory ECBC in different climate zones. This supports the ECBC implementation and monitoring that applies to different climatic zones of the country. The transition to mandatory phase requires lots of coordination with other agencies to make a foolproof program. There is a need to not only look into the technical inputs for the project but also the legal and operational inputs for implementation. *- we also note that US-AID has already realized and disseminated an ECBC User Guide "which aims to assist the building designers, architects and all others involved in the building construction industry to facilitate implementation of ECBC in real situations" : this correspond to your activity 2.4.1 and a part of 2.4.4 - please remove these activities from the project. [20-Oct-10] cleared, but please provide an itemized budget for 1.2.4 and 2.4.1* **Response**: - The guidelines referred in the ECBC User Guide are quite general. As	ProDoc, section 12, Table 5, p 54

Comments and Responses	Reference

mentioned, these guidelines are based on an indicative study with a very small sample size of buildings and do not represent all the categories of buildings across 5 climatic zones. Therefore, activity 2.4.1 is necessary. Since the User Guide has to include more up-to-date information, the existing version that was prepared using funds from USAID has to be revised, as proposed in Activity 2.4.1. Also, inasmuch as the ECBC is moving from a voluntary to mandatory regime (must include M&E sections), more guidance is needed.

Certainly we do not need to start from scratch, but we need to review and expand the first analysis supported by the USAID report, and update figures accordingly. Therefore, activities "2.4.1 Conduct research and prepare a Handbook and Guidelines on energy efficiency building design and technologies (for officers involved in licensing, architects, building contractors, engineering firms)" and "2.4.4 Launch and promotion of handbook, guidelines and software (five regions)" are considered to be incremental and will aim to address the existing gaps in information and guidance.

- [20-Oct-10] As mentioned above, the Annual Budget and Work Plan (ABWP) were provided for Component 1. The Table below provides the details for the Outcome 2.

Atlas Budget Account Code	ERP/ATLAS Budget Description/Input	Year 1	Year 2	Year 3	Year 4	Total (USD)
71200	International Consultants	150,000	100,000	100,000	61,000	411,000
71300	Local Consultants	90,000	70,000	70,000	25,750	255,750
71600	Travel	50,000	75,000	50,000	9,200	184,200
72100	Subcontracts	200,000	200,000	150,000	99,657	649,657
72200	Equipment and furniture	5,000	2,500	2,500	-	10,000
72500	Supplies	750	500	500	13,125	14,875
72800	Info Tech Equipment	5,000	5,000	4,000	875	14,875
73100	Rental and Main Premises	250	250	250	250	1,000
73400	Rental and Main Equip	500	250	250	250	1,250
74200	Audio visual & Printing Prod.costs	10,000	7,500	7,500	5,600	30,600
74500	Miscellaneous	2,000	1,000	1,000	2,793	6,793
sub-total		**513,500**	**462,000**	**386,000**	**218,500**	**1,580,000**

ProDoc, section 12, Table 5, p 54

Apart from the above details, there are no specific itemized costs for each activity.

Comment [9.3]:

3. Coordination within the programmatic approach on energy efficiency.
The programmatic approach on energy efficiency in India (ID 3538) includes a $1M component on "knowledge sharing". This component is implemented by

Comments and Responses	Reference
the WB and executed by the BEE. This component (already endorsed by the GEF CEO) will support all the projects under the program and will deal with evaluation and knowledge management. For this reason, we do not accept funding these activities again under this project. On top of these activities 5.1 and 5.2 were not included in the PIF. So please remove this component from the project. *[20-Oct-10] The $1M component on knowledge management under the umbrella framework that was finally approved under the WB project covers ALL the projects under the program. It includes this project. Consequently, all the knowledge management activities you refer to have to be covered under this $1M, without additional money being drawn from this project.* *This is stated explicitely in the WB PAD you refer to, page 47 : "This component will support not only the MSME EE program, but - at the request of BEE - the overall Programmatic Framework Project for Energy Efficiency in India which is headed by BEE, covering the sub-projects managed by the World Bank, UNIDO, and UNDP". Please note that your understanding of the WB PAD page 48 is not correct: this document reads "The programmatic EE knowledge management will draw from GEF projects managed by the World Bank, UNIDO, and UNDP. The effort will include provision of resources and technical human resources for converting outputs of different components of Programatic Framework Project in to knowledge." This means that the WB project will provide ressources to draw experiences and lessons from subprojects, and NOT that it will draw resources and technical human resources from the subprojects. Please also refer to the CEO endorsement request of the same project that itemizes the funding of two EE specialists for knowledge management, one of them being earmarked on "buildings". For all these reasons, we will not accept to fund outcome 5.]* **Response:** The Program Knowledge Management Unit under Programmatic Framework Project for Energy Efficiency in India (ID 3538) is an umbrella knowledge management and sharing unit for all the EE projects managed by the BEE and supported by the GEF. This covers all the sub-projects managed by the World Bank, UNIDO and UNDP. Though this unit is common for all the sub-projects managed by the World Bank, UNIDO and UNDP, resources and technical human resources will be drawn from the sub-projects (refer to World Bank Project Appraisal Document [PAD], page 48). Subsequently, related financial resources will have to be drawn separately for each individual sub-project. Hence the USD 361,000 (with co-financing USD 400,000) that has been allocated to the Knowledge Sharing component in the proposed activities is justified since it is covered by the USD 1 million earmarked for the World Bank managed sub-project on EE improvements in the SMEs. Therefore, based on the PAD (page 48), it is considered that the USD 1 million included in the PAD is specifically for the sub-project on SMEs managed by the World Bank and the other sub-projects will have to come up with their own financial resources as part of their project budgets for knowledge management separately. - [20-Oct-10] As suggested, the previously allocated budget has been deleted, but the activities were retained with a clear mention of the fact that the budget will be drawn from the component on knowledge	ProDoc, section 7,

Comments and Responses	Reference
management under the "Programmatic Framework Project for Energy Efficiency in India" (GEF project 3538).	footnote in the Para after 78, p 34 & ProDoc, Section 13, Para 108, p 61
Comment [9.4]: *4. The project has been modified compared to the PIF. The scope of component 2 (technical assistance) has evolved a lot compared to the PIF. Its cost has increased from $2.7M to 7M and GEF financing has increased from $0.9 to $1.58. At the same time, the GEF financing for component 3 (investment) has decreased from $3M to $1.78M. Given comments (3) on coordination with US-AID and comments (1) on pilots, we feel that the balance of GEF financing between component 2 (TA) and 3 (inv) should not change so drastically.* *[20-Oct-10] This comment has to be addressed through changes in the CEO endorsement request and in the prodoc. More GEF money must be spent on component 3, along the lines approved by the GEF Council at the PIF stage. Given that the GEF will not fund already funded activities (1.2.2, 1.2.3, 5.1 and 5.2), you should increase component 3 by at least $0.5M.* **Response**: - Please refer to the detailed responses provided in questions 9.1, 9.2 and 9.3, which explain why the activities have to be retained along with their proposed budget allocations. - [20-Oct-10] The budget for Component 3 has been increased to US$ 0.361 million. The revised budget is reflected in the Annual Budget and Work Plan (ABWP).	ProDoc, section 12, Table 5, p 55 & CEO Endorsement Request, Part I, Table in section A, p1
Comment [9.5]: *5. We note in section E of the CEO endorsement request that $2M of GEF resources will go to international consultants. This figure is pretty high for a $5.2M project. We suggest to reduce this amount.* *[20-Oct-10] Thanks for your answer. Does it mean that the sub-contracts will be executed by national institutions?* **Response**: - This budget for international consultants has been adjusted accordingly. Initially many activities were considered to be executed by consultants. Based on the re-assessment that was done, some of the activities are now assigned to the relevant institutions through subcontracts. - [20-Oct-10] Subcontracts to the relevant institutions are not known at this stage. These institutions can be either national or international.	

RESPONSES TO THE GEF REVIEW COMMENTS ON CEO ENDORSEMENT (21 SEPTEMBER 2010)

Comments and Responses	Reference
COMMENTS ON CEO ENDORSEMENT (FSP)	
Question [9.1]: *Several concerns have to be addressed:* *1. Component 3 (demonstrations).* *The cost of this component is $10.3M and includes 8 demonstration buildings. However, in prodoc page 81, table 11, the incremental cost of these 8 pilots is estimated to be $22.4M.* **Response**: - The total investment cost for 8 demonstration buildings is USD 22.4 million. This total cost includes the technical assistance in the selection, planning, design, construction and monitoring and evaluation of new commercial buildings which is part of demo projects. To avoid confusion, the relevant column heading in Table 11 has been revised accordingly to read Total Investment Cost. *- How do you reconcile these figures?* **Response**: - DLF has provided a co-finance letter stating USD 11.1 million worth of co-financing for this proposed project. In that letter, the stated INR 52 crore as part 3and 4 in the co-finance letter are meant for demonstrating application of building EE technologies for reducing the building heat gain through better insulation practices and improved building material (Part 3); and, introducing the building energy simulation and modeling practices to take up ECBC compliance of buildings (Part 4). This amount is included a part of the confirmed co-financing for the demo projects in new buildings. Since the total investment required for the demonstrations is US$ 22.4 million, a "call for proposal" will be organized in a transparent manner to attract other EE building project developers/owners, at minimum financing of USD 11.3 million, which at the moment is considered as unconfirmed co-financing. Once this co-financing is confirmed, this will be reported as additional or leveraged co-financing in the Project Implementation Review (PIR) report. *- Who will provide the $8.5M identified as co-financing? What does this co-financing cover?* **Response**: - The BEE will work very closely with all the stakeholders, including developers, to make ECBC mandatory. DLF, which is the largest real estate and building project developer in India in terms of revenues, earnings, market capitalisation and developable area, has shown enhanced interest in working with the BEE to ensure its new buildings are ECBC compliant. DLF provides the committed co-financing of US$ 8.5 million. Actually, DLF provides more than this amount, i.e. USD 11.1 million for the 8 demonstration projects and towards the items mentioned as part 3and 4 as stated in the co-finance letter that it has issued for this project	ProDoc, Annex D, Table 11, p 83 ProDoc, Annex D, para 135, p 83 & ProDoc, section 7, para 72, p 32 ProDoc, Annex D, footnote in para 135, p 83

Comments and Responses	Reference
(also mentioned in the above response). Similar contributions are expected from other financiers/developers as the market value of the ECBC compliant buildings are expected to be higher than the ones that are not ECBC compliant. *- What does the co-financing letter from DLF utilities mean? We see INR 50 Crore ($10.7M) to reduce heat gain through better insulation and improved buildings materials, but how does this relate to the project? Is DLF's letter about new buildings or renovation of existing ones?* **Response**: - DLF's co-finance is for the demonstration of the energy efficient design, engineering, planning, construction, and in the energy conserving operation and maintenance of new buildings that it will develop. It is not for the demonstration of the retrofit of existing ones to make them energy efficient. The DLF-financed demonstrations (i.e., new EE buildings that are ECBC-compliant) will demonstrate better and more energy efficient air-conditioning in buildings, which ultimately leads to reduced building energy consumption. The use of better and energy efficient insulation and building materials bring about such improved and energy conserving air conditioning. This will also help in transforming the market for energy efficient building materials and energy efficient appliances/equipment (e.g., air conditioners). In that regard, these EE building demonstrations not only promote EE building design and construction, but also the application of EE building materials and equipment/appliances. *- Given that you are going to do a "call for proposal" to identify the 8 buildings, how can DLF utilities commit to co-finance the pilots if the pilots are not selected yet?* **Response**: - DLF prepared a cost analysis for the interventions. The call for proposal is to maintain a transparent process for the implementation of project activities by PMU. Currently, categories of buildings have been identified for pilot projects. DLF is going to lead the process but the call for proposal will provide a fair chance to other developers also to show their commitment towards implementation of ECBC. *- Finally, we understand that the general performance targets for the pilots is 135 kWh/m2/y - however, in the recent US-AID study on benchmarks for commercial buildings (see ref below), several categories of buildings are already below or close to this target. We feel that you should define a specific target for each of your 5 categories.* **Response**: - The USAID study on benchmarking is an indicative study and is based on the analysis of about 0.16 million m^2 of buildings space (860 buildings) and the BEE analysis of 1.1 million m^2 of building space. Note that the total commercial building space in India is 470 million m^2. Also there is a wide variation in building type and designs. The USAID report mentions benchmarks, ranging from 115-349 kWh/m^2/y for office buildings, 88-378 kWh/m^2/y for hospitals, 279 kWh/m^2/y for hotels and 252 kWh/m^2/y for shopping malls. The ranges for office and hospital buildings are so wide,	ProDoc, Annex D, footnote in para 135, Table 11, p 83 ProDoc, section 7, footnote in para 72, p 32 ProDoc, section 7, footnote in the table after Para 55, p 27

Comments and Responses	Reference
while the fixed benchmarks for hotel and retail buildings cannot be relied upon inasmuch as the sample buildings represent a very small fraction of the hotel and retail buildings in the country. Because of these limitations, the information cannot be used as a benchmark to rate the EE performance standardized across India. The data used in this project are based on a MOEF-cleared survey of buildings. This means the surveyed buildings already meet the 135 kWh/m^2/y standard, hence it can be stated that, performance target of 135 kWh/m^2/y in this project is actually lower (not higher) than the USAID figures. This clearly shows, more analyses are needed and are essential in the project proponents' opinion. Hence, we also strongly suggest keeping activity 1.2.2 and 1.2.3. Once the detailed benchmarking exercises are conducted under the proposed project, the appropriate SEC targets for each building category will be defined. These targets can also be reviewed after 5 years to further improve the SEC levels.	
Comment [9.2]: *2. Coordination with US-AID.* *We understand from several exchanges and publications that US-AID has worked in India on ECBC.* *- How will you coordinate concretely with them?* **Response**: - USAID is one of the project stakeholders. As mentioned in the ProDoc, USAID has played a significant role in developing and implementing building efficiency projects in India. Their current program ECO III has worked closely with the BEE in the conduct of training courses (i.e., on ECBC compliance and green building design, energy simulation etc.) and building code development. Cooperation under the proposed project with USAID will serve as a platform to implement training courses for energy auditors and energy service companies, design and implementation of a certification scheme for building energy auditors and conduct awareness workshops on energy efficiency measures, ECBC and building regulations, and share their experiences towards such training programs design and implementation. Coordination will be at three levels to ensure smooth transition of some of the long term activities and cooperation: o Through BEE: BEE is implementing partner of USAID´s ECO-III project (the project will exchange experiences in training and building code development). The BEE team dealing with the USAID-BEE initiative were involved at the project preparation stage (i.e., PPG Exercise) for GEF-UNDP-BEE initiative and hopefully continue during the implementation phase o PSC meetings: On an as-needed basis, USAID representative will be asked to join PSC meetings o Project management level: project manager will closely interact and coordinate activities with ECO-III through BEE officials who are working on ECOIII. ECO III project is expected to run until September 2011. In the meantime, the proposed UNDP-GEF project will take over some of the long-term activities that have been continuing under ECO III project. This is to	ProDoc, section 4, Table 3, p 21 & CEO Endorsement Request, Part II, section E, 1st para, p7

Comments and Responses	Reference
enable a smooth transition of long term activities from ECO III project as the proposed UNDP-GEF project will get operational in November 2010. Thus the proposed project will not only expand the horizon of the existing ECO III project but also provide continued sustainability to the government's initiative of promoting energy efficiency in buildings. *- Activities 1.2.2, 1.2.3 have been completed already (see US-AID publication:"performance based rating and energy performance benchmarking for commercial buildings in India") - please remove them from this project. Given that these tasks have been completed, we also question the utility of 1.2.1.* **Response**: - As mentioned earlier, the publications developed by the USAID study under ECO-III project are based on a relatively small sample size of buildings and limited to only few building types. It must be recognized that the building energy performance data have to be updated on a regular basis to reassess the benchmarks that are proposed. Therefore the more necessary and important for us to retain the proposed project activities "1.2.2. Gathering of information through survey, audit reports on EE in commercial buildings" on a regular basis and "1.2.3. Establishment of benchmarks: commercial building category-wise and climatic zone-wise". The implementation timeframe of this project is also strategic, inasmuch as it takes into consideration the timing for the transitioning of the ECBC from being voluntary to mandatory. *- Regarding activity 1.2.4, we note that USAID has already developed an "ECBC implementation strategy in India" - see their publication on the subject. How does 1.2.4 relate to this strategy?* **Response**: - Activity 1.2.4 has been revised to deal with the development of a plan for the practical implementation and monitoring of mandatory ECBC in different climate zones. This supports the ECBC implementation and monitoring that applies to different climatic zones of the country. The transition to mandatory phase requires lots of coordination with other agencies to make a foolproof program. There is a need to not only look into the technical inputs for the project but also the legal and operational inputs for implementation. *- we also note that US-AID has already realized and disseminated an ECBC User Guide "which aims to assist the building designers, architects and all others involved in the building construction industry to facilitate implementation of ECBC in real situations" : this correspond to your activity 2.4.1 and a part of 2.4.4 - please remove these activities from the project.* **Response**: - The guidelines referred in the ECBC User Guide are quite general. As mentioned, these guidelines are based on an indicative study with a very small sample size of buildings and do not represent all the categories of buildings across 5 climatic zones. Therefore, activity 2.4.1 is necessary. Since the User Guide has to include more up-to-date information, the existing version that was prepared using funds from USAID has to be revised, as proposed in Activity 2.4.1. Also, inasmuch as the ECBC is	ProDoc, section 7, footnote in the table after Para 55, p 28 ProDoc, section 7, footnote in the table after Para 55, p 28 ProDoc, section 7, para 67 & footnote in the table above para 67, p 30

Comments and Responses	Reference
moving from a voluntary to mandatory regime (must include M&E sections), more guidance is needed. Certainly we do not need to start from scratch, but we need to review and expand the first analysis supported by the USAID report, and update figures accordingly. Therefore, activities "2.4.1 Conduct research and prepare a Handbook and Guidelines on energy efficiency building design and technologies (for officers involved in licensing, architects, building contractors, engineering firms)" and "2.4.4 Launch and promotion of handbook, guidelines and software (five regions)" are considered to be incremental and will aim to address the existing gaps in information and guidance.	
Comment [9.3]: *3. Coordination within the programmatic approach on energy efficiency.* *The programmatic approach on energy efficiency in India (ID 3538) includes a $1M component on "knowledge sharing". This component is implemented by the WB and executed by the BEE. This component (already endorsed by the GEF CEO) will support all the projects under the program and will deal with evaluation and knowledge management. For this reason, we do not accept funding these activities again under this project. On top of these activities 5.1 and 5.2 were not included in the PIF. So please remove this component from the project.* **Response:** The Program Knowledge Management Unit under Programmatic Framework Project for Energy Efficiency in India (ID 3538) is an umbrella knowledge management and sharing unit for all the EE projects managed by the BEE and supported by the GEF. This covers all the sub-projects managed by the World Bank, UNIDO and UNDP. Though this unit is common for all the sub-projects managed by the World Bank, UNIDO and UNDP, resources and technical human resources will be drawn from the sub-projects (refer to World Bank Project Appraisal Document [PAD], page 48). Subsequently, related financial resources will have to be drawn separately for each individual sub-project. Hence the USD 361,000 (with co-financing USD 400,000) that has been allocated to the Knowledge Sharing component in the proposed activities is justified since it is covered by the USD 1 million earmarked for the World Bank managed sub-project on EE improvements in the SMEs. Therefore, based on the PAD (page 48), it is considered that the USD 1 million included in the PAD is specifically for the sub-project on SMEs managed by the World Bank and the other sub-projects will have to come up with their own financial resources as part of their project budgets for knowledge management separately.	ProDoc, section 13, para 108, p 68
Comment [9.4]: *4. The project has been modified compared to the PIF. The scope of component 2 (technical assistance) has evolved a lot compared to the PIF. Its cost has increased from $2.7M to 7M and GEF financing has increased from $0.9 to $1.58. At the same time, the GEF financing for component 3 (investment) has decreased from $3M to $1.78M. Given comments (3) on coordination with US-AID and comments (1) on pilots, we feel that the balance of GEF financing between component 2 (TA) and 3 (inv) should not change so drastically.* **Response**: - Please refer to the detailed responses provided in questions 9.1, 9.2 and 9.3, which explain why the activities have to be retained along with their	

Comments and Responses	Reference
proposed budget allocations.	
Comment [9.5]: *5. We note in section E of the CEO endorsement request that $2M of GEF resources will go to international consultants. This figure is pretty high for a $5.2M project. We suggest to reduce this amount.* **Response**: - This budget for international consultants has been adjusted accordingly. Initially many activities were considered to be executed by consultants. Based on the re-assessment that was done, some of the activities are now assigned to the relevant institutions through subcontracts.	CEO Endorsement Request, Table E, p 3 & Annex C, p 45
Comment [9.6]: *6. A co-financing letter (from "other private sector") is missing - what is this co-financing about? If you cannot confirm the co-financing you should remove it.* **Response**: - It is unconfirmed co-financing. Hence we have removed it as suggested.	CEO Endorsement Request, Table B, p 2

PIF Energy Efficiency in Commercial Buildings, GEFSEc Review Sheet Comments and UNDP responses (at PIF/Work Program Inclusion, 14 October 2008)

Comment & Response	Reference
Project Design	
Comment 1: *Comprehensive assessment on the CO2 reduction benefits of the whole project needs to be given by the time of CEO endorsement as described in the PIF.* **Response**: The GEF support is expected to result in annual direct GHG emission reductions of 91 kilo tonne of CO_2 ($ktCO_2$) and 182 $ktCO_2$ by the year 2014 (assuming the actual realisation during the last two years of the project). The cumulative reductions achieved would be 2,267 $ktCO_2$ over the 25-year of economic lifetime of eight energy efficiency demo projects in commercial buildings. Considering the total avoided GHG emission reductions that are attributable to the project, which amounts to 906,894 tCO_2, the corresponding unit abatement cost (UAC) (i.e. GEF$ per tCO_2) is USD 5.73/tCO_2. This considers the estimated direct GHG emission reductions from the demo/model projects over the project duration of 10 years. The emission reductions that are attributable to the project are calculated using the "Manual for Calculating GHG Benefits of GEF Projects". The indirect project CO_2 emission reductions are calculated on a conservative basis as per "Calculating Indirect Impacts" (a) bottom up approach results in 2,720,682 tCO_2 and (b) top-down approach results in 48,969,467 tCO_2. More details on the emission reduction calculations are provided in Annex D of UNDP ProDoc.	ProDoc: Sec 9, Para 94, p 37
Comment 2: *(a) The co-financing level was increased especially for component 3. Now the ratio is acceptable but not considered sufficient. Further efforts are encouraged to secure*	

Comment & Response	Reference
more co-financing by the time of CEO endorsement. *(b) The figures in all tables have been updated. (The table A still says component 3 is only about TA. But it clearly has investment elements. It needs to be revised by the time of CEO endorsement).* **Response**: (a) The co-financing of the project currently stands at USD 15,827,660 against what has been mentioned in the PIF i.e. USD 14,727,500. Although the project has made a progress in securing more co-finance, the efforts will be continued to obtain more co-finance during the implementation stage of the project. As the awareness is increased among the stakeholders, more partners would join the project after seeing successful progress. Currently the activities planned will fully support this approach. (b) Changed component 3 to Inv. as suggested.	CEO Endorsement Request: Table A, B and C, p 2 CEO Endorsement Request: Table A, p 2
Comment 3: *Section D has been elaborated and addressed the issues. But the Programmatic Framework for Energy Efficiency is not mentioned. This project is under this Framework. The coordination under the Framework needs to be secured.* **Response**: The proposed improvement in energy efficiency in commercial buildings project is part of the "Programmatic Framework Project for Energy Efficiency in India" (GEF project 3538). Five projects on energy efficiency are proposed under this program (GEF implementing agencies for these projects are given in the parenthesis): 1. Energy Efficiency Improvements in Commercial Buildings (UNDP); 2. Chiller Energy Efficiency Project (World Bank); 3. Financing Energy Efficiency in Small and Medium Enterprises (World Bank); 4. Promoting Energy Efficiency and Renewable Energy in Selected SME clusters in India (UNIDO); and 5. Improving Energy Efficiency in the Indian Railways System (UNDP). The proposed project will establish the necessary communication and coordination mechanism through its Project Steering Committee with the Project Board of the Programmatic Framework, and with the Project Steering Committees and Project Management Units of chillers project and the Railways project. UNDP India will also take the lead ensuring adequate coordination and exchange of experiences with other activities, as detailed in Section 13 of UNDP ProDoc.	ProDoc: Sec 5, Para 43, p 23 ProDoc: Sec 5, Para 44, p 24
Comment 4: *The estimation of CO2 savings was totally revised. But new estimate is only about component 3 without mentioning to the cost. By the time of CEO endorsement, more specific and convincing discussions need to be given.* **Response**: Addressed under Comment 1. Further, Table 11 in Annex D of UNDP ProDoc details on the average incremental investment cost and monetary value of savings through saving the energy bill.	ProDoc: Annex D, p 82

Comment & Response	Reference
Comment 5: *The co-financing ration was improved up to 2.8. It is acceptable. But further efforts are strongly encouraged to secure more co-financing by the time of CEO endorsement.* **Response**: As addressed under Comment 2, the project will continue its efforts to secure more co-financing from its stakeholders during implementation phase. Currently the co-financing ratio is improved to 3.1.	CEO Endorsement Request: Table A, p 2

STAP Screening of the PIF (8 November 2008)

STAP welcomes and supports the UNDP- India proposal on Energy Efficiency in commercial buildings, which is a part of the *EE Programmatic Framework* in India. The project has a clear focus and has identified the specific barriers to implement / operationalize ECBCs through *capacity building, assisting pilot projects, enforcement of building codes and provision of economic incentives*. STAP has the following suggestions, to improve clarity and which could also inform the next steps in development of the project:

Comment & Response	Reference
Comment 1: ***Technological Innovations and Interventions:*** *The proposal highlights that air conditioning and lighting are the two most energy consuming end-uses in the commercial buildings, with a potential to reduce energy consumption by 25-40%. However, later the proposal considers building construction materials and material product performance. There is a need for clarity whether the focus of activities is on lighting and air-conditioning or on building material and material product performance or on both. A clear description of the Components and Activities and the specific barriers addressed would help the project implementation.* **Response**: Now, a clear description of the Components, Activities and the specific barriers addressed during the project implementation are given. The project objective is "operationalization of the Energy Conservation Building Code (ECBC) for new commercial buildings". Whereas, ECBC sets minimum energy performance standards for the design and construction of new commercial and public buildings. Building components include: • Building envelope (walls, roofs, windows) • Lighting (indoor and outdoor), Heating ventilation and air conditioning (HVAC) system • Solar water heating and pumping • Electrical systems (power factor, transformers) ECBC lists specific maximum and minimum limitations on a number of key building features that affect building energy use. ECBC has both prescriptive and performance-based compliance paths. The prescriptive path calls for adoption of minimum requirements for the building envelope and energy systems (lighting, HVAC, service, water heating and electrical). The project supports all the activities that are associated with the effective implementation and operationalization of ECBC. Therefore the Project Planning Matrix (PPM) in section 11 of UNDP ProDoc will clearly describe the components, Outcomes, Outputs and Activities to realise its Outputs.	ProDoc: Sec 7. & ProDoc: Sec 2, Paras 25 & 26, p 12 ProDoc: Sec 11, p 39
Comment 2: ***Baseline Emissions and Spread of Energy Efficient Technologies in the Commercial***	

Comment & Response	Reference
Buildings: *Since a number of initiatives are being implemented in India to promote EE, a good understating of the GHG emissions in the commercial buildings and spread of Energy Efficient technologies under the Baseline Scenario, in the absence of the GEF project, would assist monitoring of the impact of the project.* **Response**: BEE has commissioned studies on baseline and EE emission reduction scenarios. This data will be taken into consideration as the reports are available during project implementation. The forecasted annual energy consumption in the commercial building sector in business-as-usual (BAU) scenario and project scenario are shown in the figure 4. Mandatory implementation of ECBC would give CO_2 emission reductions of 82 $MtCO_2$ over 2011-2020 (refer to calculations in Annex D of the UNDP ProDoc).	ProDoc: Figure 4, p 15 & Annex D
Comment 3: ***Risks and Measures:*** *The risk of incremental investment cost for adopting Energy Efficient technologies for the project developers could be considered along with the mitigation measures.* **Response**: Case studies carried out by BEE show that employing environmentally sensitive designs can lead to energy savings of the order of 20-50%. Initial investment cost will increase by 10-15%, with payback period varying from 3 to 7 years. However, various barriers exist that inhibit realising cost-effective energy efficiency potential. The section 3 of ProDoc lists those barriers along with the project outputs to address those barriers and also refer to section 9 for more details.	ProDoc: Annex D, Para 133, p 82
Comment 4: ***Mitigation and Adaptation Synergies:*** *IPCC (2007) highlights the potential for mitigation and adaptation synergy in the building sector, since the buildings are likely to last longer and warming is likely due to Climate Change as well as Urban heat effect. Though there is no clear technological prescription for promoting mitigation adaptation synergy, the project could explore the possibility of incorporating the likely warming in the design of the commercial buildings. Project proponents are encouraged to explore mitigation and adaptation synergies in piloting ECBC in model buildings located in different climatic zones. Knowledge acquired can be used in other EE-related projects in residential and commercial buildings in India.* **Response**: This recommendation will be taken into account during project implementation. In fact, model pilot projects are meant not only to be ECBC-compliant, but confirm with more stringent targets, so this could incorporate future climate change effect, implicitly or explicitly. On knowledge sharing, the project will be well-coordinated with other BEE activities (e.g. standards and labelling) as well as relevant projects under the GEF EE Programmatic Framework (e.g. Railways which has activities on Railways buildings).	

GEF COUNCIL COMMENTS

Comments from Switzerland on EE Programmatic Framework (April 2008)

Comment & Response	Reference
Comment 1: ***Component 1:*** *Energy Efficiency Improvements in commercial buildings (UNDP): The objectives and expected outcomes of this project are strongly supported. This is a very relevant project. The key concerns are related to two questions:* ***First:*** *is a technical assistance-based project approach focused on capacity building/technical training capable to address the barriers prevailing in the market and to contribute effectively to market transformation?* ***Second:*** *based on the past track record and the focus of its knowledge base, is UNDP the most suitable agency for implementing such a crucially important project (as the objectives clearly state that EE in commercial buildings is targeted by this intervention and not just an intervention in public buildings)? Would not other agencies such as the World Bank or the ADB, with a track record in project financing, seem much better positioned to take on such a project? This comment reflects the opinion of the authors and not necessarily of FOEN/SDC.* **Response**: The Bureau for Energy Efficiency (BEE) under the Ministry of Power is the proponent and executing partner of this project. BEE has the mandate and capacity to coordinate all EE in Buildings activities in India. BEE is working with a variety of partners who are supporting them in implementing their mandate, amongst which the GEF, TERI, CII, LEED and USAID. Effective market transformation towards a regime of ECBC compliance is the objective of this project. This project will support BEE with a set of technical assistance activities. This intervention is not about project financing. Financing as such is not considered to be a major barrier. Financing energy efficiency is not too lucrative for financial institutions due to uncertainty about returns. There is a need for innovative financing schemes to promote EE in buildings as such there is sufficient liquidity in the financial markets to facilitate both public and private sector financing for commercial and public buildings. Hence there is no need for specific project financing expertise or a line of credit from either World Bank or Asian Development Bank. The Government of India has approved a scheme for implementation of ECBC during the 11th Five Year Plan period under which a number of steps that have been identified to ensure its effective implementation such as: BEE has empanelled ECBC expert architects to provide advice to design professionals to meet the Code requirements; awareness of ECBC through workshops and training programmes will also be conducted and officials of the various line departments are being sensitized on the Code requirements; curriculum development in the various architectural and engineering colleges to develop courses for energy efficient and sustainable building design. All these activities will be supported by the project.	
Comment 2: *Key barriers to EE in commercial buildings in India are:* • *A significant share of new commercial buildings is coming up in the 4 biggest cities and in the large cities where land prices are high. Buildings are typically built by investors/contractors who are renting out the office space; hence they do not have to include future energy bills in their balance sheets. Market transformation towards green buildings needs financing options customized to the*	

Comment & Response	Reference
results of life-cycle cost benefit analysis. • *In such situations, improving energy efficiency calls for innovative financing solutions and service delivery solutions (ESCOs?) as much as for technical training of architects/design professionals on life-cycle cost benefit and return on investment.* **Response**: Outputs 4.1 and 4.2 deals with the financing options customised to commercial buildings in order to be compliant with ECBC requirements. The key barrier is not so much a lack of financing options but the lack of awareness of the short amortization cycle and/ or the lack of incentives for investors and contractors to build ECBC compliant buildings and/ or lack of awareness that low energy bills can be a powerful marketing argument for future rental contracts. It is expected that the activities planned under the project will address the market transformation through awareness and enforcement structure for mandatory ECBC enforcement.	
Comment 3: *There is without any doubt a need for technical training addressing the Energy Conservation Building Code proposed in May 2007. If GEF, however, chooses to intervene basically at the level of technical training (e.g. through UNDP) without bringing the knowledge of financial institutions into play at the same time, a significant opportunity may be missed. It seems important to implement, at least on a pilot scale, model buildings demonstrating the application of advanced designs in selected cities. This is considered a crucial step for influencing investors as well as for dissemination of advanced designs, hence for market transformation.* **Response**: As discussed earlier access to funding for the incremental costs of ECBC compliant buildings is not a barrier, the high cost of borrowing money is the key barrier. This project will support 8 pilot buildings in 5 different climatic zones to demonstrate the application of advanced designs as suggested.	

GEFSEC Review Sheet Comments on PIF and UNDP Response (February 8, 2008)

GEFSEC Review Sheet Comments (Feb. 8, 2008)

2. Has the operational focal point endorsed the project?
Endorsement is available for the EE Program for a total of $40m. There is specific amount endorsed for this project. The amount requested for this PIF is inconsistent between Tables A ($6m for the project) and B ($5.31m). Further, the Agency fee was calculated incorrectly in Table B; it should be 10% of PPG+PIF.

UNDP Response: This has been corrected in tables A and B. In line with the EE Programmatic framework the requested amounts are 5,200,000 + 90,000 for project preparation. The agency fee is 529,000 which makes a total of 5,819,000.

8. Is the project design sound, its framework consistent sufficiently clear?
The general project framework seems sound. However, the budget figures for the project and individual components are problematic (also see comment under Question 5): (1) there is no budget for Component 4; (2) the co-financing level is set at 2 to 1 for each component. This is especially problematic for Component 3. Component 3 is supposed to support piloting of ECBC technologies and measures in five climate zones. This means that the piloting will involve at least five buildings. The GEF budget for this is $3m and co-financing $6m. What will GEF and co-financing support given this budget? It seems that much more co-financing would be needed.
In connection to the above, the total indicative cofinancing is $12m, including $2m (cash and in-kind) from the government and $10m investment from the private sector. This does not square with the co-financing budget in Table A since it appears only $6m from Component 3 will be devoted to investment.

UNDP Response: A budget for component 4 is now included. All co-financing figures have been revised. Co-financing for component 3 is now $ 11,527,500 which is a substantial increase. The underlying investment that is needed for the 5 pilot buildings is approx. $ 121,000,000 of which $ 14,627,500 is the incremental cost of making the buildings ECBC compliant. GEF will contribute $ 3,100,000 to the incremental costs ($ 620,000 per building), the balance of $ 11,527,500 will be covered by the investors (public/ private). The 620k per building will be awarded to the investor based on a public tender thus providing a financial incentive for the investor to make the building ECBC compliant.

The total co-financing is now $ 14,817,500 which results in a ratio of almost 1:3. The figures in all tables have been updated.

10. Is the project consistent and properly coordinated with other related initiatives in the country?
Section D mentions support by USAID to BEE in developing ECBC. Please ensure that the GEF project will build on top of USAID support without overlap or duplication. There seem to be other on-going initiatives related to building EE in India. More elaboration is necessary.

UNDP Response: The Bureau for Energy Efficiency (BEE) under the Ministry of Power is the proponent and executing partner of this project. BEE has the mandate and capacity to coordinate all EE in Buildings activities in India. BEE is working with a variety of partners who are supporting them in implementing their mandate, amongst which the GEF, TERI, CII, LEED and USAID. For ease of implementation of the ECBC technical reference material on the various aspects of ECBC have been developed under the USAID supported ECO III Programme. In addition, curriculum development has also been taken up in the various architectural and engineering colleges to develop courses for energy efficient and sustainable building design.

11. Is the proposed project likely to be cost-effective?
Estimated emissions reduction is $103,225 tons of CO2 per year or 16.3m tons over the 20-year time horizon assuming a market penetration rate of 80% after 10 years of project start. Please provide the basis for the annual estimate and its link to the cumulative figure.

UNDP Response: Estimation of emission reductions has been revised in line with the new methodology. Air-conditioning and lighting are the two most energy consuming end-uses in the commercial building sector. It is estimated that new buildings can reduce between 25-40% energy consumption by incorporating appropriate design interventions in the building envelope, lighting, heating, ventilation and air-conditioning system. ECBC sets minimum energy performance standards for new commercial buildings. It is estimated that implemention of the ECBC will reduce the consumption to about 140 kWh/m^2/year which translates into energy savings of 60 Kwh per sq meter. The project will support ECBC compliance in 5 buildings @ 50,000 sqm which will result in direct savings of 15,000 MWh (60 x 250,000). Multiplying this amount with the emission factor of 0,99 results in savings of 14,850 tonnes of CO2 per annum. Considering the present growth of the commercial building sector there is huge potential of post project and indirect savings which will be calculated during the PPG phase.

14. Does the project take into account potential major risks
Lack of political will is considered to be a low risk. The major risk is that commercial building developers may not voluntarily adhere to ECBC. How can this risk be mitigated? What's the likelihood (and barriers) to make ECBC mandatory?

UNDP Response: The Energy Conservation Building Code (ECBC) is for new commercial buildings having a connected load of more than 500kW and is initially on a voluntary basis. However, the Government is committed to adopting the ECBC for all new government or semi government buildings. Furthermore the Ministry of Environment and Forests under its Environmental Impact Assessment (EIA) Notification has incorporated ECBC standards as part of the EIA and has therefore made ECBC compliance mandatory for large construction projects. All buildings and construction projects having a built up area of more than 20,000 sq.mtrs are required to obtain environmental clearance under the EIA notification.

15. Is the value-added of GEF involvement in the project clearly demonstrated through incremental reasoning?
Discussed. It would be useful to elaborate what the baseline is (including other initiatives) and what is the value-added of GEF intervention. The figures given of 402m kWh of electricity savings and 337,860 tons of CO2 emissions reduction over the life of the project appear to be associated with the pilot buildings (?). The crux of the project seems to be supporting the enforcement of ECBC and eventually market transformation in the commercial buildings sector.

UNDP Response: With regard to the CO2 figures please refer to elaboration under section 13. The value added and crux of this project is to support BEE in the transition towards a mandatory and effective ECBC compliance regime. The Government of India has approved a scheme for implementation of ECBC during the XIth Plan period under which a number of steps have been identified to ensure its effective implementation such as: BEE has empanelled ECBC expert architects to provide advice to design professionals to meet the Code requirements; awareness of ECBC through workshops and training programmes will also be conducted and officials of the various line departments are being sensitized on the Code requirements; curriculum development in the various architectural and engineering colleges to develop courses for energy efficient and sustainable building design. All these activities will be supported by the project.

17. Is the GEF funding level of project management budget appropriate?
GEF: $540k out of $6m (Table A) or $5.3m (Table B). This seems high, and should be reduced

UNDP Response: The management budget has been reduced to 500k.

19. Is the indicative co-financing adequate for the project?
Indicative co-financing appears too low and inadequate for this project. The co-financing ratio of 2:1 also is considered too low for this type of project. See additional comments under Project Design.

UNDP Response: All co-financing figures have been revised. Co-financing for component 3 is now $ 11,527,500 which is a substantial increase. The underlying investment that is needed for the 5 pilot buildings is approx. $ 121,000,000 of which $ 14,627,500 is the incremental cost of making the buildings ECBC compliant. GEF will contribute $ 3,100,000 to the incremental costs ($ 620,000 per building), the balance of $ 11,527,500 will be covered by the investors (public/ private). The 620k per building will be awarded to the investor based on a public tender thus providing a financial incentive for the investor to make the building ECBC compliant.

The total co-financing is now $ 14,817,500 which results in a ratio of almost 1:3. The figures in all tables have been updated.

Comments from Switzerland on EE Programmatic Framework (April 2008)

Component 1: Energy Efficiency Improvements in commercial buildings (UNDP): The objectives and expected outcomes of this project are strongly supported. This is a very relevant project. The key concerns are related to two questions:
First: is a technical assistance-based project approach focused on capacity building/technical training capable to address the barriers prevailing in the market and to contribute effectively to market transformation?
Second: based on the past track record and the focus of its knowledge base, is UNDP the most suitable agency for implementing such a crucially important project (as the objectives clearly state that EE in commercial buildings is targeted by this intervention and not just an intervention in public buildings)? Would not other agencies such as the World Bank or the ADB, with a track record in project financing, seem much better positioned to take on such a project? This comment reflects the opinion of the authors and not necessarily of FOEN/SDC.

UNDP response: The Bureau for Energy Efficiency (BEE) under the Ministry of Power is the proponent and executing partner of this project. BEE has the mandate and capacity to coordinate all EE in Buildings activities in India. BEE is working with a variety of partners who are supporting them in implementing their mandate, amongst which the GEF, TERI, CII, LEED and USAID.

Effective market transformation towards a regime of ECBC compliance is the objective of this project. This project will support BEE with a suite of technical assistance activities. This intervention is not about project financing. Financing as such is not considered to be a major barrier. There is sufficient liquidity in the financial markets to facilitate both public and private sector financing for commercial and public buildings. Hence there is no need for specific project financing expertise or a line of credit from either WB or ADB.

The Government of India has approved a scheme for implementation of ECBC during the XIth Plan period under which a number of steps have been identified to ensure its effective implementation such as: BEE has empanelled ECBC expert architects to provide advice to design professionals to meet the Code requirements; awareness of ECBC through workshops and training programmes will also be conducted and officials of the various line departments are being sensitized on the Code requirements; curriculum development in the various architectural and engineering colleges to develop courses for energy efficient and sustainable building design. All these activities will be supported by the project.

A budget for component 4 is now included. All co-financing figures have been revised. Co-financing for component 3 is now $ 11,527,500 which is a substantial increase. The underlying investment that is needed for the 5 pilot buildings is approx. $ 121,000,000 of which $ 14,627,500 is the incremental cost of making the buildings ECBC compliant. GEF will contribute $ 3,100,000 to the incremental costs ($ 620,000 per building), the balance of $ 11,527,500 will be covered by the investors (public/ private). The 620k per building will be awarded to the investor based on a public tender thus providing a financial incentive for the investor to make the building ECBC compliant.

Key barriers to EE in commercial buildings in India are:
 A significant share of new commercial buildings is coming up in the 4 biggest cities and in the large cities where land prices are high. Buildings are typically built by investors/contractors who are renting out the office space; hence they do not have to include future energy bills in their balance sheets. Market transformation towards green buildings needs financing options customized to the results of life-cycle cost benefit analysis.
 In such situations, improving energy efficiency calls for innovative financing solutions and service delivery solutions (ESCOs?) as much as for technical training of architects/design professionals on life-cycle cost benefit and return on investment.

UNDP response: Activity 2.4 deals with life-cycle cost benefit analysis and returns on investments. This is indeed a crucial element to be considered in an investment decision. The key barrier is not so much a lack of financing options but the lack of awareness of the short amortization cycle and/ or the lack of incentives for investors and contractors to build ECBC compliant buildings and/ or lack of awareness that low energy bills can be a powerful marketing argument for future rental contracts.

There is without any doubt a need for technical training addressing the Energy Conservation Building Code proposed in May 2007. If GEF, however, chooses to intervene basically at the level of technical training (e.g. through UNDP) without bringing the knowledge of financial institutions into play at the same time, a significant opportunity may be missed. It seems important to implement, at least on a pilot scale, model buildings demonstrating the application of advanced designs in selected cities. This is considered a crucial step for influencing investors as well as for dissemination of advanced designs, hence for market transformation.

UNDP Response: As discussed earlier access to funding for the incremental costs of ECBC compliant buildings is not considered to be a key barrier. This project will support 5 pilot buildings in 5 different climatic zones to demonstrate the application of advanced designs as suggested in the comment.

ANNEX C: CONSULTANTS TO BE HIRED FOR THE PROJECT USING GEF RESOURCES

Project management

Position title	USD/ person week	Estimated person weeks	Total (in USD)	Tasks to be performed
National				
National Project Coordinator	750	208	156,000	Oversee the day-to-day planning, implementation and monitoring of project activities ; Assist the NPD in management and implementation of the project and achievement of its goals; Coordinate and manage Inception Workshop and preparation of Inception Report; To prepare progress report, annual work plans and budgets and any other necessary documentation required by UNDP, BEE and the PSCs and recommendation to the Project Steering Committee; Support the elaboration of monitoring & evaluation reports to BEE and UNDP/GEF; Prepare and approve Terms of Reference for consultants and subcontracts and for equipment procurement; Disbursement of funds, maintenance of accounts as per requirements of UNDP and provide inputs to internal and external audits; Liaise with counterparts and main stakeholders; Delegate responsibilities to the Managers ECBC, EE in Buildings Programs and Capacity Building.
Officer - ECBC implementation	375	208	78,000	Provide team leadership and guidance to the ECBC Implementation Team; Coordinate with National Project Coordinator and Project Officers of other two components of the project; Liaise with institutions at central, state and municipal level to ensure proper dissemination of the ECBC norms; Take responsibility of formulating easy to implement ECBC compliance procedures for different institutions; Provide technical inputs during piloting of ECBC compliant buildings in five climatic zones; Provide technical inputs for the training courses and conducting the trainings for the professionals.
Officer - EE in buildings	375	208	78,000	Coordinate with ECBC Implementation Program Officer; Provide technical inputs for the training courses to be conducted for architects/ design professionals, building material suppliers, etc.; Provide substantive inputs to the manager, other two component program officers, consultants and stakeholders; Coordinate the knowledge sharing activity for the energy efficiency equipment and material suppliers, and private agencies; Provide technical inputs towards establishment of testing labs.
Officer - Capacity building	375	208	78,000	Take lead in preparing the training courses and conducting the trainings for the professionals; Develop tools to conduct market assessment of energy efficient materials; Help in administration and enforcement structure of building codes developed; Provide substantive inputs to the manager, other two component program officers, consultants and stakeholders; Lead the task of compiling and disseminating information on energy efficiency financing schemes.
Total		**832**	**390,000**	

Technical Assistance

National Consultants

Position title	USD/ person week	Estimated person weeks	Total (in USD)	Tasks to be performed
Program monitoring	750	100	75,000	Coordinate with all the components of the project; Collaborate with Building, Energy and LEED specialists to prepare publications for lessons learnt from model buildings in five climatic zones; Development of Emission Reduction Calculation tool customized to the project needs and objectives; Collaborate with other teams and consultants to help BEE to develop carbon strategy which leads to sustainability of emission reduction activities.
Building and design experts	750	100	75,000	Provide technical inputs while contacting vendors, builders, contractors who build/design ECBC compliant buildings.
Building and design experts	750	100	75,000	Develop benchmarks for different categories of buildings; Develop modeling assumptions and the implementation plan and program; Develop energy conservation measures, accompanied with validation and prioritization of individual energy conservation measure; Provide inputs during preparation of training and outreach material; Enhance in-house capacity of the implementing partner (BEE).
Training experts	750	100	75,000	Train personally or, as needed, organize other training for the local stakeholders to successfully implement the project and to meet its capacity building objectives; Organize and provide training to the key stakeholders to further develop and implement the adopted practices, methods, or materials.
ECBC experts	750	66	49,500	Provide inputs to the PMU and other members of the team while preparing the workshop, training and outreach material Guide the team during identification and compliance check of the model buildings; Development of administration and enforcement mechanism for ECBC; Develop monitoring and evaluation benchmarks for implementation of ECBC; Provide inputs for accreditation process of testing labs; Coordination with various agencies for obtaining 'No Objection Certification' (NOC) at different stages of procurement.
EE in new buildings experts	750	90	67,500	Provide awareness on building rating system concept and relevance of ECBC; Provide all necessary templates and tools to calculate energy savings from BEE rated buildings (all categories); Provide inputs to prepare the report and workshop materials for the capacity building of the stakeholders s at different levels; Coordinate with other agency implemented energy efficiency programs for existing buildings; Provide awareness on building rating system concept and relevance of ECBC; Provide all necessary templates and tools to calculate energy savings from BEE rated buildings (all categories).
Climate change experts	750	20	15,000	Monitor, track, and suggest methods by which to calculate key metrics of GHG emissions saved as a result of this project; Provide reporting to the mid-term, final evaluation, and general information collection and report drafting according to UNDP/GEF M&E requirements.
Procurement specialists	750	66	49,500	Plan and procure services for the project programs; Procurement of services, as and when required; Procurement planning for timely execution and completion of various projects; Execution of EOIs, ToRs and other procurement related activities; Monitoring of contracts and amendments, if

Position title	USD/ person week	Estimated person weeks	Total (in USD)	Tasks to be performed
				required; coordination with BEE and other stakeholders.
Finance management	750	66	49,500	Support the project manager in arranging cooperation with the current project partners and, as applicable, in establishing new, additional national and/or international (financial and other) partnerships to support the project goals and objectives.
Media and communication	750	66	49,500	Develop a plan for media and outreach program as per the annual work-plan of the project; Develop the workshop material from the inputs of the area specialists; Develop outreach material and outreach program to disseminate the project objectives and programs; Develop and strengthen relationship with the private and other stakeholders; Provide inputs to prepare monitoring and evaluation manual; Coordinate with BEE and other teams to get inputs while developing outreach material.
Web designers	750	10	7,500	Establish and develop the project web-site and create ways to keep it updated and relevant to the targeted customers and project partners.
Mid-term evaluator	750	6	4,500	Support the project's mid-term evaluation and related stakeholder consultations, information collection and report drafting.
Final term evaluator	750	6	4,500	Support the project's final evaluation and related stakeholder consultations, information collection and report drafting.
Renewable energy buildings expert	750	20	15,000	Suggest practical methods and means by which to undertake RE (e.g., solar water heaters, passive solar and PV) in buildings; Lend input to the guidance and training documents developed for this project; Provide construction details, calculations, and technological solutions as needed, for the guidance on integrated building design approach; Provide engineering and technical support for use of passive/active RE systems) to be used in the demonstration building.
Audit experts	750	66	49,500	Undertake project audit as per the UNDP procedures and the annual audit plan; Prepare final audit report as per the UNDP instructions to be submitted to UN Audit Board
Other	750	75	56,250	Provide complementary support for and/or actual implementation of the projects public outreach, workshops and seminars, market monitoring and other related activities
Total		**957**	**717,750**	

International Consultants

Position title	USD/ person week	Estimated person weeks	Total (in USD)	Tasks to be performed
EE architecture design	3,000	50	150,000	Organize training and guidance to the local stakeholders on the EE building designs and methods adopted or under development; Review and analyze current EE building design practices in India together with the existing institutional and other arrangements for their implementation, and identify possible gaps and improvement needs; Analyze the technical and financial feasibility of suggested EE building practices in Indian market environment; Assist and support the teams designing the energy efficient demonstration buildings; Monitor and analyze the impact of the adopted design practices and identify their further development needs.

Position title	USD/ person week	Estimated person weeks	Total (in USD)	Tasks to be performed
Training experts	3,000	63	189,000	Monitor, report and organize training and guidance to the local stakeholders on the international EE building designs and methods adopted or under development and on the lessons learned and best practices as regards their implementation; Review and analyze current EE building design practices in India together with the existing institutional and other arrangements for their implementation, and identify possible gaps and improvement needs; Analyze the technical and financial feasibility of different internationally adopted or suggested EE building practices in Indian market environment.
EE in buildings policy and ECBC	3,000	22	66,000	Review and analyze current EE building policies in India together with the existing institutional and other arrangements for their implementation, and identify possible gaps and improvement needs; Analyze the technical and financial feasibility of different internationally adopted or suggested EE policies in Indian market environment; Monitor and analyze the impact of the adopted design policies and identify their further development needs.
Experts of verification & monitoring	3,000	32	96,000	Compile and summarize information on the availability and capacity of the existing materials or methods labs in Turkey (government, private sector and/or manufacturer in-house) to be used for enhanced product testing and compliance checking with regards to materials, equipment, and methods for EE buildings; In consultation with the key stakeholders and with support from international expert(s), draft proposals for a strengthened compliance checking and enforcement scheme both for selected products and the retail chain, including organization of testing, suggested procedures in the case of non-compliance, proposed pilot projects etc.; Organize and provide training to the key stakeholders to further develop and implement the adopted schemes.
EE modeling and software	3,000	36	108,000	Coordinate with the project managers and experts to devise or adapt EE modeling software that supports areas considered of key value to this project; Test and fine-tune modeling software; Provide training in software use to key stakeholders and lend support to the provision of data entry into the real-time website.
EE market assessment and analysis	3,000	16	48,000	Design survey instruments for undertaking specific stakeholder surveys for collecting information about the key drivers or barriers in undertaking EE in new buildings as well as the impact of the public awareness-raising and marketing activities supported by the project; Ensure that the Survey Instrument is key to baseline development and end-of-project impact analysis; Evaluate and annotate the baseline, once established, for each target group of stakeholders surveyed; Lend input to the specific outreach and marketing materials and campaigns by answering research questions asked through survey; Advice on impact analysis.

Position title	USD/ person week	Estimated person weeks	Total (in USD)	Tasks to be performed
Renewable energy buildings experts	3,000	30	90,000	Suggest practical methods and means by which to undertake RE (e.g., solar water heaters, passive solar and PV) in buildings; Lend input to the guidance and training documents developed for this project, based on international experiences; Provide construction details, calculations, and technological solutions as needed, for the guidance on integrated building design approach; Provide engineering and technical support for use of passive/active RE systems) to be used in the demonstration building.
Evaluation experts	3,000	5	15,000	Support the project's mid-term and final evaluation and related stakeholder consultations, information collection and report drafting.
Internal regulations and incentives	3,000	28	84,000	Draft proposals for recommended legal and regulatory changes in India and elaborating mechanisms for their effective implementation, including, as applicable, specific promotional campaigns, financial and/or incentive schemes to be implemented in co-operation with the private sector.
Benchmarking and audits EE	3,000	22	66,000	Develop a energy consumption data collection tool on the basis of ASHRAE 90.1.2004 or local code (whichever is more stringent and updated); Support developing benchmarks for different categories of buildings in view of international experiences; Provide inputs during preparation of training and outreach material; Enhance in-house capacity of the implementing partner (BEE); Provide technical inputs while contacting vendors, builders, contractors who build/design ECBC compliant buildings.
Other	3,000	60	180,000	Provide complementary support for and/or actual implementation of the projects public outreach, workshops and seminars, market monitoring and other related activities.
Total		**364**	**1,092,000**	

ANNEX D: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS

A. EXPLAIN IF THE PPG OBJECTIVE HAS BEEN ACHIEVED THROUGH THE PPG ACTIVITIES UNDERTAKEN.

In January 2008, UNDP submitted the PIF and PPG request to the GEF Secretariat, which was cleared by the GEF CEO in October 2008. In 2009, the services of an international and national consultant were hired, supported by the PPG grant, to advise on the development of the project and elaborate the necessary documentation for GEF submission through UNDP. As a main achievement of the PPG phase should be the final versions of (a) CEO Endorsement request and (b) the UNDP Project Document. Overall the PPG Exercise has achieved this objective.

Results of the Logical Framework Analysis (results in Project Planning Matrix) that was carried out by the team together with the stakeholders has enabled in the detailed design of the project components, expected outputs and planning activities that results the outputs expected. As a result, the Project Planning Matrix (refer Annex A, Project Results Framework) is derived in cooperation with the stakeholders. Gathered available data and information during this phase were also used in the project design. The discussions with the key stakeholders and project partners (BEE, Ministry of Power, MNRE, DLF etc.) have made possible the identification of relevant issues and barriers that need to be addressed and considered in the development and implementation of this project. Intensive discussions with the building owners and designers, architects, decision makers and relevant industry associations have made it possible for the project team to fully understand the nature and extent of these issues/barriers (refer to Section 3, of the UNDP ProDoc for more details).

B. DESCRIBE IF ANY FINDINGS THAT MIGHT AFFECT THE PROJECT DESIGN OR ANY CONCERNS ON PROJECT IMPLEMENTATION. N/A

C. PROVIDE DETAILED FUNDING AMOUNT OF THE PPG ACTIVITIES AND THEIR IMPLEMENTATION STATUS IN THE TABLE BELOW:

Project Preparation Activities Approved	*Implementation Status*	*GEF Amount ($)*				*Co-financing ($)*
		Amount Approved	*Amount Spent To-date*	*Amount Committed*	*Uncommitted Amount**	
Collecting and analyzing information on Commercial building sector in the country	Completed	15,000	61,682		-	**20,000**
Consultation with Government Departments at various levels to commercial building sector	Completed	15,000	39	0	-	**30,000**
Consultation with developers and building material suppliers and other stakeholders related to commercial building sector	Completed	25,000	69	20,000	-	**15,000**
Discussions with vocational institutions on developing training programmes on Energy Efficient Buildings in compliance with ECBC	Completed	20,000	3,000	0	-	**25,000**
Developing Project Proposal	Completed	15,000		5,220	-	
Total project preparation financing		90,000	64,780	25,220	-	**90,000**

* Uncommitted amount should be returned to the GEF Trust Fund. Please indicate expected date of refund transaction to Trustee.

United Nations Development Programme
India
GLOBAL ENVIRONMENT FACILITY
PROJECT DOCUMENT

Project Title: Energy Efficiency Improvements in Commercial Buildings

UNDAF Outcome(s): By 2012, the most vulnerable, including women and girls, and government at all levels have enhanced abilities to prepare, respond and adapt/recover from sudden and slow onset of disasters and environmental changes.

UNDP Strategic Plan Environment and Sustainable Development Primary Outcome: Strengthened national capacities to mainstream of environment and energy concerns in to national development plans.

UNDP Strategic Plan Secondary Outcome: Countries develop and use market mechanisms to support environmental management.

Expected CP Outcome: Progress towards meeting national commitments under multilateral environmental agreements

Expected CPAP output: Supporting national development objectives with co-benefits of mitigating climate change

Implementing Partner: Bureau of Energy Efficiency (BEE), Ministry of Power, Government of India

Brief Description

The Bureau of Energy Efficiency (BEE) is the statutory body to facilitate and coordinate energy efficiency initiatives at the central level. To promote energy efficiency technologies and measures in new buildings under the Energy Conservation Act (EC ACT) 2001, the Bureau of Energy Efficiency (BEE) has developed the Energy Conservation Building Code (ECBC). The ECBC is currently voluntary and India is still in the early stages of implementing the new building energy code. In practice, few (public and commercial) buildings in India currently meet the code and none of the states have adopted it yet. The expected addition of commercial building floor area in India is growing at about 8% per year and hence achieving energy efficiency in this sector is important. The project aims to address the barriers identified informational, capacity, institutional and financial that will help bring ECBC under mandatory regime.

GEF-UNDP's intervention aims to address the above barriers and assist the Government to implement and operationalize the ECBC, through a comprehensive and integrated **approach** that will focus on (a) Strengthening of institutional capacities at various levels to implement ECBC and other energy efficiency programs for commercial buildings, (b) Developing technical expertise and awareness raising of key partners; (c) Compliance with ECBC demonstrated in 8 model buildings (with a total floor area of 1.47 million m^2) in five climatic zones, (d) Formulating fiscal and regulatory incentives for investors and (e) Monitoring, evaluation; knowledge sharing and learning. Eight pilot commercial buildings planned are in the cities (in 5 different climatic zones) namely; Hyderabad, Jaipur - Hot & Dry, Kolkata, Mumbai - Hot Humid, Bengaluru - Moderate, Shimla - Cold and Ludhiana, New Delhi –Composite climate. Estimated annual direct carbon dioxide emission reduction resulting from these investments is 90.7 ktCO_2 per year or 181.4 ktCO_2 during the project duration assuming the buildings are operational for two years and 2.27 million tonne CO_2 cumulatively over 25 years of their lifetime. Indirect emission reduction as a result of the project capacity and institutional strengthening activities is estimated on a conservative basis as per "Manual for Calculating GHG Benefits of GEF Projects" (a) bottom up approach results in 2,720,682 tCO_2 and (b) top-down approach results in 48,969,467 tCO_2.

Programme Period:	2010-2012
Atlas Award ID:	00060037
Atlas Project ID:	00075374
GEF Sec Project ID:	3555
PIMS #	4043
Umbrella Project:	Programmatic framework for EE in India (ID: 3538)
Start date:	October 2010
End Date	September 2014
Management Arrangements:	National Implementation

Total resources required	USD 21,027,660
Total allocated resources:	USD 21,027,660
• Regular	
• Other:	
o GEF	USD 5,200,000
o Government (BEE)	USD 2,976,596
o SDC (Swiss Agency for Development and Cooperation)	USD 1,787,234
o DLF	USD 11,063,830

Agreed by (Government): _____

Agreed by (Implementing partners): _____

Agreed by (UNDP): _____

ACRONYMS AND ABBREVIATIONS

APR-PIR	Annual Project Review/Project Implementation Reports
BEE	Bureau of Energy Efficiency
CII	Confederation of Indian Industry
CO	Country Office (UNDP)
CP	Country Programme
CPAP	Country Programme Action Plan
DEA	Department of Economic Affairs
DFID	Department for International Development, United Kingdom
DSM	Demand Side Management
EC	Energy Conservation
EE	Energy Efficiency
EEU	Energy and Environment Unit (UNDP)
ECBC	Energy Conservation Building Code
EIA	Environmental Impact Assessment
EPI	Energy Performance Index
FACE	Fund Authorisation and Certification of Expenditures
FTE	Final Term Evaluation
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GRIHA	Green Rating for Integrated Habitat Assessment
GWh	Gigawatt-hour (billion watt-hour)
IGBC	Indian Green Building Council
IIM	Indian Institute of Management
IIT	Indian Institute of Technology
IREDA	Indian Renewable Energy Development Agency
kWh	Kilowatt-hour
LEED	Leadership in Energy and Environmental Design
MNRE	Ministry of New and Renewable Energy
MOEF	Ministry of Environment and Forests
MOP	Ministry of Power
MTE	Mid Term Evaluation
Mtoe	Million tonnes of oil equivalent
MW	Megawatt (= million Watt)
MWh	Megawatt-hour
NABL	National Accreditation Board for Testing and Calibration Laboratories
NID	National Institute of Design
NPC	National Productivity Council
NPC	National Project Coordinator
NPD	National Project Director
PMU	Project Management Unit
PSC	Project Steering Committee
QPR	Quarterly Progress Report
RCU	Regional Coordination Unit (UNDP)
RTA	Regional Technical Advisor (UNDP)
SDC	Swiss Agency for Development and Cooperation
sq.ft	square feet (1 m^2 = 10.7639 ft^2)
SME	Small and Medium-sized Enterprise
tCO_2	tonne of carbon dioxide
TERI	The Energy and Resources Institute
UN	United Nations
UNDAF	UN Development Assistance Framework
UNDP	UN Development Programme
UNIDO	UN Industrial Development Organization
US	United States
USAID	US Agency for International Development
USEPA	US Environment Protection Agency
USD or US$	US dollar
Yr or y	year

Note: 1 USD = 47 Indian Rupee (INR)

TABLE OF CONTENTS

PART A. SITUATION ANALYSIS

1. CONTEXT AND GLOBAL SIGNIFICANCE: ENVIRONMENTAL, POLICY AND INSTITITIONAL

Energy Efficiency in India and the Institutional Setup

1. India has the world's second largest population and continues to grow at 1.34% per year during the years 2007 and 2008[1]. India is among the 10 fastest growing economies in the world with an average growth rate in the GDP of 5.8 percent during the first decade of economic reforms (1992-2001). The continued annual GDP growth was affected by the global financial crisis over the past two years decelerating from 9.3% in 2007 to 6.1% in 2009[2]. Commercial primary energy consumption in India has grown by about 700% in the last four decades. The current per capita commercial primary energy consumption in India is about 350 kgoe/year which is well below that of developed countries. Driven by the rising population, expanding economy and a quest for improved quality of life, energy usage in India is expected to rise to around 450 kgoe/ year in 2010. In future, these growth rates are expected to continue, fuelling the energy demand further. The International Monetary Fund (IMF) has predicted India's growth to accelerate to 6.5% in 2010 from 5.3% in 2009. The Eleventh Five-Year Plan (2007-2012) predicts an energy demand of 547 Mtoe in 2011-12 and between 1,350-1,700 Mtoe by the year 2030. While the country's per capita energy consumption will remain much lower than that of industrialized countries, India's total energy consumption is expected to continue increasing significantly.

2. Increased energy consumption will lead to more greenhouse gas (GHG) emissions with serious impacts on the global environment; in particular, since the predominant usage of coal in the country's energy sector is expected to continue until 2020. Coal provided about 52% (199 Mtoe) of the energy demand in 2006-07. The capita energy consumption and emissions have remained relatively low at 1.2 tonnes[3] of carbon dioxide per person in 2005 due to the large population. India is currently the world's seventh largest consumer of energy and the sixth largest source of greenhouse gas (GHG) emissions and second in terms of annual GHG emissions growth. According to an International Energy Outlook in 2009, India accounts for 7% of the world's coal-related carbon dioxide emissions from 2006 to 2030 and carbon dioxide emissions from coal combustion are projected to total 1.3 billion metric tonne in 2030, accounting for more than 7% of the world total.

3. The expected increase in energy demand, along with the predominance of coal in the energy mix, highlights the significance of promoting energy efficiency. The recent Five-Year Plans (FYP) has emphasized the need for efficient use of energy resources to achieve sustainable development. By the end of the XIst FYP, a potential was assessed to save 23,700 MW of power generation capacity in the country. Some of the major efforts promoting energy efficiency in the past are summarized below:

- Setting up or supporting institutions for the promotion of energy efficiency services. These include industry associations such as Confederation of Indian Industry (CII), the Indian Green Building Council (IGBC), Financial Institutions (FI), such as the Indian Renewable Energy Development Agency (IREDA), Industrial Development Bank of India Limited (IDBI Bank) and ICICI Bank, as well as the National Productivity Council (NPC) and research institutes, such as The Energy and Resources Institute (TERI).

[1] World Bank (2009), World development Indicators (WDI) online
[2] https://www.cia.gov/library/publications/the-world-factbook/geos/in.html and http://www.eia.doe.gov/cabs/India/Background.html
[3] World Bank (2009), World development Indicators (WDI) online

- Regulatory reforms were initiated in 90's for rational pricing of energy. These have brought average retail energy prices to levels that are at par or above the cost of supply. Coal and petroleum prices have been largely deregulated and average electricity prices paid by the end-users now approximate long-run marginal costs and based on multi-year tariffs (MYT).
- The Energy Management Centre (EMC) was established for planning and developing energy efficiency programmes. With the enactment of Energy Conservation Act (passed in 2001), the roles and responsibilities have been assigned to a new agency, the Bureau of Energy Efficiency (BEE).

Energy Policy in India and the Bureau of Energy Efficiency

4. Considering the vast potential for energy savings, the Indian government in 2001 enacted the Energy Conservation Act (EC Act). The Act provides for the legal framework, institutional arrangement and a regulatory mechanism at the Central and State level to embark upon energy efficiency drive in the country. The EC Act mandates Government to designate consumers who consume power beyond a benchmarked limit. Designated consumers[4] are required to appoint Energy Managers[5], to adhere to energy efficient consumption norms, required to submit consumption information and to conduct mandatory audit (if required). Designated consumers include railways, the power sector, energy-intensive industries (e.g., fertilizer, cement, paper, steel and certain chemical industries) and large buildings.

5. The EC Act (EC Act 2001) deals with several mandatory and promotional measures:
   - Standards and labelling for equipment and appliances – To reduce the energy consumption in domestic sector and to transform the market with energy efficient appliances.
   - Development of Energy Conservation Building Codes – To conserve energy in building sector. The Energy Conservation Building Code prescribes the specifications for various building components to construct energy efficient new buildings.
   - Energy audits for existing buildings – To achieve improved energy performance in existing buildings.
   - Professional certification and accreditation of energy auditors and energy managers[6] - To produce trained professionals to conduct energy audits manage energy in industries, buildings, municipalities and agriculture operations.
   - Elaboration of manuals and dissemination of information and best practices[7] - To produce best practice manuals and guidelines for different industries.
   - Support energy efficiency policy research – To continue support on formation of effective policies for energy efficiency in different sectors.
   - Capacity building and energy conservation awareness in education – To raise awareness at school and university level about energy efficiency.

[4] Designated consumer: Gazette of India (Part II Sec 3 Sub-sec(ii) 19-03-2007)- Ministry of Power - The Central Government notified the 9 energy intensive industries as designated consumers under The EC Act 2001 ; (1) Thermal Power Stations - 30,000 metric tonne of oil equivalent (toe) per year and above, (2) Fertilizer - 30,000 toe per year and above, (3) Cement - 30,000 toe per year and above, (4) Iron & Steel - 30,000 toe per year and above, (5) Chore-Alkali - 12,000 toe per year and above, (6) Aluminum - 7,500 toe per year and above, (7) Railways - electric traction Sub-Section(TSS),diesel loco shed, Production units and Workshops of Indian Railways having total annual energy consumption of 30,000 toe or more under Ministry of Railways, (8) Textile - 3,000 toe per year and above, (9) Pulp & Paper - 30,000 toe per year and above. [Energy Conversion values used for working out annual energy consumption in terms of metric tonne of oil equivalent for the purpose of above analysis i) 1 kg of oil equivalent: 10,000 kcal and ii) 1 metric tonne of oil equivalent (toe): 10 x 10^6 kcal.] http://www.bee-india.nic.in/content.php?id=5 accessed on 3 April 2010.

[5] Energy Managers are BEE accredited professionals trained to assist designated consumers in achieving improved energy performances in their respective facilities.

[6] So far, about 2,700 auditors/managers were accredited/certified.

[7] A National Energy Conservation Awards scheme has been introduced, coordinated by BEE to provide recognition of innovation and achievements in energy conservation by buildings, industry, railways, municipalities and SDAs.

- Designated consumers – To identify energy intensive industries and name them as designated consumers and promote energy efficiency in each of them.
- Establish energy efficiency (EE) delivery systems through public-private partnerships – To develop innovative energy efficiency delivery systems through public private partnerships

6. The Bureau of Energy Efficiency (BEE) was established in March 2002 under the Ministry of Power (MoP) to implement the EC Act 2001. BEE is the statutory body for development of energy efficiency policy and strategies based on self-regulation and market principles and for the facilitation and coordination of energy efficiency at the central level while "state designated agencies" (SDAs) do the same at the state level in 30 states. The EC Act 2001 further mandates BEE to work with designated consumers and other agencies to enforce the provisions of the act. However, there are no provisions in the budget of the central government at present to enforce checks and compliance to the Act.

7. The major functions of BEE include:

- Develop and recommend to the Central Government the norms for processes and energy consumption standards.
- Develop and recommend to the Central Government minimum energy consumption standards and labelling design for equipment and appliances.
- Develop and recommend to the Central Government specific Energy Conservation Building Codes (ECBC).
- Recommend the Central Government for notifying any user or class or users of energy as a designated consumer.
- Take necessary measures to create awareness and disseminate information for efficient use of energy and its conservation.

8. Among other programmes, implementation of the ECBC developed in 2007 is a key thrust area of BEE for promoting energy efficient building design (refer box 1).

Box 1 - Energy Conservation Building Code (ECBC)

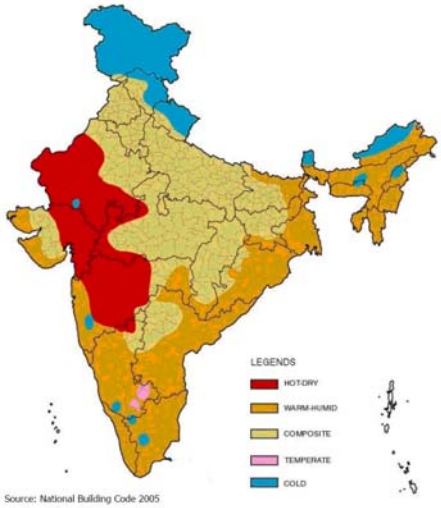


Figure 1: Climate zone map of India

Under its statutory authority, the Bureau of Energy Efficiency (BEE) with the support of the Ministry of Power (MoP) has launched the Energy Conservation Building Code (ECBC) in 2007. The ECBC has been developed by the International Institute for Energy Conservation (IIEC) under contract with the United States Agency for International Development (USAID) as a part of the Energy Conservation and Commercialization (ECO) Project providing support to the (BEE) Action Plan. The purpose of this code is to provide minimum requirements for the energy-efficient design and construction of buildings. The process of development of ECBC involved extensive data collection and analysis regarding building types, building materials and equipment. Further, the code takes in to consideration the climatic condition.

There are 5 distinct climatic zones in India and the ECBC takes in to account these climatic zones in case of Building envelop design. ECBC is currently voluntary, but it is proposed to make the ECBC mandatory for all new building that have a connected load of 500 kW or higher or a contract demand of 600 kVA or higher. **The code is also applicable to all buildings with a conditioned floor area of 1,000 m^2 or higher. The code is recommended for all other buildings.** The structure of ECBC is patterned against that of the ASHRAE Standard 90.1-2004. A summary of the major contents of ECBC are given below:

Administration and enforcement	Compliance for all applicable commercial buildings (both government and private), additions and major renovations to existing commercial buildings can also go for ECBC compliance through retrofits. So far, there is no existing commercial building that has gone for ECEBC compliance.

Envelope	Mandatory provisions and either the prescriptive criteria or trade-off options
HVAC	Mandatory provisions and prescriptive criteria
Hot water and pumping	Mandatory provisions, including solar water heating for at least 1/5 of design capacity, unless systems use heat recovery
Lighting	Mandatory provisions and prescriptive criteria for interior and exterior lighting features
Electrical power	Mandatory requirements for transformers, motors, and power distribution systems
App. A - Definitions, abbreviations and acronyms	Definitions of terms, abbreviations and acronyms in the context of this code
App. B – Whole building performance method	An alternative to the prescriptive requirements of the code
App. C – Default values for typical constructions	Procedure for determining window efficiency (also known as fenestration product U-factor), and the Solar Heat Gain Coefficient (SHGC), as well as typical thermal properties of common building and insulating materials (from ASHRAE Fundamentals Handbook, 2001)
App. D – Building envelope trade-off method	Procedure for calculating envelope performance factor (EPF) and tables for EPF coefficients for the five climate zones and the two building occupancy schedules
App. E – Climate zone map	From the National Building Code 2005, Part 8, Figure 1 (see map above)
App F. – Air-side economizer acceptance	Construction inspection and procedure for equipment testing
App. G – Compliance forms	Envelope summary, building permit plans checklist, mechanical summary, mechanical checklist, lighting summary and lighting permit checklist

India and Climate Change

9. India is undertaking several initiatives to address the threat of climate change on issues ranging across forestry, glaciology, energy efficiency and climate change technology. India is an active participant in international negotiations on climate change under the UN Framework Convention on Climate Change (UNFCCC). The Ministry of Environment and Forests is UNFCCC focal point as well as the operational focal point of the Global Environment Facility (GEF), while the Department of Economic Affairs (DEA) of the Ministry of Finance is the GEF political focal point.

10. The 8 missions under India's National Action Plan on Climate Change (NAPCC) are, National Solar Mission, National Mission for Enhanced Energy Efficiency, National Mission on Sustainable Habitat, National Water Mission, National Mission for Sustaining the Himalayan Ecosystems, National Mission for a Green India, National Mission for Sustainable Agriculture, and National Mission on Strategic Knowledge for Climate Change. The NAPCC's relevance relating to this project includes:

- Achieving national growth objectives through a qualitative change in direction that enhances ecological sustainability, leading to mitigation of greenhouse gas emissions;
- Devising efficient and cost-effective strategies for end-use demand-side management.
- Engineering new and innovative forms of market, regulatory and voluntary mechanisms to promote sustainable development.

Assistance by UNDP in the Area of Environment and Energy

11. The UN Development Assistance Framework (UNDAF) provides the objectives of assistance for the period 2008-2012. The over-arching objective of the UNDAF is "promoting social, economic and political inclusion for the most disadvantaged, especially women and girls" and the specific goals are in line with the national priorities of the Government of India's Eleventh FYP. Regarding environment, Outcome 4 of the UNDAF refers mentions "By 2012 the most vulnerable people, including women and girls and government at all levels have enhanced abilities to prepare, respond, and adapt/recover from sudden and slow onset disasters and environmental challenges".

12. The UNDP was an active partner in the development of the UNDAF and is also a lead agency for many of the thematic areas. UNDP will continue to support government's efforts towards meeting commitments under multilateral agreements through a two-pronged approach involving leveraging of additional environmental finance and supporting activities on the ground that seek to safeguard environmental resources. A special focus will be placed on energy efficiency in order to contribute to reduction of greenhouse gas emissions in energy intensive industries, transport and commercial sectors, where a burgeoning population and economic growth have resulted in a gap between energy demand and supply.

13. The Government of India, through its designated nodal department, the Department of Economic Affairs (DEA), will exercise national ownership and direction of UNDP program activities by approving and signing the Country Programme Action Plan (CPAP) 2008-2012 with UNDP. The CPAP mentions that Eleventh FYP stresses the need to ensure that growth is resource efficient and environmentally benign in key sectors such as industry, infrastructure and agriculture. The several multilateral environmental agreements to which India is a signatory – climate change, biodiversity, desertification, chemical management and ozone depleting substances offer an enormous opportunity to address global environmental concerns through action at national and local levels. The various policy instruments under these agreements (e.g., Global Environment Facility, Multilateral Fund, Technology Transfer, Clean Development Mechanism, etc.) are being increasingly used to leverage financing and additional support in terms of state-of-art technologies and capacity development.

14. Under the UNDAF Outcome 4; the Country Program (CP) 2008-2012 mentions as CP outcome 4.3 "Progress towards meeting national commitment under multilateral environmental agreements" with the related output "strengthened capacity for low carbon development and sustainable management of natural resources", while the CPAP specifically refers to GEF as source of funding through UNDP for climate-related activities.

15. The Bureau of Energy Efficiency (BEE) as indicated earlier is the statutory body to facilitate and coordinate energy efficiency initiatives at the central level. It is proposed that GEF resources be integrated into the national energy conservation and efficiency strategy by supporting specific components.

Energy use in Buildings

16. Over the years, electricity use has increased drastically in the commercial sector (see Figure 2). In commercial buildings, the annual energy consumption per square meter of the floor area is in excess of 200 kWh with air-conditioning and lighting serving as the two most energy consuming end-use applications within a building. This has led the government including them as a "designated consumer" under the Energy Conservation Act (2001). "Designated consumers" as identified by BEE are energy intensive industries or similar establishments recognized under the EC Act (2001).

Figure 2: Increase of electricity use in the commercial sector

17. The building sector is the second largest employment provider next to agriculture. Its size is expected to reach USD 60 billion per year by 2010 and commercial real estate market specifically would reach USD 12 billion per year. The building sector contributes to about 5% of the country's GDP, which is expected in the next 4-5 years to rise to 6%. In 2004-05, over 40 million m^2 of commercial and residential

construction was added. Recent trends show a sustained growth of 8-10% over the coming years, thus highlighting the pace at which energy demand in the building sector is expected to rise.

18. Consequently, the building industry is also one of the biggest emitter of GHGs in India. Electricity consumption in building sector in India is 7% of the country's total electricity consumption. Of the building sector, commercial building space accounts for 33%. The building sector is growing at 8-10% annually.

19. There are vast opportunities to reduce electricity consumption and increase energy efficiency within commercial buildings. It is estimated that new buildings can reduce between 20-50% energy (fossil fuel use as well as electricity) consumption by incorporating appropriate design interventions in the building envelope, lighting, Heating, Ventilation and Air-Conditioning (HVAC) system (see Box 2). The significant growth patterns are witnessed if introduced to efficiency measures and can provide sizeable savings for the economy.

Box 2 - Energy efficiency measures for buildings

It is estimated that new buildings can reduce energy consumption on an average between 20-50% by incorporating appropriate design interventions in the building envelope, heating, ventilation and air-conditioning (HVAC, 20-60%), lighting (20-50%), water heating (20-70%), refrigeration (20-70%) and electronics and other (e.g., office equipment and intelligent controls, 10-20%).

Through energy efficiency measures for buildings, the energy consumption in a building can be reduced while maintaining or improving the level of comfort in the building. They can typically be categorized into:

- Reducing heating demand;
  - Limiting the area exposed to outdoors to a minimum (more complex design, more exposed surface area)
  - Improving air tightness (e.g., caulking holes and cracks) and the insulation of the building
  - Reducing ventilation losses
  - Selecting efficient heating systems with effective controls
- Reducing cooling demand (need for air conditioning);
  - Controlling solar gains by avoiding excessive glazing, use of shading and blinds, glazing with the lowest solar heat gains factor;
  - Selecting office equipment with reduced heat output;
  - Making use of thermal mass materials and night ventilation to reduce peak temperatures
  - Reducing lighting loads and installing effective lighting controls
- Reducing the energy requirements for ventilation;
  - A building design that maximizes natural ventilation (air passing from one side to the other side of the building)
  - Effective window design
  - Using energy efficient mechanical ventilation systems
- Reducing energy use for lighting;
  - Appropriate window design and glass to make maximum use of daylight while avoiding excessive solar gain
  - Energy efficient lighting systems (e.g. using task lighting to avoid excessive background luminance levels; selecting lamps with a high efficacy; providing effective controls that prevent lights being left on unnecessarily
- Reducing energy used for heating water;
  - Proper insulation of pipes
  - Installing time controls and setting hot water thermostats to the appropriate temperature
  - Switching of electric heating elements when hot water is available
- Reducing electricity consumption of office equipment and appliances;
  - Use energy-efficient appliances (computers, monitors, printers, faxes, copiers, etc.), taking advantage of labelling schemes
  - Employ 'switching off – power down' modes in equipment
- Good housekeeping measures
  - Implement an energy conservation plan, involving staff, setting targets, conducting walk-around

2. ENERGY EFFICIENCY SOLUTIONS AND BASELINE ANALYSIS

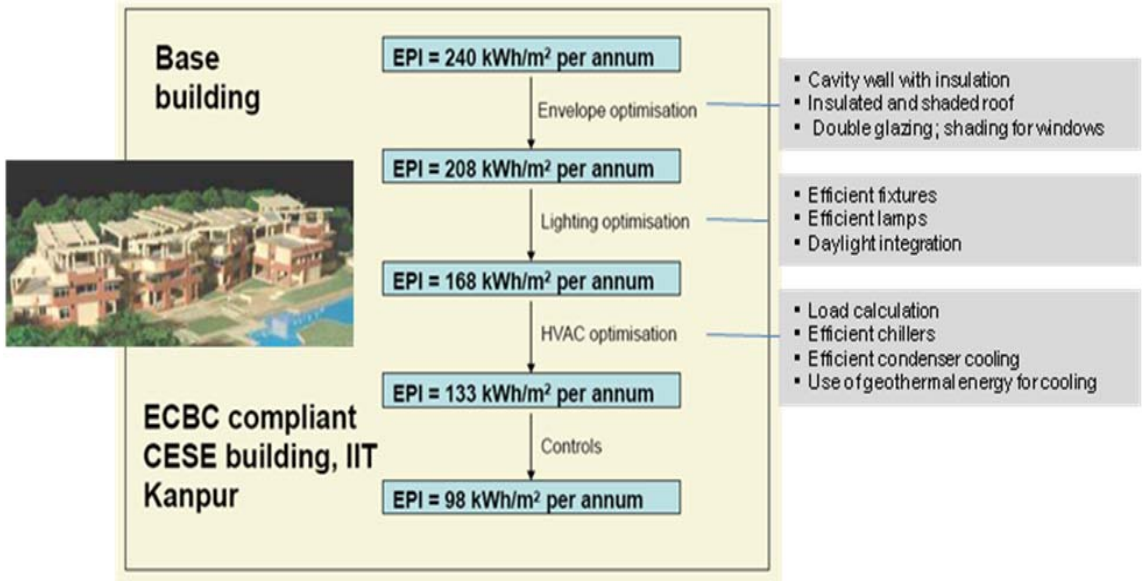
20. There exists significant possibility for energy efficiency in commercial buildings in India. For new commercial buildings[8], BEE has developed the Energy Conservation Building Code (ECBC). The purpose of ECBC is to provide inputs to the energy-efficient design and construction of buildings. The total commercial building floor area in India is estimated to be about 430 million m^2 in the year 2010[9]. Most commercial buildings in India have an Energy Performance Index (EPI) of 200-400 kilowatt-hour (kWh) per m^2 per year, while similar buildings in North America and Europe have EPI lower than 150 kWh per m^2 per year. BEE has data on energy savings through the implementation of energy efficiency measures in new and existing buildings. BEE has facilitated implementation of such initiatives in several government buildings.

21. Energy-conscious building design has been shown to reduce EPI to 180 kWh per m^2 per year (national benchmark) and is considered as ECBC compliant. ECBC compliant means those buildings which meet the code and are considered as EE buildings. Some examples are given in Box 3. These case studies show that employing environmentally sensitive designs can lead to savings of the order of 20-50%. Initial investment cost will increase by 10-15%, with payback period varying from 3 to 7 years. Further, star ratings are given to the commercial buildings as per their performance which ranges from 180 kWh per m^2 (one star) until about 100 kWh per m^2 per year (five star), refer figure 3 for more details.

Box 3 - Case studies, energy efficiency in buildings

The following case studies give an idea on energy savings that can be obtained by implementation of energy conservation measures.

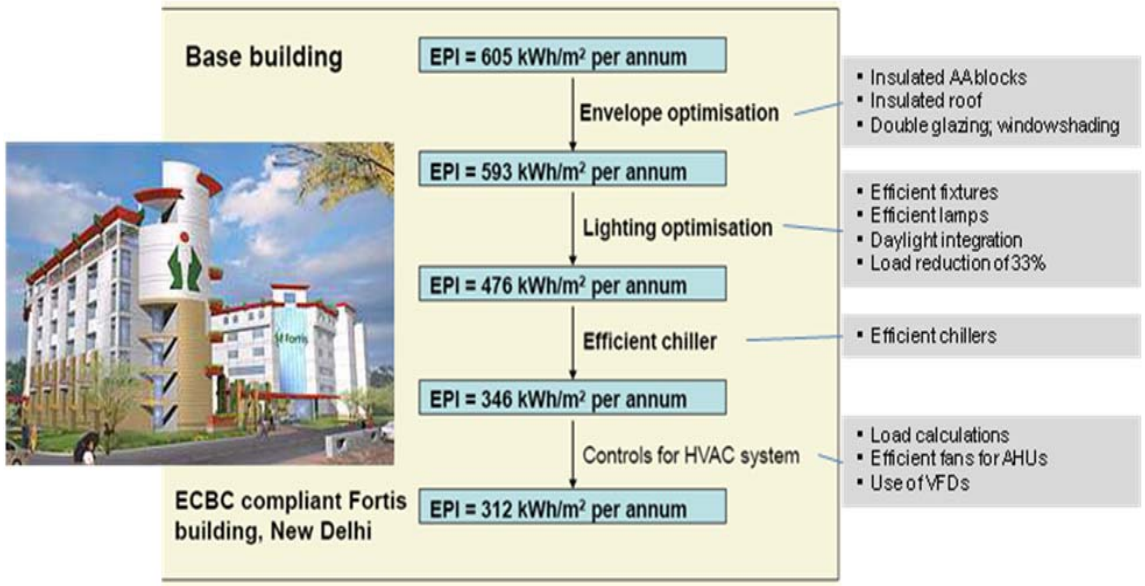
Case study 1: Centre for Environmental Science and Engineering (CESE) at Indian Institute of Technology (IIT), Kanpur



[8] **Commercial Buildings –** The government, public and private sector buildings with commercial use like hospitals, hotels, office buildings, shopping malls, airports, schools, etc qualify as commercial buildings under ECBC. The residential buildings (low or high rise) or houses are not covered under ECBC.

[9] Calculated based on the total commercial floor area of 292,061,905 m^2 for the year 2005 (Data provided by Environmental Design Solutions), and projected using a growth rate of 8% per year.

Case study 2: Fortis Hospital, New Delhi



22. India has many central and local authorities/bodies that help compile building codes and standards that are applicable at the local and national levels. There are three significant codes/regulations that have been developed by national bodies:

- The Bureau of Indian Standards, National Building Code (NBC), which covers all aspects of building design and construction;
- The Bureau of Energy Efficiency, Energy Conservation Building Codes (ECBC), which target building energy efficiency; and
- The Ministry of Environment and Forests, Environmental Impact Assessment (EIA) and Clearance.

23. Building by-laws in India fall under the purview of state governments and vary with administrative regions within the state. The Bureau of Indian Standards developed the National Building Code (NBC, 2005) in the early 1980s as a guiding code for municipalities and development authorities to follow in formulating and adopting building by-laws. The voluntary code covers most aspects of building design and construction with a small part dedicated to energy efficiency (day lighting and natural ventilation)[10].

24. EIA was made mandatory in India under the Environmental Protection Act (1986) for 29 categories of large-scale developmental activities. Builders and developers must receive environmental clearance from the Ministry of Environment and Forests before beginning large construction projects[11]. The requirement for building energy performance in the EIA is a combination of related terms in NBC and ECBC.

Energy Conservation Building Code (ECBC) for new buildings

[10] One example is the Ministry of Environment and Forests. As part of its Environmental Impact Assessment (EIA), ECBC compliance is made ECBC compliance mandatory for large construction projects (built-up area over 20,000 m^2).

[11] The Ministry of Environment and Forests (MoEF) is the nodal body in India for all environment related issues (www.envfor.nic.in). Under Environment (Protection) Act 1986, from year 2004 onwards, Ministry has made Environmental Impact Assessment (EIA) compulsory for 32 categories of projects including any new building/construction project having investment over INR 500 million or housing over 1000 people or discharging sewage over 50,000 lits/day. Based on EIA, these activities need to obtain prior environmental clearance from MoEF.

25. To promote energy efficient technologies and measures in new buildings under the Energy Conservation Act (EC ACT) 2001, BEE with the support of the Ministry of Power (MoP) has launched the Energy Conservation Building Code (ECBC) in 2007 as mentioned in Box 1. The ECBC has been developed by the IIEC. ECBC sets minimum energy performance standards for the design and construction of new commercial and public buildings[12]. Building components include:

- Building envelope (walls, roofs, windows)
- Lighting (indoor and outdoor), Heating ventilation and air conditioning (HVAC) system
- Solar water heating and pumping
- Electrical systems (power factor, transformers)

26. ECBC lists specific maximum and minimum limitations on a number of key building features that affect building energy use. ECBC has both prescriptive and performance-based compliance paths. The prescriptive path calls for adoption of minimum requirements for the building envelope and energy systems (lighting, HVAC, service, water heating and electrical). The performance-based compliance path requires the application of Whole Building Simulation Approach to prove efficiency over base building as defined by the code, refer Box 1 for more details.

27. The development of ECBC had participation of all major stakeholders: government, international agencies, NGOs, architects, industry and financing institutions to ensure that all aspects of the building sector are covered. A guide on implementing the ECBC was developed to provide additional direction on the rationale behind the code and for use of the code. ECBC is a complimentary document to the before-mentioned NBC[13] 2005. Currently, ECBC is implemented on a voluntary basis for buildings having a connected load[14] of 500 kW or a contract demand[15] of 600 kVA. The Government aims at making it mandatory for large commercial buildings and all buildings with a large air-conditioned floor area.

28. BEE has a program for energy labelling of many consumer appliances and industrial equipment. These will be complemented by Minimum Energy Performance Standards (MEPS)[16]. Currently the following products are covered by the standards and labelling program: (a) refrigerators, (b) air conditioners, (c) fluorescent tube lights, (d) domestic water heaters, (e) colour televisions, (f) ceiling fans, (g) distribution transformers, (h) induction motors and (i) agricultural pump sets, and (j) gas stoves. The program has a goal to cover most of these end-use appliances under a standards and labelling program in the next few years that would be mandatory.

[12] All forms of energy used in the buildings have to be considered for ECBC. The "Whole Building Performance Method" used to make buildings ECBC compliant requires that the energy sources other than electricity shall be converted to kWh of electric energy.

[13] NBC: National Building Codes. The National Building Code of India (NBC), a comprehensive building Code, is a national instrument providing guidelines for regulating the building construction activities across the country. It serves as a Model Code for adoption by all agencies involved in building construction works whether they are Public Works Departments, other government construction departments, local bodies or private construction agencies. The Code mainly contains administrative regulations, development control rules and general building requirements; fire safety requirements; stipulations regarding materials, structural design and construction (including safety); and building and plumbing services. The Code was first published in 1970 at the instance of Planning Commission and then revised in 1983. Thereafter three major amendments were issued, two in 1987 and the third in 1997. http://www.bis.org.in/sf/nbc.htm viewed on 3 April 2010

[14] Connected load is the electric load (in watts) on an electric system if all apparatus and equipment connected to the system are energized simultaneously. It is measured in kilowatt.

[15] Contract demand: A customer's contract demand is the amount of power which a customer agrees to pay to have available at all times. Because this refers to power which must be made available, as opposed to energy which can actually be consumed, contract demand is measured in kilowatts or in kVA, not in kilowatt-hours.

[16] MEPS: MEPS (Minimum Energy Performance Standard) is a specification containing a number of performance requirements for an energy-using device, and that effectively limits the maximum amount of energy that may be consumed by a product in performing a specified task. MEPS are usually made mandatory by a government energy efficiency body. It may include requirements not directly related to energy; this is to ensure that general performance and user satisfaction are not adversely affected by increasing energy efficiency. For example, California in USA, Australia, Brazil and New Zealand have put up MEPs for some of the equipments. Australia (refrigerators and freezers, mains pressure electric storage water heaters, three phase electric motors, three phase air conditioners, ballasts for linear fluorescent lamps, single phase air conditioners, linear fluorescent lamps, distribution transformers, commercial refrigeration, pressure electric storage water heaters smaller than 80 liters, low pressure and heat exchange types) introduced in a phased manner since 1 October 1999; Brazil (MEPS have been set for three-phase electric motors and compact fluorescent lamps); New Zealand in line with Australia. http://en.wikipedia.org/wiki/Minimum_energy_performance_standard viewed on 3 April 2010.

29. There are three important programmes for rating "green buildings" on a voluntary basis:

- Green buildings: The "Green Buildings" movement in India started with the establishment of the Indian Green Building Council (IGBC) in 2001, which was an initiative of the Confederation of Indian Industries (CII) along with the World Green Building Council and the U.S. Green Building Council (USGBC). The first green building in India, CII-Sohrabji Godrej Green Business Centre in Hyderabad, was inaugurated on 14 July 2004 (see Table 1). The IGBC offers training, technical assistance and capacity building programmes. The IGBC is promoting the Leadership in Energy and Environmental Design (LEED) Green Building Rating system in India that evaluates environmental performance from a whole building perspective over a building's life cycle, providing a definitive standard for what constitutes a green building. LEED is an internationally accepted measurement system designed for rating new and existing commercial, institutional and high-rise residential buildings (design, construction & operation). A LEED-rated building consumes 30-50% less energy as compared to a conventional building.

Table 1: Examples of Energy savings in LEED-rated green buildings in India

Building	Built-in Area (m^2)	Energy consumption (kWh)		Rating Achieved*	EPI (kWh/m^2)	Payback (Years) Annual savings (INR '000)
		Conventional	LEED-designed (Reduction, %)			
CII-Godrej GBC, Hyderabad	1,858	350,000	130,000 (63%)	Platinum (56 points)	70	7 years 9,000
ITC Green Centre, Gurgaon	15,794	3,500,000	2,000,000 (45%)	Platinum (52 points)	127	6 years 90,000
Wipro, Gurgaon	16,258	4,800,000	3,100,000 (40%)	Platinum (57 Points)	191	5 years 102,000

Source: website Confederation of Indian Industry (CII), leaflet on Sohrabji Godrej Business Centre
* Buildings are given platinum, gold and silver LEED ratings under USGBC Program. India also started a similar program in the name of Indian Green Buildings Council (IGBC).
Source: www.usgbc.com and www.igbc.com.

- GRIHA: The Energy and Resources Institute (TERI) has developed another system known as GRIHA[17] (Green Rating for Integrated Habitat Assessment) for large energy consumers (i.e. commercial institutional and residential buildings). GRIHA evaluates the environmental performance of a building holistically over its entire life cycle, thereby providing a definitive standard for what constitutes a "green building".

- BEE star rating: The scheme is based on actual performance of the buildings in terms of energy performance index (EPI, kWh/m^2/yr), in which air-conditioned and non- air-conditioned buildings (offices, hotels, hospitals, retails malls and IT parks) are rated on 1 to 5 scale (see Figure 3) targeting three climate zones (hot and dry, warm and humid, composite).

[17] GRIHA: 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 Benefits of following GRIHA rating system are (a) up to 30% reduction in energy consumption (b) limited waste generation due to recycling (c) less consumption of water (d) reduced pollution load & liability. 40 projects were undertaken so far, some of them are, Earth System & Environment Science Engineering Building, Fortis Hospital, Common Wealth Games and Hindustan Lever Limited. http://www.grihaindia.org/.

Figure 3: BEE Star rating scheme for buildings

Ratings for buildings having < 50% air-con

	EPI (kWh/m²/year)	STAR LABEL
COMPOSITE	80-70	★
	70-60	★★
	60-50	★★★
	50-40	★★★★
	BELOW 40	★★★★★
WARM & HUMID	85-75	★
	75-65	★★
	65-55	★★★
	55-45	★★★★
	BELOW 45	★★★★★
HOT & DRY	75-65	★
	65-55	★★
	55-45	★★★
	45-35	★★★★
	BELOW 35	★★★★★

Ratings for buildings with > 50% air-con

	EPI (kWh/m²/year)	STAR LABEL
COMPOSITE	190-165	★
	165-140	★★
	140-115	★★★
	115-90	★★★★
	BELOW 90	★★★★★
WARM & HUMID	200-175	★
	175-150	★★
	150-125	★★★
	125-100	★★★★
	BELOW 100	★★★★★
HOT & DRY	180-155	★
	155-130	★★
	130-105	★★★
	105-80	★★★★
	BELOW 80	★★★★★

The Star Rating Program for buildings will create a demand in the market for energy efficient buildings based on actual performance of the building in terms of specific energy usage. This programme will rate buildings having a connected load of 100 kW and above on a 1-5 Star scale with 5 Star labelled buildings being the most efficient. Five categories of buildings - office buildings, hotels, hospitals, retail malls, and IT Parks in five climate zones in the country have been identified for this programme. The energy Performance Index (EPI) in kWh/m^2/year will be considered for rating the building.

- Many states have active Designated State Agencies (SDA) established under the Energy Conservation Act, working with BEE to develop and implement state level energy efficiency policies and programs. Some state governments have taken initiatives to legislate select measures (e.g., use of solar water heating in residential and commercial buildings, or the use of compact fluorescent lamps in public buildings), but these initiatives are too early and small in number to be able to make a significant impact on the country's overall energy efficiency.

Baseline

30. Commercial building space (as defined earlier in paragraph 20) in India[18] was approximately 292 million m^2 in the year 2005[19]. The energy consumption varies across different types of commercial buildings. The most common range of Energy Performance Index (EPI) in the commercial buildings is 200 to 400 kWh/m^2/year. The energy consumption figures are much higher for specialised facilities such as hospitals, which also comes under commercial building space, is as high as 600 kWh/m^2/year. Taking the average energy consumption in commercial building to be 210 kWh/m^2/year (reports compiled at BEE), it can be estimated that the current total commercial building floor area in the country accounted for an annual energy consumption of 89,968 GWh in the year 2010. Considering the national power grid emission factor of 0.82 tCO_2/MWh[20], the total emission due to already existing commercial space is about 73.77 million tonnes of CO_2 annually. It is estimated that the growth rate of commercial building space in India is 8% annually (during the year 2005) and this annual growth rate is expected to continue until 2015 (source: Situational analysis of commercial buildings in India, November 2008. Bureau of Energy Efficiency, Ministry of Power, Government of India).

[18] Data provided by Bureau of Energy Efficiency.
[19] With the available information, this covers mainly the air-conditioned space.
[20] Dhiman, S.M., Singh, A., Gupta, P., Kumar, R., Brodmann, U., Danckwardt, T., Sacher, M., Morganti, L., (2009). CO_2 Baseline Database for the Indian Power Sector, available online at http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver5.pdf (accessed in February 2010), in: CEA (Ed.), CO_2 Baseline Database for the Indian Power Sector. Central Electricity Authority, Ministry of Power, New Delhi, p. 36.

31. ECBC was launched in May 2007 and the compliance has been voluntary since its launch. 250 buildings have used ECBC measures cumulating to about 5 million m^2 of energy efficient space in last two years[21] and are at various stages of implementation. That means only 0.6% of the new commercial buildings are in compliance with ECBC and the annual rate of compliance with ECBC in the succeeding years is expected to be at the same rate. This clearly demonstrates that compliance rate of new buildings with ECBC in business-as-usual scenario is very low (less than 1%).

Alternative Scenario

32. With the GEF intervention, the compliance rate of the new buildings with ECBC will increase. It is forecasted that the rate of compliance with ECBC would be at 10% from 2011 until 2013, 20% in 2014, 35% in 2015, 50% in 2016, 65% in 2017 and 80% from 2018 until 2025. All these buildings are expected to meet the SEC of 180 kWh/m^2/year. Thus the GEF project will contribute to energy savings in commercial building sector and Figure 4 shows the forecasted energy consumption data in business-as-usual (BAU) scenario and project scenario.

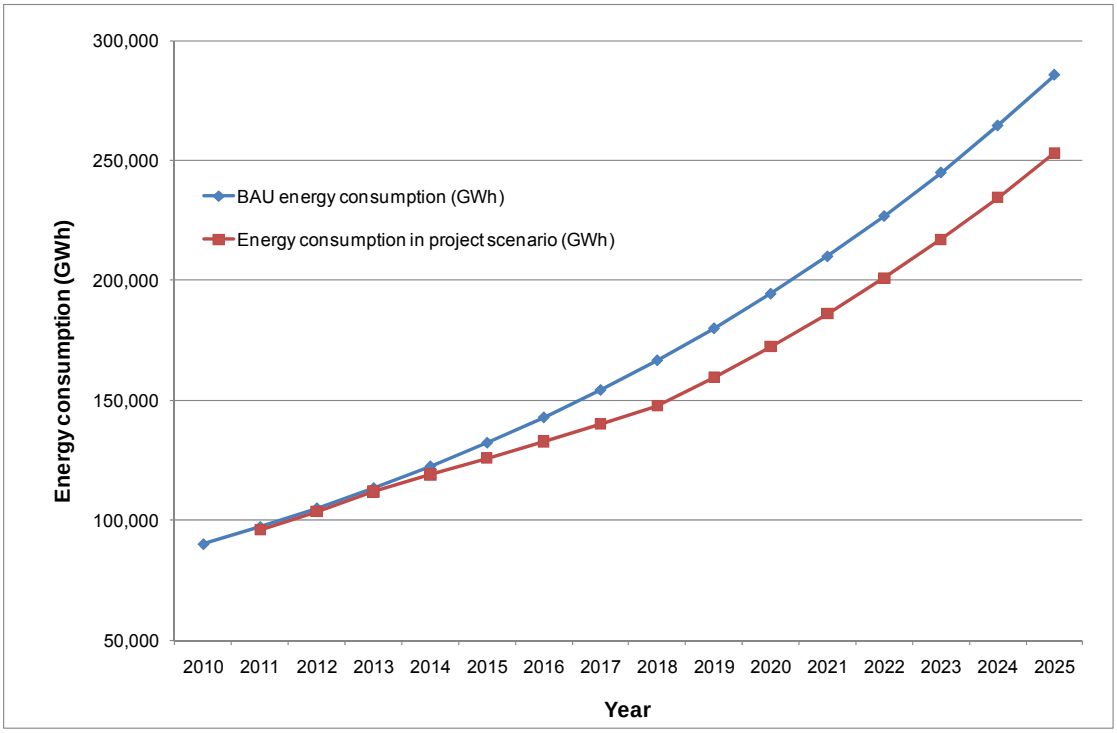


Figure 4: Forecasted annual energy consumption in the commercial building sector in business-as-usual (BAU) scenario and project scenario

3. BARRIER ANALYSIS

33. The ECBC is currently **voluntary**, but in the future, central and state governments can decide to adopt it as a mandatory standard. BEE can consider the modifications in ECBC to adapt it to climatic conditions in different climatic zones. India is still in the early stages of implementing the new building energy code. In practice, few (public and commercial) buildings in India today meet the code and none of the states has adopted it yet. A number of key barriers were identified during the project preparation

[21] Source: Bureau of Energy Efficiency (BEE)

phase (PPG), which are summarised below in Table 2. Mandatory use of ECBC in commercial buildings is expected only after major **barriers** relating to ECBC implementation are suitably addressed.

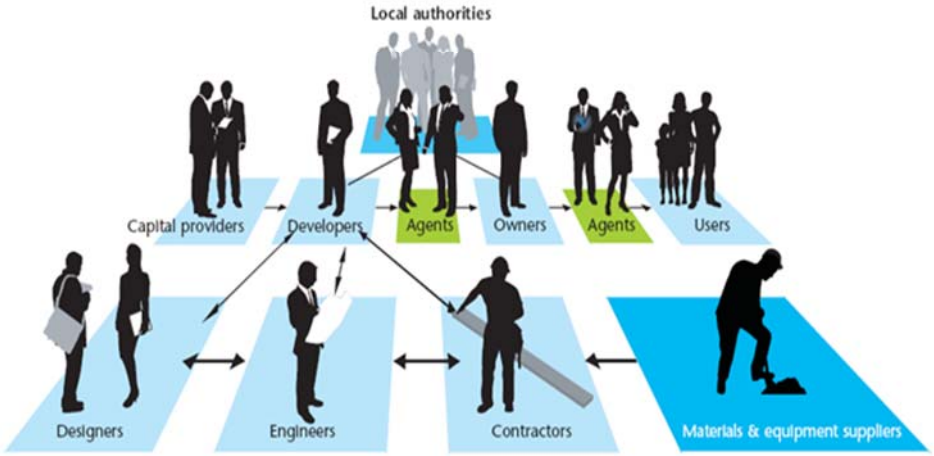
Table 2: List of barriers and corresponding Project Outputs that addresses those barriers

Barriers	Project Output
Policy and institutional barriers	
• *Absence of mandatory standards:* ECBC is currently voluntary, so there are no minimum energy performance codes for most buildings and building components in any of the building bylaws.	Output 1.1: Authorities and personnel of building departments at national, state and municipal level capable of implementing and enforcing the ECBC
• *Absence of policy guidelines for building bylaws*: Most municipalities do not have a uniform and practicable building energy code especially for passive and solar designs and no clear implementation guidelines are in place for state and municipal bodies for developing and/or implementing building energy efficiency programs and policies.	*Activity 1.1.1: Analysis of current regulatory mechanisms and capacities of institutions that support EE in commercial buildings and identify the gaps* *Activity 1.1.4: Formulation of a sustainability plan for BEE, which include the assigning of its long-term mandate to implement the ECBC, staffing, implementation procedures, budget and resource requirements needed for the implementation of a mandatory ECBC, as well as its administration and enforcement structure.*
• *No structure for ECBC implementation:* Even if mandatory, there is no effective institutional structures at national, state and local level for ECBC administration and enforcement including code-checking and inspections; so far been implemented with limited participation from state and municipal authorities; lack of capacities of these institutions; The EC Act empowers the state governments to amend the energy conservation building codes to suit the regional and local climatic conditions. This provision may in longer run lead to large deviations from the ECBC that has been developed by the BEE. This may lead to confusion among builders, developers and designers.	Output 1.1: Authorities and personnel of building departments at national, state and municipal level capable of implementing and enforcing the ECBC Output 1.2: Strengthened mechanisms and structures for ECBC implementation and gathered energy performance
• *Lack of government champions due to knowledge gap:* There is lack of knowledge of benefits related to energy efficiency in buildings among the politicians and policy makers at national as well as state/municipal levels. In fact, building energy efficiency practices have still not been adopted by most government agencies for their own buildings or for the construction done by these agencies. "Success stories'' are not widely disseminated	Output 1.3: Strengthened system of information dissemination to stakeholders *Activity 1.1.3: Conduct of workshops focusing EE options in commercial buildings and requirements under ECBC for key stakeholders from national government, state agencies municipalities, utilities, regulators as well as enforcement agencies*
Technical and managerial capacity barriers	
• *Strong first cost bias.* The building market is diverse and characterized by fragmentation into various players. The complexity of interaction among these participants is one of	Output 2.1: Property managers, developers and owners who are aware of, and interested in, EE

Barriers	Project Output
the greatest barriers to energy-efficient buildings (see Box 4 for more details). For example, building owners tend to under-invest in energy efficiency during building design and construction. The developers don't gain from the initial investments in building energy efficiency.	buildings
• *Lack of awareness of energy savings opportunities:* There are no energy use baselines for most building types. Building designers and owners are unaware of energy efficiency opportunities and techniques. Information on energy saving potential in buildings is also not available. Building audit methodologies need to be improved.	Output 2.2: Completed specific training programmes for key stakeholders and certified practitioners
• *Lack of technical expertise:* There are very few technical experts and consultants providing building energy efficiency related services. This forces many teams to hire international consultants at a high cost and also impacting the pace of design and construction.	Output 2.3: Training curricula and modules incorporated at training institutes Output 2.4: Tools in place for energy-efficient building design (guidelines, handbooks, software)
Materials and technology barrier	
• *Non availability of energy efficient equipment/materials in the local marketplace:* Most energy efficient equipment and materials are imported, often with high cost mark-ups and duties imposed.	Output 2.5: Set of specifications for EE building materials
• *Lack of equipment testing / certification:* programmes for standards, and testing equipment for energy-saving features of building materials and equipment are not in place.	Output 2.6: Technically capable and equipped building materials testing laboratories
Finance barriers	
• *Lack of financial incentives for energy efficient equipment*: Energy Efficiency of buildings is not given due consideration in funding and incentives from the government. Revision of regulatory framework is required regarding duty relaxation, incentives and tax benefits. Also financing energy efficiency is not too lucrative for financial institutions due to uncertainty about returns. There is a need for innovative financing schemes to promote EE in buildings. • *Lack of awareness:* The lack of awareness of the short amortization cycle and/ or the lack of incentives for investors and contractors to build ECBC compliant buildings and/ or lack of awareness that low energy bills can be a powerful marketing argument for future rental contracts.	Output 4.1: Fiscal and regulatory incentives for investors
• *High cost of borrowing money*: This can be a strong impediment to incremental funding in efficiency that would be offset by future savings of energy costs.	Output 4.2: Financing schemes designed with banks for investors to comply with ECBC

34. The Indian building sector comprises of numerous players vested in similar programs including government players, private sector, foundations, and donor agencies among many others. In the last decade, India has witnessed tremendous growth in the initiation of new construction projects and is collecting a growing existing building stockpile. This period has also seen the entry of programs promoting efficiency in building management and construction including the ECBC, LEED program etc. This scenario makes it imperative for BEE to understand the stakeholder profile within the country and provide a platform for these projects to co-exist and fall within an umbrella coordinating these efforts to ensure uniformity and continuity.

Box 4 - Complexity of the Commercial Building Sector



The building market is diverse and characterized by fragmentation into various players. The complexity of interaction among these participants is one of the greatest barriers to energy-efficient buildings:

- *Central-level and local authorities* influence the value chain through enacting building policies for their areas. These rules are often a compromise between high levels of energy performance and cost considerations;
- *Capital providers* and *developers* are concerned with risk and short payback periods, which can reduce energy use to a relatively minor factor in decision-making. Developers that also hold property titles may have a longer term view, which should make energy-savings attractive. However, developers will not reap the benefits of the additional investment, as energy cost savings goes to the occupier (user) and not to the developer;
- *Developers commission designers (or architects), engineers and construction* companies have expertise in technical aspects of construction, including energy efficiency. But their influence on key decisions may be limited, especially if they do not work together in an integrated fashion;
- The role of a*gents* can be important. They often stand between developers and tenants and between owners and occupiers. Typically, their financial interests are short-term;
- *Owners* may rent their buildings, making their interests different from those of end users. Some owners buy to sell (and make a capital return); others buy to lease (as an investment) or occupy. The last group is most likely to consider investments that may have paybacks over several years;
- *Property managers* are primarily interested in meeting tenant/owner needs for comfort, light, access, and safety, while energy performance is less visible as a service to the client
- *End users* are often in the best position to benefit from energy savings, but are usually not the ones that are making decisions about the initial investment for the construction of the building.

4. KEY STAKEHOLDERS

The stakeholders in the building energy efficiency process in India are listed below.

Table 3: List of stakeholders involved in ECBC

Stakeholder	Role[22]
Government	
Bureau of Energy Efficiency (BEE)	BEE is the statutory body formed by Government of India to implement the Energy Conservation act 2001. BEE serves as the main client (Implementing Partner) in this project playing a central role in the market transformation efforts to build on their ECBC programme and will guide any policy and institutional changes to the nature of building programmes in India. It is the responsible agency to implement the project.
Bureau of Indian Standards (BIS)	BIS, the National Standards Body of India is the agency in all matters concerning standardization, certification and quality. In this project BIS will serve as a source for appropriate quality standards for commercial buildings.
Ministry of Power (MoP)	MoP will ultimately serve as central authority and guide BEE in meeting program objectives and in implementation of programmes listed in EC Act 2001. Any change in energy efficiency related programs and /or policy will have to be approved by MoP.
Ministry of New and Renewable Energy (MNRE)	MNRE is supporting GRIHA rating system. Their involvement and participation helps align the GRIHA rating system with the ECBC.
Ministry of Environment and Forests (MoEF)	MoEF is the GEF focal point for GEF projects in India and thus liaise for overall coordination of the project.
Ministry of Urban Development (MoUD)	MoUD is the apex body for formulation and administration of the rules and regulations and laws relating to the housing and urban development in India**.** Thus MoUD will serve as a resource and guide under the project for ECBC implementation.
Building Materials and Technology Promotion Council (BMTPC)	BMTPC will play a role in developing and operationalising comprehensive and integrated approaches for any technology development, transfer and investment promotion to encourage application of environment-friendly & energy-efficient innovative materials. BMTPC will work with BEE to encourage the application of environment friendly and energy efficient innovative material in EE buildings.
Central Public Works Department (CPWD) and State Public Works Departments (State PWDs)	CPWD and State PWDs will be members in the Project Steering Committee to guide management decisions and project monitoring and evaluations by quality assuring these processes and products, and using evaluations for performance improvement, accountability and learning. This is integral to the successful implementation of the ECBC under the project and any changes to policy.
BEE State Designated Agencies (SDAs)	BEE will work with SDAs to ensure that the ECBC programme is being implemented appropriately at State level. The SDA's are the state designated agencies identified in EC Act 2001 to assist BEE in implementation of energy conservation programs in respective states. For this project SDA's will play a major role in implementation of ECBC
Utilities	Electric utilities will serve as a resource to identify and implement ECBC enforcement mechanisms and structure proposed under the project.
Industry / Associations	
National Productivity Council (NPC)	NPC is a national level organization to promote productivity culture in India. Besides providing training, consultancy and undertaking research in the area of productivity, NPC also implements the productivity promotion plans and programmes of the Tokyo based Asian Productivity Organization (APO), an inter-governmental body of which the Government of India is a

[22] This column describes the role of the stakeholder in the implementation of the ECBC, or the role of the stakeholder in the implementation of the proposed project.

Stakeholder	Role[22]
	founder member. This association will serve as a platform to receive information on the building market and assist BEE with implementation of activities promoting energy improvements in commercial buildings.
Indian Society of Heating, Ventilation and Air Conditioning (ISHRAE)	ISHRAE is an associate of ASHRAE (American Society of Heating, Refrigerating and Air Conditioning Engineers). The ECBC has proposed many of ASHRAE standards for buildings. ISHRAE will assist in promoting the use of energy efficient Heating, Ventilation, Air-Conditioning and Refrigeration (HVAC&R) systems in India. The ECBC has adopted a number of ASHRAE standards for buildings in India. Any future upgrades by ASHRAE will help BEE in improving the standards set under ECBC.
Confederation of Indian Industries (CII) and Indian Green Building Council (IGBC)	The Confederation of Indian Industry (CII) is a non-government, not-for-profit, industry led and industry managed premier business association, with a direct membership of over 7,800 organisations from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 90,000 companies from around 396 national and regional sectoral associations.CII catalyses change by working closely with government on policy issues, enhancing efficiency, competitiveness and expanding business opportunities for industry through a range of specialised services and global linkages. CII – IGBC promotes the “Green Buildings” movement in India and offers the LEED accreditation for improved building design and performance. IGBC will serve as a resource to promote “green” objectives and programme activities including trainings and awareness building under the project.
Energy service companies (ESCOs)	ESCOs will play a significant role in developing the market for improved efficiency in commercial buildings. ESCOs will help in conducting and implement building audits and play a central role in establishing a framework for measuring building performance.
Research and Educational Institutes	
The Energy and Resources Institute (TERI)	TERI has conducted significant research in the arenas of existing and new buildings and has also devised a building code “GRIHA” for commercial and residential buildings. The institute will serve as a resource for BEE in trying to establish a mandatory building code and to assist with implementation of building activities especially for fostering awareness. TERI will share their program data on EE buildings with BEE and provide support in making the ECBC mandatory.
Center for Environmental Planning and Technology (CEPT), Ahmedabad	CEPT will work with the proposed project to develop and adopt training curricula and modules for building professionals to improve their skills and know-how regarding the design, construction and testing of energy efficient commercial buildings.
School of Planning and Architecture (SPA), Delhi	SPA will work with the proposed project to develop and adopt training curricula and modules for building professionals to improve their skills and know-how regarding the design, construction and testing of energy efficient commercial buildings.
Indian Institute of Technology (IIT)	IITs will work with the proposed project to develop and adopt training curricula and modules for building professionals to improve their skills and know-how regarding the design, construction and testing of energy efficient commercial buildings.
Indian Institute of Management (IIM)	IIM will work with the proposed project to develop and adopt training curricula and modules for building professionals to improve their skills and know-how regarding the design, construction and testing of energy efficient commercial buildings.
National Institute of Design (NID)	NID will work with the proposed project to develop and adopt training curricula and modules for building professionals to improve their skills and know-how regarding the design, construction and testing of energy efficient

Stakeholder	Role[22]
	commercial buildings.
International Organizations	
US Agency for International Development (USAID)[23]	USAID has played a significant role in developing and implementing building efficiency projects in India. Their current programme ECO III has worked closely with the BEE in training and building code development. USAID will serve as a platform to implement trainings and share experiences from its other building programmes under the proposed project.
Asian Development Bank (ADB)[24]	ADB will focus their funding towards developing a market place for energy efficient buildings and influencing the current policies in India in support of GEF project.
World Bank[25]	World Bank will focus their funding towards developing market place for energy efficient buildings and influencing the current policies in India in support of GEF project.
German Technical Cooperation (GTZ)	GTZ works closely with BEE to support the implementation of a number of energy efficiency programs for buildings, appliances and other sectors. They will continue serving as a knowledge partner to BEE in the implementation of this GEF project.
British High Commission (BHC) and Development Fund for International Development (DFID)	BHC and DFID will serve as partners in ECBC implementation. They provide funding support to local agencies to directly or indirectly contribute to projects, which focus on policy level changes.
Swiss Development Cooperation (SDC)	SDC is a co-financier in the project. SDC will serve as a member of the technical advisory meeting for the programme advising the project team on technical issues; reviewing energy audits and data management.
DLF	DLF is one of the major co-financiers to the proposed project. DLF Limited is India's largest real estate company in terms of revenues, earnings, market capitalisation and developable area. It has a 62-year track record of sustained growth, customer satisfaction, and innovation. The company has approximately 22 million m^2 of completed development and 39 million m^2 of planned projects, and has presence across 30 cities in India.

[23] Cooperation under the proposed project with USAID will serve as a platform to implement trainings and share their experiences. Coordination will be at three levels to ensure smooth transition of some of the long term activities and cooperation:

- Through BEE: BEE is implementing partner of USAID´s ECO-III project (the project will exchange experiences in training and building code development). The BEE team dealing with the USAID-BEE initiative were involved at the project preparation stage (i.e., PPG Exercise) for GEF-UNDP-BEE initiative and hopefully continue during the implementation phase
- PSC meetings: On an as-needed basis, USAID representative will be asked to join PSC meetings
- Project management level: project manager will closely interact and coordinate activities with ECO-III through BEE officials who are working on ECO-III

ECOIII project is expected to run until September 2011. In the meantime, the proposed UNDP-GEF project will take over some of the long-term activities that have been continuing under ECO-III project. This is to enable a smooth transition of long term activities from ECO-III project the proposed UNDP-GEF project will get operational in November 2010. This the proposed project will not only expand the horizon of the existing ECO-III project but also provide continued sustainability to the government's initiative of promoting energy efficiency in buildings.

[24] ADB finance energy efficiency programs in India. Although the loan from ADB is not listed as co-finance at the moment, but it may become the part of the program in future. ADB is considered as one of the stakeholders under the project

[25] Same as the case of ADB

PART B. PROJECT STRATEGY

5. PROJECT RATIONALE, DESIGN PRINCIPLES AND STRATEGIC CONSIDERATIONS

Project Rationale and Design Principles

35. ECBC, one of the flagship programmes of BEE is at present in voluntary regime. BEE aims to make it mandatory as soon as possible. Many barriers are foreseen as impediments to make them mandatory. These barriers include (i) Policy and institutional barriers, (ii) Technical and managerial capacity barriers, (iii) Materials and technology barrier, (iv) Finance barriers which are outlined in section 3. Expertise in building energy efficiency sector is in nascent stages and limited. The experience of ECBC is limited to only a few climatic zones which need to be expanded to other zones to help compiling experiences to put up comprehensive policy framework. Since there are inadequate experiences, it has not been possible to put up fiscal and regulator incentives for the investors to invest in energy efficient buildings. Increase awareness of various stakeholders of energy efficiency is an important step to promote energy efficiency in buildings which is being addressed by the project. Capacity building and assistance to architects, design professionals, building material suppliers, builders, contractors, developers, and property managers have not been taken up in a comprehensive manner. Improving energy efficiency effort will build on BEE's existing voluntary Energy Conservation Building Code (ECBC) programme. By targeting the above barriers in a holistic manner, the project will enhance its potential impact on reducing GHG emissions in the commercial buildings sector.

36. The selection of commercial buildings as the target segment is supported by a number of factors: (i) increasing commercial and business activities are accelerating the space needed for commercial buildings and the trend is expected as the economy grows; (ii) electricity consumption in buildings is responsible for a share of about 7% of the total electricity consumption in the country which is modest at present, however the consumption is increasing rapidly as building sector is growing at about 8% per year; (iii) many existing and also new commercial buildings are not energy efficient, but significant improvements could be made at moderate costs; and (iv) increases in electricity tariffs are enabling building owners/users more aware of the energy bill and likely to drive towards energy efficiency measures in commercial buildings.

37. The design of the project is around creating enabling atmosphere to make the ECBC mandatory. They include,

- Strengthening institutional capacity in the public sector,
- Awareness creation, and technical training of key stakeholders,
- Gaining experience on ECBC compliant buildings through piloting few and,
- Creating enabling environment for investments in energy efficient buildings.

38. Ensuring compliance to ECBC is another important strategy to ensure energy efficiency measures are implemented in commercial buildings. The Energy Managers and Auditors will play a role in facilitating the compliance to ECBC. State Authorities, SDA's and Municipal bodies will be responsible to ensure the compliance. BEE will provide oversight and strategic support to implement ECBC. BEE may also take support of third party for verification of ECBC compliance.

39. Without support from GEF, BEE would continue implementing existing energy efficiency initiatives in accordance with the Energy Conservation Act, as described in sections 2 and 3, but at a low pace. In the absence of the project's interventions, the transition from voluntary to mandatory building codes would

meet long delays, and consequently, the uptake of new of emerging technologies and practices would be slow. Information dissemination on energy efficiency practices will remain hampered and developers and building owners will remain ignorant of the potential of energy efficiency, if there is no climate zone-wise demonstration of best practices and monitoring of energy and financial savings are achieved. Institutional capacity to implement innovative energy efficiency measures will remain limited and fragmented over the states and municipalities. No real incentives schemes to adopt energy efficient designs in buildings will be fully developed.

Strategic Considerations and Consistency with UNDP Programme

40. The overall strategy is to make use of the project to create an enabling environment to make ECBC mandatory by creating a long-term market for energy efficient buildings by creating awareness, training and capacity building through an integrated approach, involving all relevant stakeholders namely, government agencies, utilities (at national and lower levels), educational institutes, building owners and their associations, users, industry and service providers (architects/engineers, building material manufacturers, builders/contractors/developers), investors and financial institutions; piloting ECBC compliance in few buildings covering five climatic zones of India. This program will develop a range of knowledge products focusing on the technical, environmental and economic merits, and technical options (associated with energy efficient practices) that can lead to broader scale replication in India. Energy rating of buildings (BEE's Star Rating, see Figure 3), incentive schemes and evaluation criteria (e.g. life-cycle cost assessment) should promote the supply of and demand for energy efficient building materials in commercial buildings.

41. The UNDP Country Programme (2008-2012) mentions that "UNDP will support all levels of government to implement environment and energy policies by strengthening policy, legislative and regulatory mechanisms promoting low carbon development, standards and codes and more efficient use of natural resources. Capacities to integrate environmental management practices in planning processes will be developed at state and district levels. UNDP will also support national capacity development for the implementation of multilateral environmental agreements".

42. The UNDP Country Programme Action Plan (2008 -2012) refers to the UNDAF Outcome 4 that deals with supporting the government's efforts towards meeting commitments under multilateral environmental agreements through a two pronged approach involving leveraging of additional environmental finance and supporting activities on the ground that seek to safeguard environmental resources. To that effect, a special focus will be placed on energy efficiency in order to contribute to reduction of GHG emissions in energy intensive industries, transport and commercial sectors, where population and economic growth have resulted in rapidly increasing energy demand. The program will identify and facilitate access to clean energy (and will pilot renewable energy technologies) to reduce greenhouse gas emissions and local pollutants.

43. The GEF-UNDP project will be implemented under the direction of the Government of India and in full partnership with national authorities both at central and state level. The Department of Economic Affairs (DEA), Ministry of Finance, will be the nodal department for the project. The proposed improvement in energy efficiency in commercial buildings project is part of the "Programmatic Framework Project for Energy Efficiency in India" (GEF project 3538). Five projects on energy efficiency are proposed under this program (GEF implementing agencies for these projects are given in the parenthesis):

1. Energy Efficiency Improvements in Commercial Buildings (UNDP);
2. Chiller Energy Efficiency Project (World Bank);
3. Financing Energy Efficiency in Small and Medium Enterprises (World Bank);
4. Promoting Energy Efficiency and Renewable Energy in Selected SME clusters in India (UNIDO); and
5. Improving Energy Efficiency in the Indian Railways System (UNDP).

44. The proposed project will establish the necessary communication and coordination mechanism through its Project Steering Committee with the Project Board of the Programmatic Framework, and with the Project Steering Committees and Project Management Units of chillers project[26] and the Railways project[27]. UNDP India will also take the lead ensuring adequate coordination and exchange of experiences with other activities, as detailed in Section 13.

6. POLICY CONFORMITY AND COUNTRY OWNERSHIP

Policy Conformity

45. The proposed project conforms to the Strategic Programme 1 (SP-1) on "Promoting Energy Efficiency in Residential and Commercial Buildings" by promoting the employment of energy efficient technologies and energy-saving practices in the Indian building sector.

Country Eligibility

46. India ratified the United Nations Framework Convention on Climate Change (UNFCCC) on 1 November 1993. India has completed and submitted its First National Communication and is currently preparing its Second National Communication.

Country Drivenness

47. India has adopted the EC Act 2001, which includes the steps to implement an Energy Conservation Building Code (ECBC) scheme. The Bureau of Energy Efficiency (BEE) has designed and implemented the ECBC program, including the design of norms and standards of energy consumption expressed in energy used per square meter of the area. About 250 number of energy efficient buildings are in the different stages of implementation which are in accordance with the ECBC (see Section 2).

48. The Eleventh Five Year Plan (FYP) sets relevant national goals relevant in this context. These include: (i) reduction in energy intensity per unit of GDP by 20% over the 11th FYP period, (ii) enhance share of RETs to 10% of the total contribution of electricity and (iii) increase forest cover by 5%. Related objectives under the sectoral policies and schemes also aim at enhancing rural energy access to provide energy to all, strengthen the Panchayat Raj Institutions (PRIs) to take up energy provisions through 73rd Amendment of the constitution, encourage Independent Power Production (IPP) under the new provisions in Electricity Act 2003. The major schemes include: Enhance Energy Efficiency in all Sectors, Remote Rural Electrification (RRE), Village Energy Security Programme (VESP), Rajiv Gandhi Gramin Vidyutikaran Yojana (RGGVY), and Accelerated Power Development and Reforms Programme (APDRP).

49. The "National Action Plan on Climate Change" (NAPCC) is the national response to climate change. It also showcases Government of India's commitment to actions to counter climate change. To bring greater coordination between several ministries and agencies, the initiative is being coordinated by the "Prime Minister's Council on Climate Change" and will be implemented through eight missions along with some other initiatives[28]. One of the National Missions is for enhanced energy efficiency. The National

[26] The Chillers Project (GEF ID 3352) will assist in accelerating the conversion of ODS-based chillers to new and more energy efficient technology through the provision of financial incentives. The project will be implemented by ICICI Bank with the World Bank as GEF agency with a GEF contribution of USD 6.3 million. The project was endorsed by the GEF CEO in 2009.

[27] The Railways project under formulation) will support the introduction of energy efficiency technologies and measures in the Indian Railways system, including buildings (offices, stations, etc.). UNDP is GEF agency and the project will be implemented by Indian Railways with a proposed GEF contribution of USD 5.2 million.

[28] The 'National mission for Enhanced Energy Efficiency' strengthening the legal mandate of Energy Conservation Act of 2001, promote market based mechanisms to enhance cost effective investments in energy efficiency in energy-intensive large industries and facilities, accelerate shift to energy efficient equipments, create mechanisms to finance demand side management energy

Mission on Enhanced Energy Efficiency (NMEEE), the second of eight missions under the NAPCC, will reduce India's annual energy consumption by 5% by 2015 and reduce India's overall emissions nearly 100 million tonnes a year. Implemented by the BEE, NMEEE will accomplish this through regulatory measures and incentive mechanisms meant to increase the efficiency of production and consumption of energy on all levels in India.

50. BEE's Action Plan for energy efficiency refers to the following schemes for energy efficiency promotion during 2008-2012:

- Bachat Lamp Yojana (BLY) to promote energy-efficient and high-quality Compact Fluorescent Lamps (CFLs) – The BLY promotes replacement of inefficient bulbs with CFLs by leveraging the sale of Certified Emission Rights (CERs) under the Clean Development Mechanism (CDM) of the Kyoto Protocol.
- Standards and labelling of energy end-use equipment – To reduce the energy consumption in domestic sector and to transform the market with energy efficient appliances.
- Energy Conservation Building Code (ECBC) –To conserve energy in building sector. The Energy Conservation Building Code prescribes the specifications for various building components to construct energy efficient new buildings.
- Agricultural and municipal demand-side management (DSM) – To design and implement innovative demand side management programs in agriculture and municipal sectors.
- Operationalising the Energy Conservation Act by strengthening the institutional capacity of state-designate agencies – The state designated agencies have a major role in implementation of EC Act. The scheme will facilitate the process to strengthen the institutional capacity of state designated agencies.
- Promoting energy efficiency in small and medium enterprises (SMEs) – Under this activity, the schemes for SME sector will be planned. The focus will be on developing the innovative financing schemes for SME sector to finance energy efficiency.
- Contributing to the State Energy Conservation Fund (CECF) scheme – The State Energy Conservation Funds will further contribute to finance energy efficiency programs in the states.
- Institutional strengthening of BEE – This is to make BEE more effective in design, implement and monitor the energy efficiency programs for different sectors.

7. PROJECT OBJECTIVES, OUTCOMES AND OUTPUTS

Project Goal and Objective

51. The goal of the project is "reduction of GHG emissions from new commercial buildings through compliance with ECBC". The project objective is the "operationalisation of the Energy Conservation Building Code (ECBC) for new commercial buildings". The major components of the project and the expected outcomes of the projects are listed below. Each of the outcome, output and activities are described in the subsequent sections;

Project Component 1: Institutional Capacity Development

Outcome 1: Strengthened institutional capacities at various levels on the enactment and enforcement of ECBC for commercial buildings

saving programs, and fiscal instruments to promote energy efficiency. 'National mission on Sustainable Habitat' envisages improving energy efficiency in buildings through mechanisms such as Energy Conservation Building Codes (ECBC), management of solid waste and modal shift to public transport. 'National Mission on Strategic Knowledge for Climate Change' envisages a strategic knowledge mission to support documenting socio-economic impact of climate change, support dedicated climate change related academic units in Universities, other scientific institutions. It envisages putting up a climate science research fund. Private sector initiatives for developments of innovative technologies for adaptation and mitigation would be encouraged through venture capital funds.

Project Component 2: Technical Capacity Development

Outcome 2: Enhanced technical capacity and expertise of local building practitioners and service providers

Project Component 3: ECBC Compliance Demonstrations

Outcome 3: Increased number of new commercial buildings that are ECBC compliant

Project Component 4: Fiscal & Regulatory Frameworks for EE Buildings

Outcome 4: Enforced fiscal incentives & Regulatory frameworks incentives for investors and developers of EE buildings

Project Component 5: Information and Awareness Enhancement

Outcome 5: Readily available and easily accessible/shared information and knowledge products on best practices regarding EE building technologies and measures

52. The increased adoption of energy efficient building design, practices and materials in commercial buildings will lead to a reduction in energy consumption of new buildings (as compared to the case where these are designed not based on the ECBC) and thus of corresponding greenhouse gas (GHG) emissions. The project will reach this goal by means of strengthening and enforcement of BEE's ECBC and other energy efficiency programs in India. The ECBC scheme specifically is considered an effective instrument for the transformation of commercial buildings[29]towards more energy efficient buildings.

Objective level indicators: Energy savings achieved and CO_2 emissions reductions

Estimated reduction in annual energy consumption through effective implementation of ECBC in pilot/model commercial buildings	110.60 GWh
Total estimated annual CO_2 emissions reductions	90,689 tCO_2
Cumulative CO_2 emission reductions by the end of the project	181,379 tCO_2
Total baseline CO_2 emissions of commercial building sector in the year 2010	73,774,005 tCO_2
% of CO_2 emissions reduction due to demonstration projects when compared to baseline CO_2 emissions of commercial building sector in the year 2010	0.12 %

Project outcome, output and activities:

Outcome 1: Strengthened institutional capacities at various levels on the enactment and enforcement of ECBC for commercial buildings

53. This outcome addresses the need to improve the institutional capacity to create a favourable policy environment and implementation structures for supporting a nationwide mandatory adoption of ECBC in (new) commercial buildings.

Output	Activities
1.1 Authorities and personnel of building departments at national, state and municipal level capable of	1.1.1 Formulation and approval of the policy for mandatory implementation of ECBC 1.1.2 Analysis of current regulatory mechanisms and capacities of institutions that support EE in commercial buildings and

[29] Transformation of the commercial buildings sector will mean that new commercial buildings will be designed and operated as EE buildings and also existing commercial buildings will be retrofitted to operate as EE buildings.

Output	Activities
implementing and enforcing the ECBC	identify the gaps 1.1.3 Formulation, approval and enforcement of the implementing rules and regulations for ECBC 1.1.4 Preparation and approval of the reporting procedures 1.1.5 Preparation of papers and promotion materials for policy and decision-makers in government and private sector training materials for capacity building on ECBC and building regulations 1.1.6 Conduct of workshops focusing EE options in commercial buildings and requirements under ECBC for key stakeholders from national government, state agencies municipalities, utilities, regulators as well as enforcement agencies 1.1.7 Formulation of a sustainability plan for BEE, which include the assigning of its long-term mandate to implement the ECBC, staffing, implementation procedures, budget and resource requirements needed for the implementation of a mandatory ECBC, as well as its administration and enforcement structure

54. The output 1.1 includes enhancing capacities of building departments at various national and state levels on the effective implementation and enforcement of the ECBC. The project will analyze the current status of the building sector (for new and existing commercial buildings) in terms of organizations, regulations, implementation structure, public awareness, and experience gained with the voluntary application of ECBC to understand the gaps. It is anticipated that the analysis will suggest improvements in the roles and responsibilities for effective implementation of ECBC in new commercial buildings. The current ECBC program in India has so far been implemented with limited participation from state and municipal authorities. The building owners directly inform BEE about adoption of ECBC. States and municipal bodies are not involved in the process. Institutional structures at national, state and local level need to be established to ensure a smooth flow of information on EE decision-making from top-down and of information on energy consumption in buildings from bottom-up.

55. The capacities of these institutions involved in the process must be strengthened in order to enable them to do their job effectively. Capacity building efforts are required at the centre (BEE), state (state designated agencies like MEDA[30], PEDA), municipalities, utilities and regulators by means of workshops and seminars and making available promotional materials. Capacity in BEE will be enhanced by supporting the formulation of a post-project sustainability plan for mandatory ECBC implementation; long-term mandate, staffing, procedures, budget and resource requirements needed for the implementation of a mandatory ECBC, including its administration and enforcement structure.

Output	Activities
1.2 Strengthened mechanisms and structures for ECBC implementation and gathered energy performance	1.2.1 Establishment of a database and an online portal for communication with BEE for reporting of energy data and e-data filling by state agencies and BEE staff 1.2.2 Gathering of information through survey, audit reports on EE in commercial buildings 1.2.3 Establishment of benchmarks[31]: commercial building category-wise and climatic zone-wise

[30] MEDA, Maharashtra Energy Development Agency; PEDA: Punjab Energy Development Agency

[31] The USAID study on benchmarking was an indicative study and was based on the analysis of about 0.16 million m^2 of buildings space (860 buildings) and the BEE analysis of 1.1 million m^2 of building space. Note that the total commercial building space in India is 470 million m^2. Also there is a wide variation in building type and designs. The USAID report mentions benchmarks, ranging from 115-349 kWh/m^2/y for office buildings, 88-378 kWh/m^2/y for hospitals, 279 kWh/m^2/y for hotels and 252 kWh/m^2/y for shopping malls. The ranges for office and hospital buildings are so wide, while the fixed benchmarks for hotel and retail buildings cannot be relied upon inasmuch as the sample buildings represent a very small fraction of the hotel and retail buildings in the country. Because of

Output	Activities
	1.2.4 Development of a plan for the practical implementation and monitoring of mandatory ECBC in different climate zones 1.2.5 Accreditation of local authorities to validate and verify commercial buildings compliance with the ECBC once it is made mandatory 1.2.6 Conduct of an annual impact analysis of ECBC implementation and other buildings-relevant measures; as well as annual meetings of BEE with key stakeholders to discuss progress

56. BEE needs to make informed decisions concerning energy consumption in all buildings (above the threshold stipulated in the ECBC). The first activity includes the design of a database and website linkage with BEE with a state-wise listing of all buildings having a connected load of 500 kW (provision of this data should be the responsibility of the concerned municipality) (activity 1.1.3). In a second stage, that information will be supplemented with energy consumption data provided by the power distribution utilities as well as linking collection of energy consumption with surveys conducted by other organizations, such as NSSO and CSO[32]. These activities will be supplemented by the energy consumption data in ECBC-compliant and non-compliant buildings through market surveys, studies and surveillance, where needed, to have a reliable baseline for new buildings energy use (and related greenhouse gas emissions).

57. Having these data will allow the formulation of benchmarks for different categories of commercial buildings (in the various climatic zones). In addition, having baseline data will provide valuable insights for architecture and engineering practitioners in commercial building design and will guide architectural design and calculation methods (see Outputs 2.2, 2.3, 2.5 and 2.6).

58. ECBC compliance relating to design and construction plans of the building would require validation and verification by a competent local authority once the ECBC is made mandatory. The project supports an Indian independent accrediting agency of repute for the accreditation of local compliance authorities. To maintain transparency, the compliance authorities are required to be accredited by an independent accrediting agency for validation and verification in India.

59. With the information gained in the above-mentioned strengthened mechanisms and structures for ECBC implementation and gathered energy performance (output 1.2) and institutional capacity building (output 1.1) allows a road map and recommendations for the introduction of mandatory ECBC. BEE is responsible for the enforcement of the mandatory code with the help of State-level Designated Agencies (SDAs) as each state has a State Designated Agency. The agencies mentioned in the proposal like Maharashtra Energy Development Agency (MEDA), Punjab Energy Development Agency (PEDA) are such state designated agencies[33].

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these limitations, the information cannot be used as a benchmark to rate the EE performance standardized across India. The data used in this project are based on a MOEF-cleared survey of buildings. This means the surveyed buildings already meet the 135 kWh/m^2/y standard, hence it can be stated that, performance target of 135 kWh/m^2/y in this project is actually lower than the USAID figures. This clearly shows that more analyses are needed and therefore Activities 1.2.2 and 1.2.3 are very useful for establishing benchmarks: commercial building category-wise and climatic zone-wise. At this moment, the survey size is not clear; more clarity regarding the energy benchmarks based on more representative samples will only be realized once the proposed project is operational. Benchmarking is an ongoing activity and continuous monitoring will enhance the quality of data. Once the detailed benchmarking exercises are conducted under the proposed project, the appropriate SEC targets for each building category will be defined. These targets will be reviewed after 5 years to further improve the SEC levels. Activity 1.2.4 supports ECBC implementation and monitoring that applies to different climatic zones of the country.es of coordination with other agencies to make a foolproof program. There is a need to not only look into the technical inputs for the project but also the legal and operational inputs for implementation.

[32] NSSO: National Sample Survey Organisation; CSO: Central Statistical Organisation

[33] The output includes formulating easy-to-implement compliance procedures for the abovementioned state and local institutions. In order to ensure conformity with ECBC requirements, it is important that compliance procedures are not very complex and are easily understood by the implementing agencies (state designated authorities and municipal bodies).

Output	Activities
1.3 Strengthened system of information dissemination to stakeholders	1.3.1 Design and implementation of a system of information dissemination through web portal of BEE on energy efficiency in commercial buildings 1.3.2 Formulation of an information dissemination strategy (brochures, print ads, websites, TV documentary) 1.3.3 Implementation and maintenance of the information dissemination strategy

60. The information dissemination unit in BEE will be strengthened to raise awareness on ECBC and EE building design. A survey will be undertaken on knowledge, attitudes and awareness of key stakeholder groups, so that a communication strategy will be generated to guide the elaboration of brochures, print ads, TV and websites.

Outcome 2: Enhanced technical capacity and expertise of local expertise of building practitioners and service providers

61. This outcome is expected as a result of addressing the need to develop knowledge and expertise of building practitioners through training programmes and workshops for architects/design professionals, builders/contractors/developers, building managers as well as building material suppliers and testing facilities. It also aims to introduce courses on energy efficiency in academic institutions.

Output	Activities
2.1 Property managers, developers and owners who are aware of, and interested in, EE buildings	2.1.1 Preparation of training material/package targeted for different stakeholders 2.1.2 Conduct awareness workshops (10 numbers) focusing administrators and building owners; developers, government and private sector decision-makers and financial institutions (total 300 participants) on energy efficiency measures, ECBC and building regulations

62. This output manifest enhanced knowledge and awareness related to the benefits of EE in buildings among non-technical people, that is, decision-makers, such as property managers, developers, building owners, as well as the users of EE buildings, and the intermediary agents (real estate agents) on techno-economic aspects (e.g. life-cycle cost benefits and return on investment) in EE buildings, financial institutions for the design of financing schemes for EE building projects as well as the relevant legal and regulatory aspects for successful implementation of ECBC and other energy efficiency programs.

Output	Activities
2.2 Completed specific training programmes for key stakeholders and certified practitioners	2.2.1 Training of at least 15 trainers (TOT) 2.2.2 Training of at least 1,500 architects and design professionals, developers and contractors and building material suppliers (50 training programmes) 2.2.3 Conduct of training courses for energy auditors and energy service companies (10 training courses with a total participation of 300 numbers) 2.2.4 Design and implementation of a certification scheme for building energy auditors 2.2.5 Preparation of a registry of accredited building energy auditors

63. The activities that will be carried out to deliver this output, include the training of trainers (by means of courses/workshops/seminars arranged with international consultants, international agencies, and national experts) as well as local building experts (BEE, SDAs, municipalities, other) whose technical capacity will be enhanced thereby enabling them to deliver trainings on building EE design and practices to local stakeholders/building professionals. A database of trainers will be made (subject-wise).

64. Specific training courses will be conducted for various building professionals (architects/design professionals, building material suppliers, builders/contractors/developers, energy auditors & managers, etc.). Various training programs will be facilitated to improve their skills and know-how regarding the design; construction and auditing of energy efficient commercial buildings (using appropriate design software) (see Output 2.4).

65. Among the activities is also the enhancement of registration schemes (within existing ESCO framework) and other legal requirements (among designers, architects, engineers) for certification of building energy audits. A registry of energy managers and auditors, energy audit firms and energy service companies (ESCOs) with buildings specialization will be prepared, and be made available to public.

Output	Activities
2.3 Training curricula and modules incorporated at training institutes	2.3.1 Development of training curricula and modules at institutes (e.g., SPA, NID, IITs, IIMs) and the 19 institutes pre-selected by BEE to implement a course on ECBC and EE in buildings 2.3.2 Conduct the trainings as per curricula and modules 2.3.3 Conduct of post-training evaluations to assess the effectiveness of the training program, and making of necessary revisions.

66. Courses incorporated will be at the select institutes and the 19 institutes pre-selected by BEE to implement their ECBC course for training larger audience[34]. The project will help introduce courses in various concerned academic institutions to train future building professionals. This will require training of staff and faculty members along with preparation of relevant course materials for students.

Output	Activities
2.4 Tools in place for energy-efficient building design (guidelines, handbooks, software)	2.4.1 Conduct research and prepare a Handbook and Guidelines[35] on energy efficiency building design and technologies (for officers involved in licensing, architects, building contractors, engineering firms) 2.4.2 Review the international literature and software available for design of energy efficient buildings 2.4.3 Design and development of an energy efficient building design software 2.4.4 Launch and promotion of handbook, guidelines and software (five regions)

67. The first activity is on developing an integrated building design approach adapted to Indian conditions and five different climatic zones, which will be disseminated to stakeholders and used in the before-mentioned trainings (output 2.2) and curricula (output 2.3), resulting in a Handbook on Buildings

[34] BEE is working with a group of 19 pre-selected architectural and engineering colleges in the country who have made the commitment to pilot test the building energy efficiency courses at the under graduate level and building energy modeling at the post graduate level, at the under graduate level and building energy modeling at the post graduate level.

[35] USAID published "Energy Conservation Building Code (ECBC) User Guide" in July 2009 (www.emt-india.net/ECBC/ECBC-UserGuide/ECBC-UserGuide.pdf). The guidelines referred in the ECBC User Guide are quite general and are based on an indicative study with a very small sample size of buildings and do not represent all the categories of buildings across 5 climatic zones. Since the User Guide has to include more up-to-date information, the existing version that was prepared using funds from USAID has to be revised, as proposed in Activity 2.4.1. Also, inasmuch as the ECBC is moving from a voluntary to mandatory regime (must include M&E sections), more guidance is needed.

Design for Architects and Engineers for Commercial Buildings as well as Guidelines for developers and contractors. Certainly we do not need to start from scratch, but we need to review and expand the first analysis supported by the USAID report, and update figures accordingly. Therefore, activities 2.4.1 and 2.4.4 are considered to be incremental and will aim to address the existing gaps in information and guidance.

68. Energy simulation programmes are excellent tools to design energy-efficient buildings, such as Visual DOE, Energy Plus and Lumen Micro. The project will make software available and professionals will be trained (outputs 2.2 and 2.3).

Output	Activities
2.5 Set of specifications for EE building materials	2.5.1 Assessment and study of market to identify building materials and sale of energy efficient materials 2.5.2 Development of a roadmap for manufacturing energy efficient materials locally 2.5.3 Organize meetings and events for manufacturers to showcase energy efficient products with specifications and meet developers and construction companies as well as other stakeholders 2.5.4 Conduct workshops on capacity development for local building materials producers/ suppliers on EE building materials applications

69. Tremendous potential exists for materials and equipment, such as heat-resistive paints, fly-ash blocks, insulation materials, energy-efficient windows, energy management control systems, lighting controls. The model buildings or demonstration showing the applicability and availability of these materials and equipment will increase demand for such buildings. This will promote the demand and hence availability of energy efficient materials.

70. The activities proposed will include periodic data collection and reporting on building materials available and sold in the Indian market through organizing meetings and events for manufacturers and other stakeholders.

Output	Activities
2.6 Technically capable and equipped building materials testing laboratories	2.6.1 Development of the specifications for the laboratory 2.6.2 Development of testing procedures 2.6.3 Conduct product testing and demonstrations 2.6.4 Implementation of certification procedures

71. There is a need to strengthen existing testing and simulation laboratories that will provide services i.e. simulation, testing, quality control, certification and rating of the building envelope as a whole and of its components[36]. The project will provide assistance to BEE plans in setting up a material testing facility duly recognized by national & international organization to support rating program for the building envelope and to generate construction material property databases & building envelops.

Outcome 3: Increased number of new commercial buildings that are ECBC-compliant.

Output	Activities

[36] Manufacturers of building material products used in commercial projects typically provide energy performance ratings to their customers, which generally focus on U-Factors SHGC, Visible Transmittance, air-leakage, and condensation resistance. These ratings are used to demonstrate compliance with specifications from project architects as well as compliance with local and state energy code requirements. BEE is associating with Centre for Environmental Planning & Technology (CEPT) to provide the analysis and certification for fenestration products that would contribute to ECBC compliance.

3.1 Completed ECBC demonstrations in 5 climatic zones 3.2. Demonstrated energy savings in model buildings (under public-private partnerships in 5 climatic zone areas)	3.1.1 Preparation of detailed technical and financial feasibility studies for all the 8 model pilot demonstrations in compliance with ECBC 3.1.2 Finalised and approved designs of energy efficiency model buildings 3.1.3 Piloting construction of energy efficiency model buildings 3.2.1 Evaluation of the energy performance of the model buildings and documentation of the lessons learned

The objective of the demonstration-building component is to highlight the more energy-efficient design in the construction of buildings and the use of energy-efficient materials and products. The model buildings will be identified in all the 5 climatic zones and cities identified are; Hyderabad, Jaipur - Hot & Dry, Kolkata, Mumbai - Hot Humid, Bengaluru - Moderate, Shimla - Cold and Ludhiana, New Delhi – Composite. The component will support the design and construction a number of buildings in a sufficient number of climatic zones that comply (a) with the ECBC or even (b) will use substantially less energy than permitted by ECBC. The project will support a number of such demonstration buildings by providing technical assistance in the selection, planning, design, construction and monitoring and evaluation of model buildings. At least 8 commercial buildings are targeted to serve as 'model' under the project identified and supported in their design to comply with ECBC under public-private partnership in the five climatic zones.

72. The identification of demonstration projects will be as follows:

- Findings of baseline assessments (e.g., activity 1.2.2 and 1.2.3) and consultation meetings with authorities and experts will lead to a prioritization of type of buildings, size of buildings and climatic zones.
- A "Call for Proposal"[37] will be disseminated to participants (developers / owners / financiers) of the information and training meetings of Outcome 2 as well as through the information channels of BEE and SDAs and other relevant agencies. The Call for Proposals will have guidelines, including the eligibility criteria including eligible costs, eligible organizations and eligible actions; information how to apply; the selection and evaluation process etc. will be compiled in a publication.
- Evaluation of the concept project notes will be performed by the Project Team together with BEE and the SDA involved and a final selection will be made based on those who meet the criteria that were set in the Call for Proposals.

73. The project will support design, modelling, formulation of construction documents and commissioning as well as putting in place a good energy performance measurement and verification system. The results of the demonstrations will be presented in reports and documentary video that will be widely disseminated among various building professionals.

Outcome 4: Enforced Fiscal incentives & Regulatory frameworks incentives for investors and developers of EE buildings

74. This component will evaluate, recommend incentive options (e.g. fiscal and financial incentives) for the production, commercialization and/or purchase of energy efficient building materials, construction of new and retrofitting of existing buildings to be more energy efficient. Also, activities that ensure the approval and enforcement of recommended policies will be carried out in order to realize the removal of

[37] Since the total investment required for the demonstrations is US$ 22.4 million, a "call for proposal" will be organized in a transparent manner to attract other EE building project developers/owners, at minimum financing of USD 11.3 million, which at the moment is considered as unconfirmed co-financing. Once this co-financing is confirmed, this will be reported as additional or leveraged co-financing in the Project Implementation Review (PIR) report. DLF prepared a cost analysis for the interventions. Currently, categories of buildings have been identified for pilot projects. DLF is going to lead the process but the call for proposal will provide a fair chance to other developers as well to show their commitment towards implementation of ECBC.

policy barriers. The proposed incentives should be compatible with the ECBC Programme and/or other energy efficiency programs introduced by BEE and should have the potential to accelerate the transformation towards a market of energy efficient commercial buildings.

Output	Activities
4.1 Fiscal and regulatory incentives for investors	4.1.1 Design of rebate and tariff discount scheme in coordination with regulators and utilities, including the implementation rules and regulations, budget and plan 4.1.2. Conduct of promotional and advocacy campaigns for the approval of the proposed rebate and tariff discount scheme 4.1.3 Implementation of the approved/enforced rebate and tariff discount schemes 4.1.4 Design of tax incentives for the promotion and application of energy efficient materials, equipment and technology, including the implementation plan, rules and regulations, and budget. 4.1.5. Conduct of promotional and advocacy campaigns for the approval of the proposed tax incentives. 4.1.6. Implementation of the approved/enforced tax incentives 4.1.7. Review/evaluation of the implemented rebate and tariff discount schemes and tax incentives. 4.1.8. Revision for improvement of the rebate and tariff discount schemes and tax incentives 4.1.9. Implementation of the improved rebate and tariff discount schemes and tax incentives

75. The project will help design, develop and implement rebates/ tariff discount schemes in coordination with regulators and utilities for commercial buildings that comply with ECBC requirements. For example, the introduction of accelerated depreciation on energy efficient (and green) buildings can provide investors in buildings an incentive to incorporate energy-efficient features. Also, the project will help establish and implement tax incentives to create demand for and promote sales of energy efficient building materials and products.

76. The project will conduct policy researches to review related in country policies and policies from other countries in order to come up with policy recommendations. The policy studies conducted could be used as bases for whatever policy recommendations will be made after the review.

Output	Activities
4.2 Financing schemes designed with banks for investors to comply with ECBC	4.2.1. Compilation and dissemination of information on existing financing schemes 4.2.2 Discussion on the design of new loan schemes with financial institutions and/or guarantee schemes with ESCOs[38] 4.2.3 Involving interested financial institutions in the design of financing schemes for EE building projects and inviting participation of financial institutions in the awareness raising workshops (activity 2.1.2) 4.2.4 Assistance to building practitioners in preparing bankable energy efficient buildings proposals 4.2.5 Evaluation of the performance of the financing schemes

77. The proposed project will help design financing schemes with banks to encourage investments in buildings that are ECBC-compliant and energy efficient commercial buildings by various investors (developers, local businesses, material suppliers, ESCOs and funding institutions). Building professionals

[38] ESCOs assist buildings in achieving energy performance through signing performance guarantee contracts and also facilitate to obtain loans from financial institutions.

(including manufacturers of building materials) will receive assistance preparing project proposals and business plans for construction and upgrading the design to energy efficient commercial buildings for both new and existing buildings. Interested financial institutions will be encouraged (through e.g. capacity building) to provide financing to projects on the design and construction of energy efficient buildings.

Output	Activities
4.3 Award schemes for energy-efficient investments or improvements in commercial buildings	4.3.1 Design and development of an annual "best green and/or energy efficient investment" award scheme (for commercial buildings), including implementation plan, rules and regulations and budget 4.3.2. Implementation of the annual awards 4.3.3 Evaluation of the impacts or the annual awards

78. Existing platforms, such as the Green Building Congress, can be used to hold annual "best green and/or energy efficient investment" award ceremony, in coordination with IGBC's LEED and the GRIHA Green Building Schemes.

Outcome 5: Readily available and easily accessible/shared information and knowledge products[39] on best practices regarding EE buildings technologies and measures

Output	Activities
5.1 In-depth end-of-project impact analysis	5.1.1 Conduct of end-of-project impact study consisting of the following sub-activities: • Qualitative and quantitative assessment of impact of project's capacity building and institutional strengthening activities • Evaluation of direct and indirect energy savings and associated emission reduction calculations

79. A more in-depth analysis is proposed to: (a) provide a methodology for monitoring and measuring energy savings and resulting direct greenhouse gas emission (from the demonstration buildings) and of the indirect emissions reductions from the project's capacity building and institutional strengthening activities; (b) analyse results of previous building energy performance assessments (before project) and (c) where there are still gaps, by doing additional quantification of energy demand for EE buildings.

80. The activity will incorporate the results of activities 1.1.1 (analysis of current regulatory mechanisms and capacities of institutions that support EE in commercial buildings and identify the gaps), 1.2.2 (gathering of information through survey, audit reports on EE in commercial buildings) and 2.5.1 (Assessment and study of market to identify building materials and sale of energy efficient materials).

81. A similar exercise will be done at the end of the project with the purpose of having a market assessment and assess the project's technical assistance has had in terms of moving towards market transformation of EE commercial buildings in India. The savings and emission reduction calculations will be calculated and compared with the baseline. This information will also be valuable additional information on EE in the commercial sector for India's formal communication with the UNFCCC.

Output	Activities

[39] As mentioned earlier, this project is one of the five projects proposed under "Programmatic Framework Project for Energy Efficiency in India" (GEF project 3538). The US$ 1 million component on knowledge management under the Programmatic Framework that was approved under the WB project covers all the projects under the program including this project. Therefore activities are retained as it is to provide clarity during implementation. However, budget will be sourced from the "Programmatic Framework Project for Energy Efficiency in India" (GEF project 3538).

5.2 Knowledge sharing products developed on best practices	5.2.1 The project will produce at least one leaflets, a flyer and a video capsule for five climatic zones depicting project impact and uploaded onto the web

82. This activity will involve in the development of knowledge sharing products such as development of leaflets, flyers and video capsule indicating the project impact in the five climatic zones based on the model pilot projects. The developed knowledge sharing products will be uploaded onto the web for wider information dissemination.

8. KEY INDICATORS, RISKS AND ASSUMPTIONS

Indicators

83. Key indicators of the project's success (impact indicators) include:

- Direct impacts of demo buildings, in terms of area of new commercial buildings, amount of energy savings (as compared with conventional buildings) and corresponding reduced CO_2 emission.
- Making ECBC mandatory for buildings above a threshold energy consumption level and corresponding amendments to policies, regulations and strategies.
- Indirect energy savings and reduced CO_2 emissions as a result of the above-mentioned capacity building and institutional strengthening activities.

Indicator	Time Frame	Target
Direct energy savings from demo projects, GWh	EOP	221.19
Direct CO_2 emission reductions from demo projects, tonne	EOP	181,379
Reduction in energy consumption in commercial buildings sector, %	EOP[40]	1.69
Increase in EE buildings in the commercial buildings sector, million m^2	EOP	116.77
EE buildings in the commercial buildings sector, %	EOP	20%
Volume of investments in EE buildings in commercial buildings sector, million USD	5 Years after EOP	1750

84. The project results framework outlined in section 11 below provides a detailed list of project progress indicators for the various outputs of the project.

Risks

85. The project can be considered to face two categories of risks: external (policy-related) and internal (risks inherent to project implementation itself):

86. The external risks include:

a) Failure to secure continuous support from state and municipal authorities for the ECBC efforts and other energy efficiency programmes – possible effects of this could be the slow implementation of ECBC (and other energy efficiency programmes) at sub-national level and the ineffective enforcement of ECBC or other energy efficiency standards.

[40] It is the sum of energy savings from 2011-2014 over its baseline energy consumption.

b) Frequent shifting/transfer of dedicated government staff across agencies and departments – a possible effect of this could be the loss of capacity that has already been built for the programme.

87. The internal risks include:

c) Failure to trigger positive response from consumers and stakeholders (architects, design professionals, building material suppliers, builders, contractors, developers, building managers) – possible effects of this could be ineffective capacity building efforts and a resultant slower rate of market transformation.

d) Unavailability of experts to deliver trainings – a possible effect of this would be related to the previous risk based on inefficient capacity building efforts.

e) Failure to secure public and private sector support and resources for research and testing building materials – possible effects of this include insufficient resources available for research and testing of new energy efficient materials and improved building designs and reduced availability of new improved materials and building designs for the programme.

f) Failure to secure consumer interest – possible effects here include a low demand for ECBC compliant buildings, slow rate of market transformation and reduced incentives for manufacturer to improve design. The demonstration project should deliver the expected savings to mitigate this risk.

g) Lack of building material suppliers' access to credit for investing in energy efficient materials – possible effects here include unavailability of co-financing from a slow rate of replacement of existing buildings and an associated higher cost of building/retrofitting new and existing buildings.

88. A detailed risk-analysis table is available in Annex A. This also includes suggestions for countermeasures to deal with outlined risks to warrant successful implementation of this GEF project.

Assumptions

89. The assumptions for this project revolve around expectations from both the government and market sides. It is expected that the government will prepare a road map and plan for the implementation of the project that is clearly understood by the stakeholders and other participants. It is also assumed that any experiences from demonstrations are clearly communicated to ensure raising awareness.

90. On the other hand, assumptions regarding the market side highlight that this will be continuing commitment from government and private sector participants to implement ECBC and other energy efficiency programmes in their buildings and accreditation or testing authorities are willing to cooperate on equipment or materials labelling. Finally for this programme to be effective and achieve its objectives it is assumed that there is readily available information and data from the stakeholders and the market.

9. COST-EFFECTIVENESS; GEF INCREMENTAL REASONING

91. GEF resources are required to remove barriers preventing market penetration of energy-efficient (ECBC-compliant) commercial buildings, leading to a significant increase in the number of new energy efficient commercial buildings in India. The market transformation effort will build on BEE's existing voluntary ECBC programme and will be achieved through an improved policy and implementation framework (including mandatory ECBC), capacity building and awareness raising to architects, design professionals, building material suppliers, builders, contractors, developers, and building managers as well providing technical assistance in demonstrating energy savings opportunities in model buildings.

92. In the absence of the project's interventions, the transition from voluntary to mandatory building codes will meet long delays, and consequently, the uptake of new of emerging technologies and practices would be slowly. Information dissemination on energy efficiency practices will remain hampered and many developers and building owners will remain ignorant of the potential of energy efficiency, if there is no climate zone-wise demonstration of best practices and monitoring of energy and financial savings are achieved.

93. The project aims to promote the increased adoption of new energy efficient commercial buildings design, practices and materials in new commercial buildings. It is considered that the ECBC compliant energy efficient buildings will be able to give same performance for over 25 years of estimated service life. Thus, energy efficient buildings will continue saving electricity and GHG emissions over their lifetimes of 25 years.

94. The GEF support is expected to result in annual direct GHG emission reductions of 90.69 kilo tonne of CO_2 ($ktCO_2$) and 181.38 $ktCO_2$ by the year 2014 (the project is designed such that the actual realisation of model projects will be during the last two years of the project). The cumulative reductions achieved would be 2,267 $ktCO_2$ over the 25-year of economic lifetime of eight energy efficiency demo projects in commercial buildings. Considering the total avoided GHG emission reductions that are attributable to the project, which amounts to 906,894 tCO_2, the corresponding unit abatement cost (UAC) (i.e. GEF$ per tCO_2) is USD 5.73/tCO_2. This considers the estimated direct GHG emission reductions from the demo/model projects over the project duration of 10 years. The emission reductions that are attributable to the project are calculated using the "Manual for Calculating GHG Benefits of GEF Projects". The indirect project CO_2 emission reductions are calculated on a conservative basis as per "Calculating Indirect Impacts" (a) bottom up approach results in 2,720,682 tCO_2 and (b) top-down approach results in 48,969,467 tCO_2. More details on the emission reduction calculations are provided in Annex D.

10. SUSTAINABILITY AND REPLICABILITY

Sustainability

95. After completion of the proposed GEF project, it is expected that the push for continuously improving energy efficiency initiatives in commercial buildings will continue under the mandate of BEE. Sustainability of this GEF-supported project is ensured by:

- Establishing a road map for the implementation of mandatory ECBC.
- Improved cooperation between the various public sector and private sector stakeholders, that is between public sector authorities (BEE, State authorities and Municipalities) as well by promoting strategic partnerships between the public and private sectors, for example in the area of developing a market for energy-efficient material and strengthen financial services.
- Capacity building of stakeholders to continue building and maintaining energy-efficient buildings. Such capacities and partnerships are expected to remain in place and facilitate the continuation of energy-efficient buildings programme.

96. The GEF project will build upon a number of international and national experiences on energy efficiency programs for buildings, such as successful building programmes in US, Europe, China and Australia. The project will also adopt several of the lessons learnt from programme from other countries, such as US EPA's[41] benchmarking solutions to establish zone- wise national benchmarks for commercial buildings.

Replicability

[41] US Environmental Protection Agency (US EPA)

97. The construction of energy-efficient pilot/model commercial buildings will showcase the relevance, usefulness and cost-effectiveness of compliance with the (voluntary) ECBC. BEE's objective to make the ECBC program mandatory will also institutionalize the process thereby increasing the number of efficient commercial buildings within the country.

98. It is expected that the improved awareness and capacity building efforts will also lead to replicability in other buildings-related energy efficiency programmes, such as promotion of implementing retrofitting energy-efficient measures in existing commercial buildings as well as in large residential buildings.

99. The project will exchange lessons learnt within the country, in particular with the other projects under the GEF and lessons learnt with other UNDP GEF projects that are being implemented or programmed[42].

[42] Such Algeria, Colombia, Brazil, Mauritius, Morocco, Iran, Thailand, Turkey

11. PROJECT RESULTS FRAMEWORK

The project will contribute to achieve following country program Outcomes (as defined in CPD): *Project:* Implementation of Energy Conservation Building Code (ECBC) efforts of BEE and other energy efficiency (EE) improvement programs by BEE for commercial buildings *Outcome:* Progress towards meeting national commitments under multilateral environmental agreements (CP, Outcome 4.3) *Output:* Strengthened capacity for low carbon development and sustainable management of natural resources (CP, Output 4.3) *Output indicators:* Number of clean technologies / mechanisms piloted
Country program outcome indicators: *Outcome:* Progress towards meeting national commitments under multilateral environmental agreements (CPAP, Outcome 4.3) *Output:* Partnerships and capacities developed to meet national commitments under multilateral environmental agreements *Output indicators*: (a)Annual reductions in greenhouse gas (GHG) emissions in India; (b) million USD flowing annually to India from Global Environment Facility (GEF) through UNDP for this program;(c) number of additional UNDP initiatives for achieving global and national targets under multilateral environmental agreements
Primary applicable key environment and sustainable development result area: Strengthening national capacities to mainstream environment and energy concerns into national development plans and implementation frameworks.
Applicable GEF strategic objective and program: Strategic Objective: To promote energy-efficient technologies and practices in building sector. Strategic Program: (SP-1) Promoting Energy Efficiency in Residential and Commercial Buildings.
Applicable GEF expected outcomes: Increased market penetration of energy-efficient building materials, technologies and establishment of energy-efficient practices in commercial buildings.
Applicable GEF outcome indicators: (a) tonnes CO_2eq avoided. (b) kWh or toe saved from adoption of energy-efficient technologies and practices.

Table 4: Project Planning Matrix (PPM)

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
Project Goal: Reduction of GHG emissions from the Indian buildings sector	Cumulative CO_2 emission reductions from start of project to end-of-project (EOP), $ktCO_2eq$	0	181	M&E reports of the pilot/model projects. Reports and documents available with BEE related to ECBC compliance.	Risk: Energy performance reports may not be made available unless mandated and they may not be accurate Assumption: All the Energy performance reports are made available to BEE from the stakeholders.
Project Objective: Operationalization of the Energy Conservation Building Code (ECBC) for (new) commercial buildings.	New building space compliant with ECBC by Year 2014, million m^2	5[43]	At least 116.77[44]	ECBC compliance reports/documents from state authorities and then combined by BEE.	Risk 1: (a) ECBC is not taken up as envisaged and failure to secure continued support from state and municipal authorities. (b) Information on ECBC compliance is not available. (c) Failure to secure support from developers/building owners for buildings to be ECBC compliance. Assumption 1: continued support is available for ECBC compliance by all stakeholders and Information is available. Risk 2: Delay in the construction of
	Average energy consumption in new buildings compared to baseline by Year 2014, $kWh/m^2/y$	210[45]	180.	Monitoring of ECBC compliance by state authorities and assessment studies by BEE.	
	Direct energy savings in the project by EOP, GWh/y	0	221.19[46]	Energy monitoring reports of demonstration buildings produced in the frame of the project.	

[43] 250 buildings under ECBC (which are in various stages of construction) cumulating to 5 million m2 of commercial space since the date of launch of ECBC in May 2007.
[44] Increase in EE buildings in the buildings sector by the EOP will be 20% of total existing commercial building floor area i.e. 20%* 583,833,099 m^2.
[45] Range: 200-400 $kWh/m^2/yr$
[46] ECBC demonstrated in 8 commercial buildings cumulating to 1.47 million m^2 floor area consume 309,671 MWh in baseline and 199,074 MWh in the project scenario annually. The model pilot buildings demonstrated will save more energy than the benchmark SEC of 180 $kWh/m^2/y$ and the rationale for this is model buildings will implement all the energy efficiency measures as per the guidance provided under ECBC. Thus the SEC achieved is expected to be 135 $kWh/m^2/y$ and it is equivalent to 35% energy savings.

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
	CO_2 emissions avoided from 8 pilot demonstration buildings by EOP, tonne	0	181,379 [47]	Monitoring of data collected during the actual operation of demo projects and calculated emission reductions on the basis of the available data & assumed baseline development	demo projects. Inappropriate data monitoring. Assumption 2: Demo projects implemented as on time. Data are recorded and reported as needed.
	CO_2 emission avoided – indirect emissions by Year 2020, million tonne	0	2.7 – 49 [48]	Declaration of energy consumption details by building space owners/users and assessment by BEE as part of the project.	Risk: The market growth rate of ECBC compliant buildings may not take place as estimated. Assumption: Market growth rate of new commercial buildings
Component 1. Institutional Capacity Development					
Outcome 1: Strengthened institutional capacities at various levels on the strengthened to enactment and enforcement of ECBC for commercial buildings					
Output 1.1: Authorities and personnel of building departments at national, state and municipal level capable of implementing and enforcing the ECBC	Number of state designated agencies and municipal bodies promote the implementation of ECBC by EOP	0	• 50 [49] • 30 [50]	Official notifications issued by state designated agencies and municipal bodies.	Risk: (a) Lack of continued commitment of the key public authorities and government entities to develop and implement effective EE buildings policies and practices. (b) Non availability of qualified staff to promote ECBC & other EE programmes. (c) Non availability of experts to deliver trainings. (d) Frequent shifting/transfer of dedicated government staff may result in loss of capacity that has already

[47] Emission reduction (for details on calculation see Annex D): 90,689 tCO_2 annually or 181,379 tCO_2 during the project period (2011 to 2014) and 2.27 million tCO_2 cumulatively over 25 year period (demo projects)

[48] Through a bottom-up approach 2.7 million tCO_2; in the top-down approach, from 2011 to 2020, assuming growth rate of 10% for 1st 3 years, 20% in year 4, 35% in year 5, 50% year 6, 65% in year 7, and 80% thereon over commercial space as in 2011 and a causality factor of 0.6 results in 49 million tCO_2.

[49] State designated agencies and municipal bodies that have adopted a policy to promote ECBC and other EE programs.

[50] State designated agencies that have dedicated resources for ECBC efforts and other EE programs

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
	Number of prepared papers, promotional materials and training material for capacity building of policy & decision makers in government and private sector by Year 2014	0	5[51] and 6[52]	Produced papers, promotional and training material	been built. Assumption: Key public authorities are aware of the need to learn on ECBC compliance needs and depute staff to attend the training programmes. Also continued commitment to promote ECBC & other EE programmes
	Number of completed outreach programmes for government staff at various level of government by Year 2013	0	25[53]	• Workshop proceedings and evaluation reports. • Completion reports for training and capacity building workshops. • After-training evaluations completed by participants.	
	• Number of national and local government institutions with clearly defined roles and responsibilities of institutions that enforce the ECBC by Year 2014 • Number of states that carry out the mandatory implementation of ECBC through a clearly defined and effective institutional structure by Year 2014	• 0[54] • 0[55]	25 20	• A report is produced • Project progress reports • Government reports, guidelines and statements	Risk: ECBC may not be made mandatory and no clarity of ECBC compliance in voluntary regime Assumption: ECBC is mandated and states support its implementation
Output 1.2: Strengthened mechanisms and structures for ECBC implementation and gathered energy performance data	Number of states that actively participate in an officially established national energy audit information gathering system by Year 2014	0	20	• A online database is functional and energy audit reports information is available	Risk: Poor quality of energy audits and no flow of information to database. Assumption: Interest of the key stakeholders and ministries/departments to co-operate in the development of the audit database and benchmarking

[51] Papers
[52] Types of promotional & training materials (power point slides, brochures, print ads (such as flyers etc), video for TV documentary/trainings, training manual/s and kits, and websites)
[53] 750 participants from national, state and/or local governments participate to learn ECBC implementation and enforcement.
[54] No clarity in roles and responsibilities, and ECBC enforcement
[55] No effective structure is in place

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
	Number of energy audits that are carried out annually starting Year 2012	0	500	• Reports generated from database	Risk: Insufficient data collection. Too many variations in energy consumption/savings may hamper the objective of benchmarking. Assumption: Reporting of building energy performance is consistent and well-understood by key stakeholders
	Number of vetted energy audit reports that are prepared and submitted to the building owners each year starting Year 2012	0	500		
	Number of independent surveys carried out to gather information on building sector energy performance each year starting Year 2011	0	250		
	% annual increase in data volume in the building sector energy database starting Year 2011	0	80		
	Number of satisfied users of the building sector energy database each year staring Year 2011	0	100		
	Number of buildings covered in commercial buildings database by Year 2014	0[56]	1000	• Database outputs • Progress reports • Audit reports	
	Number of reports on benchmark information of energy efficiency in commercial buildings by Year 2014	0	5	Detailed reports are available and benchmarks defined for different types of commercial buildings for each of five climatic zones	
	Number of states carrying out the mandatory enforcement of the formulated ECBC roadmap by Year 2011	NA	1	A report on road map and sustainability plan is approved	Risk: Inability to state governments to adopt the ECBC Assumption: Government commitment to make ECBC mandatory and suggest road map which is actionable and acceptable to key relevant agencies

[56] Although there is a database of about 1,000 government and commercial buildings, but it is not detailed enough for defining benchmarks. The target set is to obtain detailed enough data for defining benchmarks.

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
	Number of annual energy consumption reports submitted by building owners that will be evaluated for ECBC implementation impact analysis starting Year 2011	0	1000	Annual reports submitted by building owners to BEE	
	Cumulative number of impact analyses of ECBC implementation and other buildings-relevant measures conducted, documented and disseminated by EOP	0	5	Annual impact analysis report is available of ECBC implementation and other buildings-relevant measures	
	Cumulative number of review meetings of BEE with key players in the buildings sector to discuss measures to address issues concerning improving the average SEC of the sector by EOP	0	5	Annual stakeholder meeting proceedings are available with BEE	
	Number of accredited local authorities (at municipality level) to validate and verify mandatory commercial buildings compliance with the ECBC by EOP Number of verified ECBC compliant buildings each year starting Year 2011	NA	50-100 250	Accredited local authorities list available with BEE	
Output 1.3: Strengthened system of information dissemination to stakeholders	• % of key stakeholders that use the information dissemination system on EE in buildings[57] each year starting Year 2011 • Number of users on the information system each year starting Year 2011	0 0	50 250	• Web portal • Survey results as it is planned by year 1 on web usage, awareness and attitudes of stakeholders	Risk: Web portal design is not user friendly Assumption: Use of web portal is consistent and large number of stakeholders will use that to obtain the information
	• Average percentage of building owners submitting reports annually for inclusion in the information system starting Year 2011, % • Percentage of building owners that rated the information system as useful by EOP, %	0 0	75 50	•	
Component 2: Technical Capacity Development					
Outcome 2: Enhanced technical capacity and expertise of local building practitioners and service providers					

[57] This is to be established as part of the BEE website by 2011.

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
Output 2.1: Property managers, developers and owners who are aware of, and interested in, EE buildings	Number of training workshops designed and conducted by Year 2014	0	10[58]	• Workshop proceedings and evaluation reports. • Completion reports for training workshops. • After-training evaluations completed by participants.	Risk: Failure to trigger positive response from architects, design professionals, building material suppliers, builders, contractors, developers, building managers. Assumption: Experts to deliver trainings are available and willingness of the targeted stakeholders to benefit from the training.
Output 2.2: Completed specific training programmes for key stakeholders and certified practitioners	Number of training of trainers workshops for creating awareness on ECBC and other EE programmes conducted by Year 2014 Number of trained architects and design professionals, developers and contractors and building material suppliers by Year 2014 Percentage of trainees that rated the training workshop training as good/excellent by EOP, % Proportion of trainees that are still providing training on ECBC and other EE programmes by EOP, %	0 0 NA NA	15 1500[59] 50 25	• Training manual/s and kits • Evaluations completed by participants. • Completion reports for training and capacity building workshops. • Brochures • List and profile of stakeholders	Risk: Failure to trigger positive response from key stakeholders and certified practitioners. Assumption: Experts to deliver trainings are available and willingness of the targeted stakeholders to benefit from the training. Accredited authorities willing to cooperate on EE in commercial buildings

[58] These are awareness raising workshops to be participated in by 300 professionals.
[59] 50 training workshops conducted with the participation of 1,500 professionals.

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
	Number of training courses conducted for energy auditors and energy service companies (ESCOs) by Year 2014	0	10[60]		
	Percentage of trainees that rated the training workshop training as good/excellent by EOP, %	NA	50		
	Proportion of trainees that are applying their training in the conduct of building energy audits and in the design and operation of EE buildings by EOP	NA	50%		
	Proportion of trainees still involved in the building industry by EOP, %	NA	75		
	Number of buildings practitioners that utilize design software for EE in buildings & understand and apply EE guidelines by EOP	Limited	2,500	• Workshop proceedings and evaluation reports. • Completion reports for training workshops. • After-training evaluations completed by participants.	
	Number of accredited building energy auditors, energy audit firms and energy service companies by EOP	NA	1000	After completion of training programmes, produced a report on list and profiling of accredited building auditors, energy audit firms and ESCOs	
Output 2.3: Training curricula and modules incorporated at training institutes	Number of developed course curricula and modules on ECBC and EE in buildings incorporated in academic institutions by Year 2014	0	At least 5	Course materials and curriculum from academic institutions like Centre for Environment Planning & Technology (CEPT), IITs and Indian Institute of Management, Ahmedabad	

[60] Training courses conducted with the participation of 300 certified energy auditors and participants from ESCOs

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
Output 2.4: Tools in place for energy-efficient building design (guidelines, handbooks, software)	Prepared Handbook on EE in buildings and requirements under ECBC by Year 2012	NA	1	Handbook on EE Buildings Design published	
	Number of building practitioners each year that use the handbook in their work starting Year 2012	NA	2500		
	% of building practitioners each year that are satisfied in using the handbook starting Year 2012	NA	50		
	Number of building projects that were designed based on the handbook by EOP	NA	2500		
	Number of sets of guidelines prepared on EE Buildings for developers and investors by Year 2012	1[61]	1[62]	Guidelines	
	% of building practitioners each year that are satisfied in using the guidelines starting Year 2012	NA	50		
	Number of building projects that were designed based on the guidelines by EOP	NA	2500		

[61] User guide on (voluntary) ECBC elaborated under USAID project
[62] Prepared guidelines with improved and expanded architectural guidance

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
	Appropriate design software package prepared for EE building design in compliance with ECBC by Year 2012	NA	1[63]	Software	
	Number of building practitioners each year that use the software package in their work starting Year 2012	NA	2500		
	% of building practitioners each year that are satisfied in using the software package starting Year 2012	NA	50		
	Number of building projects that were designed based on the software package by EOP	NA	2500		
Output 2.5: Set of specifications for EE building materials	Number of organized and conducted meetings and events for manufacturers to showcase energy efficient products and meet developers and construction companies as well as other stakeholders by EOP	0	Min 1 meeting/ year Min 2 events/year	• Market study report detailing the building materials and sale of energy efficient materials • Proceedings of the meeting prepared by BEE • Event summary prepared by BEE	
	Cumulative number of follow-up dialogue meetings held by EOP	NA	5		
	Average number of participating local building material manufacturers and suppliers in each dialogue meeting	NA	30-40		
	Percentage of EE buildings using new EE building materials that are locally available by end Year 2013	NA	50		

[63] Developed a Software for EE building design

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
Output 2.6: Technically capable and equipped building materials testing laboratories	Number of laboratories capable of doing R&D and testing of EE building materials by EOP	Limited[64]	• 5[65] • 5[66]	Data are available with National Accreditation Board for Testing and Calibration Laboratories (NABL) website (http://www.nabl-india.org/index.asp).	
	Number of EE building material specifications developed and enforced for compliance by EOP	NA	5		
	% of locally produced building material manufacturers that comply with EE building material specifications by EOP, %	NA	75		
	Percentage of local building material manufacturers that participated in the building material testing by EOP, %	NA	75		
	Percentage of local building material manufacturers that rated the building material testing as useful & good/excellent by EOP, %	NA	75		
	Proportion of building material manufacturers that made use of the product testing results in improving their building material products by EOP, %	NA	75		
Component 3: ECBC Compliance Demonstrations					
Outcome 3: Increased number of new commercial buildings that are ECBC compliant					

[64] Test labs like Central CPRI, Sri Ram Institute of Industrial Research, etc have limited capacity of testing building material
[65] In-house capacity increase of existing 5 research labs to conduct R&D on EE building materials
[66] 5 accredited third-party test labs available for testing

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
Output 3.1: Completed ECBC demonstrations in 5 climatic zones	Number of detailed technical and financial feasibility studies done for demonstration site selection by Year 2012	0[67]	8[68]	• Reports on model buildings planning and construction and results of evaluation • Documentary video of demo commercial building construction	Risk: Delay in the actual implementation and experiences from the demonstration building are not properly and accurately recorded Assumption: The model buildings are implemented as planned and all the process documentation carried out and documented lessons learned
	Number of finalized and approved demonstration project designs (engineering & construction) by Year 2012	NA	8		
	Number of financed demonstration projects confirmed and approved for implementation each year starting Year 2012	NA	8		
	Number of demo projects implemented each year starting Year 2013	NA	4		
Output 3.2: Demonstrated energy savings in model buildings (under public-private partnerships in 5 climatic zones)	Cumulative energy savings realized from ongoing demo projects, GWh by EOP	NA	90.7[69]	• Energy bills • Construction and operational cost of building	
	Cumulative CO_2 emission reductions from ongoing demo projects by EOP, million tonnes	NA	1.27		
	Number of demo projects that achieved its design SEC performance by EOP	NA	8		
	Number of demo projects that achieved its anticipated economic performance by EOP	NA	8		
Component 4: Fiscal & Regulatory Frameworks for EE buildings					
Outcome 4: Enforced fiscal incentives & Regulatory frameworks incentives for investors and developers of EE buildings					

[67] Only model public buildings demonstrated so far.
[68] At least 8 model commercial buildings with demonstrations covering an area of 1.47 million m^2 facilitated.
[69] Total energy savings of 90.7 GWh (leads to an annual savings of USD 5.7 million with payback period of around 3-5 years).

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
Output 4.1: Fiscal and regulatory incentives for investors	Number of completed satisfactorily acceptable fiscal and regulatory incentives policy researches/studies by EOP	None[70]	3-5	• Reports on incentive options • Utility and SDA reports • Builder/developer/investor surveys. • Published brochures and website information	Risk: • Lack of interest from builders' / developers' / contractors' access to credit for ECBC compliant buildings. • Lack of building material suppliers' access to credit for investing in energy efficient materials. Assumption: • Ministry / Department / Financial Institutions are convinced to create financing schemes. • There is good linkage between builders / users / manufacturers with financing agencies.
	Number of fiscal and regulatory incentives policy materials prepared, presented and disseminated to GOI policy makers by Year 2012	NA	3-5		
	Cumulative number of targeted policy coordination meetings conducted by EOP	NA	10		
	Number of fiscal and regulatory policy recommendations accepted for consideration of approval by the relevant GOI authorities by Year 2012 & 2013	NA	3-5		
	Number of approved fiscal and regulatory incentives for EE building initiatives that were approved and enforced by EOP	NA	3		
Output 4.2: Financing schemes designed with banks for investors to comply with ECBC	Number of financing mechanisms using partial risk guarantee and venture capital funds that are operational by EOP	None[71]	4	• Documents of approved financing schemes. • End of project impact report giving investments in ECBC compliant buildings • Report on schemes to support energy efficient materials	
	Number of financing schemes for EE building projects designed by EOP	NA	25		
	Percentage of banks and financial institutions that are committed to support EE building projects by EOP	NA	4		
	Number of financing schemes for EE building projects implemented by banks/financing institutions by EOP	NA	2500		

[70] Incentives for EE are available, but not particularly targeted to commercial buildings
[71] Bank loan schemes are not specifically geared towards ECBC compliance (green investments)

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
Output 4.3: Award schemes for energy-efficient investments or improvements in commercial buildings	Number of Green Building Awards scheme that is officially operational by Year 2012 Number of buildings participating each year in the Green Building Awards starting Year 2012 Number of qualified awardees each year for the National Building EE Awards starting Year 2012 Number of new EE building projects that are based on the design of green building awardees by EOP	1[72] NA NA NA	1[73] 25 5 25	• Case studies of award winners • Proceedings/publications of events in which awards are given	Risk: • Lack of interest from builders and developers, contractors for any such award. • Other awards already in place Assumption: • ECBC is run by BEE and the award from a statutory government agency attracts interest.
Component 5: Information and Awareness Enhancement					
Outcome 5: Readily available and easily accessible/shared information and knowledge products on best practices regarding EE building technologies and measures					
Output 5.1: In-depth end-of-project impact analysis	Developed methodology for monitoring and impact assessment as per the requirements of ECBC by Year 2011	NA	1	A methodological tool is developed for monitoring and impact assessment of ECBC	Risk: All relevant parameters are not covered in the baseline study Assumption: • Available reliable information and data made available by building owners • Ongoing monitoring and recording of the impact of the project and barriers faced
	Final report consolidating results, impacts and lessons learned prepared by EOP	NA	1	A final report that consolidates the results and lessons learned of the ECBC operationalisation	
	Impact study by the end of the project	NA	1	End-of-project impact report, giving a reliable snapshot of the formal and informal construction market impacts owing to EE and ECBC	

[72] LEED Green Building and IGBC schemes
[73] Official award scheme for ECBC compliant commercial buildings both at central and state level

Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Risks/Assumptions
	Indicator	Baseline	Target		
Output 5.2: Knowledge sharing products developed on best practices	Number of sets of knowledge sharing products developed by Year 2014	NA	15[74]	These materials will also indicate the compliance procedure under ECBC climatic zone-wise, EE measures and their availability; and financial details	

[74] Produced at least one each (3 nos), leaflets/flyer/Video capsule, for five climatic zones depicting project impact and uploaded onto the web.

12. TOTAL BUDGET AND WORK PLAN

Annual Budget and Work Plan (ABWP)

Table 5: Project Annual Budget and Work Plan (ABWP)

Award ID:	00060037
Project ID:	00075374
Award Title:	PIMS 4043 CC FSP Energy Efficiency Improvements in Commercial Buildings
Business Unit:	IND10
Project Title:	PIMS 4043 CC FSP Energy Efficiency Improvements in Commercial Buildings
Implementing Partner (Executing Agency):	Bureau of Energy Efficiency (BEE)

GEF Outcome / Atlas Activity	Respon-sible Party (Imple-menting Agency)	Source	Budget Code	ERP/ATLAS Budget Description/Input	Annual Expenses (USD)				Total (USD)
					Year 1	Year 2	Yeas 3	Year 4	
Outcome 1 Strengthening of institutional capacities	UNDP	GEF 62000	71200	International Consultants	40,000	40,000	40,000	24,000	144,000
			71300	Local Consultants	40,000	40,000	30,000	31,375	141,375
			71600	Travel	15,000	20,000	20,000	9,027	64,027
			72100	Subcontracts	50,000	50,000	50,000	70,831	220,831
			72200	Equipment and furniture	12,500	2,500	2,500	-	17,500
			72500	Supplies	1,750	1,750	750	750	5,000
			72800	Info Tech Equipment	2,000	2,000	500	500	5,000
			73100	Rental and Main Premises	1,500	1,000	1,500	1,000	5,000
			73400	Rental and Main Equip	1,500	1,500	1,000	1,000	5,000
			74200	Audio visual & Printing Prod. costs	2,500	2,500	2,500	2,468	9,968
			74500	Miscellaneous	1,538	1,500	1,600	2,661	7,299
			sub-total		**168,288**	**162,750**	**150,350**	**143,612**	**625,000**
Outcome 2	UNDP	GEF	71200	International Consultants	150,000	100,000	100,000	61,000	411,000

GEF Outcome / Atlas Activity	Respon-sible Party (Imple-menting Agency)	Source	Budget Code	ERP/ATLAS Budget Description/Input	Annual Expenses (USD)				Total (USD)
					Year 1	Year 2	Yeas 3	Year 4	
Expertise of key partners developed and awareness raised		62000	71300	Local Consultants	90,000	70,000	70,000	25,750	255,750
			71600	Travel	50,000	75,000	50,000	9,200	184,200
			72100	Subcontracts	200,000	200,000	150,000	99,657	649,657
			72200	Equipment and furniture	5,000	2,500	2,500	-	10,000
			72500	Supplies	750	500	500	13,125	14,875
			72800	Info Tech Equipment	5,000	5,000	4,000	875	14,875
			73100	Rental and Main Premises	250	250	250	250	1,000
			73400	Rental and Main Equip	500	250	250	250	1,250
			74200	Audio visual & Printing Prod. costs	10,000	7,500	7,500	5,600	30,600
			74500	Miscellaneous	2,000	1,000	1,000	2,793	6,793
			sub-total		**513,500**	**462,000**	**386,000**	**218,500**	**1,580,000**
Outcome 3: ECBC-compliant model buildings piloted in 5 climatIc zones	UNDP	GEF 62000	71200	International Consultants	50,000	150,000	100,000	141,000	441,000
			71300	Local Consultants	40,000	60,438	70,000	96,937	267,375
			71600	Travel	25,000	30,000	40,000	58,863	153,863
			72100	Subcontracts	250,000	250,000	250,000	416,647	1,166,647
			72200	Equipment and furniture	15,000	20,000	10,000	7,000	52,000
			72500	Supplies	1,500	1,500	2,000	2,500	7,500
			73400	Rental and Main Equip	750	750	1,000	8,000	10,500
			74100	Professional services – audits	3,000	3,000	3,000	3,000	12,000
			74200	Audio visual & Printing Prod. costs	1,000	2,500	3,000	15,483	21,983
			74500	Miscellaneous	1,000	2,000	3,000	7,132	13,132
			sub-total		**387,250**	**520,188**	**482,000**	**756,562**	**2,146,000**
Outcome 4:	UNDP	GEF	71200	International Consultants	20,000	30,000	40,000	6,000	96,000

GEF Outcome / Atlas Activity	Respon-sible Party (Imple-menting Agency)	Source	Budget Code	ERP/ATLAS Budget Description/Input	Annual Expenses (USD)				Total (USD)
					Year 1	Year 2	Yeas 3	Year 4	
Fiscal and regulatory incentives for investors		62000	71300	Local Consultants	10,000	15,000	15,000	13,250	53,250
			71600	Travel	10,000	10,000	15,810	640	36,450
			72100	Subcontracts	30,000	30,000	40,000	37,332	137,332
			72200	Equipment and furniture	5,000	2,500	1,500	1,000	10,000
			72500	Supplies	1,000	750	250	500	2,500
			73400	Rental and Main Equip	650	650	600	600	2,500
			74200	Audio visual & Printing Prod. costs	1,000	1,000	2,600	2,500	7,100
			74500	Miscellaneous	1,000	1,000	1,000	868	3,868
			sub-total		**78,650**	**90,900**	**116,760**	**62,690**	**349,000**
Outcome 5: M&E; knowledge sharing and learning	UNDP	GEF 62000	71200	International Consultants	-	-	-	-	-
			71300	Local Consultants	-	-	-	-	-
			71600	Travel	-	-	-	-	-
			72100	Subcontracts	-	-	-	-	-
			72500	Supplies	-	-	-	-	-
			73400	Rental and Main Equip	-	-	-	-	-
			74100	Professional services - audits	-	-	-	-	-
			74200	Audio visual & Printing Prod. costs	-	-	-	-	-
			74500	Miscellaneous	-	-	-	-	-
			sub-total		**-**	**-**	**-**	**-**	**-**
Project Management Unit	UNDP	GEF 62000	71400	Local consultants (Contractual Services-Individual)	97,500	97,500	97,500	97,500	390,000
			71600	Travel	8,775	8,775	8,775	8,775	35,100
			72200	Equipment and furniture	20,000	-	10,000	-	30,000
			72500	Supplies	4,600	4,600	4,600	1,630	15,430

GEF Outcome / Atlas Activity	Respon-sible Party (Imple-menting Agency)	Source	Budget Code	ERP/ATLAS Budget Description/Input	Annual Expenses (USD)				Total (USD)
					Year 1	Year 2	Yeas 3	Year 4	
			72800	Info Tech Equipment	5,000	4,000	-	1,000	10,000
			74200	Printing and audiovisuals	3,000	3,000	3,000	3,000	12,000
			74500	Miscellaneous	500	1,500	500	4,970	7,470
			Sub-total		**139,375**	**119,375**	**124,375**	**116,875**	**500,000**
TOTAL					**1,287,063**	**1,355,213**	**1,259,485**	**1,298,239**	**5,200,000**

General notes to the budget:

- International consultants (IC) are budgeted at $ 3000 per week and short-term national consultants (NC) are budgeted at $ 750 per week
- The cost of workshops has been divided of various budget lines as per UNDP ATLAS budget which does not have a separate budget line for training / workshops. For example, budget line 'international consultant' will have a % allocation for international experts to support workshops. The number of workshops for each output is given in the 'results framework'. A workshop will cost about USD 2,500 per day

Budget per component (outcome)

Table 6: Budget per component

Category	USD	Components					
		1	2	3	4	5	6
International experts	1,092,000	144,000	411,000	441,000	96,000	-	-
National consultants	1,107,750	141,375	255,750	267,375	53,250	-	390,000
Travel	473,640	64,027	184,200	153,863	36,450	-	35,100
Subcontracts	2,174,467	220,831	649,657	1,166,647	137,332	-	-
Equipment	119,500	17,500	10,000	52,000	10,000	-	30,000
Supplies and rental equipment	100,430	20,000	32,000	18,000	5,000	-	25,430
Printing and audiovisuals	81,651	9,968	30,600	21,983	7,100	-	12,000
Professional services	12,000	-	-	12,000	-	-	-
Miscellaneous	38,562	7,299	6,793	13,132	3,868	-	7,470
Total	**5,200,000**	**625,000**	**1,580,000**	**2,146,000**	**349,000**	**-**	**500,000**

GEF budget and co-financing

Table 7: GEF budget and co-financing

Outcome		TOTAL	GEF	Co-finance	BEE	SDC	DLF Utilities	Other	Co-finance (in USD)	
		(in USD)	(in USD)	Cash (in USD)	(in USD)	(in USD)	(private) (in USD)	private sector	In-kind (BEE)	Private
1	Institutional capacity	1,475,000	625,000	825,000	825,000	-	-	-	25,000	-
2	Training and awareness	7,036,383	1,580,000	5,431,383	325,000	1,787,234	3,319,149	-	25,000	-
3	Piloting ECBC-compliant buildings	10,754,681	2,146,000	8,544,681	800,000	-	7,744,681	-	64,000	-
4	Incentives and financing	527,000	349,000	153,000	153,000	-	-	-	25,000	-
5	Information and Awareness Enhancement	-	-	-	-	-	-	-	-	-
e	PM	1,234,596	500,000	196,174	196,174	-	-	-	538,422	-
	Total	**21,027,660**	**5,200,000**	**15,150,238**	**2,299,174**	**1,787,234**	**11,063,830**	**-**	**677,422**	**-**

13. MANAGEMENT ARRANGEMENTS

Project Organization Structure

100. The project is co-financed with funding from the GEF and UNDP acts as the *GEF Executing Agency*. The project will be implemented by the Bureau of Energy Efficiency (BEE) and will assume the overall responsibility for the achievement of the project results as the *Implementing Partner (GEF Local Executing Agency).* UNDP provides overall management and guidance from its New Delhi Country Office and the Asia Pacific Regional Centre (APRC) in Bangkok, and is responsible for monitoring and evaluation of the project as per normal GEF and UNDP requirements. BEE will designate a senior official as the *National Project Director (NPD)* for the project. The NPD will be responsible for overall guidance to project management, including adherence to the Annual Work Plan (AWP) and achievement of planned results as outlined in the ProDoc, and for the use of UNDP funds through effective management and well established project review and oversight mechanisms. The NPD also will ensure coordination with various ministries and agencies provide guidance to the project team to coordinate with UNDP, to review reports and to look after administrative arrangements required under the Government of India and UNDP.

101. A *Project Management unit (PMU)* shall be established to implement the project. The structure of PMU is given in Figure 5. The PMU shall be headed by a *National Project Coordinator (NPC)* and be responsible for implementing day-to-day activities in coordination with the National Project Director (NPD). Efforts shall be made to mobilise the project team for the full project tenure to ensure the availability of experts and consultants until the end of project. The NPC will be supported by three project and one administration and finance staff. As needed, adequate numbers of technical experts in different disciplines and project management consultants with expertise in project, finance, legal matters, etc. will be associated on longer-term or short-term time basis depending upon the work load. The job description and ToRs for the PMU positions and assignments are enclosed in Annex C.

102. The *Project Steering Committee (PSC)* is responsible for making management decisions for the project in particular when guidance is required by the NPC. The PSC plays a critical role in project monitoring and evaluations by quality assuring these processes and products, and using evaluations for performance improvement, accountability and learning. It ensures that required resources are committed and arbitrates on any conflicts within the project or negotiates a solution to any problems with external bodies. BEE will sign the budgeted AWP with UNDP on an annual basis, as per UNDP rules and regulations. Based on the approved AWP, the PSC will consider and approve the quarterly plans and also approve any essential deviations from the original plans.

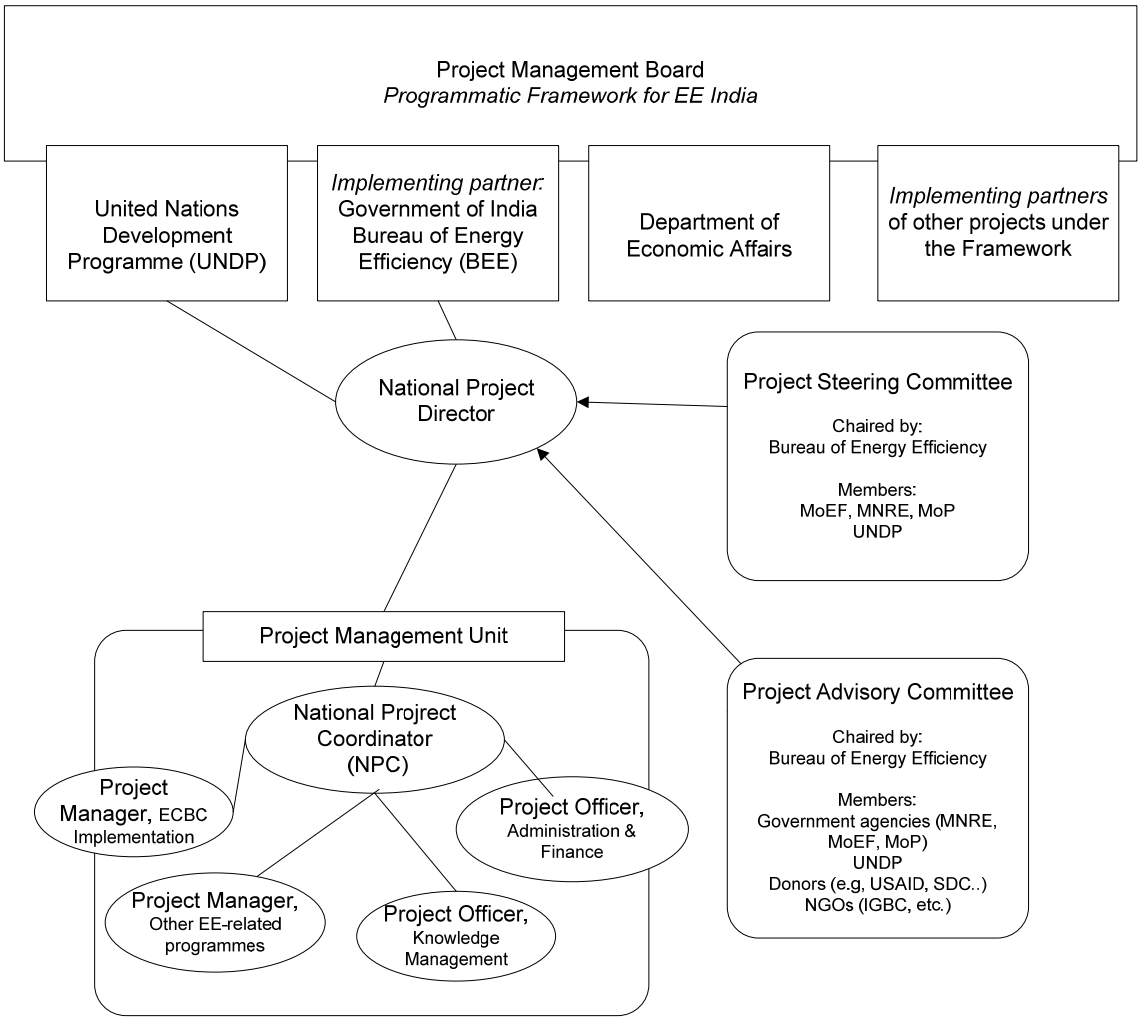

Figure 5: Project management structure

103. The PSC will be composed of BEE[75], Ministry of Environment and Forests (MOEF), Ministry of Power[76] as well as UNDP[77]. Other members (e.g. CPWD, DLF & Other developers, financing institutions, regulators, associations, research institutes, etc)[78] can be invited by the decision of the PSC on as-needed basis, however, by taking care that the PSC remains operational by its size.

104. BEE under the chairmanship of DG-BEE will establish and institutionalize a technical advisory committee, support teams and any other committees as and when needed with the approval of the PSC. The team members will include distinguished stakeholders such as Ministry of New and Renewable Energy, donor agencies such as USAID, British High Commission, Swiss Development Corporation, GTZ, and non-government agencies such as IGBC and developers such as DLF. The technical advisory committee will advise the project team on technical issues; review energy audits and data management;

The Project Steering Committee has 3 distinct roles:
[75] Executive: in this case the NPD, representing the project ownership by Indian Railways and chair
[76] Supplier: parties concerned which provide funding for specific cost sharing projects and/or technical expertise to the project
[77] Assurance: supports the PSC and PMU by carrying out objective and independent project oversight and monitoring (in this case done by UNDP India)
[78] Beneficiary: individual or group of individuals representing the interests of those who will ultimately benefit from the project

advice on approach selection; and suggest policy issues of relevance to energy efficiency and energy conservation approach/technology adoption in the commercial building sector.

General

UNDP support service

105. BEE may enter into an agreement with UNDP for support services in the form of procurement of goods and services during the project implementation process. In such a case, appropriate cost recovery will be charged as per UNDP rules and regulations. The support services will be outlined in the form of Letter of Agreement signed between BEE and UNDP. A small budgetary allocation will be allocated for communication, advocacy and accountability purposes undertaken by UNDP.

Collaborative arrangements with related projects

106. The proposed project is closely related to the Framework Programme of "Supporting National Development Objectives with Co-Benefits of Mitigating Climate Change" with the following specific outputs:

- Energy efficiency improvements in selected energy-intensive sectors
- Framework developed for inclusive planning and delivery of clean energy services
- Strategic partnerships to leverage environmental financing
- Knowledge sharing and inputs provided for environmental and climate policy regimes

107. The indicative UNDP core budget is USD 5.2 million for the period 2010-2015 with expected co-financing of USD 16 million. Regarding the energy efficiency output, co-financing is sought from the GEF, and for this particular purpose "Programmatic Framework Project for Energy Efficiency in India" (GEF project 3538) is an umbrella project. Five projects on energy efficiency are proposed under this Programme: (i) Energy Efficiency Improvements in commercial Buildings (UNDP); (ii) Chiller Energy Efficiency Project (World Bank); (iii) Financing Energy Efficiency in Small and Medium Enterprises (World Bank); (iv) Promoting Energy Efficiency and Renewable Energy in Selected SME Clusters in India (UNIDO); and, (v) Improving Energy Efficiency in the Indian Railways System (UNDP).

108. The Program Knowledge Management Unit under Programmatic Framework Project for Energy Efficiency in India (ID 3538) is an umbrella knowledge management and sharing unit for all the EE projects managed by the BEE and supported by the GEF. This covers all the sub-projects managed by the World Bank, UNIDO and UNDP. The US$ 1 million component on knowledge management under the Programmatic Framework covers all the projects under the program including this project. Therefore activities are retained as it is to provide clarity during implementation, however, budget will be sourced from the "Programmatic Framework Project for Energy Efficiency in India" (GEF project 3538).

109. The proposed project will establish the necessary communication and coordination mechanisms through its PMU and PSC with the Project Management Board[79] of the before-mentioned GEF "Programmatic Framework for EE" umbrella program to ensure proper coordination between the various projects there under. UNDP India will also take the lead ensuring adequate coordination and exchange of experiences. In addition, the project will seek to coordinate its actions with other UNDP energy and climate change activities in India. Similarities in the strategy of the proposed project may extend an opportunity to share lessons and exploit synergies, in particular in the areas of harmonization and mutual

[79] Implementing Partners are Ministry of Environment and Forests (MoEF), Ministry of New and Renewable Energy (MNRE), Ministry of Power (MoP), Bureau of Energy Efficiency (BEE) and state governments and is co-chaired by UNDP and Department of Economic Affairs (DEA)

recognition. Also, the proposed project will also seek to coordinate actions with other existing government commitments and non-government initiatives.

110. BEE will ensure that the activities on ECBC for commercial buildings are properly coordinated with the other activities which BEE is undertaking or promoting, such as ECBC for residential buildings, appliance energy standards and labelling, renewable energy in buildings as well as linking with incentive programs with utilities.

111. BEE is getting co-finance and cooperation from programs implemented by other agencies like Swiss Development Corporation (SDC) and DLF, one of the largest developers in India[80]. The SDC is going to provide the support under these areas;

- In partnership with BEE, organise building design workshops with private builders in India
- Provide technical assistance in developing building material testing infrastructure in India
- Develop building design guidelines and tools for the design of energy efficient residential buildings
- Production and dissemination of knowledge products

112. DLF is going to provide the support in the following areas:

- Support in developing new building designs incorporating ECBC measures
- Implementation of ECBC in new buildings
- Implement innovative projects like Combined Heat and Power to achieve energy efficiency in new buildings

Prior obligations and prerequisites

113. There are no prior obligations or prerequisites that been identified

Brief description of inputs to be provided

114. The tentative GEF budget of the Project Management Unit (PMU) is given below. Co-financing (by BEE) is an estimated USD 734,596:

Table 8: GEF budget and co-financing

Project management	USD/pw	person week (pw)	GEF budget (USD)
NPC/PM	750	208	156,000
Project Manager - ECBC implementation	375	208	78,000
Project Manager - EE in buildings	375	208	78,000
Project Officer - Knowledge management	375	208	78,000
Travel			35,100
Misc and office supplies			44,900
Equipment and office space			30,000
Total		**832**	**500,000**

[80] During project implementation, cooperation will be sought with Energy Conservation and Commercialization-III (ECO-III) Project of USAID, on: a) preparation of an ECBC implementation roadmap, b) assisting BEE in design and implementation of a Star Rating and Building Benchmarking Program, c) promotion of Demand Side Management Programs for building sector in India, d) training of architects, energy managers and auditors as well as e) establishment of three Energy Efficiency Centres, which will also house the information on building energy efficiency programs

Audit Arrangements

115. The Government will provide the Resident Representative with certified periodic financial statements, and with an annual audit of the financial statements relating to the status of UNDP (including GEF) funds according to the established procedures set out in the programming and finance manuals. The audit will be conducted by the legally recognized auditor of the Government, or by a commercial auditor engaged by the Government.

Agreement on the intellectual property rights and use of logo on the project's deliverables

116. The GEF logo should appear on all relevant project publications, including amongst others, project hardware and other purchases with GEF funds. Any citation in publications regarding projects funded by GEF should also acknowledge the GEF. Logos of the Implementing Agencies and the Executing Agency will also appear on all publications. Where other agencies and project partners have provided support (through co-financing) their logos may also appear on project publications.

14. MONITORING FRAMEWORK AND EVALUATION

Project Start

117. A Project Inception Workshop will be held within the first three months of project start with those assigned roles in the project organization structure, UNDP country office (CO) and where appropriate/feasible regional technical policy and program advisors as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year AWP. The Inception Workshop should address a number of key issues including:

- Understand objectives & other outputs and activities.
- Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and RCU staff vis-à-vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.
- Based on the project results framework and the relevant GEF Tracking Tool if appropriate, finalize the first AWP. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
- Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
- Discuss financial reporting procedures and obligations, and arrangements for annual audit.
- Plan and schedule Project Board meetings. Roles and responsibilities of all project organization structures should be clarified and meetings planned. The first Project Board meeting should be held within the first 12 months following the inception workshop.

118. An Inception Workshop report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

Quarterly Review

119. Quarterly review will consist of:

- Progress made shall be monitored in the UNDP Enhanced Results Based Management Platform.
- Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS. Risks become critical when the impact and probability are high. Note that for UNDP GEF projects, all financial risks associated with financial instruments such as revolving funds, microfinance schemes, or capitalization of ESCOs are automatically classified as critical on the basis of their innovative nature (high impact and uncertainty due to no previous experience justifies classification as critical).
- Based on the information recorded in Atlas, Project Progress Reports (PPR) can be generated in the Executive Snapshot.
- Other ATLAS logs can be used to monitor issues, lessons learned, etc. The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.

Annual Review

120. Annual Project Review/Project Implementation Reports (APR/PIR): These key reports are prepared to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July). The APR/PIR combines both UNDP and GEF reporting requirements. The APR/PIR includes, but is not limited to, reporting on the following:

- Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative);
- Project outputs delivered per project outcome (annual);
- Lesson learned/good practice;
- AWP and other expenditure reports;
- Risk and adaptive management;
- ATLAS QPR;
- Portfolio level indicators (i.e. GEF focal area tracking tools) are used by most focal areas on an annual basis as well.

121. UNDP CO and the UNDP RCU will conduct visits to project sites based on the agreed schedule in the project's Inception Report/AWP to assess first hand project progress. Other members of the Project Steering Committee may also join these visits. A Field Visit Report/BTOR will be prepared by the CO and UNDP RCU and will be circulated no less than one month after the visit to the project team and Project Board members.

Mid-term of Project Cycle:

122. The project will undergo an independent Mid-Term Evaluation (MTE) at the mid-point of project implementation (October 2012). The Mid-Term Evaluation will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the UNDP Evaluation Office Evaluation Resource Center (ERC).

Table 9: Elements and cost of monitoring and evaluation (M&E)

Type of M&E activity	Responsible Parties	Budget USD ($) *Excluding project team staff time*	Time frame
Inception Workshop and Report	▪ Implementing Partner (National Project Director and National Project Coordinator) ▪ UNDP CO	Indicative cost: $ 20,000	Within first three months of project start up
Measurement of Means of Verification of project results (baseline and end-of-project impact study)	▪ UNDP GEF RTA/Project Coordinator will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members.	Indicative cost: $ 90,000	Start, mid and end of project (during evaluation cycle) and annually when required.
Measurement of Means of Verification for Project Progress on *output and implementation*	▪ Oversight by National Project Coordinator ▪ Project team	Indicative cost: $ 7,000 (to be determined more precisely) as part of the Annual Work Plan's preparation.	Annually prior to ARR/PIR and to the definition of annual work plans
ARR/PIR	▪ NPD, NPC and Project team ▪ UNDP CO ▪ UNDP RTA ▪ UNDP EEG	Already included in the PMU cost	Annually
Periodic status/ progress reports	▪ NPD, NPC and Project team	Already included in the PMU cost	Quarterly
Mid-term Evaluation	▪ NPD, NPC and Project team ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team)	Indicative cost: $ 40,000	At the mid-point of project implementation.
Final Evaluation	▪ NPD, NPC and Project team, ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team)	Indicative cost: $ 40,000	At least three months before the end of project implementation
Project Terminal Report	▪ Project Coordinator and team ▪ UNDP CO ▪ local consultant	None	At least three months before the end of the project
Audit	▪ UNDP CO ▪ Project Coordinator and team	Indicative cost per year: $ 3,000	Yearly
Visits to field sites	▪ UNDP CO ▪ UNDP RCU (as appropriate) ▪ Government representatives	For GEF supported projects, paid from IA fees and operational budget	Yearly
Total Indicative Cost Excluding project team staff time and UNDP staff and travel expenses		**US$ 200,000** (4% of Total Budget)	

End of Project:

123. An independent Final Evaluation will take place three months prior to the final Project Board meeting and will be undertaken in accordance with UNDP and GEF guidance. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF.

124. The Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response which should be uploaded to PIMS and to the UNDP Evaluation Office Evaluation Resource Center (ERC).

125. During the last three months, the project team will prepare the Project Terminal Report. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results.

Learning and Knowledge Sharing

126. Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums. The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar projects in future.

127. Finally, there will be a two-way flow of information between this project and other projects of a similar focus.

15. LEGAL CONTEXT

128. This document together with the CPAP signed by the Government and UNDP, which is incorporated by reference, constitute together a Project Document as referred to in the SBAA and all CPAP provisions apply to this document.

129. Consistent with the Article III of the SBAA, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner.

130. The implementing partner shall:

a) Put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
b) Assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

131. UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

132. The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

PART C. ANNEXES

ANNEX A. RISK ANALYSIS

Table 10: Summary of Risk Log and counter measures

Project Title: Energy Efficiency Improvements in Commercial Buildings	Award ID: 60037	Date: November 2009

S.No.	Description	Date Identified	Type	Impact and Probability (on a scale of 1 (low) to 5 (high)	Countermeasures/ Management Response	Owner	Submitted, updated by	Last update	Status
1.	ECBC does not become mandatory.	15 April 2010	Regulatory	Probability = 3 Impact = 4	o The Project outputs help BEE to convince the regulators for a mandatory regime	UNDP	UNDP CO		
2.	Failure to secure continuous support from state and municipal authorities for the ECBC efforts and EE in buildings.	15 April 2010	Political	Probability = 4 Impact = 3	o BEE is a statutory body under Ministry of Power, Government of India for implementing ECBC. Though it may not be possible to secure support from all the states but it is expected that most states would support the implementation. o Inception workshop is expected to help getting the state implementing authorities on board. o The awareness, training and capacity building programmes under the project will help authorities to appreciate the benefits of ECBC.	UNDP	UNDP CO		
3.	Frequent shifting/transfer of authorities/government staff.	15 April 2010	Operational	Probability = 5 Impact = 2	o Transfer of officials with the authorities periodically is common practice. The project will choose such officials who are dedicated	UNDP	UNDP CO		

S.No.	Description	Date Identified	Type	Impact and Probability (on a scale of 1 (low) to 5 (high)	Countermeasures/ Management Response	Owner	Submitted, updated by	Last update	Status
					to building sector. Even if they are transferred it would be only from one place to other but they continue with same theme.				
4.	Failure to trigger positive response from consumers and architects, design professionals, building material suppliers, builders, contractors, developers, building managers.	15 April 2010	Strategic	Probability = 1 Impact = 4 Possible Effects: o Ineffective capacity building efforts. o Slower rate of market transformation.	o EE in buildings have inherent economic benefits in addition to energy reduction and emissions reduction which is expected to attract the stakeholder response. o It is expected that the project activities have provision to create awareness, training and capacity building of the stakeholders mentioning benefits of ECBC. o Mandatory ECBC regime will motivate the stakeholders' involvement.	UNDP	UNDP CO		
5.	Unavailability of experts to deliver trainings.	15 April 2010	Logistical	Probability = 3 Impact = 4	o Proper planning along with prior commitments from/agreements with national and international experts for their availability for trainings.	UNDP	UNDP CO		
6.	Failure to secure public and private sector support leads to ineffective penetration of ECBC	15 April 2010	Strategic	Probability = 2 Impact = 4	o Create suitable incentives (financial or regulatory) for investment in EE design and implementation. o Mandatory ECBC regime will also motivate effective penetration of ECBC	UNDP	UNDP CO		
7.	Failure to secure continuous support from regulators, utilities, state	15 April 2010	Regulatory	Probability = 1 Impact = 5	o Proper coordination with regulators, utilities, state and municipal authorities to establish ECBC enforcement mechanisms	UNDP	UNDP CO		

S.No.	Description	Date Identified	Type	Impact and Probability (on a scale of 1 (low) to 5 (high)	Countermeasures/ Management Response	Owner	Submitted, updated by	Last update	Status
	and municipal authorities for the ECBC efforts and other energy efficiency programs				and structures. o Introduction of rebates and tariff discounts in coordination with utilities. o Introduction of tax incentives for ECBC compliant buildings.				
8.	Failure to secure consumer interest.	15 April 2010	Strategic	Probability =1 Impact =5	o The project helps the market aware of benefits of EE in buildings and the benefits of ECBC.	UNDP	UNDP CO		
9.	Lack of building material suppliers' access to credit for investing in energy efficient materials.	15 April 2010	Financial	Probability = 5 Impact = 5	o Project will help put up mechanisms to support manufacturers and builders/developers/ architects accessing finance.	UNDP	UNDP CO		
10.	Delay in the construction of demo projects. Inappropriate data monitoring.	15 April 2010	Operational and Strategic	Probability = 3 Impact = 3	o The steering committee meetings would review the situation and propose an alternate plan if it is likely to delay inordinately such as alternative space to be monitored and recorded.	UNDP	UNDP CO		
11.	All relevant parameters are not covered in the baseline study	15 April 2010	Operational and strategic	Probability = 3 Impact =5	o As part of the Programmatic EE project, BEE is coordinating five projects with three agencies. The project's baseline is an important subject. Periodic coordinated meetings are expected to help in developing a strong baseline.	UNDP	UNDP CO		

Note: empty fields are to be filled out or updated by the UNDP Country Office during project inception and implementation

ANNEX B. AGREEMENTS

The Project Identification Note (PIF) is attached in a separate file.

Co-financing letters from Bureau of Energy Efficiency (BEE), Swiss Agency for Development AND Cooperation (SDC) and DLF Utilities Ltd. are provided in a separate file

ANNEX C. TERMS OF REFERENCE

Project Management Unit (PMU)

National Project Director (NPD)

The National Project Director (NPD) will be appointed by the Bureau of Energy Efficiency (BEE) in consultation with UNDP for overall supervision of the project. NPD will act as Member Secretary to the Project Steering Committee (PSC) and shall be responsible for overall implementation of the project.

Scope of work

- To organize/convene Project Steering Committee meetings as per UNDP procedures
- To facilitate interaction and communication with other Ministries and Governmental departments
- To provide overall guidance to the National Project Coordinator (NPC) and the Project Management Unit (PMU)
- Approve Terms of Reference for PMU staff, including the NPC
- Review project budget revisions, annual progress reports, quarterly progress reports, FACE (Fund Authorisation and Certification of Expenditures) annual work plan, facilitate audit and other administrative arrangements as required by BEE and UNDP
- Facilitate evaluations, mid-term, terminal and facilitate implementation of recommendations
- Ensure timely progress of activities and project implementation as per the ProDoc
- Ensure required government support to attain the envisaged project milestones

National Project Coordinator (NPC)

Scope of work

- Oversee the day-to-day planning, implementation and monitoring of project activities
- Assist the NPD in management and implementation of the project and achievement of its goals
- Coordinate and manage Inception Workshop and preparation of Inception Report
- To prepare progress report (quarterly and annual), FACE, annual work plans and budgets, facilitate audit, and any other necessary documentation required by UNDP, BEE and the PSCs and recommendation to the Project Steering Committee.
- Support timely progress of activities and project implementation as per the ProDoc
- Support the elaboration of monitoring & evaluation reports (midterm, terminal etc.) to BEE and UNDP/GEF.
- Prepare and approve Terms of Reference for consultants and subcontracts and for equipment procurement
- Disbursement of funds, maintenance of accounts as per requirements of UNDP and provide inputs to internal and external audits.
- Liaise with counterparts and main stakeholders for ensuring their roles are appropriately integrated in the project as envisaged
- Delegate responsibilities to the Managers ECBC, EE in Buildings Programs and Capacity Building

Project Manager, ECBC Implementation

Scope of Work

- Provide team leadership and guidance to the ECBC Implementation Team in BEE
- Coordinate with National Project Coordinator and other Project Managers
- Liaise with institutions at central, state and municipal level to ensure proper dissemination of the ECBC norms
- Take responsibility of formulating easy-to-implement ECBC compliance procedures for different institutions
- Provide technical inputs during piloting of ECBC compliant buildings in five climatic zones
- Provide technical inputs for the training courses and conducting the trainings for the professionals

Project Manager, Analysis and Demonstration

Scope of work

- Coordinate with ECBC Implementation Team in BEE
- Provide technical inputs towards market assessment of energy efficient materials and the establishment of testing labs
- Provide technical inputs for the training courses to be conducted for architects/design professionals, building material suppliers, etc
- Coordinate demonstration component
- Provide substantive inputs to the manager, other Project Managers consultants and stakeholders

Project Manager, Knowledge Management

Scope of work

- Take lead in preparing the training courses and conduct the trainings for project managers and other PSU staff
- Coordinate information gathering on energy performance in existing and new buildings; database management on energy consumption in commercial buildings and energy benchmarking
- Provide substantive inputs to the manager, other Project Managers, consultants and stakeholders
- Lead the task of compiling and disseminating information on energy efficiency financing schemes
- Facilitate the sharing of experiences from other GEF project operational under Knowledge Management Cell established by BEE

Manager, Administration & Finance (not paid by GEF funds)

Scope of work

- Conduct annual financial audit of the project, produce the required statements as needed, keeps checks and balances in place to ensure proper use of finances under various heads and report the financial progress;
- Prepare quarterly expenditure reports and their timely submission to UNDP
- Responsible for administrative and secretarial matters;
- Arrangement of logistics, including travel and organization of meetings/workshops;
- Assist processing and reporting project incomes and expenditures

A detailed list of **National and International Consultants** that will provide services to the Project is attached in Annex C of the GEF CEO Endorsement Request sheet.

ANNEX D. EMISSION REDUCTION CALCULATION

133. Commercial buildings are energy intensive buildings. Majority of the energy intensive activities are linked with space heating, cooling and lighting. Globally efforts are being made to reduce the energy consumption significantly. The concept of green buildings and sustainable buildings stem up from the quest to reduce energy consumption in the buildings – residential, commercial and industrial. India, under the provision of Energy Conservation Act, 2001, has voluntary Energy Conservation Building Code (ECBC). In India, the building sector constitutes approximately 7% of electricity consumption and commercial building floor area is growing by 8% every year. The computer simulations have shown that a new, ECBC compliant building, can save of the order of 20-50% energy consumption against the baseline (conventional buildings).

Emission Reductions

Direct emissions reductions

134. Based on Table 11, a total investment of USD 22.4 million is required for the 8 EE building demonstrations that are part of the project. The energy efficient features of these demo building projects will generate energy savings when compared to the operation of similar conventional buildings that are relatively not energy inefficient. The total estimated energy savings from the operation of these 8 demo EE buildings is about 110.6 gigawatt-hour (GWh) per year. A building is considered ECBC compliant when its specific energy consumption (SEC) is ≤180 kWh/m^2/y. The demo EE buildings are expected to perform (in terms of SEC) better than the benchmark SEC of 180 kWh/m^2/y. The rationale for the demo EE buildings, serving as model buildings, will implement all the energy efficiency measures as per the guidance provided under ECBC. Thus the SEC that is target to achieve is about 135 kWh//m^2/y. Such improvement in the SEC is equivalent to about 35% energy savings. At an average emission factor of 0.82 tCO_2/MWh (based on India's national power grid), this translates to a *direct emission reduction* of 90,689 tCO_2 per year. Assuming the pilot buildings are operational for two years during the project duration, the direction emission reduction would be about 181,379 tCO_2. Assuming economic lifetime of these commercial buildings as 25 years, the *cumulative direct emission reduction* is 2.267 million tCO_2.

135. The table below summarizes calculated energy savings associated with 8 demonstration projects in commercial buildings.

Business-as-Usual emissions scenario

136. The GHG abatement potential of introduction of mandatory ECBC in commercial buildings over the next 10 years is given in Table 12. In the "business-as-usual", conventional construction will continue, with about 0.06% of the new commercial building constructions will meet the ECBC compliance. Assuming an average SEC/EPI of 210 kWh/m^2/year at 8% annual growth, this implies that annual energy consumption in commercial buildings would have doubled to 194,400 GWh in 2020 (as compared to the base year 2011).

137. It is assumed that, due to the influence from project, percentage increase of new buildings that would comply with ECBC requirements will be 10% in the year 2011 and this number will increase up to 80% by the year 2020. Also the SEC will be 180 kWh/m^2/year. This gives a total energy saving of 99,531 GWh.

Table 11: Energy savings associated with project-supported demo projects

	Number of demos	Total Building area (m^2)	Total investment cost (USD)[81]	Energy savings (MWh)	Money savings (USD)	Payback period (yr)
Hotels	1	240,822	5,392,322	18,062	1,781,504	3.0
Office buildings	2	185,057	3,974,783	13,879	1,087,721	3.7
Shopping malls	2	345,270	2,931,442	25,895	2,115,842	1.4
Institutes and IT parks	2	399,514	4,173,365	29,964	2,433,796	1.7
Hospitals and institutional care	1	303,962	5,941,686	22,797	1,567,112	3.8
Total	**8**	**1,474,624**	**22,413,599**	**110,597**	**6,364,756**	**3.5**

Note:

- Data on buildings area, average incremental investment cost, energy savings are based on Annex E (MOEF-cleared Buildings Survey) in the report Situation Analysis of Commercial Buildings in India (Bureau of Energy Efficiency, November 2008)
- Money savings are calculated by assuming a tariff for commercial buildings of USD 0.19/kWh, USD 0.13 for institutes and USD 0.11/kWh for hospitals
- Average energy savings of about 35% in comparison with conventional buildings
- Assumed economic life of buildings is 25 years
- Cost have been converted from Indian Rupees (INR) assuming an exchange rate of USD 1 = INR 47

Indirect emissions reductions -

138. There are two different approaches for estimating indirect effects, resulting in a range of likely indirect effects. The first one—referred to as "bottom-up"—requires an expert judgment on the likely effectiveness of a project's demonstration and triggering effects. The direct and direct post-project impacts of a project are simply multiplied by the number of times that a successful investment under the project might be replicated after the project's activities have ended. This gives a lower limit for the indirect GHG abatement impact. The second—or "top-down" —approach assesses indirect impacts by estimating the combined technical and economic market potential for the technology within the 10 years after the project's lifetime. This provides an upper limit for the indirect GHG emission reduction impact.

139. In the "bottom-up" approach, a replication factor of "three" is taken, as suggested in the GEF *Manual for Calculating GEF Benefits)*[82] for market transformation projects. This implies *indirect emission reduction* of 2,720,682 tCO_2 considering 10 years of economic lifetime as per GEF guidelines.

[81] The BEE will work very closely with all the stakeholders, including developers, to make ECBC mandatory. DLF, which is the largest real estate and building project developer in India in terms of revenues, earnings, market capitalisation and developable area, has shown enhanced interest in working with the BEE to ensure its new buildings are ECBC compliant. DLF has provided a co-finance letter stating USD 11.1 million worth of co-financing for this proposed project. In that letter, the stated INR 52 crore as part 3 and 4 in the co-finance letter are meant for demonstrating application of building EE technologies for reducing the building heat gain through better insulation practices and improved building material (Part 3); and, introducing the building energy simulation and modeling practices to take up ECBC compliance of buildings (Part 4). This amount is included a part of the confirmed co-financing for the demo projects in new buildings. DLF's co-finance is for the demonstration of the energy efficient design, engineering, planning, construction, and in the energy conserving operation and maintenance of new buildings that it will develop. It is not for the demonstration of the retrofit of existing ones to make them energy efficient. The DLF-financed demonstrations (i.e., new EE buildings that are ECBC-compliant) will demonstrate better and more energy efficient air-conditioning in buildings, which ultimately leads to reduced building energy consumption. The use of better and energy efficient insulation and building materials bring about such improved and energy conserving air conditioning. This will also help in transforming the market for energy efficient building materials and energy efficient appliances/equipment (e.g., air conditioners). In that regard, these EE building demonstrations not only promote EE building design and construction, but also the application of EE building materials and equipment/appliances.
Similar contributions are expected from other financiers/developers as the market value of the ECBC compliant buildings are expected to be higher than the ones that are not ECBC compliant.

[82] *Manual for Calculating GHG Benefits of GEF Projects: Energy Efficiency and Renewable Energy Projects, GEF/C.33/Inf.18.*
CO_2 indirect BU = CO_2 direct * RF

140. In the "top-down" approach, it is estimated based on the potential energy savings in new commercial buildings as given in Table 12 on the annual building of new commercial building space (since 2011) and associated potential energy savings. As explained above, the average emission reduction associated with annually added commercial buildings over 2011-2020 would be 81.6 million tCO_2. Because other building-government policies and market forces might generate some of the energy reduction achievements, we apply a GEF causality factor. The GEF Manual defines various levels of GEF impact and causality. It is assumed a causality factor of 60% (i.e., 'level 3', meaning a substantial but conservative estimate of indirect emission reduction). This implies *indirect emission reduction* of 48,969,467 tCO_2 as per GEF guidelines.

Cost effectiveness

The ratio of the GEF contribution (USD 5.2 million) to the combined direct and direct post-project emission reductions is the project's unit abatement cost (UAC) (i.e. GEF$ per tCO_2), which is USD 5.73/tCO_2[83].

[83] Only direct emission reductions 906,894 t CO_2 are considered for 10 years of economic lifetime as per GEF guidelines. There are no direct post-project emissions pertain to the project.

Table 12: GHG abatement potential through the introduction of mandatory ECBC in commercial buildings over the next 10 years

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Commercial building space - baseline area (m^2)	463,465,538	500,542,781	540,586,203	583,833,099	630,539,747	680,982,927	735,461,561	794,298,486	857,842,365	926,469,754
At 8% growth (m^2)	37,077,243	40,043,422	43,246,896	46,706,648	50,443,180	54,478,634	58,836,925	63,543,879	68,627,389	74,117,580
BAU ECBC compliance (m^2)	5,029,128	5,058,426	5,087,895	5,117,536	5,147,349	5,177,336	5,207,497	5,237,834	5,268,348	5,299,040
BAU energy consumption (GWh)	97,177	104,962	113,370	122,451	132,259	142,851	154,291	166,646	179,989	194,400
Percentage ECBC compliance in project scenario - assumed	10%	10%	10%	20%	35%	50%	65%	80%	80%	80%
Commercial building space compliance - area (m^2)	46,346,554	50,054,278	54,058,620	116,766,620	220,688,912	340,491,464	478,050,015	635,438,789	686,273,892	741,175,804
Energy consumption in project scenario (GWh)	95,937	103,612	111,901	119,102	125,793	132,792	140,105	147,740	159,559	172,323
Energy savings - project attributed (GWh)	1,240	1,350	1,469	3,349	6,466	10,059	14,185	18,906	20,430	22,076
Emission reduction (tCO_2)	1,016,409	1,106,898	1,204,680	2,746,567	5,302,322	8,248,728	11,631,926	15,502,943	16,752,736	18,102,568

Assumptions[84]:

- 8% growth in energy consumption, based on 2005 data (22 million m^2 added, while existing commercial space was 292,061,905 m^2)
- Average energy consumption in business-as-usual (BAU) scenario: 210 kWh/m^2/year
- SEC of ECBC compliance building: 180 kWh/m^2/year
- Grid emission factor for India: 0.82 tCO_2/MWh

[84] Data provided by Environmental Design Solutions, except the ECBC-compliance factor which are own assumptions