Accelerating adoption of super-efficient technologies for sustainable thermal comfort in buildings in India

Part I: Project Information

GEF ID
10370

Project Type
FSP

Type of Trust Fund
GET

CBIT/NGI
CBIT **No**
NGI **No**

Project Title
Accelerating adoption of super-efficient technologies for sustainable thermal comfort in buildings in India

Countries
India

Agency(ies)
UNDP

Other Executing Partner(s)
Bureau of Energy Efficiency, Ministry of Power, Ministry of Environment Forest and Climate Change (MoEFCC)

Executing Partner Type
Government

GEF Focal Area
Climate Change

Taxonomy

Focal Areas, Chemicals and Waste, Climate Change, Influencing models, Transform policy and regulatory environments, Demonstrate innovative approache, Deploy innovative financial instruments, Stakeholders, Beneficiaries, Local Communities, Type of Engagement, Gender Equality, Gender Mainstreaming, Capacity, Knowledge and Research, Enabling Activities, Capacity Development, Knowledge Exchange

Sector
Energy Efficiency

Rio Markers
Climate Change Mitigation
Climate Change Mitigation 2

Climate Change Adaptation
Climate Change Adaptation 0

Submission Date
2/2/2022

Expected Implementation Start
7/1/2022

Expected Completion Date
7/1/2027

Duration
60In Months

Agency Fee($)
426,014.00

A. FOCAL/NON-FOCAL AREA ELEMENTS

Objectives/Programs	Focal Area Outcomes	Trust Fund	GEF Amount($)	Co-Fin Amount($)
CCM-1-3	Promote innovation, technology transfer for sustainable energy breakthroughs for accelerating energy efficiency adoption	GET	4,484,357.00	94,859,523.00
		Total Project Cost($)	**4,484,357.00**	**94,859,523.00**

B. Project description summary

Project Objective

To curb GHG emissions through accelerating the provision of energy-efficient thermal comfort in buildings in India and enable the market transformation of energy-efficient technologies

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing($)	Confirmed Co-Financing($)

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing($)	Confirmed Co-Financing($)
I. Enhancing the effectiveness of national policy, regulatory and institutional frameworks for energy efficiency in buildings	Technical Assistance	1. ECBC harmonized with ICAP, NBC and model building by-laws at pan-India and state level	1.1 Improved coordination structures among key Government Agencies in states 1.2 Developed unified framework/guidelines for thermal comfort in buildings based on energy conservation building codes (ECBC), NBC and the India Cooling Action Plan (ICAP) 1.3 A roadmap developed for implementation and enforcement for the adoption of energy management systems (EMIS) for thermal comfort in buildings at national and subnational/municipal levels 1.4 An innovative tool that the Bureau of Energy Efficiency (BEE) can apply to account for progress on building energy code compliance and adoption of ?Star Labelling? to be developed along with EMIS (Energy Management Information System) to track building energy performance and thermal comfort	GET	894,642.00	1,902,381.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing($)	Confirmed Co-Financing($)
II. Market acceleration and innovation for super-EE and thermal comfort deployment / diffusion	Technical Assistance	2a. Enhanced investments and deployment of super energy-efficient technologies and thermal comfort in buildings	2.1 Interventions assessed based on business value chain for accelerated adoption of thermal comfort interventions in major buildings types 2.2 Investment mechanisms and business models developed to enable the private sector to adopt and operationalize harmonized codes and enable diffusion of highly efficient cooling technologies.	GET	487,394.00	1,449,762.00
II. Market acceleration and innovation for super-EE and thermal comfort deployment / diffusion	Technical Assistance	2b. Enhanced evidence for investment in energy-efficient technologies and thermal comfort in buildings	2.3 Pilots implemented in representative climatic zones with harmonized codes, and highly-efficiency and thermal comfort technologies	GET	1,776,184.00	83,000,000.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing($)	Confirmed Co-Financing($)
III. Capacity building and knowledge sharing	Technical Assistance	Enhanced capacity at national, sub-national and within the private sector for thermal comfort systems in buildings	3.1 Linkages with accelerator platforms established 3.2 Consumer behavioural inducements through awareness campaign for critical stakeholders 3.3 Institutional training and awareness for transitioning to ECBC compliance and for nvewly adopted Residential building Codes in all types of buildings as well as on e-waste management and recovery and recycling of refrigerants 3.4 Targeted and customised training/ new programmes? development in EE (energy efficiency) measures/solutions implementation by building type at all levels	GET	990,841.00	1,802,380.00
Monitoring and evaluation (M&E)				GET	125,000.00	455,000.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing($)	Confirmed Co-Financing($)
				Sub Total ($)	**4,274,061.00**	**88,609,523.00**

Project Management Cost (PMC)

		GET	210,296.00	6,250,000.00
Sub Total($)			**210,296.00**	**6,250,000.00**
Total Project Cost($)			**4,484,357.00**	**94,859,523.00**

Please provide justification

C. Sources of Co-financing for the Project by name and by type

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount($)
Recipient Country Government	Bureau of Energy Efficiency	Grant	Recurrent expenditures	9,000,000.00
Recipient Country Government	Government of Uttar Pradesh	In-kind	Recurrent expenditures	666,667.00
Recipient Country Government	Government of Telangana	In-kind	Recurrent expenditures	1,428,571.00
Recipient Country Government	Government of West Bengal	In-kind	Recurrent expenditures	714,285.00
Private Sector	State Bank of India	Loans	Investment mobilized	83,000,000.00
GEF Agency	UNDP	Grant	Investment mobilized	50,000.00
			Total Co-Financing($)	**94,859,523.00**

Describe how any "Investment Mobilized" was identified

Confirmed in co-financing letters (attached in Annex L of the Project Document). The direct GHG emission reduction calculation (refer to Annex F in the UNDP Project document for calculation details) is a consequence of investments realised during project implementation (over the investment?s lifetime) in 55 buildings estimated at USD 18.6 million. An amount of USD 64 million is expected to be invested after the project?s lifetime (post-project). In both cases, the investor or developer can apply for loan and grant to KfW credit line (total of USD 83 million), if the investor/developer desires to do so, and, if the applicant is meeting the KfW requirements.

D. Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount($)	Fee($)	Total($)
UNDP	GET	India	Climate Change	CC STAR Allocation	4,484,357	426,014	4,910,371.00
			Total Grant Resources($)		**4,484,357.00**	**426,014.00**	**4,910,371.00**

E. Non Grant Instrument

NON-GRANT INSTRUMENT at CEO Endorsement

Includes Non grant instruments? **No**

Includes reflow to GEF? **No**

F. Project Preparation Grant (PPG)

PPG Required **true**

PPG Amount ($)

150,000

PPG Agency Fee ($)

14,250

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount($)	Fee($)	Total($)
UNDP	GET	India	Climate Change	CC STAR Allocation	150,000	14,250	**164,250.00**
				Total Project Costs($)	**150,000.00**	**14,250.00**	**164,250.00**

Core Indicators

Indicator 6 Greenhouse Gas Emissions Mitigated

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO?e (direct)	4010000	2685000	0	0
Expected metric tons of CO?e (indirect)	11700000	8055000	0	0

Indicator 6.1 Carbon Sequestered or Emissions Avoided in the AFOLU (Agriculture, Forestry and Other Land Use) sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO?e (direct)				
Expected metric tons of CO?e (indirect)				
Anticipated start year of accounting				
Duration of accounting				

Indicator 6.2 Emissions Avoided Outside AFOLU (Agriculture, Forestry and Other Land Use) Sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO?e (direct)	4,010,000	2,685,000		
Expected metric tons of CO?e (indirect)	11,700,000	8,055,000		
Anticipated start year of accounting		2022		
Duration of accounting		20		

Indicator 6.3 Energy Saved (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Total Target Benefit	Energy (MJ) (At PIF)	Energy (MJ) (At CEO Endorsement)	Energy (MJ) (Achieved at MTR)	Energy (MJ) (Achieved at TE)
Target Energy Saved (MJ)	67,214,633	44,340,767,000		

Indicator 6.4 Increase in Installed Renewable Energy Capacity per Technology (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Technology	Capacity (MW) (Expected at PIF)	Capacity (MW) (Expected at CEO Endorsement)	Capacity (MW) (Achieved at MTR)	Capacity (MW) (Achieved at TE)

Indicator 11 Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment

	Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)
Female	7,200	77,779		
Male	10,800	113,917		
Total	18000	191696	0	0

Provide additional explanation on targets, other methodologies used, and other focal area specifics (i.e., Aichi targets in BD) including justification where core indicator targets are not provided

Part II. Project Justification

1a. Project Description

There is going to be an unprecedented expansion of India?s building sector where residential building stock is projected to increase from 272 million households (over 15 billion m2) in 2017-2018 to 386 million (over 28 billion m2) by 2037-2038. Similarly, the commercial building sector is projected to increase from 1.2 billion m^2 in 2017-2018 to 3.1 billion m^2 in 2037-38. Accordingly, the building sector cooling demand shows a very significant growth in comparison with as compared to the baseline. As a consequence, energy consumption for space cooling (comprised of refrigeration and air conditioning applications for residential and commercial buildings), is estimated to grow from 10% in 2017 to 45% by 2050[1][1].

In 2018, India?s total GHG emissions amounted to 2,308 $MtCO_2$ (million tons of CO_2), of which electricity and heat production (51%), road transport (13%), industry (25 %), residential (4%), commercial and public services (1%), agriculture (1%), other sources, 4%). Despite the growth in the renewable energy sector in India, the country?s economic growth is still significantly dependent on fossil fuels (with coal being the predominant source of energy). Even though GHG emissions from residential and commercial buildings are currently comparatively low, the building sector presents an enormous opportunity in restricting emissions. If today?s policy trends are followed, India?s building energy demand will grow by almost 700% by 2050 compared to 2005 levels and the associated CO_2 emissions are likely to increase tenfold to 1100 MtCO2 from 119 MtCO2 in 2018. If effective dnergy efficiency policy actions are taken, then the growth in CO_2 emissions in the building sector can be contained by means of measures aimed at reducing energy demand to 440 $MtCO_2$ by 2050.

Barriers to more widespread introduction of energy efficient cooling technology

The transition to an economy with increased access to thermal comfort as with the use of high-efficiency, low-carbon cooling technologies, is faced by substantial challenges and barriers that are briefly described below.

Policy-regulatory-institutional

(a) Fragmentation of mandates and lack of integrated and coordinated framework on building energy efficiency regulation and cooling action plan and (b) No mechanism in place to verify thermal comfort and energy efficiency in operated buildings. (c) Varying levels of building energy code implementation at national levels.

? Suboptimal coordination on building energy efficiency policy actions

Buildings? approvals cut across different mandates of different institutions and at national/subnational or local levels. Mandates are different for MoUHD and BEE at the national level, and SDA and ULBs at the sub-national level, thereby leading to ineffective coordinated efforts towards building energy efficiency.

Currently, there is a gap between emerging needs under the approved policies and programmes (NBC, ECBC, ICAP, Energy Star Labelling of buildings). The implementation on the ground is very slow and piecemeal; For example, policies transposition (notification) and implementation at state and municipal levels are slow and delayed.

ECBC (commercial buildings) has been notified in 18 States/UTs since 2007, but implementation at the municipal level is limited. Also, there is no mandate on implementation of ?Star Labelling? for new/existing buildings due to which the operational level energy efficiency of buildings remains unchecked and unreported. The ?Eco-Niwas Samhita? or ECBC-R for residential buildings is still in the early stages of its implementation and appropriate regulations to ensure its effective implementation in states are yet to be undertaken. This is putting at risk the achievement of policy targets at the national level. Code enforcement is the responsibility of local governments, where institutional capacity and resources are limited. The States and the Municipalities do not have sector-wide coordinated mandates or guidelines for developing and implementing building energy-efficiency programmes in an integrated manner. The building design approval process is under the purview of ULBs (urban local bodies) and it is at the ULB level where harmonized efforts to implement building energy efficiency actions rest. The State Designated Agencies (SDAs) are strategic partners for the promotion of energy efficiency in the State, they have limited resources and lacks overall convergence and coordination at many levels.

The National Building Code of 2016 is an advisory document for the states and not a statutory one. The states of Telangana, West Bengal and Uttar Pradesh are yet to adopt the latest NBC 2016 code guidelines as part of their building bye-laws. Green Building Ratings are voluntary across all states in India. There is no mandate in states for the developers on meeting the requirements of green building ratings. The cost and process of going through the procedures of application is a barrier for developers. Few incentives are available for certified green buildings in the states. The Government of India offers fast track environmental clearance for green building projects which are Pre-certified/ Provisionally Certified under the LEED, IGBC certification and GRIHA certification. There is no such mandate at the central level yet to introduce an energy code for residential buildings. The relevant amendments to Energy Conservation Act shall be required for the roll-out of R-ECBC in states.

? Non-harmonized Policy actions hamper the creation of enabling environment for increasing uptake of low carbon cooling solutions for enhanced thermal comfort.

ICAP was launched in 2019 by MoEF&CC. However, there has been no clarity on the implementation of recommendations outlined in ICAP in terms of state-level implementation and agencies involved in implementation. Building level space cooling recommendations of ICAP are interlinked closely with building energy efficiency and hence they require coordinated efforts along with ECBC (commercial and residential) and ?Star Labelling? implementation in states. The ECBC provides minimum

requirements for the energy-efficient design and construction and air conditioners in commercial buildings. The Star labelling programme for buildings does not rate the buildings based on actual energy efficiency levels attained to achieve thermal comfort conditions in buildings. The existing draft data reporting structures established by BEE (such as EMIS, BEP for Star Labelling of Buildings) requires strengthening and lack reporting framework for data reporting on thermal comfort aspects in operational buildings. While ICAP has put forward thermal comfort principles and access to cooling for all across India, recommendations made as part of the recently launched ICAP have not been yet integrated with the existing building energy efficiency codes. Hence, a government-harmonized code/standard for different climate zones along with the necessary data reporting framework will be required in India to facilitate energy efficiency and thermal comfort in a climate-friendly manner for both existing and new buildings (residential and commercial).

Market development/ acceleration

Slow penetration of EE technologies and low private sector investments due to lack of enabling environment, access to new technologies, pricing, supply chain, and of financing as well as limited business models at scale

? Lack of local manufacturing and appropriate support system.

The supply chain for technologies, applications and services are still at nascent stages. Many equipment and materials are imported with high-cost mark-ups and duties imposed. This leads to a situation of non-availability of energy-efficient equipment or raw materials in the local marketplace, while the uptake of inefficient (but less costly) cooling technologies continues. In India, for example, the compressor market is import-dominated. Specifically looking at room air-conditioners (RACs), the total RAC sales in India was about 6.7 million units in FY 2018-19 and around 6 million compressors were imported into India in the same year (at high costs given the duties imposed). There is a need to upscale national manufacturing of (energy-efficient) compressors in India.

? High upfront cost.

Consumer sensitivity to high upfront costs, risk averseness and lack of information can reinforce conventional buying behaviour and influence underinvestment in energy efficiency during the building design and construction process. Currently, the market adoption of low-carbon cooling technologies is low and can be attributed to high upfront costs. The development of innovative low-carbon energy-efficient cooling systems (including not-in-kind technologies, see Box 11**)** requires investment in new technologies and creating new manufacturing lines that need to be financed. There is a need to demonstrate business models/ financing mechanisms to increase uptake of super-efficient cooling technologies.

? Limited demonstration

Seeing is believing. There is a need to demonstrate pilots to increase uptake of low carbon cooling technologies which can be achieved through:

a) Pilots to demonstrate adoption of established innovative technologies to increase market uptake - There is a lack of pilots on technologies that are already established in the Indian market but face barriers to further market penetration. Having demonstration projects in place for such technologies will reduce the incremental cost of these technologies through demand aggregation;

b) Pilots to demonstrate benefits of innovative technologies - There have been no or limited pilots up to now on demonstrating the feasibility of new low-carbon options, such as ?district cooling? for residential buildings based on low GWP refrigerants[2][2];

c) Research pilots/studies to target future/next level of interventions - There have been no or very few demonstrated case studies on the use of IT-based digital platforms to set up a data management system to report thermal comfort and energy efficiency parameters on a continuous basis for buildings in India. The framework for this kind of data management and information systems at the national and sub-national levels is missing.

? Lack of investment support and financing.

Many of the business models rely on impetus through Governmental mandates programmes or regulations or concessional financing (to lower financing cost). There is generally a lack of innovative financing approaches and schemes tailored to promote EE in buildings. The need for evidence-based approaches to scale up is lacking as most of the energy efficiency measures are implemented in isolation. These are further influenced by factors such as challenges in obtaining approvals and/or new permits for new buildings or retrofit measures in existing buildings.

Systemic Capacity, knowledge and information barriers

Lack of knowledge about benefits arising from energy efficiency in buildings among stakeholders and policy makers

? Limited knowledge and low awareness.

Alternative technologies such as thermal energy storage, trigeneration and district cooling are available but are not widely adopted in India. One of the challenges of adopting not-in-kind and alternative technologies is that these solutions need to be catered to a specific set of end-users considering building and other design parameters. These are often based on specific building needs and are comparatively more expensive. This forms a barrier in the price-sensitive Indian market. These technologies also demand a skillset of multiple stakeholders which includes technology providers, HVAC consultants and other designers. Unlike conventional cooling solutions, not-in-kind and alternative technologies are not readily available off-the-shelf. The low uptake of non-conventional cooling technologies and

thermal comfort concepts can be linked to a general lack of awareness among designers and consultants regarding ongoing technological improvements. Major challenges reported in the cities? context included insufficient awareness of the importance of energy efficiency and a lack of knowledge and technical expertise in building science. For many cities, this knowledge gap, which applies to both code enforcement officials and building industry stakeholders, impedes the building energy code enforcement system.

? Temperature setting for thermal comfort.

Most office spaces operate at 22.5?C (? 1?C) being well below the comfort range specified even by the 2016 National Building Code, which recommends India-specific thermal comfort guidelines with higher temperatures. Public awareness of appropriate room temperature setting is low. Often occupants put the air con at low temperatures (e.g., 18^{o}C) under the wrong assumption that doing so will cool down a room faster. However, it will take the same amount of time for the room to reach 26 ^{o}C (which is still significantly cooler than the average summer outdoor temperature of 40 ^{o}C in Delhi) whether you set the temperature at 18 ^{o}C or 26^{o}C. Of course, 18^{o}C costs more energy to cool. Although some may feel comfortable at such a low temperature, modelling studies (e.g., IMAC, 2014 and international studies) show that occupants feel 'neutral' at around (24-25?C) and this does not seem to vary much with the outdoor temperature (if ranging between 16-38?C).

? Limited technical capacity on super-EE technology and thermal comfort.

Lack of capacity in using refrigerant alternatives integrated with energy-efficient buildings and equipment in an integrated manner among different stakeholders. There are few technical experts and consultants providing building energy efficiency related services and hiring international consultants is cost-prohibitive. Successful case studies need to be disseminated widely. Awareness creating needs to be supplemented with adequate training and access to markets.

2) The baseline scenario and any associated baseline projects,

Baseline trends

In terms of energy demand, even though GHG emissions from residential and commercial buildings are currently comparatively low, the building sector presents an enormous opportunity in restricting emissions. If today?s policy trends are followed, India?s building energy demand will grow by almost 700%[3][3] by 2050 compared to 2005 levels and the associated CO_2 emissions are likely to increase tenfold to 1100 $MTCO_2$ from 119 $MtCO_2$ in 2018. If effective energy efficiency policy actions are taken, then the growth in CO_2 emissions in the building sector can be contained by means of measures aimed at reducing energy demand from growth to 440 $MtCO_2$ by 2050[4][4] [5][5].

Development challenge

Given the GHG emissions impact of the expected increase in energy demand in the building sector in India with substantial shares of energy consumption related to thermal comfort, targeting this sector becomes obvious for reducing energy demand along with EE measures. The **development challenge** the Project seeks to address is the ?*high energy consumption (and greenhouse gas emissions) due to increased demand for cooling*?.

*Super-efficient ventilation technology and thermal comfort solutions to address the development challenge**[6]***[6]

Thermal comfort can be defined as the expression of an individual?s satisfaction with the thermal environment, and it affects humans psychologically. Thermal comfort can be achieved in an efficient way by three types of measures:

1. Adoption of adaptive thermal comfort standards to specify pre-setting of temperatures of cooling equipment for built spaces[7][7]
2. Incorporation of efficient cooling technologies (refrigerant-based, non-refrigerant based, not-in-kind technologies)[8][8].

3. Construction of energy-efficient buildings incorporating passive design strategies to minimize heat gains/losses via the envelope and reduce cooling demand [9][9]

The project has a technology neutral approach and will therefore consider all three approaches during project implementation whereby a strong focus on passive building design will be applied in new building pilots and specific attention will be dedicated to innovative approaches that have not yet been widely applied, e.g. the not in-kind technologies such as trigeneration and district cooling based on non-vapor-compression systems.

Baseline policies

The present buildings-related policies and policy interventions[10][10] aim at enhancing the energy performance of buildings by focussing on a) optimization of building design to reduce heat gains/losses (driven by compliance with building energy codes for new buildings) with supportive programmes and incentives to increase their adoption, b) market mechanisms such as building labels to increase awareness and adoption of energy efficiency retrofits along with energy performance monitoring, and c) increasing the penetration and adoption of energy-efficient appliances and equipment used in buildings through standards & labelling. The table below gives a summary of various policy measures regarding energy efficiency in buildings.

National Building Code (NBC)	The National Building Code (NBC) is a document that provides guidelines for the construction of residential, mercantile, institutional, educational, commercial, assembly structures, storage spaces or even hazardous buildings.
HCFC Phase- out plan under Montreal Protocol[11] [11]	The programme facilitated India?s compliance with the Montreal Protocol control targets for consumption of (HCFCs) for a phase-out
ECBC-Commercial Buildings	The purpose of the Energy Conservation Building Code is to provide minimum requirements for the energy-efficient design and construction of new buildings. ECBC focuses on building envelope, mechanical systems and equipment including heating, ventilating, and air conditioning (HVAC) system, interior and exterior lighting systems, electrical system and renewable energy, and also takes into account the five climate zones (Hot Dry, Warm Humid, Temperate, Composite and Cold) present in India (see Map, Annex A). The code prescribes the following three levels of energy efficiency (see Annex F for details): a) Energy Conservation Building Code Compliant (ECBC Building); b) Energy Conservation Building Code Plus (ECBC+ Building); and c) Super Energy Conservation Building Code (Super ECBC Building) The adoption of ECBC 2017 is estimated to save about 300 billion kWh of electricity and peak demand reduction of over 15 GW annually.
BEE ? Star rating	BEE introduced the ?Star rating? to supplement ECBC as a voluntary measure for measurement of the energy performance of buildings that are given labels based on their actual energy performance index (EPI, in kWh/m2/year)[12][12]. One-to-five stars rating is awarded based on the building?s specific energy use with five stars as the most efficient. The rating applies to buildings with a connected load of 100 kW or greater, or contract demand of 120 kVA or greater.,.
Eco-Niwas Samhita (ENS) **(ECBC-R)** **[13]**[13]	ENS (Part 1) has been developed specifically for new residential buildings, to set minimum building envelope performance standards as well as for ensuring. It sets minimum building envelope performance standards to limit heat gains (for cooling dominated climates) and to limit heat loss (for heating-dominated climate zones) as well as for ensuring adequate natural ventilation and day-lighting. The code applies to all residential use building projects built on plot area ? 500 m2 with adequate natural ventilation and day lighting.

India Cooling Action Plan (ICAP)	The India Cooling Action Plan (ICAP) provides a 20-year perspective (from 2017/18 to 2037/38) and recommendations, to address the cooling requirements across sectors and ways and means to provide access to sustainable cooling. The government of India has developed ICAP as a transitional driver toward sustainable cooling solutions. This emphasizes a reduction in cooling energy demand by 25-40% and refrigerant demand by 25-30% cent by 2037-2038 from the baseline value in 2017-2018. The Plan provides a baseline projection (reference scenario) and an intervention scenario for cooling across the various demand sectors. The Intervention scenario projects that around 30% reduction in cooling energy can be achieved through improvements in cooling equipment efficiency, and better servicing and operation and maintenance (O&M) practices. Further significant energy savings could be accrued over and above the projected 30 % reduction by optimizing, and in effect, reducing the cooling load of built spaces. ICAP mentions a reduction potential of around 20% in cooling load could be achieved by 2037-38, through passively cooled building designs with climate-appropriate building envelopes (driven by higher adoption of ECBC in new commercial buildings) and through the adoption of adaptive thermal comfort practices (pre-setting of lower set point temperature in air conditioning equipment).

*3) The proposed alternative scenario with a description of outcomes and components of the project**[14]***[14]

The **project?s objective** is ?to support Government of India and key stakeholders in policy, institutional & technical readiness to curb GHG emissions through accelerating the provision of energy efficient thermal comfort in buildings in India and enable market transformation of energy efficient building technologies. The overall goals of the project will be achieved by carrying out activities grouped in three components that address the main group of barriers to the introduction or further market penetration of the three main super-efficient and thermal comfort options mentioned before.

The overall thematic emphasis of the project remains similar to that of the PIF stage, except for some renumbering of project outputs. In general, more details are provided on the various activities per output in comparison with the PIF document but these imply further clarification and additional information rather than a change in project design.

Project Document / CEO Endorsement Request	*PIF*
Component 1 **Enhancing the effectiveness of national policy, regulatory and institutional frameworks for energy efficiency in buildings**	

1. ECBC harmonized with ICAP, NBC and model building by-laws at pan-India and state level 1.1 Improved coordination structures among key Government Agencies in states 1.2 Developed unified framework/guidelines for thermal comfort in buildings based on energy conservation building codes (ECBC), NBC and the India Cooling Action Plan 1.3 A roadmap developed for implementation and enforcement for the adoption of energy management systems (EMIS) for thermal comfort in buildings at national and subnational/municipal levels 1.4 An innovative tool that the Bureau of Energy Efficiency can apply to account for progress on building energy code compliance and adoption of ?Star Labelling? 1.5 Proof of concept for ?Measurement, verification and reporting? procedures in at least one state in each of the climatic zones of India	1.1. Energy conservation building codes (ECBC) harmonized with India Cooling Action Plan (ICAP), National Building Code (NBC), Model Building Byelaws at pan-India and state level 1.1.1 Improved coordination structures set up among key Government Agencies like MoEFCC, MoHUA, BIS, Smart Cities, BEE, and ULBs / UDDs in States 1.1.2 Developed unified framework/guidelines for thermal comfort in buildings based on energy conservation building codes (ECBC), Residential building codes and the India Cooling Action Plan (ICAP) 1.1.3 A roadmap developed for implementation and enforcement for adoption of energy management systems for thermal comfort in buildings at national and subnational/municipal levels 1.1.4 A BEP (Building Energy Passport) system/tool developed and operationalised in conjunction with EMIS (Energy Management Information System) based on Building Codes compliance 1.1.5. Proof of concept for ?Measurement, verification and reporting? procedures in at least one state in each climatic zones of India to enable States' Designated agencies (SDAs) and BEE to monitor overall results of the tools proposed.
Notes: The Outputs 1.1.1 and 1.1.3 have been merged into one Output 1.1. In the detailed description in the Project Document the baseline description (e.g., ECBC and notification by States; status ECBC-Residential, Star labelling) has been updated as has the description of the current state of development of tools such as EMIS and BEP. Regarding the local implementation of ECBC and other guidelines, the Project will focus on the three states in which the pilot building demonstrations of Outcome 2b will be located, i.e. Uttar Pradesh, West-Bengal and Telangana.	
Component 2 **Market acceleration and innovation for super-EE and thermal comfort deployment/diffusion**	
2a. Enhanced investments and deployment of super energy-efficient technologies and thermal comfort in buildings 2.1. Interventions assessed based on business value chain for accelerated adoption of thermal comfort interventions in major buildings types 2.2 Investment mechanisms and business models developed to enable the private sector to adopt and operationalize harmonized codes and enable diffusion of highly efficient cooling technologies.	2.1. Enhanced investments and deployment of Super Energy Efficient technologies in buildings 2.1.1. Market incentive structures evolved based on business value chain for accelerated adoption of thermal Comfort interventions in major buildings types (commercial and residential) 2.1.2. Investment mechanisms developed to enable private sector to adopt and operationalize harmonized codes, and enable diffusion of highly efficient cooling technologies.

2b. Enhanced evidence for investment in energy-efficient technologies and thermal comfort in buildings 2.3 Pilots implemented in representative climatic zones with harmonized codes, and highly-efficiency and thermal comfort technologies [for a) existing buildings and b) new buildings compliant to ESS/ gender aspects]	2.2. Enhanced evidence for investment in Energy Efficient technologies in buildings 2.2.1 Design of business models/tools for investments in harmonized codes - EE and thermal comfort which may include SDG Impact Investments Bonds, retrofit pay-as-you models, CSR bonds, Financial de-risking mechanism 2.2.2 Pilots in 5 representative climatic zones with Harmonized codes, compliant to ESS/ gender aspects,highly-efficiency technologies for a) Existing buildings (pan-India/ Smart Cities) and b) New buildings (pan-India/Smart Cities)
Notes: The Components has two outcomes, 2a (which is TA) and 2b (which is INV). The, Output 2.2.1 has been moved as merged with Output 2.1.2 into one Output 2.2, due to substantial overlap in these Outputs (some activities have been put in the Output 2.3 as far as financing of the pilot/demos is concerned). However, parts of Output 2.2.1 have been merged with Output 2.3 as far these concern the developer/investors of the pilots/demos in applying to loans and grants from the KfW credit line (and other possible financiers).In the Project Document, the status of concepts and implementation of de-risking mechanisms and business models for super-EE and other thermal comfort interventions in buildings (new and existing) has been updated, while a detailed description of these interventions is given in the Project Document. Pilot buildings (52 existing and 03 new buildings) will be demonstrated in climatic zones in Lucknow (Uttar Pradesh), Kolkata (West Bengal), and Hyderabad (Telengana).	
Component 3 **Capacity building and knowledge sharing**	
3. Enhanced capacity at national, sub-national and within the private sector for thermal comfort systems in buildings [for identifying, designing, planning, financing and implementing energy-efficient and environmentally friendly technologies]	3.1. Enhanced capacity at national, sub-national and within private sector for identifying, designing, planning, financing and implementing efficiency improvement and thermal comfort systems in buildings
3.1 Linkages with accelerator platforms (SE4ALL, SCIP, and Kigali Cooling Efficiency Programme) established 3.2 Consumer behavioural inducements through awareness campaign for critical stakeholders 3.3 Institutional training and awareness for transitioning to ECBC compliance and for the newly adopted Residential Building Codes as well as on e-waste management and recovery and recycling of refrigerants [in all types of buildings, including ESS and gender elements] 3.4 Targeted and customised training/ new programmes? development in EE measures/solutions implementation by building types at all levels	3.1.1. Linkages with accelerator platforms (SE4ALL, SCIP, and Kigali Cooling Efficiency Programme) established through online access to knowledge platform to assimilate tools and financing options for government and private sector stakeholders. 3.1.2. Consumer behavioural inducements through awareness campaign, controlled experimentation with critical stakeholders 3.1.3. Institutional training and awareness for transitioning to ECBC compliance including ESS and gender elements and for the newly adopted Residential building Codes in all types of buildings 3.1.4. Targeted and customised trainings/ new programs? development (energy auditors, policymakers, regulators, public and private agencies) in EE measures/solutions implementation by building types at all levels.
Notes: There are no real changes in the Outputs between PIF and ProDoc, except that on activity-level (within each Output) the ProDoc provides more details	

The Project Document describes in greater detail than the PIF the various types of measures thermal comfort can be achieved by and distinguishes three types of measures:

1. Construction of energy-efficient buildings incorporating passive design strategies to minimize heat gains/losses via the envelope and reduce cooling demand.
2. Adoption of adaptive thermal comfort standards to specify pre-setting of temperatures of cooling equipment for built spaces
3. Incorporation of efficient cooling technologies, namely refrigerant-based (such as room air-conditioners (AC), chiller systems, packaged direct expansion and variable refrigerant flow systems), non-refrigerant based (such as fans and air coolers), not-in-kind technologies (such as radiant and structure cooling, heat pumps, evaporative cooling and vapour absorption cooling).

These technologies are in various levels of market adoption and technology innovation. Evaporative cooling and conventional energy-efficient room ACs and chillers are established technologies but the adoption of the most efficient types still faces market barriers due to high initial costs and other factors. Passive building design and zero GWP refrigerant-based ACs and chillers as well as not-in-kind technologies are innovative and proven but have met low market adoption up to date. These are therefore the prime focus of demonstration in Output 2.4 in new and existing buildings, while passive design options are considered for demonstration in new buildings. Technologies as district cooling and digital interventions have not been adopted yet or are more futuristic. Linked with the pilot building demonstration is a study on the expansion of digital interventions from the established energy modelling (with EMIS, smart meter integration) into more innovative modelling (with integrated project delivery) to integration with ?smart technologies such as AI, automation and robotics, Internet, etc.

The overall goals of the project will be achieved by:

(a) Establishing a strong coordination mechanism that can link the regulatory and policy framework that gravitates around the cooling sector and energy planning and energy use in buildings, so actions can be improved based on long term energy efficiency policies and harmonized guidelines under the purview of ECBC compliance, and paired with the Kigali Amendment?s activities for refrigerant transition.

(b) Accelerating the market innovation on cooling by linking energy efficiency technologies and finance for the deployment of market activities and incentives that will allow the growing demand to be met by the most efficient cooling technologies. This will allow a reduction of potential GHG emissions from the current baseline scenario;

(c) Promoting actions, sharing knowledge and increasing capacities in stakeholders and increased capacity building activities to enhance energy efficiency interventions in the buildings (and cooling equipment) design, installation, maintenance and repair phases.

The three project components are thus designed to address in an integrated and transformative mode the gaps and challenges, discussed earlier, in (A) policy and regulations; (B) market acceleration; and (C) knowledge management and capacities, building on what has been achieved up to now (baseline interventions). Box 1 shows the dynamic strategy aspects of the theory of change, i.e., how the Project?s strategy and outcomes address the challenges and gaps.

Box 1 Theory of change: challenges and causes, interventions, outcomes and impacts

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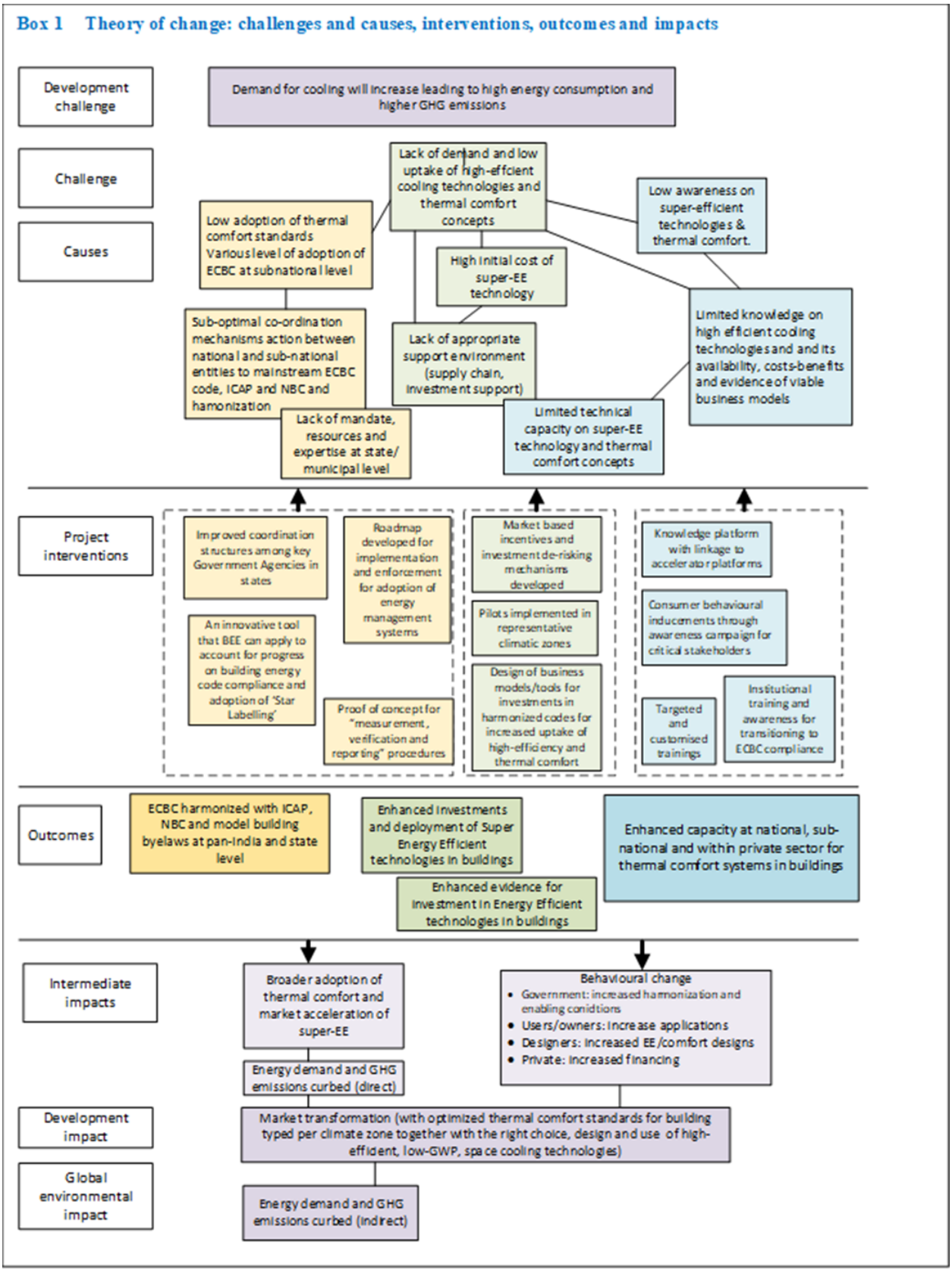

Component 1 Enhancing the effectiveness of national policy, regulatory and institutional frameworks for energy efficiency in buildings

Outcome	***Outputs***
1. ECBC harmonized with ICAP, NBC and model building by-laws at pan-India and state level	1.1 Improved coordination structures among key Government Agencies in states 1.2 Developed unified framework / guidelines for thermal comfort in buildings based on energy conservation building codes (ECBC), NBC and the India Cooling Action Plan 1.3 A roadmap developed for implementation and enforcement for the adoption of energy management systems (EMIS) for thermal comfort in buildings at national and subnational/municipal levels 1.4 An innovative tool developed that the Bureau of Energy Efficiency can apply to account for progress on building energy code compliance and adoption of ?Star Labelling? (such as BEP) to be developed along with EMIS (Energy Management Information System) to track building energy performance and thermal comfort parameters. 1.5 Proof of concept established for ?Measurement, verification and reporting? procedures in at least one state in each of the climatic zones of India (to enable States' Designated agencies (SDAs) and BEE to monitor overall results of the tools proposed)
	Partners: Ministries-agencies: BEE, MoEFCC, MoHUA, SDAs, UDDs and ULBs of 3 States (Telangana, West Bengal, Uttar Pradesh)

Output 1.1 Improved coordination structures among key Government Agencies in states

At a regulatory level, a review of challenges to implementing building energy efficiency policy actions will be assessed for their sustained implementation rollout. Institutional capacity of the BEE and MoEF&CC will be strengthened in the context of interrelated goals of the Bureau of Energy Efficiency and MoEF&CC for combining energy efficiency under the GEF proposal to parallel actions of phase-out/phase-down of refrigerant gases under the Montreal Protocol activities, working together with Urban Local Bodies (ULBs) under the respective States administrative departments (that are aligned with the Ministry of Housing and Urban Affairs at the central government level) as well as with the State Designated Agencies (SDAs) responsible for energy efficiency interventions in the building sector (aligned with BEE at the central level). Coordination and cooperation will also be sought with regional power distribution companies (DISCOMs)[1].

[1] As a customer strategy, DSM (demand-side management) programs encourage the installation of end-use technologies that consume less energy, thereby reducing or shifting the customers? overall

electric bill. DSM programs can help utilities to reduce their peak power purchases on the wholesale market thereby lowering their overall cost of operations. The capacity building and other support is essential for the DISCOMs to implement cooling-related DSM in their respective areas.

Municipalities and states will be provided with modules and guidelines for developing and implementing **harmonized building energy efficiency guidelines for sustainable thermal comfort (harmonized thermal comfort guidelines)** in an integrated and coordinated manner. Once the harmonized guidelines are developed (as covered under Output 1.2) the implementation shall utilize the existing network of Project Steering Committee (PSC) for ECBC implementation to the maximum extent in states to regulate the activities for implementation of project activities under the said output. The harmonized guidelines will be included in the building bye-laws of respective states for their adoption. This will require a state government approval followed by a notification in the official state gazette. Further, the notification shall be circulated to relevant departments for information dissemination before becoming a mandatory provision as part of building bye-laws. At present, the action of institutionalizing thermal comfort is lacking as there is no institution with a dedicated mandate for the same. The capacities of institutions involved in the implementation of building bye-laws will thus require to be strengthened through capacity building and training on one hand and the process of updating the mandates of relevant institutions on the other. The PSC level consultations will lead to a clear definition of mandates of each of the agencies to implement the harmonized thermal comfort guidelines at the state level. In order to identify an entity for institutionalizing thermal comfort at state levels, an assessment of the current institutional framework adopted to implement ECBC shall be required .

The recommendations on key state agencies with the responsibility of the mandate for implementation of thermal comfort guidelines in states shall thus be made to the PSC based on the outputs of above. Suitable recommendations to PSC shall be made depending upon the existing representation in PSC of each of the states. The State Designated Agencies (SDAs), who are the strategic partners for the promotion of energy efficiency in the State, will need to be engaged continuously and provided with technical assistance towards enhanced focus and access to technical and financial resources for energy efficiency measures. Also, the capacity of implementing agencies such as the ULBs and UDDs in the states need to be enhanced both from the technical and managerial side so that these decisions and pre-feasibility studies can be taken up seamlessly.

Activities:

1.1.1 Assess the technical and administrative capabilities of implementing agencies at the national and sub-national level and propose recommendations to strengthen the existing capacity of institutions and mandates of sub-national implementing agencies for the implementation of harmonized thermal comfort recommendations in states. This shall be achieved by:

? Appointment of inter-governmental committee members in the PSC with participation from MoEFCC, BEE and MoHUA. The PSC shall be responsible for the finalization of the implementation framework for harmonized thermal comfort guidelines based on the recommendations and consultations amongst the PSC members, and it shall oversee the development of harmonized thermal comfort guidelines.

? PSC to propose suitable changes to existing mandates of institutions at national and sub-national levels to enable the implementation of harmonized guidelines.

? Appointment of building energy efficiency specialists with minimum qualification of being ?ECBC master trainers? at ULBs/UDDs in states with the mandate to implement harmonized thermal comfort guidelines

? Definition of the roles and responsibilities and coordination arrangements between the SDAs and ULBs/UDDs such that there is a seamless collaboration between the state-level agencies.

1.1.2 Develop an action plan for implementation of harmonized thermal comfort guidelines that shall include:

? Originating studies to establish city/state-wise targets across building types in a phased manner for sustainable thermal comfort aligned with the findings of NBC, ICAP?, Eco-Niwas[1] and ECBC implementation involving criteria for building selection, incentives for builders and building owners, penalties in case of non-compliance.

? State/city-wise strategies in the residential, and commercial building segments to achieve the intended targets with an economic justification of each. Strategy design shall include estimating the heating and cooling energy demand in states of Telangana, West Bengal and Uttar Pradesh and pathways to reduce it, centred around super-efficient technologies adoption.

? Strategies shall specify the step wise actions to implement harmonized guidelines with key milestones, timelines, investment requirements and impacts.

? Each strategy to have coordinated institutional structures with the roles of implementing agency and partner agency defined at subnational levels.

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[1] The Project will build on the results of the Indo-German Energy Programme supported Eco-Niwas Samhita-ENS (Energy Efficiency Building Code for Residential Building) and Residential Building Energy Efficiency Star label in five states Punjab, Uttar Pradesh, Delhi, Karnataka, Telangana and Maharashtra

Output 1.2 Developed unified framework/guidelines for thermal comfort in buildings based on energy conservation building codes (ECBC), NBC and the India Cooling Action Plan

The objectives of the output shall be to develop a unified framework with guidelines developed for enhanced thermal comfort in buildings based on ECBC, NBC and ICAP harmonization. There are two

aspects to thermal comfort in buildings ? one that ensures that the building has been designed to achieve thermal comfort conditions while the other to ensure that the building is operated efficiently to maintain thermal comfort for its occupants. The building energy codes implicitly address the thermal comfort aspects at the design stage while there is no mandate at present to ensure thermal comfort at the operational stage. Low-carbon cooling technologies must be utilized to meet thermal comfort requirements in buildings in line with the recommendations of ICAP. This is presently missing as part of code compliance in buildings (new buildings) and as part of ?Star labelling? programs for buildings.

The development of **harmonized building energy efficiency guidelines for sustained thermal comfort (harmonized thermal comfort guidelines)** requires a critical analysis of thermal comfort norms leading to the formulation of standardized thermal comfort norms for Indian buildings. This shall include a review of relevant national and international standards and models for thermal comfort, identification of a set of thermal comfort criteria for different building types and climatic zones. The India Model for Adaptive Comfort (IMAC) standard is widely accepted as the normative reference. Operative temperature thresholds for thermal comfort for indoors are defined for each of the major cities in India covering the buildings with natural ventilation, mix-mode ventilation and air conditioning. A detailed reference to adaptive thermal comfort guidelines for India is made in the NBC 2016 and ICAP for its adoption in Indian buildings. The ECBC also provides guidance on considerations of ?Adaptive Thermal Comfort?. The thermal comfort ranges provided by IMAC are gender-inclusive and addresses the thermal comfort needs of all genders. The same can be referred for the standardised thermal comfort norms. It is to be noted that the IMAC findings are only for commercial spaces and does not cover residential buildings. Additionally, the NBC 2016 states that IMAC temperature calculations are not reliable for locations that have mean monthly temperatures of less than 15 degrees Celsius for significant parts of the year.[16][15] Thus a joint consultation with PSC members and key sector experts to gain buy-in on the proposed recommendations shall be required to seek their feedback. In the context of residential buildings, engagement with building energy efficiency experts in India to gain insights on the definition of thermal comfort which to date has not been established formally for the Indian context shall be required. Thus the project?s approach will follow a consultative process to seek buy-in from implementing agencies to define the standardized thermal comfort norms. The norms shall further be finalized by the PSC.

The ECBC and R-ECBC lay the minimum requirements for passive design features (envelope efficiency) to achieve the required thermal comfort (in line with the requirements of ?Adaptive Thermal Comfort? as defined in the NBC 2016) and the corresponding reduction in cooling demand and energy savings. Under chapter 4, ECBC provides minimum mandatory requirements for thermal efficiency of walls, roof, glass, and shading for different non-residential building typologies in different climatic zones as part of the prescriptive approach. Under chapter 3, ENS / R-ECBC (Part 1) provides RETV requirements for residential buildings in different climatic zones. There are also minimum performance requirements laid out on the selection of thermal comfort systems in ECBC. In the case of residential buildings, the minimum performance requirements for the selection of thermal comfort systems are not yet defined. Some degree of harmonization already exists between ECBC and ICAP in terms of low carbon cooling solutions (not including zero GWP refrigerant-based cooling systems). ECBC awards ECBC+ status to buildings with an approved low carbon cooling system for more than

50% of the cooling demand; SuperECBC to buildings with an approved low carbon cooling system for more than 90% of the cooling demand. The list of low carbon cooling systems recognized by ECBC includes: evaporative cooling, desiccant cooling system, solar air conditioning, tri-generation (waste-to-heat), radiant cooling system, ground source heat pump, adiabatic cooling system. Thus, there is a need for the harmonized comfort guidelines to introduce the element of low carbon cooling with requirements on the use of zero GWP refrigerants for commercial and residential buildings to meet the requirements of the standardized thermal comfort norms. The need for convergence between the India Cooling Action Plan and ECBC and other relevant policies and regulations need to be dealt with in a cross-sectoral and integrated manner. The project will support streamlining the guidelines/codes with relevant aspects of building by-laws of ULBs (municipalities) in States and their linkages to policies and regulations at the national level.

The building energy efficiency actions through ECBC at the moment have been notified in selected states of India (18 States/UTs) for commercial buildings while in the case of residential buildings the policy level actions, and their implementation are further awaited. The ?Star Labelling? requirements in states are voluntary and there is no clear indication on the mandate for a MEPS[17][16] for buildings. Thus, the development and inclusion of thermal comfort guidelines as part of harmonized efforts towards achieving the goals of ECBC and ICAP in states will be centred around utilizing existing institutional structures in states requiring improved coordination among key government agencies in states and development of unified guidelines. The guidelines will be included as part of building bye-laws as stated in Output 1.1.

The harmonized thermal comfort guidelines shall cover the attainment of thermal comfort by design in new buildings based on the standardized thermal comfort norms. Further, it will have an element of post-monitoring of thermal comfort in addition to design stage compliance. This is further covered as part of Output 1.3 on ?Development and Enforcement of EMIS?. Further, the process of subnational revisions of building bye-laws to incorporate the harmonized building energy efficiency guidelines for sustained thermal comfort shall be facilitated.

Activities:

1.2.1 *Assessment of policy landscape including ECBC, NBC and ICAP harmonization opportunities for the rollout of harmonized thermal comfort guidelines to achieve standardized thermal comfort norms for the building sector.*

Thermal comfort norms have been developed for buildings in India and are specified in NBC 2016 (Volume 2) based on IMAC standard that shall require further investigation for its inclusion in harmonized efforts towards achieving thermal comfort in buildings in the design and post-occupancy/operational stage of buildings. As the thermal comfort norms are closely related to policy actions of building energy efficiency through ECBC code implementation and that of ICAP, the assessment will be centred around a study to recommend strategies on aligning ECBC, NBC and ICAP

with the inclusion of standardized thermal comfort norms at national and state level for the buildings in India.

1.2.2 *Assess guidelines/regulation/policies aimed at standardization of thermal comfort norms across buildings sectors* (commercial and residential) at the national and subnational level both from active and passive cooling perspectives and map its linkage in transiting towards enhanced energy efficiency and the use of zero GWP refrigerants).

Assessment should also include limitations with the identified guidelines/regulations/policies. This shall include a review of the relevant sections of ECBC, RECBC / ENS (relevant sections referring to codes/standards for thermal comfort conditions and low carbon cooling technologies), NBC 2016 Volume 2, Sections with guidance on ?Indices of Thermal Comfort?, ?Design of Indoor Conditions as per Adaptive Thermal Comfort Model?, ?Design of Air-Conditioning?, and other relevant sections), ICAP (actions on use of low GWP refrigerants in air conditioning, adoption of adaptive thermal comfort-based set-point for AC operation, mandatory minimum indoor air temperature setting, mandatory disclosures of building cooling requirement and energy use) and Model Building Byelaws and State building bye-laws of Telangana, Uttar Pradesh and West-Bengal.

o Assess existing norms of thermal comfort for residential and commercial buildings (including standards, previous research and guidelines in NBC 2016) and propose recommendations based on a consultative approach to standardize the thermal comfort guidelines thereby ensuring their aptness across the major building typologies in India for their inclusion as part of building design and post-occupancy monitoring.

o Assess gaps in the implementation of standardized thermal comfort norms as stipulated in NBC for the commercial and residential buildings (in operational stage) with a focus on target cities of Component 2 (Lucknow, Hyderabad and Kolkata) by consulting BEE, State Designated Agencies, building owners and facility management firms.

o Assess mandate related gaps at the national level including the mandates of central agencies of BEE and MoUHA and sub-national agencies of SDAs, ULBs and UDDs, in the context of the implementation of harmonized thermal comfort guidelines and building energy efficiency in a harmonized manner.

o Identification of relevant stakeholders with the collective interest of mainstreaming thermal comfort at low energy use and environmental impacts (using low carbon technologies and zero GWP refrigerant-based thermal comfort cooling technologies)

o Consultation with MoHUA, BEE, SDAs and State PWDs of Uttar Pradesh, West-Bengal and Telangana to identify and agree on an entity responsible for institutionalizing thermal comfort and its adoption

o Organize virtual workshops and focus group meetings with stakeholders (including members of MoHUA, BEE, SDAs, CPWD & State PWDs, State Urban Development Ministries, ULBs, City Planners, Architects & Engineers to assess the level of awareness and importance of thermal comfort

o Develop harmonized thermal comfort guidelines in consultation with PSC members to ensure attainment of standardized thermal comfort norms through low carbon cooling solutions at design and post-occupancy stage for buildings opting for ECBC along with guidance on the selection of low carbon thermal comfort technology to achieve the same.

o The guidelines shall further be finalized by PSC and submitted to the state cabinet for their integration as part of building bye-laws in the states through appropriate notification.

o Identify possible strategies through the study to incorporate thermal comfort guidelines in existing building energy efficiency policies such as ECBC code adoption and ICAP implementation in the respective states.

o Identify possible strategies through the study to incorporate thermal comfort guidelines in existing building energy efficiency policies such as ECBC code adoption and ICAP implementation in the respective states.

o Conduct Stakeholder consultations amongst existing institutions on ECBC in states of West Bengal, Telangana and Uttar Pradesh to formulate a shortlisted set of harmonized thermal comfort guidelines.

Output 1.3 A roadmap developed for implementation and enforcement for the adoption of energy management systems (EMIS) for thermal comfort in buildings at national and subnational/municipal levels

A roadmap will be prepared for joint action by BEE and MoEF&CC to calibrate the activities of ICAP and ECBC for improved energy performance of thermal comfort systems (HVAC and related auxiliaries). At present, there exists a draft Energy Management Information System (EMIS) for the reporting of the energy performance of buildings with the use of smart energy meters and supportive protocol. However, there is no mechanism in place in buildings to report thermal comfort aspects at an operational stage of buildings. The activities planned under this output shall focus on identifying the challenges in the implementation and enforcement of data reporting in buildings adopting ECBC / ENS and/or harmonized thermal comfort guidelines. Further, they will aim at strengthening and developing a roadmap to implement EMIS as part of compliance with ECBC / ENS and harmonized thermal comfort guidelines. This shall address the existing challenge of unreported building energy performance and ?unmet load hours?[18][17] for thermal comfort. Subsequently, relevant enhancements shall be accordingly made to existing EMIS so that the operational performance of buildings can be reported through the establishment of necessary protocols.

The roadmap for implementation of EMIS shall guide thermal comfort and energy performance monitoring in new and existing buildings. The activities planned shall include a review of different M&V frameworks based on the following non-exhaustive parameters applicable for EMIS such as: a)

parameters to monitor (operative temperature, discomfort, etc.), b) mode of assessment (survey-based/sensor-based), c) time-step (discreet/continuous), d) applicability for different building types, e) ease of implementation. A framework shall thus be developed for EMIS for recording, storing and archiving the energy performance and thermal comfort data for buildings at the city, state and national level, as applicable for different building types (commercial, public, residential).

BEE is actively working on implementing EMIS at the national and state level. There is thus an opportunity for integrating the monitoring of thermal comfort within this framework in line with harmonized thermal comfort guidelines. Temperature data through sensors could be collected, reported, and monitored at a central level thus ensuring a central repository and analytics platform to assess the implementation of thermal comfort guidelines as part of EMIS. The mainstreaming of EMIS can happen in two ways: a) In new buildings as part of the adoption of ECBC / R-ECBC rules in building bye-laws, b) In existing buildings as part of the adoption of Star Labelling programme for commercial and residential buildings.

At the moment there is no mandate for the states to adopt star labelling. The project activities will aim to evaluate the possible options of associating star labelling with fiscal instruments such as property tax, etc for it to become a mandatory provision in states. This will require consultations with relevant state government authorities. In the case of new buildings, the integration of harmonized thermal comfort guidelines with building bye-laws and ECBC rules shall lead to the mandatory implementation of EMIS for new buildings.

Activities:

1.3.1 *Assess and develop the framework for EMIS for its effective rollout for enhanced implementation at the state level to incorporate protocol for measurement and reporting of thermal comfort aspects in addition to energy performance data of buildings.*

? Identify opportunities in strengthening the framework for existing EMIS

? Study the functionality of draft EMIS tool[19][18] at the building level, state level and national level requirements to inform the development of EMIS online tool

? In consultation with project stakeholders involving PSC and TAC, develop the framework for an ideal EMIS to define a protocol for measurement and reporting of building energy performance and thermal comfort aspects

? Assess roles and responsibilities of key institutions involved in the implementation of EMIS by analysing the ECBC rules in the states of Telangana, Uttar Pradesh and West Bengal.

? Understand the existing ECBC implementation infrastructure in the state in the context of EMIS requirements, to inform the design of EMIS development.

? Identify key actors in states with common interests towards establishing EMIS and assess their capacities towards implementation

? Mapping of existing technical expertise in SDAs, ULBs, and distribution utilities related to EMIS operation and implementation

? Prepare a roadmap to mainstream EMIS in consultation with PSC and TAC for existing and new buildings in the states of Uttar Pradesh, Telangana and West Bengal.

1.3.2 *Implementation and operationalization of energy management information system for thermal comfort through a consultative approach.* This shall be established through the following set of sub-actions:

? Appoint an IT support team at the national level to support further enhancements to the existing EMIS tool as per the new framework established for EMIS (as indicated in Activity 1.2.1)

? Demonstration of integration opportunities of existing EMIS with IoT-based services thereby enabling M&V reporting for energy and thermal comfort parameters

? Develop necessary toolkits relevant for the online building energy performance tool for recording and reporting building energy performance and other necessary parameters related to thermal comfort by incorporating aspects of IoT based services. The sub-activities shall include:

o Identifying the potential areas (like lighting, thermal comfort systems etc.) for integration of IoT-based reporting services for different typologies of buildings;

o Consultation with technology providers, system integrators, building owner/developers, design architects and consultants to understand/match their need for IoT integration for thermal comfort systems;

o Identifying opportunities for integrating data captured by IoT services, with EMIS system;

o Identifying key parameters and indicators to assess building energy performance, (like EPI, energy consumption specifically by air conditioning etc.) and thermal comfort parameters (such as indoor room temperature, average air speed, relative humidity levels, and other relevant parameters as applicable)

1.3.3 *Based on the recommendations on institutional arrangements, develop the framework for M&V reporting protocol thereby ensuring data privacy and security for EMIS*

? Leverage the existing infrastructure for EMIS implementation for the development of a framework for M&V reporting protocol

? Identify key indicators for M&V protocol based on energy end-use application and thermal comfort parameters

? Ensure with technology provider for data authenticity, data security and data protection/privacy for the data captured by IoT based systems

? Development of legal framework/policies for data breach and agreement with technology providers

Output 1.4 An innovative tool developed that the BEE can apply to account for progress on building energy code compliance and adoption of ?Star Labelling?

(such as BEP) to be developed along with EMIS to track building energy performance and thermal comfort parameters).

The Building Energy Passport (BEP) is a tool that facilitates ECBC compliance by providing a platform that brings together building owners, building professionals, empanelled firms, and approving authorities and facilitates management of building information, compliance documentation and approvals through an online process. It was designed to serve as a tool for ECBC compliance management with an application manager to facilitate maintenance of building records and approvals in conjunction with an ?Energy Monitoring Portal? to facilitate monitoring of ongoing energy use at building level, municipal level, state level and national level. Its development has hit a roadblock since 2018 and, at present, it can be said that the BEP has been partially developed and is not in operational mode. Even though ECBC is mainly a design code and does not focus much on the actual energy performance of a building when it is in operation, the integration of harmonised thermal comfort guidelines involving EMIS integration with BEP for ECBC compliance can be a game-changer for enhanced building energy efficiency policy actions. Hence, to further the development and operationalization of BEP in conjunction with EMIS, the project can support the three states with the incorporation of state-specific modifications to the existing modules of BEP and be further integrated with EMIS. The EMIS can thus act as a tool for M&V reporting of building energy performance and building?s thermal comfort.

Activities:

1.4.1 *Review and assess existing BEP tool and ECBC rules in the target states to identify gaps and development areas*

? Review the already developed BEP for commercial buildings to inform further enhancements to the existing BEP tool for accommodating state-specific modifications in respective modules

o Identify gaps in the existing framework

o Consult PSC and PAC to inform further improvements and enhancements

o Detail out those ECBC rules for their incorporation in state-specific modules in BEP

? Development of BEP for residential buildings as per the state R-ECBC rules and protocols established

? Hiring of an IT team to develop BEP tool for residential commercial buildings

? Integration of BEP and EMIS tools under one platform for commercial and residential buildings

Output 1.5 Proof of concept established for ?measurement, verification and reporting? procedures in at least one state in each climatic zones of India

(to enable States' Designated agencies (SDAs) and BEE to monitor overall results of the tools proposed)

Rating schemes and Building Energy Passports (BEPs) are enabling measures and processes for mainstreaming ECBC 2017 implementation into States and Urban Local Bodies (ULBs). This will also lead to the development of a proof of concept for M&V reporting procedures in at least one state of India to enable States' Designated agencies (SDAs) and BEE to monitor the overall results of the tools proposed. The EMIS shall thus act as a M&V reporting tool to monitor, verify and report the building energy performance along with the thermal comfort parameters. The EMIS data can be thus useful for MoEFCC to measure the progress towards achieving the ICAP objectives.

As EMIS is a tool applicable in larger buildings (that have an energy manager to input data), other measures will supplement, such as building surveys (using samples with extrapolation approaches). All these measures (EMIS, surveys) will provide a robust setup of monitoring, reporting and verification (MRV) mechanism through checks and compliance and will facilitate the stringent implementation of ECBC 2017 and other standards. Along with a strong MRV mechanism, the scheme also showcases a good example of making information transparent in the public domain, thus giving further impetus for building owners to comply with the process. The periodic evaluation of the program impact by a third-party agency helps the building owners to assess the building?s energy efficiency and also track improvements over time. Regular monitoring of the program helps in strict enforcement of the ECBC and other existing standards. Maintaining technical specifications in the building design also demonstrates compliance to ECBC standard.

Activities:

1.5.1 *Demonstration of EMIS implementation in states*

? Identification of buildings for EMIS piloting[20][19]

? Facilitate operations and maintenance team from identified buildings in setting up infrastructure requirements for EMIS implementation

? Identification of key indicators for M&V reporting in the context of building energy use and thermal comfort aspects

? Provide facilitation and handholding support to implement EMIS for the demonstration projects in states

? Development of case studies for replication of pilots

? Development of a framework for replicating findings for the public at large

? Development of user manual along with other supporting material for EMIS

Component 2 Market acceleration and innovation for super-EE and thermal comfort deployment/diffusion

Outcome	***Outputs***
2a. Enhanced investments and deployment of super energy-efficient technologies and thermal comfort in buildings	2.1. Interventions assessed based on business value chain for accelerated adoption of thermal comfort interventions in major buildings types 2.2 Investment mechanisms and business models developed to enable the private sector to adopt and operationalize harmonized codes and enable diffusion of highly efficient cooling technologies.
	Project partners: EESL; super energy-efficient cooling technology providers, building material suppliers of energy-efficient envelope materials, building developers, and financial institutions
2.b Enhanced evidence for investment in energy-efficient technologies and thermal comfort in buildings	2.3 Pilots implemented in representative climatic zones with harmonized codes, and highly-efficiency and thermal comfort technologies [for a) existing buildings and b) new buildings compliant to ESS/ gender aspects]
	Project partners: EESL, SDAs and ULBs of 3 states, BEE, DISCOMs, NGOs, super EE cooling technology providers, building material suppliers of energy-efficient envelope materials, building developers, co-financers

Output 2.1 Interventions assessed based on business value chain for accelerated adoption of thermal comfort interventions in major building types

The project aims at accelerating the adoption of energy-efficient thermal comfort interventions in major building types that evolve out of the business value chain, local policies and regulations and incentives. It is to be noted that the energy-efficient thermal comfort interventions described earlier are at a nascent stage of adoption as there are no mandatory policy requirements for the same. As captured in component 1, the National Building Code 2016 (Volume 2) of India defines thermal comfort conditions per type of building. However, there is no mechanism in place to verify whether a given building is meeting or following the thermal comfort requirements as stated in the NBC since these are suggestive measures as part of building design that can only be mandated in states as a result of their inclusion in building by-laws. In addition to this, there are no financial incentives for buildings to meet the requirements of thermal comfort for the greater percentage of the year during occupancy hours.

The project will take into consideration the building materials for the building envelope as per the Eco-Niwas Samhita-ENS (ECBC for Residential building) in order to reduce the cooling requirement in compliance with the Code and to achieve the Residential Building Energy Efficiency Star Label[21][20].

Activities:

2.1.1 *Identification and assessment of suitable building energy efficiency technologies and cooling in residential & commercial buildings, consisting of the following elements:*

? Identify best practices of building energy efficiency technologies & cooling (passive design measures & technological advancements) from international markets and in India.

? Conduct a SWOT analysis to establish benefits in terms of thermal comfort, viability, energy savings potential, refrigerant use of identified technologies in India.

? Validate the findings & understand practical issues faced during operations for uptake of best practices via the use of energy-efficient technologies and low-carbon cooling in existing buildings in India.

? Establish percentage of penetration and market readiness in the adoption of best practices.

? A study to understand barriers on consumer behaviour relating to technological & financial aspects limiting the uptake of suitable thermal comfort interventions.

? Map existing incentive structures being offered to consumers for uptake of super-efficient cooling/HVAC technologies along with barriers.

2.1.2 *Conduct a business value chain analysis to identify the barriers in uptake of suitable building energy efficiency technologies.*

? Map the availability and penetration of each of the interventions with value chain analysis of major suppliers at the national and international levels.

? Identify barriers for local manufacturing of building energy efficiency technologies & cooling (passive and technological).

? Review existing incentive structures and incentive models of super-efficient cooling/ HVAC technologies in India and other developed markets.

? Identify barriers/ gaps in terms of manufacturing of identified super-efficient cooling/ HVAC technologies and cooling and suggest a possible action plan by incorporating proposed solutions against identified technological and financial barriers.

Output 2.2 Investment mechanisms and business models developed to enable the private sector to adopt and operationalize harmonized codes and enable diffusion of highly efficient cooling technologies

Financing mechanisms, business models and incentives for energy efficiency are key for mobilizing investment but should be complemented by other efforts in an integrated approach, such as market transformation policies, regulations, awareness-raising activities and behaviour change initiatives. These efforts work alongside each other in a complementary manner. The project interventions in this Output will focus on facilitating suitable business and financing models, implementing procedures and bankable projects at participating states and municipalities. Some of the established financing mechanisms and business models around the globe for both residential and commercial building typologies by the Indian government and stakeholders to promote the greater uptake of super-efficient cooling technologies are referenced in Annex M. These programs include bulk procurement and AC Replacement Scheme by power distribution companies under DSM programmes to name a few. The above programs are only applicable to unitary cooling technologies and do not focus on innovative cooling technologies such as district cooling, thermal energy storage, etc.

Financing mechanisms also include financial risk mitigation instruments that reduce the risks perception for consumers and the other stakeholders involved in a project (e.g., banks, technology providers). Risk mitigation instruments can reduce risk at different levels: consumers, banks (lenders), energy efficiency technology providers, the public sector, etc. Risk mitigation instruments can unlock access to finance and provide better financial conditions for investors. Steps in implementing a

framework to address barriers related to information skilling, technology availability, first-cost biases, and risk perceptions will be explored. This will be done by conducting a study to identify and address challenges of the private sector, technologies and interventions at the national level. The project may apply UNDP?s DREI conceptual approach to support policymakers in selecting public instruments to promote energy efficiency.

Companies across the supply chain of the RAC industry as technology providers, as well as end-users - such as the real estate sector and companies financing it - will be key stakeholders within this project. These stakeholders will be engaged actively in the demonstration and implementation of building norms, piloting new business models, and efficient cooling systems in commercial and residential buildings. The objective behind these engagements is to establish the energy savings, investments and financial returns, and address the risk or challenges of implementation for potential scaling up. Specifically, the following private sector entities will be engaged systematically through the course of this project, a) financiers in the real estate segment; b) technology providers and developers; training agencies; c) and real-estate developers.

Funding will be critical in terms of the needed technical assistance and capacity building for the financial institutions to step in and the loans to be successfully taken up by the building sector. The Project will seek partnerships during project implementation with national and international financial institutions, which may then, in turn, offer financial instruments such as credit lines, loan guarantees and public equity for investments to local financial institutions such as banks. One such partnership will be with the State Bank of India (SBI) that has signed a USD 277 million agreement on energy-efficient housing with KfW which will allow builders and home buyers to apply for financial support available from the KfW credit line for developing/ purchasing energy-efficient building projects that achieve at least 25% energy savings in comparison to standard reference buildings (see Box 2). The Implementing Partner, BEE, is one of the key stakeholders in the KfW loan programme and is committed to align the project with the KfW loan programme. While the KfW programme has a technical assistance component to support SBI in preparing loan documents and developing communication and marketing strategies for the programme, it does not specifically extend to support the uptake of innovative thermal comfort solutions. This is where the project will be able to add value to the KfW loan programme and thereby expand the impact of the programme in the uptake of loans and the realization of GHG emission reduction.

Activities:

2.2.1 *Understanding barriers and needs in private sector stakeholders and identification and proposals for suitable financial mechanisms in the residential & commercial sectors*

? Conduct a study on information barriers related to awareness & risk perceptions related to technological advancements.

? Understand consumer sentiments related to first-cost barriers and identify appropriate financial instruments concerning shortlisted barriers.

? Assess and review international case studies on existing and successful finance schemes and business models.

? Assess and review other financial schemes and business models in project states which have been successfully implemented

? Identify success factors & barriers for each business model and study its applicability in the Indian context. Understand institutional barriers and administrative barriers.

? Mapping of roles of financial institutions for the operation of business models

? Shortlist suitable business models by building typologies and their applicability in new/existing buildings and establish the readiness of shortlisted financial mechanisms in India for appropriate intervention identified based on learnings from international case studies and interventions adopted by other states.

? Stakeholder consultation to seek feedback on shortlisted financial schemes/ business models, including the KfW credit programme (see Box 2)

? Provide support to develop and market products (simple models and brochures to present to customers outlining the typical costs and savings associated with investment details) for uptake of adoption of harmonized codes and super-efficient technologies with marketing platforms (credit lines, loan guarantees, etc.) to provide support to financial institutions.

? Conduct research on the implementation of pilot/demos of Output 2.3 and incorporate findings for further improvements in the delivery of the activities of Output 2.2.

Output 2.3 Pilots implemented in representative climatic zones with harmonized codes, and highly-efficiency and thermal comfort technologies [for a) existing buildings and b) new buildings, compliant to ESS/ gender aspects]

The objective of the pilot buildings is to demonstrate innovative energy-efficient interventions in the context of low carbon thermal comfort technologies, taking into account their level of innovation:

a. Established technologies with medium adoption

b. Innovative and established technologies with low adoption

c. Futuristic technologies to target next level of interventions

Additionally, to determine the feasibility of ?futuristic technologies? there shall be a study as part of the pilots on its feasibility to complement project objectives (see Annex M for a description of this type of intervention).

Three cities from India have been selected during project preparation, including Hyderabad, Kolkata and Lucknow. While the participation of Telangana, Uttar Pradesh and West Bengal is confirmed (see attached co-financing letters), the participation of other States might very well be possible. In this Project Document, we have assumed that only three States will participate but one or more States and/or cities can be added. This will be defined by the time of project inception.

The scenario of ECBC implementation in these three states is representative of the three typical scenarios observed in all of the states of India, which is illustrated below (see also Map in ProDoc Annex A)

City / State	**ECBC Implementation Status**
Hyderabad / Telangana State	ECBC 2007 is notified and rules are mandated
Lucknow / Uttar Pradesh State	ECBC 2017 is notified but rules are yet to be mandated
Kolkata / West Bengal State	ECBC was re-notified with amendments in the year 2020

The component will support buildings that demonstrate (a) harmonized codes & (b) energy efficiency and innovative low carbon thermal comfort approaches and technologies. The project will support these interventions by providing technical assistance in terms of building design guidance, selection of materials, assistance on environmental and social safeguards screening and selection of low carbon thermal comfort technologies for new buildings and relevant retrofits in existing buildings (for a summary scope of pilot demonstration, see Box 3).

Building selection criteria

? The selection of buildings will depend on reaching an agreement with developers that shall be interested in the uptake of super-efficient technologies for sustainable thermal comfort through public-private partnerships in the respective cities. This shall require each pilot building (new construction/existing building) to necessarily meet the minimum requirements of ECBC 2017 code in the case of commercial buildings and ECBC-R Part 1 in the case of residential buildings (for a specification of these requirements, see Annex F.1). In the case of existing buildings, the buildings that have an EPI in the range of 300 kWh/m2/ year to 600 kWh/m2/year or higher and are at least 10 to 15

years old in operation shall be selected for proposing EE interventions related to ?low carbon cooling solutions? and ?implementation of EMIS?.

? Minimum considerations for built-up area thresholds are considered based on the expert judgement of the project?s preparation (PPG) team considering the typical floor area considerations as per building types in target cities.

Box 3 Scope of the pilot demonstrations in new and existing buildings

	Office	Hospitality	Large retail	Hospital	Residential
Numbers	12 (EB) + 1 (NB)	12 (EB) + 1 (NB)	12 (EB)	12 (EB)	12 (EB) + 1 (NB)
Minimum Threshold for Floor Area Selection per building (m^2)	15,000	15,000	15,000	15,000	25,000
% Cooling Area	80%	80%	80%	80%	30 %
Min. Conditioned Area per building (m^2)	12,000	12,000	12,000	12,000	7,500
Min. Cooling Demand (TR)[1]	430	430	430	430	280
Cooling Annual Operation hrs.	2568	2568	2568	2568	1600
Scope of Pilot	New Buildings: Pilots shall consider the following elements: A. Study on Digital Interventions: Study shall include but not limit to 'Building information modelling enabled integrated project delivery' with digital representation of energy processes to represent a 'Digital Twin' of buildings, and evaluation of feasibility of adoption of digitalization with integration of Smart Technologies (AI, IoT and VR / AR), B. To consider the following interventions for intervention in pilot buildings 1. Focus on passive building design strategies with analytics and feasibility-based selection 2. Use of low carbon cooling solutions backed with analytics and feasibility-based selection 3. Implementation of Energy Management Information System (EMIS) with smart energy meters Existing Buildings: Out of above interventions points 2 and 3 shall be applicable to existing building EE interventions only. The project funds (GEF + Co-financing) shall be utilized for financing the technical assistance and consultancy fees for the interventions listed above. In the case of pilots where 'New Buildings' are to be demonstrated for implementation of harmonized guidelines, the design process shall include the use of energy analytics to test the following a) passive design strategies for buildings, and b) low carbon cooling technologies In the case of existing buildings, energy analytics may be used for demonstrating applicability of 'low carbon cooling technologies' and expected energy savings.				

? A social and environmental safeguards screening will be part of the process of selection of pilot buildings to rule out potential projects with high risk social and environmental safeguards concerns. This will also look at involvement and impacts on local people (see ProDoc Attachment 2 and 3 to the SESP, Annex J).

? The report on ?Roadmap to fast-track adoption and implementation of Energy Conservation Building Code at the Urban and Local Level?[22][21], identifies ?office? and ?hospitality? building categories as high energy-consuming categories in commercial buildings in India. The upcoming developments in residential buildings in the target cities indicate a trend of residential developments moving to multi-apartment condominiums. For this reason, a residential multi-apartment condominium, an office and a hotel building shall be considered for the pilots to demonstrate EE interventions in new buildings.

? The same report identifies other building types within the commercial category that are responsible for substantial energy consumption in addition to offices and hotels and these are hospitals and large retail. Across the four building types under ?commercial? (office, hospitality, large retail and hospitals) and residential complexes, the pilot targets 52 ?existing building? projects from 3 cities (4 building projects under each of the 5 categories per city) for EE interventions as planned for existing buildings and 3 ?new buildings?

? Cooling operation hours are considered based on the considerations of ICAP

? As the actions based on harmonized codes can be implemented only in ?new buildings?, while both ?new buildings? and ?existing buildings? across three cities are selected to demonstrate innovative Energy Efficiency interventions to achieve and surpass the direct GHG emission reduction targets (as detailed in ProDoc Annex F).

The need for evidence-based approaches to scale up is lacking as most of the energy efficiency measures are pilots or are implemented in isolation. There is often a lack of standard protocols for measurement and verification due to which energy efficiency gains are agreed upon between user and service provider rather than being measured. The project will, therefore, support and demonstrate energy performance measurement and verification systems in all of the pilot projects. The results of the demonstration will be presented in documentary videos and reports that will be widely disseminated among various stakeholders.

Activities:

2.3.1 *Hiring of TA consultants to undertake a study on ?Digital Interventions? in buildings.*

The study on ?Digital Interventions? in buildings shall include the following sub-activities to inform the future building policy actions complimenting the digitalization of the building construction and design industry in India.

? Feasibility analysis of ?Integrated project delivery enabled by building information modelling? with a digital representation of energy processes to represent a ?Digital Twin? of buildings

? Development of BIM (building information modelling) roadmap for India with a focus on cooling and thermal comfort in buildings

? Feasibility analysis of the adoption of digitalization with the integration of Smart Technologies, such as AI, Automation & Robotics, IoT and VR / AR across the building lifecycle

? Development of a roadmap for inclusion of ?Digitalization with the integration of Smart Technologies? for the building industry with a focus on cooling and thermal comfort in buildings

2.3.2 *Building identification & signing of contractual terms as necessary for ?Pilot? demonstrations.*

? Based on established criteria for pilots in the PPG phase, seek confirmation from building developers and owners of New and Existing buildings for their participation in pilots under the project.

? Consultation meetings with PSC and PAC will lead to finalizing the buildings for pilot projects

? A ?Call for Proposal? shall be disseminated to participants (developers/owners/financiers) of the information along with the selection and evaluation process and the necessary selection criteria requirements (including environmental and social safeguards standards)

? Evaluation of the concept project notes will be performed by the Project team together with BEE and SDAs of respective states.

? Project team to facilitate the signing of necessary contractual terms with building owners and developers for implementation of EE interventions as envisaged as per the pilot scope as per the GEF guidelines.

2.3.3 *Conducting detailed technical and financial feasibility studies for all pilots*

? Tendering for Energy Auditors / Energy Audit Firms and TA consultants to evaluate feasible EE interventions for pilot projects:

? Hiring of energy auditors and technical consultants to undertake investment-grade energy audits for implementation of EE interventions in Existing buildings under the pilots.

? Hiring of energy design consultants to provide technical assistance for implementation of EE measures in New Buildings based on the planned interventions.

? Conducting detailed technical and financial feasibility studies and business plans for all pilots

? Performance evaluation of EE interventions with cost-benefit analyses for new and existing buildings.

? Provide assistance to building developers/owners/practitioners in preparing bankable energy-efficient buildings proposals.

? Appoint stakeholders such as ESCO?s who can support the implementation of business models to further enhance its effectiveness.

? Piloting design, construction, EE retrofit with EMIS implementation

? Implementation and commissioning support for EE retrofits in Existing Buildings

? Implementation and commissioning support for EE interventions in New Buildings

? Implementation of EMIS as part of interventions planned for pilot demonstration projects shall ensure reporting of energy performance and thermal comfort parameters post-occupancy and commissioning

? Conducting detailed environmental and social safeguards checks for pilot buildings

? Implementation and commissioning environmental and social safeguards screening for EE retrofits in Existing Buildings

? Implementation and commissioning environmental and social safeguards screening for EE interventions in New Buildings

? Evaluation of energy performance and thermal comfort performance of the model buildings and documentation of lessons learned and of implemented business models in the pilots/demos

It should be noted that GEF resources are not planned to be used as investment support to building construction of equipment acquisition. GEF resources will be used only to support the design, feasibility analysis, audits, design and results monitoring of energy and thermal comfort monitoring. For investment support, both builders and home buyers can apply for financial support available from the KfW credit line (see Box 2) for developing/ purchasing energy-efficient residential projects that achieve at least 25% energy savings in comparison to standard reference buildings. Building developers receiving KfW investment support should comply with KfW requirements to meet international environmental, social, health, safety and labour standards (see Box 2). The Implementing Partner, BEE, will thereby make use of the KfW loan programme to support the uptake of innovative thermal comfort solutions as added value to the KfW loan programme for enhanced uptake and increased GHG emission reduction.

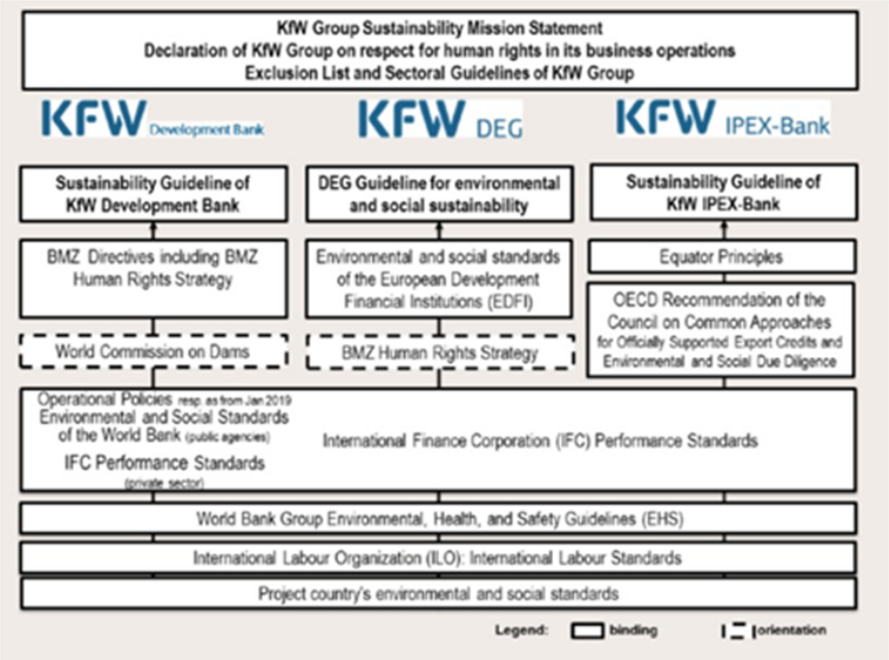
Box 2 Agreement between SBI and KfW on energy-efficient housing

In December 2019, the State Bank of India (SBI) signed an agreement of USD 277 million to establish an energy efficient buildings programme that will be a part of Indo-German Development Cooperation which is guided by the 2030 Agenda for Sustainable Development.

Under the programme, the builders and the home buyers will be financed to develop and purchase energy-efficient building projects that achieve at least 25% energy savings in comparison to standard reference buildings. It will also invest a grant of 10 million euros to provide for incentivizing builders to develop housing projects that achieve significantly higher levels of energy savings vis-a-vis standard reference buildings, which is at least 40% savings. In addition to the loan and grant facility, KfW will provide a grant of EUR 1.5 million to SBI to be used for the preparation, implementation and monitoring of the Programme. The arrangement of the loan and the grant facilities has been facilitated by SBI's investment banking subsidiary SBI Capital Markets Ltd. SBI has confirmed that USD 73 Million as credit line of KfW can be linked to relevant activities related to the UNDP/GEF proposal (see co-financing letters, Annex L)

Compliance of building pilots with environmental and social safeguards

It should be noted that GEF resources are not planned to be used as investment support to building construction of equipment acquisition. GEF resources will be used only to support the design, feasibility analysis, audits, design and results monitoring for energy efficient thermal comfort interventions. For investment support, both builders and home buyers are expected to apply for financial support available from the KfW credit line for developing/purchasing energy-efficient residential projects that achieve at least 25% energy savings in comparison to standard reference buildings. As a general rule, KfW bases the project assessment on the regulations that apply in the country in which the project is to be implemented. These regulations must be consistent with international environmental, social, health, safety and labour standards. These include the standards set by the EU and leading OECD countries, the Performance Standards of the International Finance Corporation (IFC) and the Environmental, Health and Safety (EHS) Guidelines of the World Bank Group. ESIAs (environmental and social impact assessments are an integral component of project and programme appraisals conducted by KfW Group; see also Attachment 2 in the SESP in Annex J). The implementation of these requirements as well as regular monitoring and reviews of implementation of the measures become an integral part of the loan agreement, such as is the case with the agreement between SBI and KfW.



Regarding individual intervention in buildings (new or old) these have to follow national or State-level social and environmental requirements that are referred to in Annexes J and M.4. Per proposed intervention it will be analysed what support the project can provide in social-environmental impact assessment screening and in suggesting accompanying mitigation measures. Annex M.4 gives and overview of requirements regarding the handling of refrigerants and e-waste (air conditioners, etc.) will be an important issue that will also be addressed as part of Activity 3.3 (institutional training and awareness).

2.3.4 *Application of SBI-KfW and other suitable financial de-risking instruments for buildings developers and owners that participate in pilot/demo projects (in residential and commercial sectors)*

? Assess the technical parameters of the SBI-KfW de-risking instruments, including technologies and business models, eligibility requirements (i.e., energy savings - including benchmark tool to be used) and criteria for selection

? In discussion with SBI and other relevant financial institutions, update and maintain standard templates, forms and lists to allow for streamlined investment processes for each consumer group (e.g., commercial, public or residential building complexes) for application to the SBI-KfW credit line. Develop clauses for default risk mechanism in case of a payment default.

? Support pilot/demo proponents in checking project level eligibility under this Program during loan appraisal and verifying the same on completion of the residential building project (for loans as well as investment grant disbursement), including the calculation of eligible amount under the investment loan or grant; and estimation of CO_2 emission reduction and energy savings.

Component 3 Capacity building and knowledge sharing

Outcome	***Outputs***
3. Enhanced capacity at national, sub-national and within the private sector for thermal comfort systems in buildings [for identifying, designing, planning, financing and implementing energy-efficient and environmentally friendly technologies]	3.1 Linkages with accelerator platforms (SE4ALL, SCIP, and Kigali Cooling Efficiency Programme) established [through online access to the knowledge platform to assimilate tools and financing options for government and private sector stakeholders] 3.2 Consumer behavioural induced through awareness campaign for critical stakeholders 3.3 Institutional training established and awareness enhanced for transitioning to ECBC compliance including ESS and gender elements and for the newly adopted Residential Building Codes in all types of buildings as well as on the management of e-waste and recovery and recycling of refrigerants[23][22] 3.4 Targeted and customised training/ new programmes? developed on EE measures/solutions implementation by building types at all levels
	Partners: MoEFCC, BEE, SDAs of 3 states, ULBs; super energy-efficient cooling technology providers, building material suppliers of energy-efficient envelope materials, building developers; training and research institutions

Output 3.1 Linkages with accelerator platforms established [through online access to the knowledge platform to assimilate tools and financing options for government and private sector stakeholders)

In favouring the implementation of efficient cooling technologies and measures in buildings, the project expects to build capacity and confidence of the building owners, staff on energy efficiency measures, thus enabling the scale-up of efficient cooling technologies, as well as the replication of norms on a larger scale. The project would explore collaboration with global energy efficiency Accelerators and others for accessing the tools and knowledge exchanges and experience sharing for further harmonisation during the pilot implementation at the sub-national levels (see Box 10).

Taking guidance from the accelerator platforms, the project envisages developing a knowledge platform that will assimilate tools and financing options for government and private sector stakeholders as well as streamline information and funding opportunities at the national and sub-national levels. The platform will be IT-based and operate under the purview of BEE. BEE would hold all the admin rights of the platform and can add/ update information through an administrative panel.

The knowledge platform will assist in the following:

? *Monitoring:* Function as an observatory to keep track of funding opportunities at the national and sub-national levels for energy-efficient cooling projects under commercial and residential buildings

? *Pilot implementation:* Accessing the tools, knowledge exchanges and experience-sharing through the platform for further harmonisation and implement pilot projects at the sub-national levels.

? *Mobilising function:* Facilitating contacts between project developers and the financing community, on a one-on-one basis through the platform. Assisting project developers in improving their project designs, descriptions and plans to improve their bankability.

? Innovation function: The platform will also promote innovation in the energy efficiency cooling sector and link the technological innovation with global and Indian platforms like Global Cooling Prize, BEE?s award for energy efficiency etc.

? *Data collection and storage:* Develop a repository/ database of all concerned actors and reports/ information on energy-efficient cooling and thermal comfort. Distribute relevant news and announcements to all actors recorded in the database. Facilitate pooling of projects to make them more attractive to financiers/investors.

? *Campaigns and events*: Develop a global campaign like Energy Efficient Cooling week and organize events as part of the campaign to raise awareness on energy-efficient cooling and thermal comfort. Also, enlist all the events in the area of energy efficiency and thermal comfort and create a single hub for registration for these events.

The project will also link with successful national technological innovations and approaches BEE?s energy conservation awards and EESL?s new buildings programme targeting 10,000 large government/private buildings. This will ensure efficient and timely access to information on the implementation of efficient cooling projects targeting buildings in India for the industry, government agencies and others.

Activities:

3.1.1 *Create and exchange knowledge through an online knowledge platform with linkages with international accelerator platforms*

? Identify the various accelerator platforms as per the focus areas, such as SE4ALL, Kigali Cooling Efficiency Programme (K-CEP), Global Cool Coalition, Global Cooling Prize and Global Programme on Sustainable Cities in discussion with BEE;

? Develop a prototype of the knowledge platform that links with these accelerator programme using an IT tool and seek inputs from BEE and other relevant stakeholders on the platform.

? Conduct bilateral consultations with key sector stakeholders? groups that includes Government, technology providers, consultants, industry associations etc., for feedback, inputs and further refinement of the prototype from various aspects.

? Finalization of the platform as per inputs from the stakeholders and deploy it online.

? Exchange knowledge and experience with the Buildings Energy Efficiency Accelerators for harmonization of building codes during pilot implementation at the sub-national level]

? Link successful national technological innovation and approaches (like such as BEE?s energy conservation awards and EESL?s new buildings programme targeting large government/private buildings)

Output 3.2 Consumer behavioural induced through awareness campaign for critical stakeholders

The project will specifically increase capacity, awareness and knowledge of stakeholders across the spectrum: including assimilating existing knowledge in this domain, and targeting an increase in such understanding across consumers, behavioural changes inducements, policymakers, industry players, financiers, and technicians. Enhancing the technical capacity and expertise of government stakeholders, local building practitioners and service providers will be addressed in this component.

In order to create a demand simultaneously, a consumer-focused campaign will be organized to spread awareness on energy-efficient and low-carbon buildings, using passive designs and climate-friendly cooling technologies; and the need for transitioning towards ECBC compliances. This would be further enhanced by researching key messages, and media, to spread such awareness based on controlled experimentation with critical stakeholders.

Institutional training and awareness for transitioning to ECBC compliance and newly adopted Residential building Codes are necessary at a subnational level. The activities under the output would lead to increase knowledge and awareness of stakeholders and enhance technical capacity and expertise of government stakeholders, local building practitioners and service providers. The project will support identifying government champions and raising awareness among critical stakeholders for operationalizing ECBCs. Activities conducted such as workshop cum training programme in the presence of stakeholders, builders, architects and concerned government organizations on thermal comfort, its relationship to energy consumption will assist in bridging the information gap.

Activities:

3.2.1 *Organize consumer-focused campaign to spread awareness on energy-efficient buildings* [and efficient and climate-friendly cooling technologies and the need for transitioning towards ECBC compliances]

? Identify the various consumer-focused awareness campaign and stakeholders that would be part of such awareness programs.

? Develop a detailed city-wise schedule to conduct awareness programs.

? Prepare the inputs for the event (such as presentation, agenda etc.).

? Develop invites for the stakeholders. The project team would then share the invite with the stakeholders and seek confirmation through various modes like email, telephonic call etc.

? Conduct events at the given schedule

3.2.2 *Increase technical and implementation capacity for efficient and climate-friendly cooling technologies through training [for energy auditors, service and installation technicians, policymakers, regulators, public and private agencies]*

? Identify the activities at national/ sub-national/ levels and develop a list of critical stakeholders to participate in the activities.

? Develop a detailed city-wise schedule to conduct awareness programs.

? Prepare the inputs for the event (such as presentation, agenda etc.).

? Develop invites for the stakeholders. The project team would then share the invite with the stakeholders and seek confirmation through various modes like email, telephonic call etc.

? Conduct events at the given schedule

Output 3.3 Institutional training established and awareness enhanced for transitioning to ECBC compliance and for the newly adopted Residential Building Codes as well as on e-waste management and recovery and recycling of refrigerants

[in all types of buildings, including ESS and gender elements]

However, mere awareness programmes have limited impacts and that needs to be supplemented with adequate training and handholding to showcase performance. These could contribute to series of successful case studies that have also not yet been disseminated widely. The capacity development interventions at the national and subnational level comprise identifying, designing, planning, financing and implementing EE actions for operationalizing ECBC and efficiency improvement systems in buildings. This project will address those gaps through increasing technical and implementation capacity enabled through training and new programmes? development for energy auditors, service and installation technicians, policymakers, regulators, public and private agencies to implement and measure energy efficiency norms and technical solutions for different building types at all levels.

Moreover, as the new codes get implemented, institutional training and awareness for implementation of ECBC guidelines, transitioning to ECBC compliance and newly adopted Residential building Codes would be necessitated at a subnational level. This project will address those gaps through increasing technical and implementation capacity enabled through training and new programmes? development for energy auditors, service and installation technicians, policymakers, regulators, public and private agencies to implement and measure energy efficiency norms and technical solutions for different building types at all levels. The above stakeholders will also be apprised with topics related to thermal comfort, super-efficient technologies etc.

Activities:

3.3.1 *Conduct activities such as workshop cum training programme at national/ sub-national/ level for critical stakeholders* (such as builders, architects and concerned government organizations on identifying, designing, planning, financing and implementing EE actions for operationalizing ECBC and efficiency improvement systems in buildings):

? Identify the activities such as workshop cum training programme at national/ sub-national/ level and develop a list of critical stakeholders to participate in the activities.

? Develop a detailed city-wise schedule to conduct awareness programs.

? Prepare the inputs for the event (such as presentation, agenda etc.).

? Develop invites for the stakeholders. The project team would then share the invite with the stakeholders and seek confirmation through various modes like email, telephonic call etc.

? Conduct events at the given schedule

3.3.2 *Increase technical and implementation capacity for transitioning to ECBC compliance and newly adopted Residential building Codes as well as on e-waste management and recovery and recycling of refrigerants through training* [for energy auditors, service and installation technicians, policymakers, regulators, public and private agencies]

? Identify the activities at national/ sub-national/ levels and develop a list of critical stakeholders to participate in the activities.

? Develop a detailed city-wise schedule to conduct awareness programs.

? Prepare the inputs for the event (such as presentation, agenda etc.).

? Develop invites for the stakeholders. The project team would then share the invite with the stakeholders and seek confirmation through various modes like email, telephonic call etc.

? Conduct events at the given schedule

Output 3.4 Targeted and customised trainings/ new programmes? developed in EE measures/solutions implementation by building types at all levels [for energy auditors, policymakers, regulators, public and private agencies]

In delivering this output, technical support will be provided to manufacturers, vendors, importers, new entrepreneurs, building owners etc. to upgrade the design, testing and technical characteristics of EE equipment and products, to local entrepreneurs to replicate and produce EE technologies locally and

reduce the costs of production. Manufacturers of equipment will receive further guidance regarding the design, production and testing of energy-efficient equipment.

Within the country, there are very few technical experts and consultants providing building energy efficiency related services which lead to hiring international consultants. Thus, Component 3 aims to enhance technical expertise by building from the actions deployed under the Montreal Protocol for training technicians on RAC servicing systems. While India?s HPMP programme is targeting the re-training of certain servicing sector technicians, it does not take into account the energy efficiency spectrum and is solely focussed on creating capacity on refrigerants (as technologies pose one or more safety-related issues due to sensitive parameters like high toxicity and high flammability, especially for end-users.). Even programmes for standards and testing equipment for energy-saving features of building materials and equipment are not in place.

Additionally, upstream training/capacities to architects and engineers on environmentally friendly cooling technologies, eco-design of equipment and buildings and cooling load impacts are weak or inexistent. Thus, activities like providing technical support to upgrade design, testing and technical characteristics of EE equipment?s and products, as well as for building envelope will be included. In these training sessions it would be ensured that high representation (at least 20-30% women participants) and active role participation of women is maintained, and the training materials and contents developed in form on written text as well as the development of audio and visual content with inclusive languages and appropriate illustrations highlighting balanced gender perspectives. A requirement for raising awareness and developing technical expertise, building in-country technical capacity for dealing with super-efficient technologies and thermal comfort concepts is necessary.

Activities:

3.4.1 *Provide technical support and expertise to:*

? To manufacturers, vendors, importers, new entrepreneurs, building owners etc]. to upgrade the design, testing and technical characteristics of EE equipment and products [to local entrepreneurs to replicate and produce EE technologies locally and reduce the costs of production]

? Service technicians by building their capacity on RAC servicing systems taking into account the refrigerants as well as EE spectrum, HVAC systems, super-efficient technologies, IoT etc. for the above-mentioned stakeholders. The technicians will be a mix of male and female to increase women empowerment

? Architects to upgrade building envelope designs and use environmentally friendly products and materials

4) alignment with GEF focal area and/or impact program strategies;

The project falls within the GEF-7 objective of ?Promote innovation and technology transfer for sustainable energy breakthroughs? of the Climate Change Focal Area Investments and Associated Programming, in particular its ?Entry Point? # 4, ?Accelerating energy efficiency adoption?.

Cooling is directly linked with the Montreal Protocol on Substances that Deplete the Ozone Layer through the refrigerants used in RAC equipment. Presently, the HCFC Phase-out Management Plan (HPMP) is under implementation and India is phasing out the production and consumption of HCFCs per the Montreal Protocol and the country?s obligations under the Kigali Amendment.

Barriers	**Baseline and project actions**

Barriers	Baseline and project actions
Policy, coordination and regulation barriers Currently, there is a gap between emerging needs under the approved policies and programmes (NBC, ECBC, ICAP, Energy Star Labelling of buildings). The implementation on the ground is very slow and piecemeal; there are varying levels of, policies transposition (notification) and implementation at state and municipal levels. Fragmentation of mandates and suboptimal coordination on building energy efficiency policy actions and regulations hamper the creation of enabling environment for increasing. Buildings? approvals cut across different mandates of different institutions and at national/subnational or local levels. Mandates are different for MoUHD and BEE at the national level, and SDA and ULBs at the sub-national level, thereby leading to ineffective coordinated efforts towards building energy efficiency and uptake of low carbon cooling solutions for enhanced thermal comfort. While ICAP has put forward thermal comfort principles and access to cooling for all across India, recommendations made as part of the recently launched ICAP have not been yet integrated with the existing building energy efficiency codes. Hence, a government-harmonized code/standard for different climate zones along with the necessary data reporting framework.	**Baseline action** Various programmes address energy efficiency in buildings, such as NBC, ECBC, ICAP, Energy Star Labelling of buildings. The India Cooling Action Plan (ICAP) is among the first documents that address the demand for cooling using a holistic lens of energy efficiency both through technology development (such as low GWP refrigerant-based technologies) and the adoption of buildings codes. BEE is already taking efforts for ECBC adoption in states for commercial and residential buildings. The BEE ?five-star? rating is applicable to office spaces, hospitals, business process outsourcing (BPO) buildings, and shopping malls and soon will be extended to data centres and hotels. The Building Energy Passport (BEP) has been developed by BEE to be used for compliance checking during building design, construction and operation stages. However, the development of BEP ended in 2018 and the BEP tool has remained non-functional.

Barriers	Baseline and project actions
GEF-additional intervention (Outcome 1): **Energy conservation building codes (ECBC) harmonized with India** *Cooling Action Plan (ICAP), National Building Code (NBC), Model Building By-laws at pan-India and State level* The implementation of activities under Outcome 1 will enable the development and implementation of harmonized guidelines catering to objectives of ECBC, Eco Niwas Samhita (part 1), Star labelling of buildings, NBC, and ICAP recommendations. with the intent of integrated policy actions of ECBC and ICAP. The harmonized guidelines will tackle energy efficiency and cooling demand, cooling technologies and people?s thermal comfort simultaneously in new and existing buildings. The policy directions shall strengthen the institutional arrangements in terms of inter-ministerial coordination and collaboration with common mandates of implementing agencies at the national and sub-national levels. States (focussing on Uttar Pradesh, West Bengal, Telangana) will be provided with modules and guidelines for developing and implementing the harmonised building energy-efficiency programs and policies in an integrated and coordinated manner. The guidelines will inform the development of a digital framework for reporting thermal comfort parameters in existing buildings based on recommendations of NBC 2016. This will require changes in the existing energy management information system (EMIS), which also needs to be updated. The guidelines should inform the development of a digital framework for reporting thermal comfort parameters in existing buildings based on recommendations of NBC 2016. This will require changes in the existing energy management information system (EMIS), which also needs to be updated.	

Barriers	Baseline and project actions
Market acceleration and development barriers Slow penetration of EE technologies and low private sector investments due to lack of enabling environment, access to new technologies, pricing, supply chain, and of financing as well as limited business models at scale. This is related to a lack of local manufacturing and appropriate support system and the high upfront cost of super-efficient technologies for thermal comfort in comparison with conventional alternatives (these are related: the local supply chain for technologies, applications and services are still at nascent stages. Many equipment and materials are imported with high-cost mark-ups and duties imposed. There is generally a lack of innovative financing approaches and schemes tailored to promote EE in buildings. The need for evidence-based approaches to scale up is lacking as most of the energy efficiency measures are implemented in isolation. There is a need to demonstrate pilots to increase uptake of (alternative and conventional) low-carbon cooling technologies	**Baseline actions** Energy Efficiency Services Limited (EESL) is an energy service company (ESCO) of the Government of India and is the world's largest public ESCO and has implemented a number of programmes on energy-efficient lighting, efficient air-conditioning and the Building Energy Efficiency Programme (BEEP). BEE has partnerships with bilateral and multilateral agencies. The BEE-UNIDO Facility for Low-Carbon Technology Development (FLCTD) is a GEF-supported programme that aims to promote innovation of low-carbon technologies and their deployment. Other examples are cooperation with GIZ on Indo German Energy Programme (IGEN) and the Energy Efficiency in Residential Building (EERB) programme, and with USAID under Market Integration and Transformation for Energy Efficiency (MAITREE) Programme .

Barriers	Baseline and project actions
GEF-additional intervention (Outcome 2): *Enhanced investments and deployment of super-energy-efficient technologies and thermal comfort interventions in buildings; Enhanced evidence for investment in energy-efficient technologies and thermal comfort in buildings* Carrying out super-efficient investments is a capital-intensive activity, which could pose a major challenge for the manufacturers. This also increases the procurement cost of the ACs for the consumers. The project will identify responses to the challenges that need to be addressed across the building sector and HVAC sector supply chains to enable a market transformation towards efficient cooling and enabling thermal comfort within commercial and residential buildings. The study would lead to a de-risking investment framework with recommended de-risking mechanisms that will be established to tackle challenges and encourage investments towards both building norms? adoption, as well as technology diffusion. The project interventions will focus on identifying suitable business and financing models. Low carbon cooling technologies have been present in the Indian market for at least a decade, but not all are being applied in the market on a wide scale The Pilots in the Project will be demonstrated based on the following classification of cooling technologies: a. Established technologies with medium adoption; b. Innovative and established technologies with low adoption, c. Futuristic technologies to target the next level of interventions. These will be demonstrated in 52 existing and 3 new buildings of various types (office buildings, hotels, large retail and residential complexes) in Kolkata (West Bengal), Lucknow (Uttar Pradesh), and Hyderabad (Telangana).	
Systemic Capacity, knowledge and information barriers Alternative technologies and ?not-in-kind?, such as thermal energy storage, trigeneration and district cooling are available but are not widely adopted in India not readily available off-the-shelf. Most office spaces operate at 22.5?C (? 1?C) being well below the comfort range specified even by the 2016 National Building Code, which recommends India-specific thermal comfort guidelines with higher temperatures. Public awareness of appropriate room temperature setting is low. Often occupants put the air con at too low temperatures. ack of capacity in using refrigerant alternatives integrated with energy-efficient buildings and equipment in an integrated manner among different stakeholders. There are few technical experts and consultants providing building energy efficiency related services and hiring international consultants is cost-prohibitive. Successful case studies need to be disseminated widely. Awareness creating needs to be supplemented with adequate training and access to markets.	**Baseline actions** India has already implemented and successfully achieved the targets under the HCFC Phase-out management plan (HPMP), Stage I, implemented for a period of four years from 2012 to 2015 to achieve 10% phase-out targets of HCFCs by 2015 (see Box 9). The HPMP Stage-I for the room air-conditioning sector also focused on the technicians training, institutional strengthening, reclamation centres, and monitoring and evaluation. However, the HPMP programme does not take into account the energy efficiency spectrum and is mainly focused on creating capacity for refrigerants.

Barriers	Baseline and project actions
GEF-additional interventions (Outcome 3): *Enhanced capacity at national, sub-national and within the private sector for identifying, designing, planning, financing and implementing efficiency improvement and thermal comfort systems in buildings* A consumer-focused campaign is planned to be organized to spread awareness on energy-efficient buildings, efficient and climate-friendly cooling technologies; and the need for transitioning towards ECBC compliances. There is a need to increase capacity, awareness, and knowledge of stakeholders, including assimilating existing knowledge of energy-efficient technologies and thermal comfort. This is required across the spectrum of stakeholders including policymakers, industry players, financiers, architects, technicians and consumers. This will be done by various mediums like workshops, training, focused group discussions etc. and using the latest and innovative mediums like social media, print and digital media, roadshows etc. Tailored technical support will be provided to manufacturers, vendors, importers, new entrepreneurs, building owners, to upgrade the design, testing and technical characteristics of EE equipment and products, and to indigenous entrepreneurs to replicate and produce EE technologies locally and reduce the costs of production. A knowledge platform will act as a podium for assessing the financial/ funding opportunities between the government and private sector and streamline information and funding opportunities at the national and sub-national levels. The portal can also bridge the gaps in accessing the tools and knowledge exchanges and experience sharing for further harmonisation during the pilot implementation at the sub-national levels.	

5) incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, and co-financing;

The transition to an economy with increased access to thermal comfort as with the use of high-efficiency, low-carbon cooling technologies, is faced with substantial challenges and barriers. The three project components are thus designed to address in an integrated and transformative mode the gaps and challenges, in (A) policy and regulations; (B) market acceleration; and (C) knowledge management and capacities, building on what has been achieved up to now (baseline interventions).

6) global environmental benefits (GEFTF)

Regarding, global environmental benefits, these are estimated in great detail and presented in Annex F of the UNDP Project Document:

? *Direct emission reduction* is 671 kilotons of CO_2 ($ktCO_2$)

The Project will support through technical assistance and advice about demonstrating super-efficient room ACs and chillers together with a higher temperature setting for thermal comfort in new buildings or retrofit in existing (and by incorporating energy-saving passive design elements in new buildings) in 52 new and 3 existing buildings (including 11 office buildings, 10 hospitality, 10 large retail, 10 hospital and 11 residential building complexes)[24][23]. The model buildings will be identified in three cities that are located in states with different climatic zones, namely Lucknow (Uttar Pradesh), Hyderabad (Telangana), and Kolkata (West Bengal).. The three cities are also selected based on the variations in the progress achieved in the context of ECBC implementation in the respective states to which these cities belong.

? *Post-project direct emission reduction* associated is 2,014 $ktCO_2$

The post-project direct emission reduction is linked with the KfW co-financing amount of USD 83 million[1]. Some of the finance is linked with the 55 buildings that are supported by the UNDP/GEF project as pilots/demos (of which the energy and climate-relevant investments in energy-efficiency measures will require an investment of USD 16.39 million). This implies that the remainder (of the already committed co-financing) can be made available for post-project reduction. Thus, the amount of USD 45.43 million is available for similar emission reduction efforts, resulting in an emission reduction estimated (calculated proportionally).

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[1] The project expects to leverage 83 mln$ by means of project activities targeted towards innovative thermal comfort solutions out of the KfW loan of 277 mln$ for energy efficiency in buildings

? Indirect emission reductions after the project?s end) are estimated at 8,055 $ktCO_2$

These are the consequence of the Project?s capacity buildings, institutional strengthening and awareness creation activities and have been calculated *top-down* by starting with the analysis of the alternative and business-as-usual scenarios on which India?s Cooling Action Plan (ICAP) is based. The realization thereof will be influenced by the Project?s activities. Assuming a causality factor of 20%, the top-down indirect emission reduction estimate is 301 $MtCO_2$. The indirect (*bottom-up*) approach assumes a replication as a result of the Project?s demonstration, capacity building and awareness-raising efforts. Applying a replication factor (RF) = 3, the indirect emission reduction is 8,055 $ktCO_2$.

GHG emission targets	**PIF GHG targets**
Total direct emission reduction - Direct GHG: 670 $ktCO_2$ - Post-project: 3,340 Indirect GHG emission reduction: - Bottom-up: 11,700 - Top-down: -----	Total direct emission reduction- - Direct GHG: 671 $ktCO_2$ - Post-project: 2,014 $ktCO_2$ Indirect GHG ER: - Bottom-up: 8,055 - Top-down: 300,961

Note on difference between CEO ER and GHG emissions at PIF stage.

The direct GHG emission reduction, as given in the project documentation in both cases is 670 ktCO2 Investment in EE and new buildings, out of total co-financing of USD 83 million, is USD 19 million (for 3 new and 135 existing buildings, which is an estimated USD 315,000 per building on average for existing and USD 727,750 for new buildings). This leaves USD 64 million for investment that leads to post-project emission reduction. However, we assume that relatively more new buildings will participate (30 new and 135 existing) in post-project ER. You are able to do more EE interventions in new buildings than in retrofits but these also come at a higher initial cost (USD 52,000 per ktCO2 for new in comparison with USD 26,000 per existing building). Hence, fort the same USD 64 million you may get less GHG emission reduction (as was estimated in PIF) but this is compensated by demonstrating effect of newer EE interventions that will have a wider longer-term mpact if only EE was demonstrated in existing buildings.

7) innovativeness, sustainability and potential for scaling up. ?

This project is designed to ensure innovation, sustainability and potential scale-up. The harmonization of existing building codes to reflect cooling action plan recommendations and offering thermal comfort in buildings would be a first-of-its-kind effort of policy coordination. The harmonized codes that will be supplemented through stakeholder engagement across government agencies would be part of a coherent policy guideline. Hence, these are expected to ensure its sustainability and encourage the potential of this code to be applied across the country. Moreover, the implementation of these codes will be measured through the use of building passports and energy management systems to ensure the viability and long-term sustainability of such interventions.

Improving the energy efficiency of buildings will be a focal driver which is one of the main objectives of this project intervention. Harmonizing the implementation strategies for energy efficiency with the India Cooling Action Plan by the two-pronged approach described earlier in this project will slowly drive the replacement of existing less efficient room air conditioning units available on the market today. Identifying and assisting in the adoption of these super-efficient technologies will accomplish the broad objective of the India Cooling Action Plan while establishing compliance mechanisms that will enforce the ECBC standards across the country. Thus, the project will provide multiple benefits of improved energy efficiency aligned to the baseline actions formed by the Montreal Protocol activities and the country?s obligations under the Kigali Amendment.

Since it is well established that the demand for refrigerant and energy use is only going to increase mostly from the building sector, targeting this sector becomes obvious for reducing energy demand along with EE measures. This project will make a significant change in the existing use of inefficient technologies for air conditioning, in the commercial and residential sectors. It will also identify those structural barriers that limit the potential for establishing an innovation-friendly, market approach for

the adoption of efficient technologies for end-user. Project interventions targeted during this early stage will help India to leapfrog to less efficient cooling systems. The project will test harmonized codes along with these new and/or alternative technologies in existing and new buildings across different climatic zones in India. This is again designed as a key intervention of this project to ensure that such findings of innovations in the efficient cooling and building materials segments can be highlighted publicly. These pilot projects will also showcase innovative business models. The entire premise of this market transformation component is to encourage a scale-up across the country. Moreover, the demonstration of new technologies and business innovations across building types, and climatic zones is to ensure sustainability.

Finally, the aim of the component on capacity building and awareness-raising is to ensure that all the policy, regulatory, technology, and financial interventions of this project can be sustained, maintained, and scaled up beyond the project dates. Moreover, the creation of a portal to assist companies and others in accessing finance will also assist in sustaining and encouraging the scaling up of technical interventions around the country.

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[1] IEA 2018, Link: https://cstep.medium.com/cooling-india-38b84b6269e7

[2] There are other advanced technologies which are in various stages of development that require pilot demonstrations post which commercialization of such technologies can happen. Some of these technologies are but not limited to: ?Magnetic Refrigeration?, ?Cryptocoolers?, ?Solar thermal collector integrated cooling?, ?Smart Muscle? cooling.

[3] Radhika Khosla & Kathryn B. Janda (2019) *India?s building stock: towards energy and climate change solutions*, in: Building Research & Information, 47:1, 1-7, DOI: 10.1080/09613218.2019.1522482,

[4] https://www.gbpn.org/activities/india

[5] As the proposed project delineates the focuses between the GEF and Montreal Protocol, the reduced warming impact resulting from replacement of the conventional, high GWP refrigerant technologies with alternative cooling technologies with low or zero-ODP and low-GWP refrigerants is *treated as part of the baseline and are not included in the GEF core indicator total for the emission reduction of the Project*

[6] More details are given in section 2.3 of the UNDP ProDoc

[7] The National Building Code of India (2005) defines thermal comfort at temperature ranges of 23?C to 26?C (during summers), and 21?C to 23?C (for winters). This standard is derived from an international standard, created for an average group of people and typically for artificially ventilated spaces, thereby making it largely unsuitable for India. Worse, many consumers, go for the lowest

temperature settings in AC, In fact, in the absence of an India-specific thermal comfort standard, most office spaces tend to operate at 22.5?C (? 1?C) being well below the comfort range specified even by the National Building Code. According to BEE, increasing the room temperature has an energy-saving impact of about 3-5% per centigrade.

[8] Low carbon cooling technologies have been present in the Indian market for at least a decade, offering significant energy and emissions savings, are scalable, attract adopters from multiple sectors and could significantly replace conventional cooling technologies. Such technologies are referenced in the India Cooling Action Plan (ICAP) and include vapour-compression based technologies (such as room air/conditioners, chiller systems, packaged direct expansion and variable refrigerant flow systems), non-refrigerant technologies (such as fans or air coolers) and include not in-kind cooling technologies (such as radiant and structure cooling, heat pumps, evaporative cooling and vapour absorption cooling; see Annex F and Annex M). These are in various stages of market development. Alternate cooling strategies include a) the use of thermal energy storage; b) personalized cooling/conditioning systems; c) trigeneration (combined cooling, heating and power (CCHP) offers an optimal solution for air conditioning and/or refrigeration), and d) district cooling (see Box 11). These alternate technologies are only beginning to penetrate the space cooling segment.

[9] Mechanical or ?active? comfort HVAC systems are responsible for more than 40% of a building?s total energy consumption. Passive building design offers significant potential to reduce peak cooling and heating load by up to 50% of HVAC systems. Passive building design uses natural resources (e.g., sun, wind, microclimate or water) to provide thermal and visual comfort inside the building. Increasing the ability of the building envelope to provide thermal comfort can reduce or eliminate the requirement for active thermal comfort systems. These strategies can very well be analysed through building energy modelling and simulation for a given building configuration.

[10] See also section 2.3 of the UNDP ProDoc

[11] The HPMP project is in principle not an energy efficiency project but is listed here for its relation to energy efficiency due to the EE co-benefit of technology conversion of the appliances manufacturing industries

[12] Within this scheme, a standardized format for data collection of the actual energy consumption of the building exists to collect information on built-up area, type of building, conditioned and non-conditioned areas, hours of operation of building in a day, climatic zone, and other information related to facility

[13] Based on the code, ?Energy Efficiency Label for Residential Buildings? was launched in 2019 with to make a transparent instrument over the energy performance of a home which will gradually lead to an effective model influencing decisions regarding home prices in future. It aims to provide a benchmark to compare one house over the other based on energy efficiency standards to create a consumer-driven market transformation solution for energy efficiency in the housing sector.

[14] A detailed discussion on barriers and how the Project envisages to address these barriers is given in sections 2.4 and 3.1 of the UNDP Project Document

[15] The Project will build on the results of the Indo-German Energy Programme supported Eco-Niwas Samhita-ENS (Energy Efficiency Building Code for Residential Building) and Residential Building Energy Efficiency Star label in five states Punjab, Uttar Pradesh, Delhi, Karnataka, Telangana and Maharashtra

[16] NBC 2016

[17] Minimum Energy Performance Standard are regulations that require buildings to meet a minimum performance standard, set in terms of a carbon or energy rating, or minimum renovation measures. These have been implemented in Europe and other countries. See: https://www.raponline.org/knowledge-center/case-studies-minimum-energy-performance-standards-for-european-buildings/

[18] Occupancy hours in buildings when thermal comfort is not met, https://www.iesve.com/support/faq/pdf/unmet-load-hours.pdf

[19] The existing EMIS tool is operational but is only capable of reporting energy performance data for buildings and not thermal comfort or ?Indoor Air Quality? parameters.

[20] New buildings adopting ECBC shall follow the BEP route while for operational buildings EMIS shall be established in the case of pilot projects.

[21] The Indo-German Energy Programme has been working on energy efficient building materials and intends to work on standards and labelling for EE building materials in the next phase. Therefor the project will try to synchronise the efforts of the building material directory for mitigating a rising cooling demand.

[22] Developed by AEEE with support from BEE and UNDP

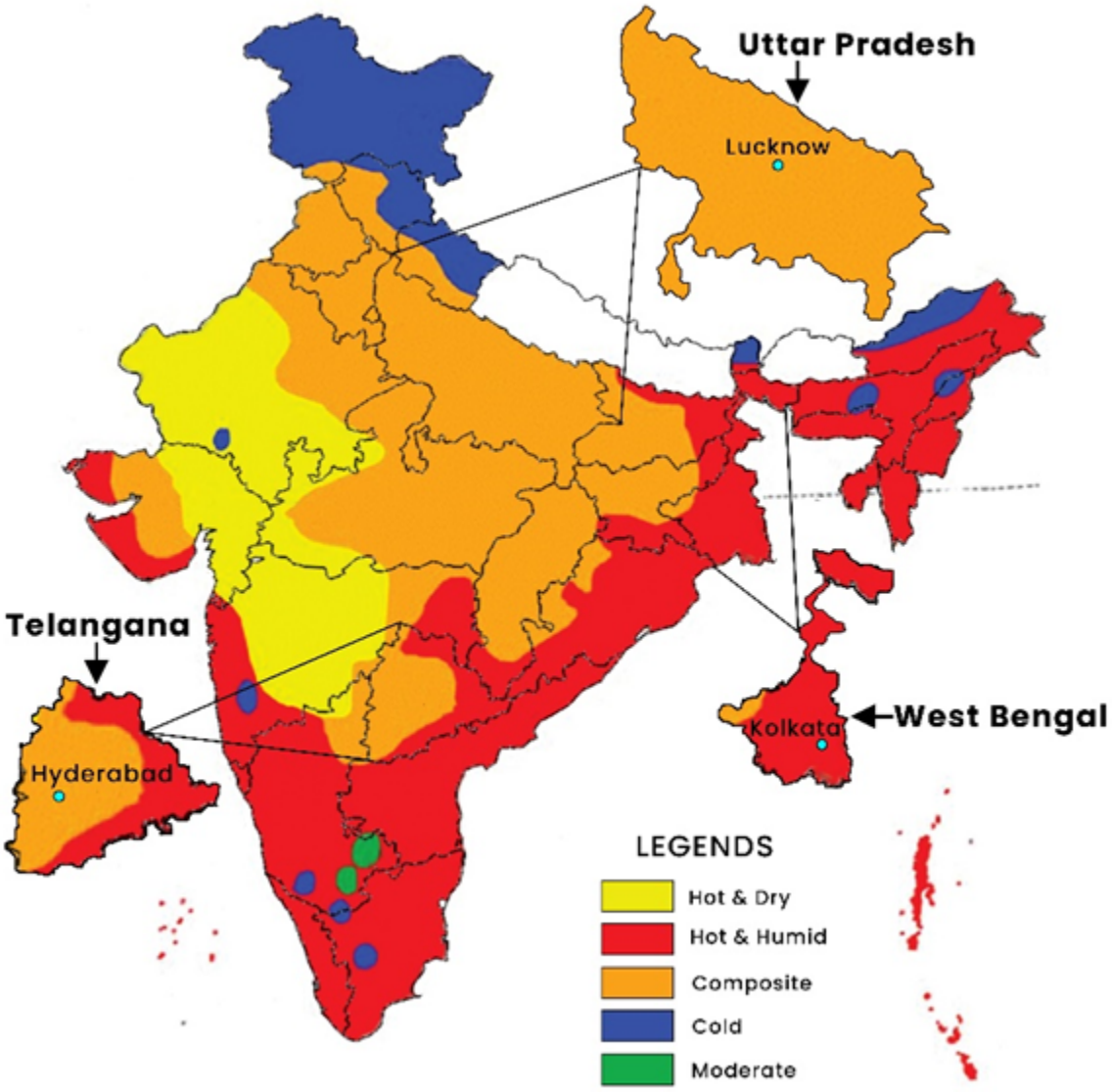
[23] As follow up of the issues and options described in Annex M.4 of this Project Document

[24] Based on the cost of super-EE air-conditioners and chillers (as given in Box 23), the investment cost in low-carbon technologies (chillers, room A/C) in 52 existing buildings is an estimated USD 16.4 million, while the incremental cost of construction of design improvements (due to ECBC+ or SuperECBC compliance or additional passive design improvements) in the three new buildings is an estimated USD 2.2 million. Total investment (EE technology and ECBC compliance) is USD 18.57 million.

1b. Project Map and Coordinates

Please provide geo-referenced information and map where the project interventions will take place.

Please see also Annex E to the CEO ER and ProDoc Annex A for a map and regional information



Hyderabad

DMS Lat	17? 23' 13.7040" N
DMS Long	78? 29' 30.0624" E

Lucknow

DMS Lat	26.8467? N

DMS Long 80.9462? E

1c. Child Project?

If this is a child project under a program, describe how the components contribute to the overall program impact.

N/A

2. Stakeholders

Select the stakeholders that have participated in consultations during the project identification phase:

Civil Society Organizations Yes

Indigenous Peoples and Local Communities

Private Sector Entities Yes

If none of the above, please explain why:

Please provide the Stakeholder Engagement Plan or equivalent assessment.

Annex i. Stakeholder engagement

I.1 Stakeholder engagement plan

Project preparation

During the project preparation (PIF and PPG stage), consultations were held with stakeholders with the objective of informing project design, validating project activities and ensuring interventions are as inclusive as possible, as well as in line with international best practice, the existing relevant national policies, electrification plans and off-grid electrification initiatives.

Project inception and implementation

The project will effectively engage the stakeholders involved in the project to get their support and guide the project implementation to achieve higher results.

? Project outreach proposed includes project website, media (print/audio-visuals), workshops, training, etc.

? The PMU and the Project Board will ensure that the Gender Action Plan recommended by the project is pursued and implemented. The various groups especially women will be engaged during the consultation meetings, prioritized to avail the program, and be included in the different capacity

building programs. The project will also ensure that it is closely coordinated with the UNDP/GEF CBIT Project

? Meetings, monitoring visits, surveys, and written communications will be used to receive feedback to continue the ongoing dialogue as well as during implementation.

? The project will follow a participatory approach in decision making by engaging all the relevant stakeholders. The Government agencies, NGOs, CSOs, and the private sector actors will be actively involved during the project implementation.

The table below presents the Stakeholder Engagement plan and summarizes different categories of stakeholders, which are described in Section 4.3.

Stakeholder group or organization	Roles and responsibilities	Relation to project outcomes
BEE	Local Implementing Partner for the project. Responsible for overall advisory, guidance and approvals on the project.	Government decision-making bodies influence the value chain through enacting building policies for the area (thematic or geographical) they cover. Particular project-related interventions may include: ? Scope of the pilot programme, feedback on baseline requirements for cities ? Barriers in implementing ECBC in states and UTs especially in target cities ? Success stories where ECBC implementation has been achieved at State /UT level ? Establish EE focal points at UDD/ULB level to facilitate the integration of ECBC compliance checks during the building approval process. ? Feedback on identified harmonization points between NBC, ECBC, and ICAP ? Capacity building areas for each of the stakeholders ? Gender representation in decision-making processes
Other ministries (MoEFCC, MoHUA)	Part of Project Steering Committee and advisory and approval role	
State Governments and Municipal Corporations	Involvement at PSC and advisory level with a role in facilitating the implementation of project interventions	

Real estate developers and owners; ESCOs	Pilot Project Partners. The signing of Agreements for undertaking projects on energy efficiency interventions.	Developers play a role in the pilot projects and business model development in general that reflect their concerns. Often, they are concerned with risk and short payback periods, which can reduce energy use to a relatively minor factor in decision-making. Developers will not reap the benefits of the additional investment, as energy cost savings go to the occupant (user) and not to the developer. ESCOs can help work on financial and business models to address the issues
Technology Providers	Provide technology, participate in tendering process and commissioning of EE equipment at the building level.	Technology providers will have expertise in technical aspects of construction, including energy efficiency. They play a key role in business model development and incentives for scaling up the adoption of such technologies in India. They provide super-efficient technologies for thermal comfort, their specifications and market barriers with costs.
Civil society organizations	To be part of Project Advisory Committee. Possible beneficiaries /affected social groups by gender due to project activities.	The role is in participation as an important stakeholder and to provide Inputs on indicators for environmental & social impact and employment statistics across sectors disaggregated by states/cities. CSOs also can represent possible beneficiaries /affected social groups by gender due to project activities
Financial Institutions	Key stakeholder in business model development and operationalization.	Financiers are often concerned with risk and short payback periods, which can reduce energy use to a relatively minor factor in decision-making. From this viewpoint, they provide inputs on possible financing instruments and schemes.
Donors	These are multilateral and bilateral organizations working to promote the adoption of energy efficiency policies & measures in India such as GIZ, USAID, SDC, etc.	Donors? projects programs & platforms will need to be coordinated to avoid duplication. Donors can provide co-financing support as per the need and interest and cooperate on interventions to promote EE interventions in buildings, possible business models.
National Research institutes and universities	To be part of Project Advisory Committee.	To advise on the implementation of project actions from time to time and to provide feedback and play a role in defining and setting up relevant training and course-related activities on low-carbon and EE in buildings

The key indicator for the engagement of each group of stakeholders is their practical involvement in implementation and dissemination.

Responsibilities

The PMU is primarily responsible for carrying out the specified stakeholder engagement activities. The stakeholders will be engaged while carrying out various assessments and studies, training, and workshop events.

Monitoring and reporting

The project stakeholders would be engaged at various levels to carry out the monitoring activities. Then the PMU will liaise with relevant Government agencies and other partners and collect data and monitor the activities regularly. The PMU will report back the results to the stakeholders at the earliest through letters or conduct meetings both individually as well as through engagement of all relevant agencies.

I.2 Communication plan

The Project will also emphasize strong communications with a broader range of stakeholders. Key elements of the project?s communication strategy are outlined in the table below:

Key element	Relevant group	Means
1. Project governance meetings; PSC meetings; Working Group meetings	All stakeholders that are members of the PSC or its Working Groups or are invited to attend	Meetings
2. Seminars/workshops and training events, including the Inception workshop, and final project workshop	National and sub-national government officials Private sector; NGOs and CSOs	Workshop, meeting, seminar, training On-the-job training

3. Project documents, thematic reports and publications; Technical and other reports	Government departments and decision-makers at the national and sub-national level; Development partners Research institutes and academia; individual experts; NGOs	Direct dissemination (e.g., email or hard copy/ USB-drive) Access via the website to reports and documents and database and info systems
4. Project knowledge capturing and info dissemination	Government officials Financial and private sector Development partners; NGOs and CSOs	Online access; Printed materials Media

The budget for workshops, training and information dissemination (printed materials, etc.) is about USD 423,500 (not including consultancy or contracted services which are in separate budget lines).

I.3 Grievance mechanism

Project-level Grievance Redress Mechanism

During the design and implementation of any project, a person or group of people may perceive or experience potential harm, directly or indirectly due to the project activities. The grievances that may arise can be related to social issues such as eligibility criteria and entitlements, disruption of services, temporary or permanent loss of livelihoods and other social and cultural issues. Grievances may also be related to environmental issues such as excessive dust generation, damages to infrastructure due to construction-related vibrations or transportation of raw material, noise, traffic congestions, decrease in quality or quantity of private/ public surface/ ground water resources during irrigation rehabilitation, damage to home gardens and agricultural lands, etc.

Should such a situation arise, there must be a mechanism through which affected parties can resolve such issues in a cordial manner with the project personnel in an efficient, unbiased, transparent, timely and cost-effective manner. To achieve this objective, a Grievance Redress Mechanism will be agreed

upon during the Inception Phase. The design of the Grievance Redress Mechanisms (GRM) will be discussed at the project inception workshop and operationalized prior to the initiation of activities.

The Grievance Redress Mechanism will be designed to:

1. be a legitimate process that allows for trust to be built between stakeholder groups and assures stakeholders that their concerns will be assessed in a fair and transparent manner;
2. allow simple and streamlined access to the Grievance Redress Mechanism for all stakeholders and provide adequate assistance for those that may have faced barriers in the past to be able to raise their concerns;
3. provide clear and known procedures for each stage of the Grievance Redress Mechanism process, and provides clarity on the types of outcomes available to individuals and groups;
4. ensure equitable treatment to all concerned and aggrieved individuals and groups through a consistent, formal approach that is fair, informed and respectful to a concern, complaints and/or grievances;
5. to provide a transparent approach, by keeping any aggrieved individual/group informed of the progress of their complaint, the information that was used when assessing their complaint and information about the mechanisms that will be used to address it; and
6. enable continuous learning and improvements to the Grievance Redress Mechanism. Through continued assessment, the learnings may reduce potential complaints and grievances.

The GRM will be gender- and age-inclusive and responsive and address potential access barriers to women, the elderly, the disabled, youth and other potentially marginalized groups as appropriate to the Project. The GRM will not impede access to judicial or administrative remedies as may be relevant or applicable and will be readily accessible to all stakeholders at no cost and without retribution.

Information about the Grievance Redress Mechanism and how to make a complaint and/or grievance will be communicated during the stakeholder engagement process and placed at prominent places for the information of the key stakeholders.

All complaints and/or grievances regarding social and environmental issues can be received either orally (to the field staff), by phone, in a complaints box or in writing to the UNDP. A key part of the grievance redress mechanism is the requirement for the PMU to maintain a register of complaints and/or grievances received. The following information will be recorded:

a) time, date and nature of enquiry, concern, complaints and/or grievances;

b) type of communication (e.g. telephone, letter, personal contact);

c) name, contact address and contact number;

d) response and review undertaken as a result of the enquiry, concern, complaints and/or grievances; and

e) actions taken with the name of the person taking action.

UNDP SRM and SECU

In addition to the project-level and national grievance redress mechanisms, complainants have the option to access UNDP?s Accountability Mechanism, with both compliance and grievance functions.

The Social and Environmental Compliance Unit investigates allegations that UNDP's Standards, screening procedure or other UNDP social and environmental commitments are not being implemented adequately, and that harm may result to people or the environment. The Social and Environmental Compliance Unit is housed in the Office of Audit and Investigations and managed by a Lead Compliance Officer. A compliance review is available to any community or individual with concerns about the impacts of a UNDP programme or project. The Social and Environmental Compliance Unit is mandated to independently and impartially investigate valid requests from locally impacted people, and to report its findings and recommendations publicly.

The Stakeholder Response Mechanism offers locally affected people an opportunity to work with other stakeholders to resolve concerns, complaints and/or grievances about the social and environmental impacts of a UNDP project. Stakeholder Response Mechanism is intended to supplement the proactive stakeholder engagement that is required of UNDP and its Implementing Partners throughout the project cycle. Communities and individuals may request a Stakeholder Response Mechanism process when they have used standard channels for project management and quality assurance and are not satisfied with the response (in this case the project level grievance redress mechanism). When a valid Stakeholder Response Mechanism request is submitted, UNDP focal points at country, regional and headquarters levels will work with concerned stakeholders and Implementing Partners to address and resolve the concerns. Visit www.undp.org/secu-srm for more details.

In addition, provide a summary on how stakeholders will be consulted in project execution, the means and timing of engagement, how information will be disseminated, and an explanation of any resource requirements throughout the project/program cycle to ensure proper and meaningful stakeholder engagement

The role of Stakeholders is explained in section 4.3 of the Project Document and in its Annex J (Stakeholder engagement plan). An overview of the main stakeholders is given in the table below.

Group/type	Stakeholders	*Role and responsibility* **Relation to project outcomes**
Government, Regulatory bodies etc.	Bureau of Energy Efficiency (BEE), Ministry of Power (MoP)	*BEE is the local Implementing Partner for the project. Responsible for overall advisory, guidance and approvals on the project. Other Ministries and governments of participating States will be involved in the PSC and advisory level (Advisory Committee) with a role in facilitating the implementation of project interventions* *Government decision-making bodies influence the value chain through enacting building policies for the area (thematic or geographical) they cover. Particular project-related interventions may include*: ? Scope of the pilot programme, feedback on baseline requirements for cities ? Barriers in implementing ECBC in states and UTs especially in target cities ? Success stories where ECBC implementation has been achieved at State /UT level ? Establish EE focal points at UDD/ULB level to facilitate the integration of ECBC compliance checks during the building approval process. ? Feedback on identified harmonization points between NBC, ECBC, and ICAP ? Capacity building areas for each of the stakeholders
	Ministry of Environment & Forests and Climate Change (MoEFCC), GoI	
	Ministry of Housing and Urban Affairs (MoHUA)	
	State Governments and Municipal Corporations	
	Ministry of Science & Technology (MoST), Department of Science & Technology	
	State Governments and Municipal Corporations	

Private companies and private-sector associations	Technology providers, Energy Consultants, ECBC Master Trainers, Real Estate developers, HVAC designers, Manufacturers of Cooling technologies, testing laboratories, etc. EESL (super-ESCO) is implementing the Buildings Energy Efficiency Programme (BEEP) to retrofit commercial buildings in India into energy-efficient complexes	*Real estate developers and owners are Pilot Project Partners. The signing of Agreements for undertaking projects on energy efficiency interventions. Technology Providers sell and install technology, participate in tendering process and commissioning of EE equipment at the building level.* ? Developers play a role in the pilot projects and business model development in general that reflect their concerns. Often, they are concerned with risk and short payback periods, which can reduce energy use to a relatively minor factor in decision-making. Developers will not reap the benefits of the additional investment, as energy cost savings go to the occupant (user) and not to the developer. ? ESCOs can help work on financial and business models to address the issues ? Technology providers will have expertise in technical aspects of construction, including energy efficiency. They play a key role in business model development and incentives for scaling up the adoption of such technologies in India and. They provide super-efficient technologies for thermal comfort, their specifications and market barriers with costs.
Civil Society organizations	Research Institutions, Academia, Industrial Associations, NGOs, Social Groups etc.	*To be part of Project Advisory Committee. Possible beneficiaries /affected social groups by gender due to project activities.* ? The role is in participation as an important stakeholder and to provide Inputs on indicators for environmental & social impact and employment statistics across sectors disaggregated by states/cities. CSOs also can represent possible beneficiaries /affected social groups by gender due to project activities ? Research institutes and universities will advise on the implementation of project actions from time to time to provide feedback and play a role in defining and setting up relevant training and course-related activities on low-carbon and EE in buildings
Financial Institutions	Financial institutes, lending institutions, banks (including State Bank of India)	*These are key stakeholders in business model development and operationalization.* ? Financiers are often concerned with risk and short payback periods, which can reduce energy use to a relatively minor factor in decision-making. From this viewpoint, they provide inputs on possible financing instruments and schemes.

Donors	These are multilateral and bilateral organizations working to promote the adoption of energy efficiency policies & measures in India such as GIZ, USAID, SDC, etc.	*Donors? projects programs & platforms will need to be coordinated to avoid duplication. Donors can provide co-financing support as per the need and interest and cooperate on interventions to promote EE interventions in buildings, possible business models*.

Select what role civil society will play in the project:

Consulted only; Yes

Member of Advisory Body; Contractor; Yes

Co-financier;

Member of project steering committee or equivalent decision-making body;

Executor or co-executor;

Other (Please explain)

3. Gender Equality and Women's Empowerment

Provide the gender analysis or equivalent socio-economic assesment.

The Gender Action Plan is provided in Annex H of the UNDP Project Document. With a significant focus on gender equality and inclusion in India, the proposed Project will mainstream gender in the following ways:

At the project activity level:

? Collection, inclusion, and analysis of gender-disaggregated data in all key project activities and stakeholder coverage (project structure and governance, user details, participation in training, supplier and vendors, consultants and so on).

? Integration of gender-sensitive plan in pilot projects, with the engagement of women entrepreneurs, vendors and suppliers and technicians. The pilots will also be designed to be responsive to the need of men and women and particularly safeguard the interest of women, such as their health and wellbeing.

? Gender-responsive revision and/or development of policies with due consideration of the need for enhancing the involvement of women in the sector and perspective of user needs of men and women, across age and social groups in the evolving urban context

? Involvement of women in policymaking and project governance will be facilitated

? Encourage more increased and active participation of women at the planning, designing, and decision-making levels of the project. Involvement of CBOs/ NGOs, women?s associations/ groups, women-led households, women in the energy sector, women in leadership roles to steer the participation across the project components.

? Develop training and awareness-raising materials integrated with gender concerns in energy-efficient thermal cooling (i.e., avoiding gender stereotypes, focusing on gender-specific needs, using inclusive language and using appropriate illustrations)

? Encourage increased and active participation of men and women at the citizen awareness programs on superefficient technologies for sustainable thermal comfort

? Exchange of gender-responsive good practices/knowledge in urban sub-sectors for potential integration with policy/planning and implementation

? Technical reports, documents and awareness-raising materials on need, usage, effects and challenges associated with the project would capture the gender perspectives focusing on how the project impacts the life of men and women and their role in decision making;

At the partner and stakeholder level, the project will follow the following strategies for gender mainstreaming:

? Sensitization of project stakeholders with regards to gender equality. Efforts will be made to promote a balance between male and female participation;

? Stakeholder consultations with partners to identify effective strategies to engage men and women from various ages, social groups and ethnic backgrounds;

? In all the working teams of the Project governance structure, e.g. PSC and PMU, Technical Advisory Committee and its Working Groups, gender balance will be ensured by balancing representation of both male and female participants

Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment?

Yes

Closing gender gaps in access to and control over natural resources;

Improving women's participation and decision making

Generating socio-economic benefits or services or women Yes

Does the project?s results framework or logical framework include gender-sensitive indicators?

Yes

4. Private sector engagement

Elaborate on the private sector's engagement in the project, if any.

The private sector will be closely engaged, including technology providers, energy consultants, real estate developers, designers of HVAC, manufacturers of cooling technologies, commercial testing laboratories, etc.

The following private sector entities will be engaged in a systematic manner throughout the course of this project, a) financiers in the real estate segment; b) technology providers and developers; training agencies; c) and real-estate developers and financiers. These stakeholders will be engaged actively in the demonstration and implementation of building norms, piloting new business models, and efficient cooling systems in commercial and residential real buildings. The objective behind these engagements is to establish the energy savings, investments and financial returns, and address the risk or challenges of implementation for potential scaling up.

The private sector plays an important role in supporting green growth in India. The focus of private sector approaches has been, unsurprisingly, mostly in sectors where there is a clear business case and potential for returns, i.e., renewable energy and to a smaller extent energy efficiency. Efforts are needed to build a stronger evidence base of what works and what does not. There is a general lack of evidence on the extent to which private sector engagement efforts have resulted in wide-ranging environmental impact and results, beyond the mobilization of private investment. The project will demonstrate successful, innovative ways to engage the private sector in promoting energy efficiency for thermal comfort in buildings and scale up such approaches and develop bankable projects through engaging industries/private developers as well as industry associations like CII, FICCI, CREDAI[1]. Private sector representatives (e.g. above-mentioned associations, as well as sectoral associations (constructors and developers; acrhitects, equipmenbt suppliers? associations) will participate in the project?s Technical Advisory Committee.

Last, but not least, most investors/financiers/developers of efficient and green buildings will be private sector entities. These will be the beneficiaries of the projects awaremess and capacity building

activities. The can also take advantage of SBI financial support which is made available through the KfW co-financing).

[1] CII: Confederation of Indian Industries; CREDAI: Confederation of Real Estate Developers' Associations of India; FICCI: Federation of Indian Chambers of Commerce & Industry

5. Risks to Achieving Project Objectives

Elaborate on indicated risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, the proposed measures that address these risks at the time of project implementation.(table format acceptable):

Description	Level	Mitigation Measures
1. Lack of coordination among different agencies	Moderate	The project facilitates effective enforcement of regulations and harmonization of policies for promoting EE among different agencies. The project will follow structured coordination approaches to align the project activities (Components 1 and 3) and evolve strategies for upscaling the successful initiatives with due consultative processes with all concerned stakeholders.
2. Limited interest of the private sector in the project and lack of investment mobilization for demo/pilot buildings	Low	The Indian construction industry is valued at over USD 126 billion. The building sector in Indian is the second-largest employer and contributor to economic activity, after the agriculture sector. Construction accounts for most of the FDI inflow after the services sector and employs more than 35 million people in the country. The pilots proposed (Component 2) will be designed with private partnerships. Since the Indian Infrastructure and Construction Sectors have moved out of their nascent stages with many low hanging opportunities for private developers, there is substantial opportunity to induce private interests for building new technological competence and efficiency. The Project will support proponents with proposal formulation and feasibility analysis.
3. Shifting government priorities	Moderate	The project Components are aligned with the Government of India?s ongoing policy initiatives like the implementation of ECBC 2017, implementation of National Missions under NAPCC and the implementation of IACP and also the phase-out of high GWP gases from the RAC sector.

Description	Level	Mitigation Measures
4. Low level of private sector investments to implement significant technology shifts and to trigger a full market transformation	Substantial	It shall be ensured that the mechanism for financing low-carbon RAC alternatives are showcased and risks, challenges and investments mitigated through the different business models, technology return on investment, and the development of de-risking mechanisms to sustain investments beyond the project. (Component 2). With the Kigali Amendment implementation required in India over the next years, lessons from this project will be showcased as part of its knowledge portal to support companies to further such action when they are mandated to do so as part of India?s transition away from HFCs.
5. Potential risk of adverse impact on the enjoyment of the human rights due to inappropriate selection of the location of pilots and/or pilot designs	Moderate	The project will address the safeguards risk related to the location of pilot buildings by means of including in the design process of the pilot buildings (UNDP?s SES accountability) the environmental and social screening service as part of the technical assistance provided to pilot buildings under Activity 2.3.3. Management of risk as a result of actual construction will be managed through the procedure described in Annex J3 (under development).
6. Potential safety risk of elements to local communities and construction workers due to weaker enforcement of laws and regulations during project construction, operation, or decommissioning, including risks due to the construction of non-ECBC-compliant buildings and potential collapse of buildings	Moderate:	As this risk is related to actual construction works this risk falls under KfWs accountability. Management of risk as a result of actual construction will be managed through the procedure described in Annex J3 (under development).

Description	Level	Mitigation Measures
7. Potential risk due to generation of construction waste (both hazardous and non-hazardous) as well as risk of significant consumption of raw materials, energy, and/or water	Moderate	the project will address the risk of construction waste and consumption of raw materials, energy and water through the technical assistance for pilot project designs (designs to be monitored for waste production and resource consumption) as part of the technical assistance provided to pilot buildings under Activity 2.3.3. Where related to actual construction works, this risk falls under KfWs accountability. Management of risk as a result of actual construction will be managed through the procedure described in Annex J3 (under development).
8. Gender equality concerns in decision-making and employment opportunities	Moderate	The proposed Project will mainstream gender at both project activity level and partner and stakeholder level, as described in section 4.4 of the ProDoc and detailed in the Gender Action Plan (GAP) in Annex I
9. Potential Risks to the Environment & Climate Change	Moderate	Where related to actual construction works, e.g. as part of the disposal of high-GWP refrigerants during building retrofitting this risk falls under KfWs accountability and thus SES consistency is required. Management of risk as a result of actual construction will be managed through the procedure described in Annex J3 (under development).
10. Potential risk of policy development. Policies that are developed with support from the project may not be implemented properly and/or may lead to indirect/ unintended environmental and/or social impacts.	Low	The project is supporting policy development for thermal comfort in buildings. The project activities are thereby emphasizing the aspect of challenges in policy implementation and action plans needed to ensure proper implementation of policies (activities 1.1.1; 1.1.2; 1.1.3; 1.2.1; 1.2.2; 1.3.1; 1.3.2; 1.3.3)

Description	Level	Mitigation Measures
11. Applicable international, national and local norms to prevent the spread of the COVID-19 pandemics,	Moderate	By the time the Project activities start with the Inception, the COVID pandemic may have well passed its peak both in India and worldwide with the largest part of the population vaccinated. Even then, new variants may come up leading to more waves of COVID-19 infections with effects such as quarantine periods and social distancing, leading to a delay in project activity implementation. In such cases, a contingency plan will be made by bringing some activities forward as possible, and with online meetings. The COVID-19 situation will be taken into account in the Project Inception Report and closely monitored. This assessment will both evaluate the possible negative effects of COVID-19 as well as any ?green? opportunities that may arise. Possible longer-term COVID-19 related risks in relation to transport preferences of the public, changes in the priorities of the government (due to shortage of capital financing) and any other limitations cannot be foreseen as of today)

More details on risks are given in Annex D (Risk log register) and Annex J (Social and environmental safeguards planning) of the UNDP Project Document.

Note on COVID and climate risks

The COVID-19 pandemic has demonstrated over the past 2 years to continuously limit social interaction and restrict promotional activities. This situation may hinder proposed project activities, mainly involving public participation such as visits to the demonstration/pilot buildings, exhibitions, and other promotional events. The economic impact of COVID-19 can shift the investment priority of the individual, government, and companies towards preventing uncertainties. Thus, investing in energy-efficient technologies in buildings may not be prioritized by those potential markets.

In addressing the unwanted impact of COVID-19, the proposed project *will need to build an innovative promotional strategy that integrates cooling with health protocols*. When the weather is warm, people want to use a fan or air conditioner to cool their home or apartment. These devices do not introduce fresh outdoor air but only move the indoor air around. If having guests, people should ensure that the devices are not creating an air flow from one person to another. Fresh air from outdoors constantly replaces stale indoor air, which may contain fine particles and humidity. Ventilation also helps to limit the transmission of respiratory infections. There are various ways to ventilate an indoor area: by leaving windows open at a tilt, by opening ventilation grilles or gaps, or by using mechanical ventilation systems. For example, airing out an indoor space is also a form of ventilation, for example, by opening windows and doors across from

each other and leaving them wide open for 10 to 15 minutes. Fresh air from outdoors constantly replaces stale indoor air, which may contain fine particles and humidity. Ventilation also helps to limit the transmission of respiratory infections. When cooling a space, people may be hesitant to open windows as hot air flows that will heat up the cooled space. If no natural fresh air can be put into the space, a mechanical ventilation system might be considered. Regarding air conditioners, it is important to know the percentage of outdoor air supply of the air conditioner (if the recirculation mode cannot be improved or modified, maximizing ventilation by using natural ventilation through opening windows should be considered). The air conditioner should be equipped with so-called HEPA (high-efficiency particulate air) filters, to remove pollutants from the indoor air (that can originate either outside or inside) such as smoke, viruses, powders, etc., It should be noted that the filtered recirculated air does not replace ventilation in any circumstance and good maintenance and cleaning routine need to be applied.

Energy efficiency in buildings and industry is generally ranked high by most studies in terms of delivering economic and environmental benefits. Employment multipliers such as jobs created per million dollars for investment and spending are critical indicators. The IEA (2020) found that based on investment made, energy efficiency in buildings and industry could create between 10-15 jobs per million dollar of investment. For buildings energy efficiency, the jobs created can be as high as 19-32 jobs per million dollar invested in some regions; and use of more efficient and connected household appliances could create 7-16 jobs per million dollar of spending. The project activities being focused on increasing energy efficiency for thermal comfort in buildings in India, can therefore directly contribute to green recovery efforts in India.

Regarding *climate risks*, in general, potential effects of climate change in the building sector are known to consist of high intensity and frequency of cyclone and storms in coastal cities, damage to infrastructure and buildings from extreme weather events, difficulty to access water and natural resources and more specifically, a direct effect of the energy use for heating or cooling and the energy for water. Each state in India is different than the others in terms of landscapes, traditions, effects of climate changes and the challenges or the barriers faced to tackle climate change also differs from place to place and region to region. E.g. the main challenges that Delhi is expected to face are water scarcity, dried up water bodies, the drastic rise in temperature, energy consumption of fossil fuel and electricity resulting in the rise of carbon emissions and issues related to waste management. On the other hand, Mumbai is at the Arabian Sea-coast, thus, issues related to the rise in sea level causing floods in certain areas are directly expected as a consequence of climate change. Mumbai is also facing changes in the rainfall pattern, which becomes the key reason floods, soil erosion and landslides. However, a general impact of climate change affecting the building sector in India is climate-change-induced rise in average summer temperatures, which is expected to result in growth in the demand for air conditioners. While these aspects will be difficult to quantify in the short project timeframe of 4-5 years, these may be taken into account in the design of energy-efficient buildings. In fact, the Project will promote ?super-efficient and thermal comfort solutions? that range from the most efficient conventional (refrigerant and non-refrigerant options) to innovative options that yet have to penetrate the market (not-in-kind technologies) and promote passive building design (see e.g. ProDoc Box 11). The more ?super-efficient? technologies applied, the better prepared for a warmer-than-expected future. The project activities are thereby directly contributing to addressing the impact of climate change in the building sector in India on the medium to long term.

6. Institutional Arrangement and Coordination

Describe the institutional arrangement for project implementation. Elaborate on the planned coordination with other relevant GEF-financed projects and other initiatives.

Section 1: General roles and responsibilities in the projects? governance mechanism

Implementing Partner (or GEF Project Executing Agency): The Project will be implemented under the Full National Implementation Modality (Full NIM). The Implementing Partner for this project is the Bureau of Energy Efficiency (BEE).

The Implementing Partner is the entity to which the UNDP Administrator has entrusted the implementation of UNDP assistance specified in this signed project document along with the assumption of full responsibility and accountability for the effective use of UNDP resources and the delivery of outputs, as set forth in this document.

The Implementing Partner is responsible for executing this project. Specific tasks include:

? Project planning, coordination, management, monitoring, evaluation and reporting. This includes providing all required information and data necessary for timely, comprehensive and evidence-based project reporting, including results and financial data, as necessary. The Implementing Partner will strive to ensure project-level M&E is undertaken by national institutes and is aligned with national systems so that the data used and generated by the project supports national systems.

? Risk management as outlined in this Project Document;

? Procurement of goods and services, including human resources;

? Financial management, including overseeing financial expenditures against project budgets;

? Approving and signing the multiyear work plan and annual work plans (AWPs);

? Approving and signing the combined delivery report at the end of the year; and,

? Signing the financial report or the funding authorization and certificate of expenditures.

Responsible Parties:

No Responsible Parties have been identified during project design.

Project stakeholders and target groups:

An overview of main stakeholders and target groups is given in section 4.3, while Annex I provides details on their involvement in the Project.

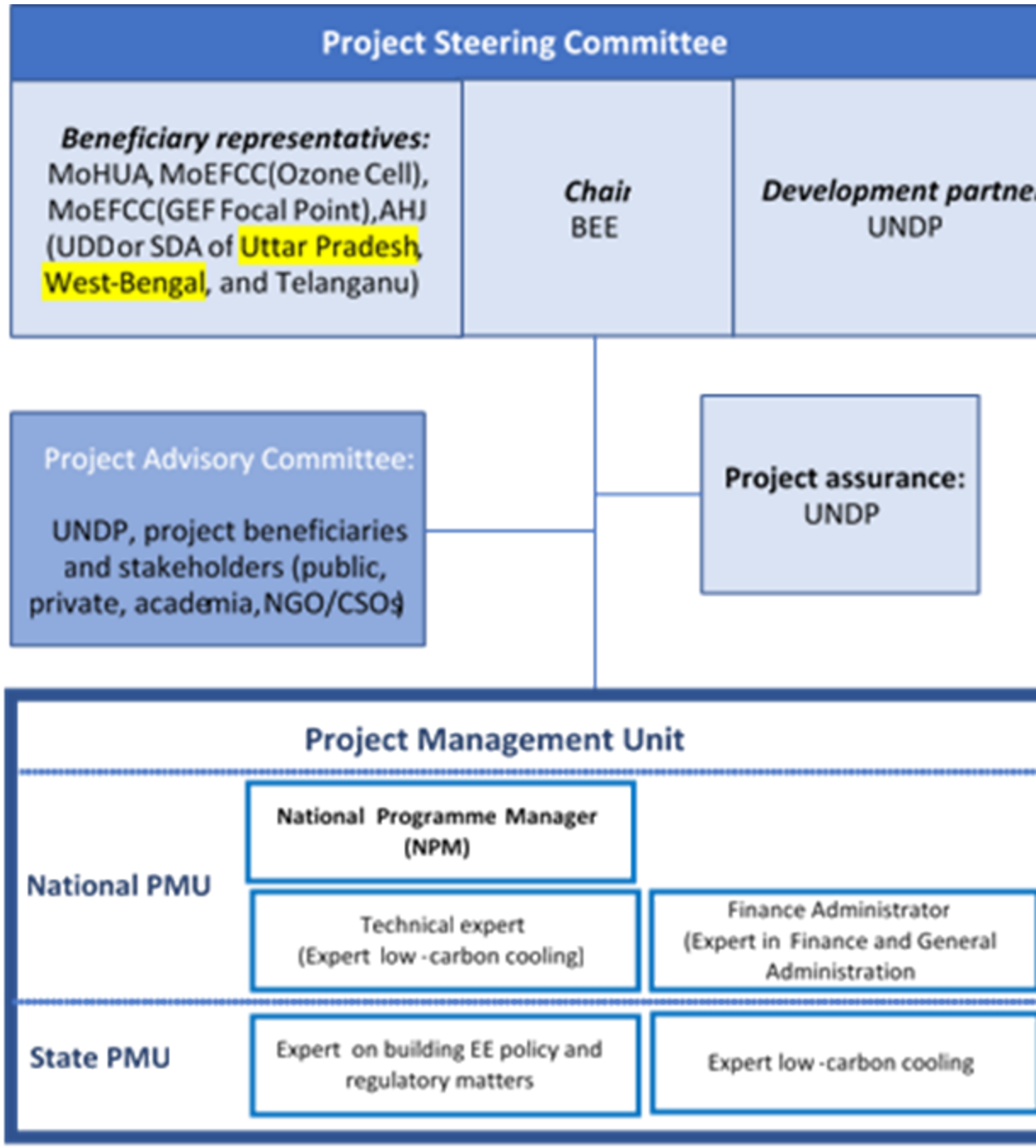
UNDP:

UNDP is accountable to the GEF for the implementation of this project. This includes overseeing project execution undertaken by the Implementing Partner to ensure that the project is being carried out in accordance with UNDP and GEF policies and procedures and the standards and provisions outlined in the Delegation of Authority (DOA) letter for this project. **The UNDP GEF Executive Coordinator, in consultation with UNDP Bureaus and the Implementing Partner, retains the right to revoke the project DOA, suspend or cancel this GEF project.** UNDP is responsible for the Project Assurance function in the project governance structure and presents to the Project Board and attends Project Board meetings as a non-voting member.

Section 2: Project organisation structure

The UNDP Resident Representative assumes full responsibility and accountability for oversight and quality assurance of this Project and ensures its timely implementation in compliance with the GEF-specific requirements and UNDP?s Programme and Operations Policies and Procedures (POPP), its Financial Regulations and Rules and Internal Control Framework. A representative of the UNDP Country Office will assume the assurance role and will present assurance findings to the Project Board, and therefore attends Project Board meetings as a non-voting member.

Box 19 Project organisation structure



Second line of defense

? Regional Bureau oversees RR and Country Office compliance at portfolio level.

? BPPS NCE RTA oversees technical quality assurance and GEF compliance. BPPS NCE PTA oversees RTA function.

? UNDP GEF Executive Coordinator and Regional Bereau Deputy Director can revoke DOA/cancel/suspend project or provide enhanced oversight.

Section 3: Segregation of duties and firewalls vis-?-vis UNDP representation on the project board:

As noted in the Minimum Fiduciary Standards for GEF Partner Agencies, in cases where a GEF Partner Agency (i.e. UNDP) carries out both implementation oversight and execution of a project, the GEF Partner Agency (i.e. UNDP) must separate its project implementation oversight and execution duties, and describe in the relevant project document a: 1) Satisfactory institutional arrangement for the separation of implementation oversight and executing functions in different departments of the GEF Partner Agency; and 2) Clear lines of responsibility, reporting and accountability within the GEF Partner Agency between the project implementation oversight and

execution functions.

In this case, UNDP is only performing an implementation oversight role in the project vis-?-vis our role in the project board and in the project assurance function and therefore a full separation of project implementation oversight and execution duties has been assured.

Section 4: Roles and Responsiblities of the Project Organization Structure:

a) Project Board: All UNDP projects must be governed by a multi-stakeholder board or committee established to review performance based on monitoring and evaluation, and implementation issues to ensure quality delivery of results. The Project Board (also called the Project Steering Committee) is the most senior, dedicated oversight body for a project.

The two main (mandatory) roles of the project board are as follows:

1) **High-level oversight of the execution of the project by the Implementing Partner** (as explained in the ?Provide Oversight? section of the POPP). This is the primary function of the project board and includes annual (and as-needed) assessments of any major risks to the project, and decisions/agreements on any management actions or remedial measures to address them effectively. The Project Board reviews evidence of project performance based on monitoring, evaluation and reporting, including progress reports,

evaluations, risk logs and the combined delivery report. The Project Board is responsible for taking corrective action as needed to ensure the project achieves the desired results.

2) **Approval of strategic project execution decisions of the Implementing Partner** with a view to assess and manage risks, monitor and ensure the overall achievement of projected results and impacts and ensure long term sustainability of project execution decisions of the Implementing Partner (as explained in the ?Manage Change? section of the POPP).

Requirements to serve on the Project Board:

? Agree to the Terms of Reference of the Board and the rules on protocols, quorum and minuting.

? Meet annually; at least once.

? Disclose any conflict of interest in performing the functions of a Project Board member and take all measures to avoid any real or perceived conflicts of interest. This disclosure must be documented and kept on record by UNDP.

? Discharge the functions of the Project Board in accordance with UNDP policies and procedures.

? Ensure highest levels of transparency and ensure Project Board meeting minutes are recorded and shared with project stakeholders.

Responsibilities of the Project Board:

? Consensus decision making:

o The project board provides overall overall guidance and direction to the project, ensuring it remains within any specified constraints, and providing overall oversight of the project implementation.

o Review project performance based on monitoring, evaluation and reporting, including progress reports, risk logs and the combined delivery report;

o The project board is responsible for making management decisions by consensus.

o In order to ensure UNDP?s ultimate accountability, Project Board decisions should be made in accordance with standards that shall ensure management for development results, best value money, fairness, integrity, transparency and effective international competition.

o In case consensus cannot be reached within the Board, the UNDP representative on the board will mediate to find consensus and, if this cannot be found, will take the final decision to ensure project implementation is not unduly delayed.

? Oversee project execution:

o Agree on project manager?s tolerances as required, within the parameters outlined in the project document, and provide direction and advice for exceptional situations when the project manager?s tolerances are exceeded.

o Appraise annual work plans prepared by the Implementing Partner for the Project; review combined delivery reports prior to certification by the implementing partner.

o Address any high-level project issues as raised by the project manager and project assurance;

o Advise on major and minor amendments to the project within the parameters set by UNDP and the donor and refer such proposed major and minor amendments to the UNDP BPPS Nature, Climate and Energy Executive Coordinator (and the GEF, as required by GEF policies);

o Provide high-level direction and recommendations to the project management unit to ensure that the agreed deliverables are produced satisfactorily and according to plans.

o Track and monitor co-financed activities and realisation of co-financing amounts of this project.

o Approve the Inception Report, GEF annual project implementation reports, mid-term review and terminal evaluation reports.

o Ensure commitment of human resources to support project implementation, arbitrating any issues within the project.

? Risk Management:

o Provide guidance on evolving or materialized project risks and agree on possible mitigation and management actions to address specific risks.

o Review and update the project risk register and associated management plans based on the information prepared by the Implementing Partner. This includes risks related that can be directly managed by this project, as well as contextual risks that may affect project delivery or continued UNDP compliance and reputation but are outside of the control of the project. For example, social and environmental risks associated with co-financed activities or activities taking place in the project?s area of influence that have implications for the project.

o Address project-level grievances.

? Coordination:

o Ensure coordination between various donor and government-funded projects and programmes.

o Ensure coordination with various government agencies and their participation in project activities.

Composition of the Project Board: The composition of the Project Board must include individuals assigned to the following three roles:

1. **Project Executive:** This is an individual who represents ownership of the project and chairs (or co-chairs) the Project Board. The Executive usually is the senior national counterpart for nationally implemented projects (typically from the same entity as the Implementing Partner), and it must be UNDP for projects that are direct implementation (DIM). In exceptional cases, two individuals from different entities can co-share this role and/or co-chair the Project Board. If the project executive co-chairs the project board with representatives of another category, it typically does so with a development partner representative. The Project Executive is: *Director General of Bureau of Energy Efficiency*
2. **Beneficiary Representative(s):** Individuals or groups representing the interests of those groups of stakeholders who will ultimately benefit from the project. Their primary function within the board is to ensure the realization of project results from the perspective of project beneficiaries. Often representatives from civil society, industry associations, or other government entities benefiting from the project can fulfil this role. There can be multiple beneficiary representatives in a Project Board. The Beneficiary representative (s) is/are: *MoHUA, MoEFCC (Ozone Cell), MoEFCC (GEF Focal Point), AHJ (UDD or SDA of West Bengal, Uttar Pradesh and Telanganu)*
3. **Development Partner(s):** Individuals or groups representing the interests of the parties concerned that provide funding, strategic guidance and/or technical expertise to the project. The Development Partner(s) is/are: *UNDP Resident Representative or Deputy Resident Representative.*

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b) **Project Assurance:** Project assurance is the responsibility of each project board member; however, UNDP has a distinct assurance role for all UNDP projects in carrying out objective and independent project oversight and monitoring functions. UNDP performs quality assurance and supports the Project Board (and Project Management Unit) by carrying out objective and independent project oversight and monitoring functions, including compliance with the risk management and social and environmental standards of UNDP. The Project Board cannot delegate any of its quality assurance responsibilities to the Project Manager. Project assurance is totally independent of project execution.

A designated representative of UNDP playing the project assurance role is expected to attend all board meetings and support board processes as a non-voting representative. It should be noted that while in certain cases UNDP?s project assurance role across the project may encompass activities happening at several levels (e.g. global, regional), at least one UNDP representative playing that function must, as part of their duties, specifically attend board meeting and provide board members with the required documentation required to perform their duties. The UNDP representative playing the main project assurance function is/are: *Programme manager from Environment Unit, UNDP.*

c) **Project Management ? Execution of the Project:** The Project Manager (PM) (also called project coordinator) is the senior most representative of the Project Management Unit (PMU) and is responsible for the overall day-to-day management of the project on behalf of the Implementing Partner, including the mobilization of all project inputs, supervision over project staff, responsible parties, consultants and sub-contractors. The project manager typically presents key deliverables and documents to the board for their review and approval, including progress reports, annual work plans, adjustments to tolerance levels and risk registers.

A designated representative of the PMU is expected to attend all board meetings and support board processes as a non-voting representative. The primary PMU representative attending board meetings is: *Project Manager*

BEE under the chairmanship of DG-BEE will establish and institutionalize a **Project Advisory Committee (PAC).** The team members will include distinguished stakeholders such as representatives from the Bureau of Energy Efficiency (BEE), UNDP, Energy Efficiency Services Limited (EESL), Ministry of Power (MOP) and Ministry of Housing and Urban Affairs (MoHUA). Other private stakeholders such as associations & NGO?s can be invited by the decision of the PAC on an as-needed basis, however, by taking care that the PAC remains operational by its size. Also, the municipalities and city governments (in particular those were the pilots will take place) will participate in the PAC. The project advisory committee will advise the project team on technical issues and advice on approach selection relevant to accelerating the adoption of super-efficient technologies for sustainable thermal comfort in buildings in India.

7. Consistency with National Priorities

Describe the consistency of the project with national strategies and plans or reports and assesments under relevant conventions from below:

NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc.

The Project is consistent will the following national priorities:

? Harmonizing the implementation strategies for energy efficiency with the *India Cooling Action Plan* by the two-pronged approach described earlier in this project will slowly drive the replacement of existing less efficient room air conditioning units available on the market today. Identifying and assisting in the adoption of these super-efficient technologies will realize the broad objectives of ICAP while establishing compliance mechanisms that will enforce the ECBC standards across the country;

? The purpose of the *Energy Conservation Building Code* (ECBC), launched in 2017, is to provide minimum requirements for the energy-efficient design and construction of new buildings. ECBC focuses on building envelope, mechanical systems and equipment including heating, ventilating, and air conditioning (HVAC) system, interior and exterior lighting systems, electrical system and renewable

energy, and also takes into account the five climate zones (Hot Dry, Warm Humid, Temperate, Composite and Cold) present in India. So far, about 18 States/Union Territories have notified the ECBC;

? *National Communications (NC*) and *Biennial Update Report (BUR)* under UNFCCC: The project will contribute to the policies and measures adopted by India in the mitigation chapter of the latest BUR and NC to reduce the sources of GHGs, and are used to compare and evaluate GHG mitigation policies and measures against the counterfactual situation described in the baseline scenario;

? *Nationally Determined Contribution*s: The project will help the Government to achieve its NDC target. India has committed to reducing its emission intensity of the economy by 33 to 35% by 2030 from 2005 level and buildings alone account for one-third of energy use in India. The project outcomes will support GHG emission reduction in the buildings sector towards zero GWP technologies;

? *UNFCCC Technology Needs Assessment*: This project will highlight the scope and challenges for bridging the gap between the energy efficiency of buildings and the use of low-GWP technologies for cooling. Lessons and experiences from this project can be further enhanced through technology needs assessment and scale-up of efficient cooling technologies in buildings.

8. Knowledge Management

Elaborate the "Knowledge Management Approach" for the project, including a budget, key deliverables and a timeline, and explain how it will contribute to the project's overall impact.

The project will effectively engage the stakeholders involved in the project to get their support and guide the project implementation to achieve higher results.

? Project outreach proposed includes project website, media (print/audio visual), workshops, trainings, etc.

? The PMU and the Project Board will ensure that the Gender Action Plan recommended by the project is pursued and implemented. The various groups especially women will be engaged during the consultation meetings, prioritized to avail the program, and be included in the different capacity building programs. The project will also ensure that it is closely coordinated with other initiatives supported by development partners on electric mobility

? Meetings, monitoring visits, surveys, and written communications will be used to receive feedback to continue the ongoing dialogue as well as during implementation.

? The project will follow a participatory approach in decision making by engaging all the relevant stakeholders. The Government agencies, NGOs, CSOs, and the private sector actors will be actively involved during the project implementation.

The Project will also emphasize strong communications with a broader range of stakeholders. Key elements of the project?s communication strategy are outlined in the table below:

Key element	Relevant group	Means	Timeframe
1. Project governance meetings; PSC meetings; Advisory Committee meetings	All stakeholders that are members of the PSC or its Working Groups or are invited to attend	Meetings	Periodically, depending on PSC and PAC frequency of meetings
2. Seminars/workshops and training events, including the Inception workshop, and final project workshop	National and sub-national government officials Private sector; NGOs and CSOs	Workshop, meeting, seminar, training On-the-job training	Typically, workshops will be held to start up an activity and/or at the end to present results. The timeline of each activity is given in Annex B of the UNDP ProDoc
3. Project review/evaluation reports Technical and other reports	Government departments and decision-makers at the national and sub-national level; Development partners Research institutes and academia; individual experts; NGOs	Direct dissemination (e.g., email or hard copy/ USB-drive) Access via the website to reports and documents and database and info systems	Technical reports will typically be published at the end of an assignment (see Annex B of the ProDoc).
4. Project knowledge capturing and info dissemination; thematic reports	Government officials Financial and private sector Development partners; NGOs and CSOs	Online access; Printed materials Media	Thematic reports and knowledge products are published at the end of one or more outputs to provide a summary of findings, results, lessons learnt

The budget for workshops, training and information dissemination (printed materials, etc.) is about USD 423,500 (not including consultancy or contracted services which are in separate budget lines).

Knowledge Product	**Time of issuance**
Action plan for implementation of harmonized thermal comfort guidelines (Output 1.1)	Year 1

Knowledge Product	Time of issuance
Demonstration of EMIS implementation in states	Year 3
Database of suitable building energy efficiency technologies and cooling in residential & commercial buildings; (Output 2.1)	Year 2
Online knowledge platform (with linkages with international accelerator platforms) (Output 3.1)	Year 4
Consumer-focused campaign to spread awareness on energy-efficient buildings (Output 3.2)	Year 4
Project website with interactive features on project results	Year 1
Videos of Project activities as a media tool for disseminating information on the project	Year 2
Lessons learned study that can be shared with other countries	Year 5

9. Monitoring and Evaluation

Describe the budgeted M and E plan

The project results, corresponding indicators, and mid-term and end-of-project targets in the project results framework will be monitored annually and evaluated periodically during project implementation. If baseline data for some of the results indicators are not yet available, it will be collected during the first year of project implementation. The Monitoring Plan (Annex C) includes details of the roles, responsibilities, and frequency of monitoring project results.

Project-level monitoring and evaluation will be undertaken in compliance with UNDP requirements as outlined in the UNDP POPP (including guidance on GEF project revisions) and UNDP Evaluation Policy

The UNDP Country Office is responsible for ensuring full compliance with all UNDP project M&E requirements including project monitoring, UNDP quality assurance requirements, quarterly risk management, and evaluation requirements.

Additional mandatory GEF-specific M&E requirements will be undertaken in accordance with the GEF Monitoring Policy and the GEF Evaluation Policy and other relevant GEF policies[1]. The M&E plan and budget included below will guide the GEF-specific M&E activities to be undertaken by this project.

In addition to these mandatory UNDP and GEF M&E requirements, other M&E activities deemed necessary to support project-level adaptive management will be agreed ? including during the Project Inception Workshop - and will be detailed in the Inception Report.

Minimum project monitoring and reporting requirements as required by the GEF:

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Inception Workshop and Report: A project inception workshop will be held within 2 months from the First disbursement date, with the aim to:

1. Familiarize key stakeholders with the detailed project strategy and discuss any changes that may have taken place in the overall context since the project idea was initially conceptualized that may influence its strategy and implementation.
2. Discuss the roles and responsibilities of the project team, including reporting lines, stakeholder engagement strategies and conflict resolution mechanisms.
3. Review the results framework and monitoring plan.
4. Discuss reporting, monitoring and evaluation roles and responsibilities and finalize the M&E budget; identify national/regional institutes to be involved in project-level M&E; discuss the role of the GEF OFP and other stakeholders in project-level M&E.
5. Update and review responsibilities for monitoring project strategies, including the risk log; SESP report, Social and Environmental Management Framework (where relevant) and other safeguard requirements; project grievance mechanisms; gender strategy; knowledge management strategy, and other relevant management strategies.
6. Review financial reporting procedures and budget monitoring and other mandatory requirements and agree on the arrangements for the annual audit.
7. Plan and schedule Project Board meetings and finalize the first-year annual work plan. Finalize the TOR of the Project Board.
8. Formally launch the Project.

GEF Project Implementation Report (PIR The annual GEF PIR covering the reporting period July (previous year) to June (current year) will be completed for each year of project implementation. UNDP will undertake quality assurance of the PIR before submission to the GEF. The PIR submitted to the GEF will be shared with the Project Board. UNDP will conduct a quality review of the PIR, and this quality review and feedback will be used to inform the preparation of the subsequent annual PIR.

GEF Core Indicators:

The GEF Core indicators included as Annex F will be used to monitor global environmental benefits and will be updated for reporting to the GEF prior to MTR and TE. Note that the project team is responsible for updating the indicator status. The updated monitoring data should be shared with MTR/TE consultants prior to required evaluation missions, so these can be used for subsequent groundtruthing. The methodologies to be used in data collection have been defined by the GEF and are available on the GEF website.

Independent Mid-term Review (MTR):

The terms of reference, the review process and the final MTR report will follow the standard UNDP templates and UNDP guidance for GEF-financed projects available on the UNDP Evaluation Resource Center (ERC).

The evaluation will be ?independent, impartial and rigorous?. The evaluators that UNDP will hire to undertake the assignment will be independent from organizations that were involved in designing, executing or advising on the project to be evaluated. Equally, the evaluators should not be in a position where there may be the possibility of future contracts regarding the project under review.

The GEF Operational Focal Point and other stakeholders will be actively involved and consulted during the evaluation process. Additional quality assurance support is available from the BPPS/NCE-VF Directorate.

The final MTR report and MTR TOR will be publicly available in English and will be posted on the UNDP ERC by January 2025. A management response to MTR recommendations will be posted in the ERC within six weeks of the MTR report?s completion.

Terminal Evaluation (TE):

An independent terminal evaluation (TE) will take place upon completion of all major project outputs and activities. The terms of reference, the evaluation process and the final TE report will follow the standard templates and guidance for GEF-financed projects available on the UNDP Evaluation Resource Center. TE should be completed 3 months before the estimated operational closure date, set from the signature of the ProDoc and according to the duration of the project. Provisions should be taken to complete the TE in due time to avoid delay in project closure. Therefore, TE must start no later than 6 months to the expected date of completion of the TE (or 9 months prior to the estimated operational closure date).

The evaluation will be ?independent, impartial and rigorous?. The evaluators that UNDP will hire to undertake the assignment will be independent of organizations that were involved in designing, executing or advising on the project to be evaluated. Equally, the evaluators should not be in a position where there may be the possibility of future contracts regarding the project being evaluated.

The GEF Operational Focal Point and other stakeholders will be actively involved and consulted during the terminal evaluation process. Additional quality assurance support is available from the BPPS/NCE-VF Directorate.

The final TE report and TE TOR will be publicly available in English and posted on the UNDP ERC by April 2027. A management response to the TE recommendations will be posted to the ERC within six weeks of the TE report?s completion.

Final Report:

The project?s terminal GEF PIR along with the terminal evaluation (TE) report and corresponding management response will serve as the final project report package. The final project report package shall be discussed with the Project Board during an end-of-project review meeting to discuss lesson learned and opportunities for scaling up.

Agreement on intellectual property rights and use of logo on the project?s deliverables and disclosure of information**:** To accord proper acknowledgement to the GEF for providing grant funding, the GEF logo will appear together with the UNDP logo on all promotional materials, other written materials like publications developed by the project, and project hardware. Any citation on publications regarding projects funded by the GEF will also accord proper acknowledgement to the GEF. Information will be disclosed in accordance with relevant policies notably the UNDP Disclosure Policy[2] and the GEF policy on public involvement[3].

Monitoring Plan:

The project results, corresponding indicators and mid-term and end-of-project targets in the project results framework will be monitored by the Project Management Unit annually, and will be reported in the GEF PIR every year, and will be evaluated periodically during project implementation. If baseline data for some of the results indicators is not yet available, it will be collected during the first year of project implementation. Project risks, as outlined in the risk register, will be monitored quarterly. A detailed Monitoring Plan table is provided in ProDoc Annex C.

GEF M&E requirements	**Responsible Parties**	**Indicative costs (USD)**	**Time frame**
Inception Workshop and inception report	BEE; National Project Manager (NPM)	Indicative Cost: 12,500	Within 2 months from the First disbursement date
Monitoring of indicators in the project results framework	NPM; Subcontract	Indicative Cost: 44,500	Start, mid and end of the project (during evaluation cycle) and annually when required
GEF Project Implementation Report (PIR)	UNDP RTA ?CO; NPM	Iincluded in PMU Cost	Annually typically between June-August
Monitoring all risks (UNDP risk register)	UNDP CO; NPM	None	On-going.
Supervision and oversight missions	UNDP CO; BPPS/GEF	None[1]	Annually, troubleshooting and oversight as needed
Final project workshop	BEE, UNDP CO	Indicative Cost: 12,500	Before project closure
Independent Mid-Term Review (MTR)	Independent evaluators	Indicative Cost: 27,750	See ProDoc cover page
Independent Terminal Evaluation (TE)	Independent evaluators	Indicative Cost: 27,750	See ProDoc cover page
TOTAL indicative COST[2]	**125,000 (3 % of total budget)**		

[1] The costs of UNDP CO and UNDP-GEF Unit?s participation and time are charged to the GEF Agency Fee.

[2] Excluding project team staff time and UNDP staff and travel expenses

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[1] See https://www.thegef.org/gef/policies_guidelines

[2] See http://www.undp.org/content/undp/en/home/operations/transparency/information_disclosurepolicy/

[3] See https://www.thegef.org/gef/policies_guidelines

10. Benefits

Describe the socioeconomic benefits to be delivered by the project at the national and local levels, as appropriate. How do these benefits translate in supporting the achievement of global environment benefits (GEF Trust Fund) or adaptation benefits (LDCF/SCCF)?

The manufacturing of cooling technology for domestic sales (replacing importation) will boost new employment opportunities. The project includes actions to facilitate access to jobs related to cooling technology, passive building design and other cooling options through training (so that they are skilled in maintenance and repair), a revision of recruitment strategies (more gender-responsive) and taking advantage of the appeal of new and innovative technologies for potential high-skilled workers (e.g., integration with IT and other smart technology).

Beneficiaries of the project are not only building and real estate developers and technology manufacturers and suppliers but the building occupants themselves, as apartment dwellers or workers in an office, hospital, hotel or other commercial buildings by having more thermal comfort at lower operating cost.

The project will endeavour to encourage key players in the urban transport services to incorporate women as employees and in decision-making positions. The project includes actions to facilitate access to energy-efficiency-related jobs through training, and a revision of recruitment strategies, taking advantage of the appeal of advanced technologies for potential workers (so that they are skilled in the design and installation/construction of energy-efficient ventilation and cooling technologies in buildings.

Socioeconomic development and climate change are intricately linked, with social and economic activities determining energy use determining emissions determining climate forcing and climate change determining climate impacts which in turn affect socio-economic developments. For example, the realization of energy-efficient dwellings will have both environmental and socio-economic impacts. If more people live in efficient apartments or work in green buildings, a decrease in local urban pollution and global warming mitigation, while at the same time providing more skilled jobs and employment in the ecosystem (suppliers, government, financiers). Seeing both the direct environmental (cleaner urban

environment) and socioeconomic benefits (new skilled jobs and better services; lower annual energy bills and more thermal comfort) will attract more potential buildings owners and developers to go ?green? and eventually transform the market into self-sustained growth.

11. Environmental and Social Safeguard (ESS) Risks

Provide information on the identified environmental and social risks and potential impacts associated with the project/program based on your organization's ESS systems and procedures

Overall Project/Program Risk Classification *

PIF	CEO Endorsement/Approval	MTR	TE
	Medium/Moderate		

Measures to address identified risks and impacts

Elaborate on the types and risk classifications/ratings of any identified environmental and social risks and impacts (considering the GEF ESS Minimum Standards) and any measures undertaken as well as planned management measures to address these risks during implementation.

The overall risk is moderate. Please see the technical assessment planned and management plan in Annex J on SESP.

Supporting Documents

Upload available ESS supporting documents.

Title	Module	Submitted
Annex J_PIMS 6323_Social and Evironmental Screening Procedure	**CEO Endorsement ESS**	

ANNEX A: PROJECT RESULTS FRAMEWORK (either copy and paste here the framework from the Agency document, or provide reference to the page in the project document where the framework could be found).

The following table shows the results framework of the project (as can also be found in Section 5 of the UNDP Project Document).

This project will contribute to the following Sustainable Development Goal (s): SDG-3: Ensure healthy lives and promote well-being for all at all ages; SDG-7: Ensure access to affordable, reliable, sustainable and modern energy for all; SDG-8: Inclusive and sustainable growth for all, SDG-13: Take urgent action to combat climate change and impacts
This project will contribute to the following country outcome included in the UNPDF/Country Programme Document: **UNSDF outcome 6**. By 2022, environmental and natural resource management is strengthened, and communities have increased access to clean energy and are more resilient to climate change and disaster risks.[1] **Output 3.2:** Effective solutions developed at national and subnational levels for sustainable management of natural resources and ecosystems, ozone-depleting substances, chemicals and wastes; **Output 3.3**: Inclusive and sustainable solutions adopted to achieve increased

	Objective and Outcome Indicators	**Baseline (2020/21)**	**Mid-term project (early 2023)**	**End of Project (EoP) target (end 2024)**
Project Objective: To curb GHG emissions through accelerating the provision of energy-efficient thermal comfort in buildings in India and enable the market transformation of energy-efficient technologies	1) Lifetime direct GHG emissions avoided as a result of super-efficient technologies for sustainable thermal comfort in buildings and indirect emission reduction [GEF Core Indicator]	Zero by definition	One-third of EoP direct emission reduction: 223 $ktCO_2$ (75 $ktCO_2$ in each city)	Direct lifetime emission reduction of 671 $ktCO_2$ (223 $ktCO_2$ for each city), post-project direct emission reduction of 2,594 $ktCO_2$ and indirect emission reduction of 9,797 $ktCO_2$. (see Annex F)
	2) Number of direct project beneficiaries disaggregated by gender [GEF core indicator]	Zero per definition	Direct: 64,000(of which 41% women)	Direct (building dwellers and office workers -3 buildings; training/workshop participants): 192,000 (of which 77,800 women). See Annex F for a qualitative estimate of these figures.

	Objective and Outcome Indicators	Baseline (2020/21)	Mid-term project (early 2023)	End of Project (EoP) target (end 2024)
	3) Volume of investment mobilized and leveraged by GEF for low GHG development (co-financing and additional financing)	Zero per definition	Half of the investment associated with direct CO_2 emission reduction (USD 9 million)	Around USD 83 million of investment by EoP will be mobilized in 220 pilot/demo buildings (of which USD 18.5 million during project implementation (55 buildings) and USD 64 million post-project (165 buildings)
Output Indicators				
Component 1 Enhancing the effectiveness of national policy, regulatory and institutional frameworks for energy efficiency in buildings				
Outcome 1 Energy conservation building codes (ECBC) harmonized with India Cooling Action Plan (ICAP), National Building Code (NBC), Model Building Byelaws at pan-India and state level	4) Status of mechanisms and structures for ECBC/IPAC/IMAC implementation	ECBC code and rules are implemented in Telangana by-laws but not implemented in Uttar Pradesh and West Bengal	Uttar Pradesh and West Bengal well equipped to implement ECBC/ ICAP structure. Telangana well equipped to integrate ICAP actions at the state level	Telangana, Uttar Pradesh and West Bengal implement ECBC/ ICAP mechanism and structure
	5) Status of the roadmap for implementation and enforcement for the adoption of energy management systems (EMIS) for thermal comfort in buildings at national and subnational/municipal levels	No roadmap developed	Draft roadmap formulated and under discussion	Roadmap developed and is in a stage of implementation
	6) Status of M&V procedure implementation	0 cities with MRV system	Framework in development for M&V system for 3 cities	M&V framework developed for all 3 cities and states

	Objective and Outcome Indicators	Baseline (2020/21)	Mid-term project (early 2023)	End of Project (EoP) target (end 2024)
Outputs, Outcome 1	1.1 Improved coordination structures among key Government Agencies in states 1.2 Developed unified framework/guidelines for thermal comfort in buildings based on energy conservation building codes (ECBC), NBC and the India Cooling Action Plan 1.3 A roadmap developed for implementation and enforcement for the adoption of energy management systems (EMIS) for thermal comfort in buildings at national and subnational/municipal levels 1.4 An innovative tool that the Bureau of Energy Efficiency can apply to account for progress on building energy code compliance and adoption of ?Star Labelling? (such as BEP) to be developed along with EMIS (Energy Management Information System) to track building energy performance and thermal comfort parameters. 1.5 Proof of concept for ?Measurement, verification and reporting? procedures in at least one state in each of the climatic zones of India (to enable States' Designated agencies (SDAs) and BEE to monitor overall results of the tools proposed)			
Component 2	**Market acceleration and innovation for super-EE technology deployment/diffusion**			
Outcome 2a Enhanced investments and deployment of super energy-efficient technologies and thermal comfort in buildings	7) Status of assessment of the suitability of EE/thermal comfort technologies	According to baseline description in sections 2.2 and 2,3 and Annex M	Draft assessment carried out with identified barriers and incentive models	Assessment carried out with identified barriers and incentive models
	8) Status of investment mechanisms and business models developed to enable the private sector to adopt and operationalize harmonized codes	No investment mechanisms and business models developed (in the case of Hyderabad faster clearance of ECBC compliant projects are provided)	Investment mechanisms and business model identified	Set of investment mechanism and business models developed for the three cities and states

	Objective and Outcome Indicators	Baseline (2020/21)	Mid-term project (early 2023)	End of Project (EoP) target (end 2024)
Outputs, Outcome 2a	2.1 Interventions assessed based on business value chain for accelerated adoption of thermal comfort interventions in major buildings types 2.2 Investment mechanisms and business models developed to enable the private sector to adopt and operationalize harmonized codes and enable diffusion of highly efficient cooling technologies.			
Outcome 2b Enhanced evidence for investment in energy-efficient technologies and thermal comfort in buildings	9) Status of pilots implemented (with harmonized codes, and highly-efficiency technologies for a) new and b) existing buildings in 3 cities	No pilots implemented in the three cities.	Buildings for pilots identified in all three cities. Implementation started in 20 existing buildings and 3 new buildings	All pilots (in 52 existing and 3 new buildings) implemented in three cities (18 or 19 per city)
	10) Status of the role of women in pilot/demo implementation	Pilots not implemented	a. 20% participation of women as project partner representatives for each city/ state; b. 25% of skilled workers (project engineers, planners, technicians) are women for each city/ state;	a. 20% participation of women as project partner representatives for each city/ state; b. 25% of skilled workers (project engineers, planners, technicians) are women for each city/ state;
	11) Reduction of global warming equivalent impact of used refrigerant due to use of low-GDP refrigerant	Pilots not implemented	One-third of EoP value (= 31.0 $ktCO_2$)	74 $ktCO_2$ equivalent in 55 pilot/demo buildings). See Annex F
Output, Outcome 2b	2.3 Pilots implemented in representative climatic zones with harmonized codes, and highly-efficiency and thermal comfort technologies [for a) existing buildings and b) new buildings compliant to ESS/ gender aspects]			
Component 3	**Capacity building and knowledge sharing**			
Outcome 3 Enhanced capacity at national, sub-	12) Development of the online knowledge platform	No online knowledge platform available	Framework finalized for the knowledge platform	Knowledge platform deployed online

	Objective and Outcome Indicators	Baseline (2020/21)	Mid-term project (early 2023)	End of Project (EoP) target (end 2024)
national and within the private sector for identifying, designing, planning, financing and implementing efficiency improvement and thermal comfort systems in buildings	13) Number of people benefiting from seminar and workshop events (and % women participating)	Zero	1,100 people benefitting/participating in training events (35% women)	1,950 people benefitting/participated in events (of which 35% women). See Annex F for estimates)
	14) Number of people benefiting from training events	Zero	200	300 See Annex F for estimates.
Outputs, Outcome 3	3.1 Linkages with accelerator platforms established [through online access to the knowledge platform to assimilate tools and financing options for government and private sector stakeholders] 3.2 Consumer behavioural inducements through awareness campaign for critical stakeholders 3.3 Institutional training and awareness for transitioning to ECBC compliance and for the newly adopted Residential Building Codes as well as on e-waste management and recovery and recycling of refrigerants [in all types of buildings, including ESS and gender elements] 3.4 Targeted and customised training/ new programmes? development in EE measures/solutions implementation [by building types at all levels for energy auditors, policymakers, regulators, public and private agencies]			

*) The reports will identify gender-related issues at national and subnational levels (see also ProDoc Annex I).

[1] Relevant Outcome indicators are: 6.1 Annual reduction in tons of CO2 (tCO2/year) in line with the nationally determined contribution and commitments under UNFCCC (Baseline:0.5 million (2018); Target:1.5 million CO2 (2022), and 6.5 Integrated approaches adopted to reduce pollution and environmental degradation with a focus on chemicals and waste management (Baseline: 0 (2018); Target: tbd (2022

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).

B.1 Responses to GEF Sec Review (on the PIF)

UNDP India EE PIF Review sheet...

B.2 Responses to STAP Review (on the PIF)

UNDP India EE STAP Review 1037...

Overall Assessment of the project proposal - Review Sheet at PIF Stage	**Project Team Response at CEO endorsement stage**
It is noted that the project will connect with accelerator platforms, including the Global Programme on Sustainable Cities of the GEF Sustainable Cities Impact Program (SCIP). Given that India is one of the countries involved in the child projects of the SCIP, this interaction should be established immediately to ensure synergy and enhance GEBs from the project. Early interaction between the two projects will also prevent duplication of efforts. The SCIP child project cities should also be considered during the selection of Indian states where this project will be implemented under Output 1.1.5.	The Program is referred in the overview of accelerator programs in Box 15.
Given STAP guidelines, the proposal should, however, consider a "theory of change" in terms of the "roadmap" that is proposed (Output 1.1.3) and its overall impact on the performance metrics for climate impact mitigation. Please see STAP's theory of change primer for further guidance on theory of change preparation (https://stapgef.org/sites/default/files/publications/STAP%20ToC%20Primer_webposting.pdf).	A Theory of Change has been developed, taking the guidelines into account and is included in the Project Document described in section 2.4 (barriers) and 3.2 (actions to address barriers) with an overview ToCh diagram in Box 5.

There are also some definition issues which need to be addressed and are noted in specific sections below. For example, the word "super-efficient" is ambiguous and seems like a hyperbolic term without a clear definition.	The project follows the terminology that India proposes. A definition of ?super-efficient? technology is added in a footnote on page 2 of the ProDoc. ?Super-EE? means that the project goes beyond the EE improvements that can be expected over time due to innovation, legislation, voluntary guidelines, etc. by following latest technology and best practices

It is not clear what the project intends to implement under output 1.1.4. The description indicates that a labeling system already exists and applies to office spaces, hospitals, BPO buildings, shopping malls, and will soon be extended to data centers and hotels. However, no clear information was presented on what "innovative tool" will be developed in this project under this output, and its exact purpose and function. Please clarify.	What in PIF is output 1.1.4, is in the ProDoc output 1.4. The Building Energy Passport (BEP) is a tool that facilitates ECBC compliance. Harmonized thermal comfort guidelines involving EMIS (energy management information systems; see Output 1.3) integration with BEP for ECBC compliance can be a game-changer for enhanced building energy efficiency policy actions. These will be supplemented art State level with MVR procedures to monitor results of the tools. See description in ProDoc in Section 3.1 and 4.1 (Component 1)

Climate risk: The PIF recognized the role of increasing global warming, and consequently, rise in average summer temperatures as factor resulting in growth in the demand for air conditioners. It is essential to assess the projections of global warming for the selected cities to ascertain the expected temperature increase, and design solutions that consider this. Climate risk consideration should also be included in the recommendations from the project on the design of new energy-efficient buildings.		In the short and medium term, the demand for air conditioners is in large part due to population and economic growth. On the longer term, higher ambient temperature may have an impact. All the more reason, to promote ?super-efficient and thermal comfort solutions? that range from the most efficient conventional (refrigerant and non-refrigerant options) to innovative options that yet have to penetrate the market (not-in-kind technologies) and promoting passive building design (see e.g. Box 11). The more ?super-efficient?, the better prepared for a warmer-than-expected future
Comments on project justification		**Additional response at CEO endorsement stage**
Issue	**STAP comment**	

2.The baseline scenario or any associated baseline projects Are the lessons learned from similar or related past GEF and non-GEF interventions described; and how did these lessons inform the design of this project?	GOI-GEF-UNDP initiative on energy efficiency improvements in the commercial buildings sector helped in removal of barriers for the adoption of the ECBC ((energy conservation building codes) is mentioned. However, what lessons are to be gleaned from this is not elaborated upon. Clarity on this is needed.	ECBC has been introduced and notified in 18 States/UT since 2007. However, a lesson learned is that practical implementation at local level is lagging ans harmonization of different guidelines (ECBC, Star labelling, ICAP). This is one issue the Project seeks to address (see sections 3.1 and 4.1-Component 1 in the ProDoc)
3.The proposed alternative scenario Have gender differentiated risks and opportunities been identified, and were preliminary response measures described that would address these differences?	Gender sensitivity elements noted in training to be provided. Since women spend far more time in buildings in India than men, specially with reference to cooking, attention will be needed to also give women household members a voice on adaptability to building changes.	Please note these are described in a separate Annex Gender Analysis and Action Plan in the ProDoc (Annex H) and also referred to in the Social and Environmental Screening (Annex J)
3. The proposed alternative scenario What is the theory of change? What is the sequence of events (required or expected) that will lead to the desired outcomes?	No mentioned even though there is considerable literature on this. Diagram would be helpful	Theory of Change explained in the ProDoc in sections 2.4 (barriers) and 3.1 (ways to address barriers), including a ToCh diagram (box 5)

5.Risks Are the identified risks valid and comprehensive? Are the risks specifically for things outside the project's control? Are there social and environmental risks which could affect the project?	See STAP's overall assessment for advice of climate risk.	Climate vulnerability and risks are discussed in Annex J (Social and environmental screening)
6.Coordination Have specific lessons learned from previous projects been cited?	Could be augmented	A summary of previous initiatives is given in Box 4 in Section 2.2 of the ProDoc, while remaining barriers (that the Project seeks to address) are discussed in Section 3.1)
General conclusion		
STAP has identified specific scientific /technical suggestions or opportunities that should be discussed with the project proponent as early as possible during development of the project brief.	The proponent should provide a report of the action agreed and taken, at the time of submission of the full project brief for CEO endorsement.	Suggestions and how these are addressed are mentioned in the the right column in this table with, where appropriate, references to the ProDoc

B.3 Response to GEF Council Comments (on PIF)

A) Germany Comments

Climate Change

24. India: Accelerating adoption of super-efficient technologies for sustainable thermal comfort in buildings in India, UNDP (GEF Program Financing: $4,416,210), GEF-ID = 10370.

Suggestions for improvements to be made during the drafting of the final project proposal:

? Component 1 of the project should build on the framework developed under the Indo-German Energy Programme (including thermal comfort database) for residential buildings during implementation.

Footnote added in section 3.1 in ?GEF-additional intervention (Outcome 1). Footnote 27, page 22

? Component 2 of the project should take into consideration the building materials for the building envelope as per the Eco-Niwas Samhita-ENS (Energy Efficiency Building Code for Residential building) in order to reduce the cooling requirement in compliance with the Code and to achieve the Residential Building Energy Efficiency Star Label. The Indo-German Energy Programme is working on energy efficient building materials and intends to work on standards and labelling for EE building materials in the next phase. Therefor the project should consider adopting and synchronising the efforts of the building material directory for mitigating a rising cooling demand.

The observation on building materials has been addressed in in section 4.1 in the introduction text of Output 2.1.

? The Indo-German Energy Programme is currently working on implementation of the Eco-Niwas Samhita-ENS (Energy Efficiency Building Code for Residential Building) and Residential Building Energy Efficiency Star label in five states Punjab, Uttar Pradesh, Delhi, Karnataka and Maharashtra through State Designated Agencies (SDA) and intends to add two more states including Telangana in the next phase of the programme. The project should avoid duplication of similar activities in the same states.

Footnote added in the description of activity 1.1.2

? The project should avoid supporting the market entrance or accelerated uptake of regulated substances, in particular HFC-based air conditioning systems, even when super-efficient, in any way.

Such support would not be regarded as a project with sufficient incremental value and innovative character as it promotes a technology lock-in irrespective of short-term climate benefits.

The observation on building materials has been addressed in in section 4.1 in the introduction text of Output 2.1.

? The project should take into consideration that the Central Government in consultation with the Bureau of Energy Efficiency (BEE) has notified new energy performance standards for room air conditioners on 30th October 2019 that 24-degree Celsius default setting has been made mandatory from 1st January 2020 for all room air conditioners covered under the ambit of the BEE star-labelling programme.

Text added, end of section 2.3 in ?Thermal comfort temperature setting

? In paragraph 42 the project proposal states that India?s HPMP programme targeting the re-training of servicing sector technicians ?does not take into account the energy efficiency spectrum and is solely focussed on creating capacity on refrigerants?. O&M best practices for alternative technology options (including flammable A2L and A3 refrigerants) are in fact being taken into account in India?s HPMP programme.

Noted, but the statement has not been referred to in the Project Document

Canada Comments

Climate Change Mitigation

India: Accelerating adoption of super-efficient technologies for sustainable thermal comfort in buildings in India, UNDP (GEF Program Financing: $4,416,210) (GEF ID: 10370)

The project leads should establish linkages with the Clean Energy Ministerial (CEM) - Super-efficient Equipment and Appliance Deployment (SEAD) group, which has identified cooling efficiency as a priority area going forward, and has been involved in leading initiatives such as the Advanced Cooling Challenge.

Noted with thanks and text on linkage in section 4.3 ?partnerships?.

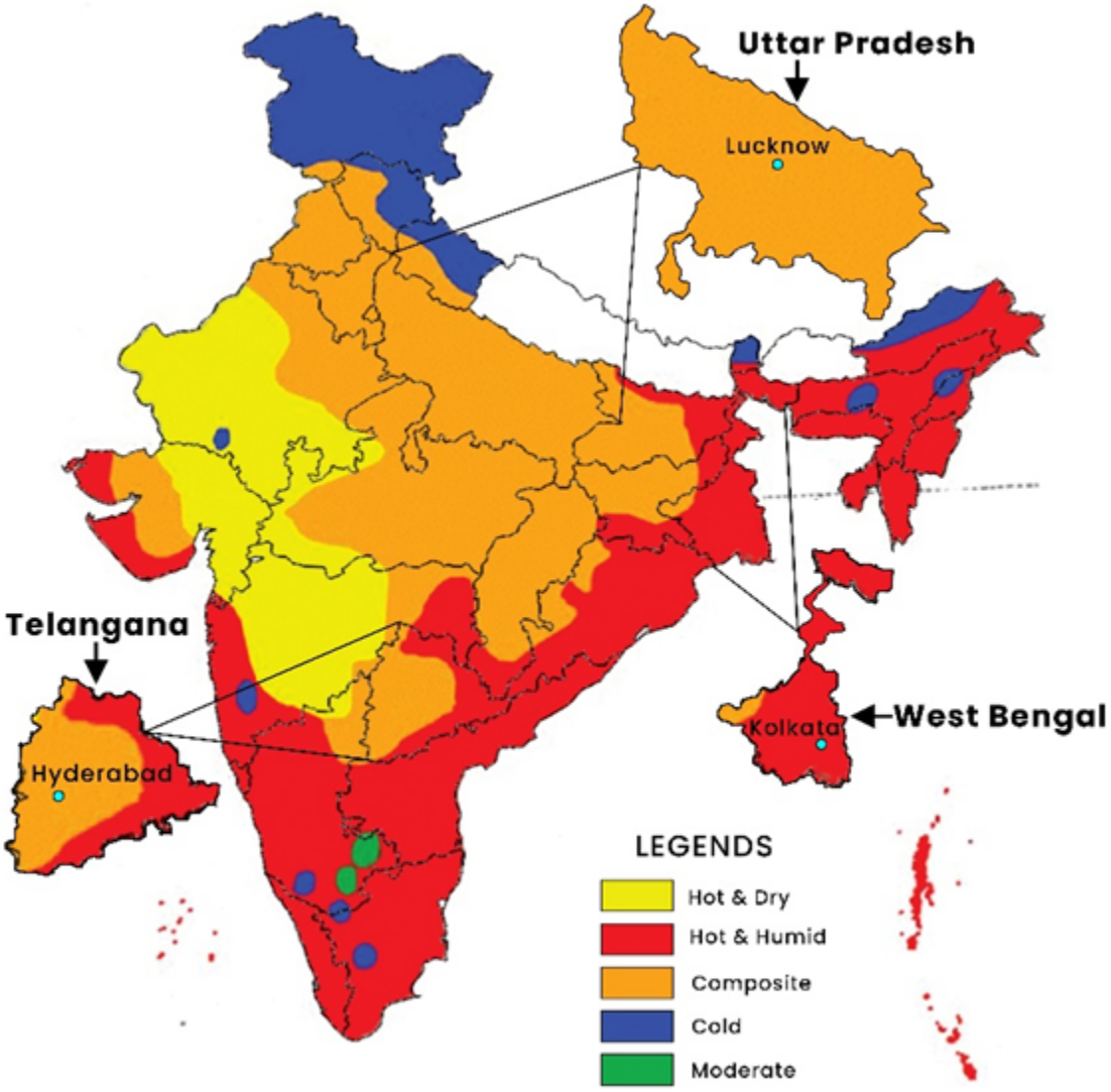
ANNEX C: Status of Utilization of Project Preparation Grant (PPG). (Provide detailed funding amount of the PPG activities financing status in the table below:

Project Preparation Activities Implemented	*GETF Amount ($)*		
	Budgeted Amount	***Amount Spent Todate***	***Amount Committed***
Project preparation grant to finalize the UNDP-GEF project document for project Accelerating adoption of super-efficient technologies for sustainable thermal comfort in buildings in India	150,000	137,554.40	12,445.60
Total	150,000	**137,554.40**	12,445.60

ANNEX D: Project Map(s) and Coordinates

Please attach the geographical location of the project area, if possible.

See also Annex A of the UNDP Project Document.



India possesses a large variety of climates which are broadly categorized into five regions with distinct climates. According to the National Building Code of India, the country has been divided into five major climatic zones based on mean monthly temperature, and mean monthly relative humidity. The five climatic zones illustrated in the adjacent map are:

Three cities from India are selected by the ?Implementing Partner? (BEE) in consultation with GEF Executing Agency (UNDP). These are Hyderabad, Uttar Pradesh and Bhubaneshwar. The three cities are selected based on the variations in the progress achieved in the context of ECBC implementation in the respective states to which these cities belong. The scenario of ECBC implementation in these three states is representative of the three typical scenarios observed in all of the states of India, Telangana IECBC 2007 notified and mandated), Uttar Pradesh (ECBC 2017 is notified but rules are yet to be mandated), West Bengal (ECBC re-notified in 2020)

ANNEX E: Project Budget Table

Please attach a project budget table.

The budget table provided in the Agency Project Document is uploaded as an excel file in GEF Portal Document section.

Expenditure Category	Detailed Description	Component (USDeq.)							Total (USD eq.)	Responsible Entity (Executing Entity receiving funds from the GEF Agency)[1]
		Component 1	*Component 2*		*Component 3*					
		Sub-component 1.1	*Sub-component 2.1*	*Sub-component 2.2*	*Sub-component 3.1*	*Sub-Total*	*M&E*	*PMC*		
Equipment	Office equipment (IT, computer) and audio-visual equipment related to activities of Component 1 (USD 61,048), Outcome 2a (USD 12,000), and Outcome 2b (USD 27,300)	7,000				7,000			7,000	BEE
Equipment	Office equipment (IT, computer) and audio-visual equipment related to activities of Component 1 (USD 61,048), Outcome 2a (USD 12,000), and Outcome 2b (USD 27,300)	54,048				54,048			54,048	BEE

Equipment	Office equipment (IT, computer) and audio-visual equipment related to activities of Component 1 (USD 61,048), Outcome 2a (USD 12,000), and Outcome 2b (USD 27,300)		7,500			7,500			7,500	BEE
Equipment	Office equipment (IT, computer) and audio-visual equipment related to activities of Component 1 (USD 61,048), Outcome 2a (USD 12,000), and Outcome 2b (USD 27,300)		4,500			4,500			4,500	BEE
Equipment	Office equipment (IT, computer) and audio-visual equipment related to activities of Component 1 (USD 61,048), Outcome 2a (USD 12,000), and Outcome 2b (USD 27,300)			27,300		27,300			27,300	BEE
Equipment	Office equipment (IT, computer) and info. Tech. equipment related for project administration							5,000	5,000	BEE
Equipment	Office equipment (IT, computer) and info. Tech. equipment related for project administration							5,000	5,000	BEE

Equipment	Office equipment (IT, computer) for general activities of Component 3 and special AV, IT equipment, for setting up knowledge platform and equipment for technical training				18,747	18,747			18,747	BEE
Equipment	Office equipment (IT, computer) for general activities of Component 3 and special AV, IT equipment, for setting up knowledge platform and equipment for technical training				63,000	63,000			63,000	BEE
Equipment	USD 97,300: equipment for energy audits and energy performance measurement kits (Output 2.4)			97,300		97,300			97,300	BEE
Contractual Services - Individual	Individual service contract for project staff (National Coordinator, Assistant Programme Managers, admin & finance expert and state-level ECBC cell) for managerial and administrative work (USD 160,000)							160,000	160,000	BEE

Contractual Services - Individual	Individual service contract for project staff (National Coordinator, Assistant Programme Managers, gender & social expert, and state-level ECBC cell) for technical work in the three Components (USD 602,466)	120,494				120,494			120,494	BEE
Contractual Services - Individual	Individual service contract for project staff (National Coordinator, Assistant Programme Managers, gender & social expert, and state-level ECBC cell) for technical work in the three Components (USD 602,466)		120,494			120,494			120,494	BEE
Contractual Services - Individual	Individual service contract for project staff (National Coordinator, Assistant Programme Managers, gender & social expert, and state-level ECBC cell) for technical work in the three Components (USD 602,466)			240,984		240,984			240,984	BEE

Contractual Services - Individual	Individual service contract for project staff (National Coordinator, Assistant Programme Managers, gender & social expert, and state-level ECBC cell) for technical work in the three Components (USD 602,466)				120,494	120,494			120,494	BEE
Contractual Services - Company	Company contract for M&E logframe indicator measurement (at mid-term and towards end of the project						44,500		44,500	BEE
Contractual Services - Company	Company contracts for A) creation and operation of knowledge platform (USD 125,000), B) Assessment of institutional and technical capacity needs and development of workshop cum training programme (USD 100,000) and C) Targeted and customised technical and training support (USD 200,000)				425,000	425,000			425,000	BEE

Contractual Services - Company	Company contracts for A) technology assessment of established and innovative low-carbon cooling options for thermal comfort (in India and climatic zones of 2 states in particular), USD 100,000 and on B) Business and financing model design & development for highly efficient cooling in buildings (USD 125,000)		225,000			225,000			225,000	BEE
Contractual Services - Company	Company contracts for harmonized national and state-level guidelines to achieve thermal comfort in buildings (USD 210,000) and BEP-EMIS development and enhancements with MRV procedure in three states (USD 310,000)	520,000				520,000			520,000	BEE
Contractual Services - Company	Contracts for energy audits, EE option assessment, feasibility assessment and design, and related discussions with developers, owners and technology providers related to the demonstration in the selected new and existing pilot buildings (at about USD 15,820 per buildings)			1,238,000		1,238,000			1,238,000	BEE

International Consultants	International (10 p/w) and national consultancy (10 p/w) for mid-term review and terminal evaluation						30,000		30,000	UNDP
International Consultants	International consultancy (13 p/w) for selected accelerator knowledge exchange activities as well as for targeted and customised technical support super EE technology and other thermal comfort options				54,000	54,000			54,000	BEE
International Consultants	International expertise (8 p/w) and national consultancy (16 p/w) on technical and business aspects of innovative super-EE technology and thermal comfort options and financing needs and options		45,000			45,000			45,000	BEE
International Consultants	International expertise (8 p/w) and national consultancy (16 p/w) on technical and business aspects of innovative super-EE technology and thermal comfort options and financing needs and options			18,000		18,000			18,000	BEE
International Consultants	International expertise (8 p/w) on energy information systems and tools for compliance monitoring	24,000				24,000			24,000	BEE

Local Consultants	National consultancy (29 p/w) for state-level expertise and knowledge on implementation of ECBC/ICAP/state by-law harmonised guidelines and implementation of MRV systems and energy management info tools	36,250				36,250			36,250	BEE
Local Consultants	International (10 p/w) and national consultancy (10 p/w) for mid-term review and terminal evaluation						12,500		12,500	UNDP
Local Consultants	International expertise (8 p/w) and national consultancy (16 p/w) on technical and business aspects of innovative super-EE technology and thermal comfort options and financing needs and options		20,000			20,000			20,000	BEE

Local Consultants	National consultancy (38 p/w) for selected accelerator knowledge exchange activities; training on ECBC and harmonised guidelines; participation as trainer in workshops and training programme on EE equipment and product; servicing and maintenance of systems; and passive design of buildings; as well as s-needed consultancy advise to manufacturers, vendors, importers, new entrepreneurs, building owners, and architects				35,000	35,000			35,000	BEE
Local Consultants	National consultancy (63 p/w) for the evaluation of energy performance and thermal comfort performance of selected model buildings and documentation of lessons learned			78,750		78,750			78,750	BEE
Training, Workshops, Meetings	Inception and final project workshop (USD 10,000 each)						20,000		20,000	BEE
Training, Workshops, Meetings	Organisation (venue, servicing) of workshops (27) and training (9 related to Component 3				189,000	189,000			189,000	BEE

Training, Workshops, Meetings	Organisation (venue, servicing) of workshops (8) and training (6) related to Component 1	96,000				96,000			96,000	BEE
Training, Workshops, Meetings	Organisation (venue, servicing) of workshops (9) related to Outcome 2a at national and state level		27,000			27,000			27,000	BEE
Training, Workshops, Meetings	Organisation (venue, servicing) of workshops (9) related to Outcome 2b in the three states (Uttar Pradesh, West Bengal, Telangana)			30,000		30,000			30,000	BEE
Travel	Travel (USD 22,850) for project staff and short-term consultants and workshop key speakers	22,850				22,850			22,850	BEE
Travel	Travel (USD 37,600) for project staff and short-term consultants, selected workshop/training key speakers and facilitation of exchange platform participation (of Comp. 3)				37,600	37,600			37,600	BEE
Travel	Travel (USD 52,750) for project staff and short-term consultants and selected workshop participants in Comp. 2		25,900			25,900			25,900	BEE
Travel	Travel (USD 52,750) for project staff and short-term consultants and selected workshop participants in Comp. 3			26,850		26,850			26,850	BEE

Travel	Travel for M&E consultants and selected inception workshop key participants/speakers/experts						15,500		15,500	UNDP
Travel	Travel related to managerial duties of Project Coordinator and Assistant programme managers							16,000	16,000	BEE
Office Supplies	Office supplies (paper, stationery, printer ink, etc.) needed for project administration and component activities (USD 30,796)	7,000				7,000			7,000	BEE
Office Supplies	Office supplies (paper, stationery, printer ink, etc.) needed for project administration and component activities (USD 30,796)		4,500			4,500			4,500	BEE
Office Supplies	Office supplies (paper, stationery, printer ink, etc.) needed for project administration and component activities (USD 30,796)			10,000		10,000			10,000	BEE
Office Supplies	Office supplies (paper, stationery, printer ink, etc.) needed for project administration and component activities (USD 30,796)				5,000	5,000			5,000	BEE
Office Supplies	Office supplies (paper, stationery, printer ink, etc.) needed for project administration and component activities (USD 30,796)							4,296	4,296	BEE

Other Operating Costs	AV materials as well as printed materials for awareness raising and workshop/training materials				43,000	43,000			43,000	BEE
Other Operating Costs	AV materials as well as printed materials for awareness raising and workshop/training materials						2,500		2,500	BEE
Other Operating Costs	AV materials as well as printed materials for awareness raising and workshop/training materials							5,000	5,000	BEE
Other Operating Costs	Printing cost of reports, workshop proceedings and materials, photo reproduction, general project info for Component 1	7,000				7,000			7,000	BEE
Other Operating Costs	Printing cost of reports, workshop proceedings and materials, photo reproduction, general project info for Component 2		7,500			7,500			7,500	BEE
Other Operating Costs	Printing cost of reports, workshop proceedings and materials, photo reproduction, general project info for Component 3			9,000		9,000			9,000	BEE
Other Operating Costs	Professional services for project auditing (USD 3000 per year)							15,000	15,000	UNDP
Project cost		894,642	487,394	1,776,184	990,841	4,149,061	125,000	210,296	4,484,357	

ANNEX F: (For NGI only) Termsheet

Instructions. Please submit an finalized termsheet in this section. The NGI Program Call for Proposals provided a template in Annex A of the Call for Proposals that can be used

by the Agency. Agencies can use their own termsheets but must add sections on Currency Risk, Co-financing Ratio and Financial Additionality as defined in the template provided in Annex A of the Call for proposals. Termsheets submitted at CEO endorsement stage should include final terms and conditions of the financing.

N/A

ANNEX G: (For NGI only) Reflows

Instructions. Please submit a reflows table as provided in Annex B of the NGI Program Call for Proposals and the Trustee excel sheet for reflows (as provided by the Secretariat or the Trustee) in the Document Section of the CEO endorsement. The Agencys is required to quantify any expected financial return/gains/interests earned on non-grant instruments that will be transferred to the GEF Trust Fund as noted in the Guidelines on the Project and Program Cycle Policy. Partner Agencies will be required to comply with the reflows procedures established in their respective Financial Procedures Agreement with the GEF Trustee. Agencies are welcomed to provide assumptions that explain expected financial reflow schedules.

N/A

ANNEX H: (For NGI only) Agency Capacity to generate reflows

Instructions. The GEF Agency submitting the CEO endorsement request is required to respond to any questions raised as part of the PIF review process that required clarifications on the Agency Capacity to manage reflows. This Annex seeks to demonstrate Agencies? capacity and eligibility to administer NGI resources as established in the Guidelines on the Project and Program Cycle Policy, GEF/C.52/Inf.06/Rev.01, June 9, 2017 (Annex 5).

N/A