



**United Nations Development Programme
Country: Viet Nam
PROJECT DOCUMENT**

Project Title: Energy Efficiency Improvement in Commercial and High-Rise Residential Buildings in Viet Nam

UN One Plan III Focus area(s): Focus area 1: Inclusive, Equitable and Sustainable Growth

Expected OP Outcome(s)/Indicator(s): Outcome 1.3: By 2016, key national and sub-national agencies, in partnership with the private sector and communities, have established and monitor multi-sectoral strategies, mechanisms and resources to support implementation of relevant multilateral agreements and effectively address climate change adaptation, mitigation and disaster risk management
Outcome Indicator 1: CO2 emissions, total, per capita and per \$1 GDP (PPP)

Expected OP Output(s) and Indicator(s): Output 1.3.3: A national system for Reduced Emissions from Deforestation and forest Degradation (REDD), and Nationally Appropriate Mitigation Actions (NAMAs) for a number of strategically chosen sectors and localities are formulated and operationalized with clear potential benefits
Output Indicator 1: Number of sub-sectors/ cities/ towns/ provinces with NAMAs developed and submitted to an international register

Implementing Partner: Ministry of Construction (MOC)

Implementing Entity: Department of Science, Technology and Environment (under MOC)

Brief Description

The Project has the goal to reduce intensity of GHG emissions from the building sector in Viet Nam. The project objective is to improve the energy utilization performance of commercial and high-rise residential buildings in Ho Chi Minh and Hanoi. Realization of this objective will be achieved through implementation of three components (1) Improvement and Enforcement of Energy Efficiency Building Code; (2) Building Market Development Support Initiatives, and (3) Building EE Technology Applications and Replications. Each component comprises a number of complementary activities designed to remove barriers to the stringent enforcement of the revised EEBC, and to the greater uptake of building energy efficiency technologies, systems, and practices in commercial and residential buildings. By EOP, the GEF investment will have catalysed direct GHG emission reduction of about 37,680 tCO₂e. The cumulative direct reduction in GHG emissions over the lifetime of the project is envisioned to be 236,382 tCO₂e.

| | |
|-------------------------|------------------|
| Programme Period: | 2012-2016 |
| Atlas Award ID: | 00084022 |
| Project ID: | 00092225 |
| PIMS # | 5245 |
| Start date: | 1 January 2016 |
| End Date | 31 December 2019 |
| Management Arrangements | NIM |
| PAC Meeting Date | _____ |

| | |
|--|-----------------|
| Total resources required | US\$ 24,696,550 |
| Total allocated resources: | |
| • GEF | US\$ 3,198,000 |
| • Parallel | |
| ○ UNDP | |
| US\$ 150,000 | |
| ○ Private Sector | US\$ |
| 16,578,550 | |
| • In-kind Contributions (From UNDP & Governments) | US\$ 4,770,000 |

Agreed by (Executing Entity/Implementing Partner):



**KT. BỘ TRƯỞNG
THỨ TRƯỞNG
Phan Thị Mỹ Linh**

Date/Month/Year

Agreed by (UNDP):



5/4/16

Louise Chamberlain
Country Director
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Date/Month/Year

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List of Acronyms

| | |
|-----------------|---|
| BAU | Business-as-usual |
| CEEBs | Center for Energy Efficiency in Buildings |
| CO ₂ | Carbon dioxide |
| DEA | Danish Energy Agency |
| DOC | Department of Construction |
| DOIT | Department of Industrial and Trade |
| DUPA | Departments of Urban Planning |
| EE | Energy Efficiency |
| EE&C | Energy Efficiency and Conservation |
| ECC | Energy Conservation Centers |
| EEBC | Energy Efficiency Building Code |
| EECB | Energy Efficiency Improvement in Commercial and High-Rise Residential Buildings in Viet Nam |
| EOP | Educational Opportunity Program |
| EPC | Energy Performance Contracting |
| GDP | Gross Domestic Product |
| GHG | Greenhouse gas |
| GEF | Global Environment Facility |
| GSO | General Statistics Office of Viet Nam |
| IA | Implementing Agency |
| IFC | Finance Corporation |
| IMF | International Monetary Fund |
| IPMVP | International Performance Measurement and Verification Protocol |
| IRR | Internal Rate of Return |
| ISS | Implementation Support Services |
| MOC | Ministry of Construction |
| MOF | Ministry of Finance |
| MOIT | Ministry of Industry and Trade |
| MOST | Ministry of Science and Technology |
| M&V | Measurement and Verification |
| NIM | National Implementation Modality |
| NTP | National Target Program |
| NPV | Net Present Value |
| PIF | Project Identification Form |
| ROI | Return on Investment |
| SEC | Specific Energy Consumption |
| TAG | Technical Advisory Group |
| UNDP | United Nations Development Programme |
| UNFCCC | United Nations Framework Convention on Climate Change |
| USAID | United States Agency for International Development |
| VAA | Viet Nam Association of Architects |
| VACEE | Viet Nam Association of Civil Engineering Environment |
| VCEP | Viet Nam Clean Energy Program |
| VGBC | Viet Nam Green Building Council |
| VNEEP | Viet Nam National Energy Efficiency Program |

SECTION I: ELABORATION OF THE NARRATIVE

PART I: SITUATION ANALYSIS

1.1 CONTEXT AND GLOBAL SIGNIFICANCE

1. Following the introduction of the Doi Moi policy in 1986, Viet Nam has made substantial progress in moving forward its economy, and experienced average annual economic growth rate of more than 7% during the 1990s and more than 6.5% during the 2000s¹. According to the General Statistics Office of Viet Nam (GSO), the GP growth rate in 2014 was 5.98%. The International Monetary Fund (IMF) has projected that the GDP growth in Viet Nam will be 5.7% in 2015². Strong economic expansion is expected to continue for decades to come, as the country transitions from a centrally planned to a market-based economy. The success of the political and economic reforms has also delivered a great impact on the building construction industry in Viet Nam, and large building construction projects and high-rise commercial and residential buildings have become a common scene in all the major cities, i.e. Hanoi, Ho Chi Minh and Danang.
2. The reform has also stimulated rapid growth of electricity consumption, and, despite the recent Global financial crisis and recession in the late 2000s, Viet Nam has experienced a double digit growth rate of annual electricity consumption and generation from 2000 to 2012 (
3. Figure 1). The Power Development Plan VII³ has projected that demand of electricity will grow at the rate of about 9% during the period of 2015-2030, and to be able to cope with this rising demand, the annual electricity generation capacity in 2030 will have to be five times greater than the generation capacity in 2012.
4. The success in economic development has not come without environmental consequences. With annual carbon dioxide emissions of 122 million tons, Viet Nam ranks 18th among developing countries. According to the Viet Nam's Initial Biennial Updated Report to the UNFCCC⁴, the energy sector is the largest in terms of Greenhouse Gas (GHG) emission, accounting for about 53% of the total GHG emissions⁵. As more and more people move to urban areas in search of economic opportunities, the number of buildings needed to house them and energy consumption in the building sector continues to rise. At current trends, Viet Nam's GHG emissions could triple by 2030 unless significant mitigation options are undertaken. That poses a challenge to both the local and global environment since buildings are major consumers of energy and are responsible for 30 to 40 percent of all carbon dioxide emissions. Nearly 50% of Viet Nam's total energy consumption comes from coal and oil. Looking specifically at the electricity sector, the grid emission factor is about 0.5603tCO₂/MWh⁶, which reflects the significant reliance on fossil fuels.

¹ World Development Indicators, the World Bank, <http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?page=3>

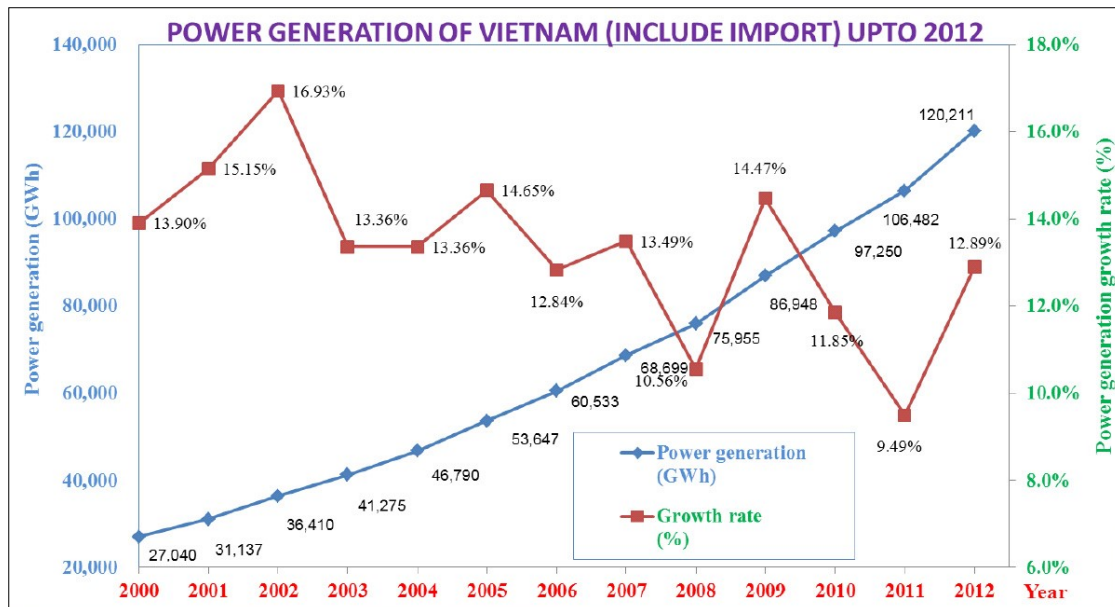
² World Economic Outlook, IMF, April 2014

³ The National Master Plan for Power Development for the 2011-2020 period with the Vision to 2030 approved by the Government of Viet Nam in July 2011

⁴ <http://unfccc.int/resource/docs/natc/vnmbur1.pdf>

⁵ Without LULUCF, the total GHG emissions were 266 million tons of CO₂ equivalent, including emissions from the energy sector accounting for the largest proportion of 53.05%, followed by agriculture of 33.20%. Emissions from industrial processes and waste were 7.97% and 5.78%, respectively

⁶ Based on the Emission Factor for 2012 published by the Vietnamese designated national authority (DNA), the Department of Meteorology, Hydrology and Climate Change, Ministry of Natural Resource and Environment



Source: EVN, 2014

Figure 1: Power Generation Growth Rate in Viet Nam

5. Estimations of the CO₂ emissions from the building sector in Viet Nam (mainly from electricity utilization) outlined in various study reports and publications are diverse, due to unavailability of energy consumption data specifically for the building sector. Vietnam's Second National Communications (2NC) Report⁷ provides estimates of the GHG emissions from the commercial and residential buildings at 19.6, 36.0 and 67.3 million tons of CO_{2e} emissions in 2010, 2020 and 2030 respectively. The building surveys⁸ conducted in 2012 show that the combined electricity consumption of the administration & household sector and the service & commercial sector accounted for about 43% of the total annual electricity consumption or about 45,000 GWh, corresponding to 25.7 million tons of CO₂ emissions. The 2NC report and the Initial biennial updated report to the UNFCCC also show that the building sector is not the largest sector in terms of GHG emissions, but it is projected to be the fastest growing sector in terms of end-user energy demand.⁹
6. Although the CO₂ emission figures vary, all analyses and studies have concurred on the significance of past and future growth of the energy consumptions by the building sector in Viet Nam. Considering the fact that the potential for improvements of energy efficiency are substantial in this sector which include various types of commercial and residential buildings, there are strong reasons to address the situation comprehensively through a project that will facilitate the widespread application of Energy Efficiency (EE) technologies and practices.
7. Data on building stock in Viet Nam disperses among different agencies and organizations responsible and involved in the building sector at national and provincial levels. A single database providing nationwide building stock data has not yet been developed, and the most comprehensive available data sets on building stock, specifically for large buildings included in the scope of the revised Energy Efficiency

⁷ Viet Nam's Second National Communication to the United Nations Framework Convention on Climate Change, Ministry of Natural Resources and Environment, Hanoi, 2010

⁸ Building Survey Report, Green Building Program in Viet Nam, IFC, 2012

⁹ Table 2.22, page 53, The Initial Biennial Updated Report of Viet Nam, 2014

Building Code (EEBC) issued in 2013, are probably based on integration of various ad-hoc surveys conducted by Energy Conservation Centers (ECC) in major cities (e.g. Hanoi and Ho Chi Minh), local consulting firms and real estate management companies. It should also be noted that these agencies and organizations have their own purposes in utilizing the data, and, thus, building stock data are available in different units, e.g. floor area in m² for office and retail buildings, number of occupied rooms for hotels. Summarized in the table below are building stock data based on best information accessible.

Table 1: Estimated Building Stock in Viet Nam

| Stock - Building Type | 2010 | 2011 | 2012 | 2013 | 2014 |
|-----------------------------------|-----------|-----------|-----------|-----------|-----------|
| Office (m ²) | 1,587,909 | 1,920,000 | 2,211,000 | 2,583,500 | 2,828,000 |
| Hotel (room) | 15,053 | 17,300 | 18,356 | 19,620 | 21,190 |
| Shopping Center (m ²) | 979,236 | 1,094,000 | 1,335,100 | 1,533,400 | 1,797,500 |

Source: Estimations by the Project Preparation Team based on reports published by CBRE, Colliers and Savills

- Similar to the building stock data, the energy performance data of large buildings in Viet Nam is made available through various ad-hoc surveys conducted by different in-country agencies. Summarized in Table 2 are Specific Energy Consumption (SEC)¹⁰ data of typical government, commercial and high-rise residential buildings, based on surveys conducted in 2011 and 2012. Reviews of the surveyed SEC data have shown that average SEC values of typical government, commercial and high-rise residential buildings in Viet Nam are about the same levels as those of similar types in Thailand (see comparison in Table 2). The assessment of energy saving potentials in the Thai building sector (JGSEE and KMUTT, 2009), shows that strict compliance with the revised EEBC (2008) in Thailand during design and construction phases can deliver around 12% to 22% reduction in SEC across different types of buildings. Comparison with the Thai scenario has suggested that significant energy savings in the building sector in Viet Nam will be realized through stringent compliance with the revised EEBC issued by the Ministry of Construction (MOC) in 2013.

Table 2: Average SEC of Commercial and High-rise Residential Buildings in Viet Nam

| Building Type | Average SEC (kWh/m ² /year) | | | |
|---------------------|--|--|--|--|
| | Building Survey Report, IFC, 2012 | Modeling of Typical Building Design in Viet Nam, IFC 2012 ¹ | Surveys Conducted by ECC HCMC, 2011-2012 | Modeling of Typical Building Design in Thailand ² |
| Office | 150 | 140-163 | 164 | 147 |
| Government Building | N/A | N/A | 114 | N/A |
| Education | 83 | 84-113 | 95 | 65 |
| Hospital | 144 | 357-397 | 138 | 158 |
| Hotel | 245 | 255-275 | 197 | 209 |
| Residential | 32 | 59-72 | N/A | N/A |
| Retail & Commercial | 321 | 249-289 | 276 | 270 |

Note: ¹ Energy modelling undertaken by IFC's consultants using IES building simulation program is based on 6 standard building types in Hanoi, HCMC and Danang.

² Assessment of energy savings from the revised building energy code of Thailand, JGSEE and KMUTT, 2009

¹⁰ Also referred to as Energy Use Index (EUI)

9. Despite the recent recession, the total floor area of buildings in Viet Nam will continue to rise, and the residential and non-residential building sector is projected to grow at an average rate of 7.8% year-on-year (y-o-y) between 2013 and 2017¹¹. The Government of Viet Nam has realized the significance of the energy consumption and GHG emissions responsible by the building sector in the country, and to respond to this alarming trend, considerable efforts have been undertaken by responsible government agencies to enhance EE in the building sector. These include but not limited to promulgation of a National Technical Code for Building Energy Efficiency (QCXDVN 09:2005) by the Ministry of Construction (MOC) in 2005 (The 2005 version superseded by the improved version - QCVN 09:2013/BXD - issued in late 2013), and implementation of the Viet Nam National Energy Efficiency Program (VNEEP) by Ministry of Industry and Trade (MOIT), in which identification and implementation of EE in designated buildings¹² are one of the program's components. EE promotions in the building sector have been further strengthened following the approval of Energy Efficiency and Conservation (EE&C) Law in June 2010¹³. This EE&C Law and relevant decrees clearly specify roles and responsibilities of various Ministries involved in EE&C in the building sector.
10. The assessment of energy savings that were facilitated through the application of the revised EEBC has shown that up to 25%¹⁴ efficiency improvement can be achieved through compliance with the revised EEBC, e.g. utilization of EE technologies (for cooling, lighting) and improvement of building designs (e.g. window-to-wall ratio, overhang). EE improvement beyond compliance with the revised EEBC can also be achieved through task lighting practices instead of uniform luminance for all spaces; utilization of day lighting; introduction of wall insulation, and; utilization of state-of-the-art building management and maintenance technologies.

1.2 INSTITUTIONAL/SECTORAL/POLICY CONTEXT

11. In September 2012, the Prime Minister approved the National Environment Protection Strategy to 2020 with vision until 2030 (Decision no. 1216/QD-TTg). The strategy aims to promote the application of clean technologies, cleaner production processes and the use of less polluting, more environmentally sound fuels and materials. The implementation plan for the said strategy was also approved by the Prime Minister in February 2014 (Decision no. 166/QD-TTg). In December 2011, Viet Nam approved the National Climate Change Strategy (Decision 2139/QD-TTg dated 05 December 2011) in which energy saving and efficiency are clearly highlighted as the key area for GHG emission reduction to protect global climate system. In addition, the Viet Nam Green Growth Strategy approved in September 2012 (Decision No. 1393/QD-TTg) specifies promulgation of compulsory application of green building measures in new and retrofitted building and green material technology in construction as solutions to achieve Green Growth and low carbon economy. In terms of bringing policy into action, formulation, development and implementation of national level Energy Efficiency and Conservation (EE&C) policies and programs in Viet Nam are primarily responsible by the Ministry of Industry and Trade (MOIT). However, various government agencies have been involved in directing and implementing EE in different sectors, e.g. MOC for

¹¹ Viet Nam Infrastructure Report, Business Monitor International Ltd., Q1, 2013

¹² Buildings with total floor areas exceeding 2,500 m² or annual energy consumption more than 500 tons of oil equivalent or 3 million kWh

¹³ <http://tietkiemnangluong.com.vn/en/activity-news/law-on-energy-efficiency-and-conservation-takes-effect-31003-8805.html>

¹⁴ Based on survey data and a sensitivity analysis undertaken by ECC HCMC

the building construction sector, the Ministry of Transport (MOT) for the transport sector.

12. Under VNEEP, the Government has implemented the National Target Program (NTP) on EE to raise public awareness, promote research and development of science and technology, and enforce regulations on energy conservation and efficiency. The Program sets a three to five percent conservation rate for national energy consumption for 2006-2010 and five to eight percent for 2011-2015. The proposed project is in line and complement Component 3 of VNEEP Phase 2 (2011 – 2015) which targets implementation of EE&C in buildings.
13. Along with VNEEP and the NTP on EE, the Government of Viet Nam approved the NTP to Respond to Climate Change in 2008¹⁵, which outlines nine targets for 2009-2015, including the formulation and implementation of GHG mitigation options. The main objective of the NTP on Climate Change is to determine sectoral and regional impacts for each time period, so as to develop feasible action plans to effectively respond to climate change, in the short and long term, in order to achieve sustainable development. The proposed project is directly contributing to climate change adaption and GHG mitigation measures highlighted in the 2nd National Communication report, in which promoting EE&C in the commercial/institutional sector has been regarded as short and long term measures.
14. During the implementation of VNEEP, EE&C has been strengthened through approval of EE&C Law (1st of January 2011), and EE&C in the building sector is clearly governed by the EE&C Law (Articles 15, 16, 17 and 18). Decree No. 21/2011/ND-CP, issued in March 2011, stipulates roles and responsibilities of various Ministries involved in EE&C, as well as criteria of designated energy-using buildings. The proposed project is expected to make a significant contribution to the enforcement of EE&C Law in the building sector, and also expected to lead to investments in building EE technologies and practices in the building sectors.
15. The project is also in accordance with UNDP Viet Nam Country Program Document (2012-2016) and the UN One Plan III (2012-2016) under the “Inclusive, Equitable and Sustainable Growth” focus area, specifically Outcome 1.3 on the climate change adaptation, mitigation and disaster risk management.

1.3 STAKEHOLDER ANALYSIS

16. During the project preparation, stakeholder analysis was undertaken in order to identify key stakeholders, assess their interests in the project and define their roles and responsibilities in project implementation. The two primary government agencies at the state management level with mandates to promote EE in the building sector in Viet Nam are MOC and MOIT. In addition to the two primary agencies, the project will involve other concerned stakeholders as discussed in Table 3 below.

Table 3: List of stakeholders and roles in the project

| Stakeholders | Role |
|--------------|------|
|--------------|------|

¹⁵ Viet Nam's Second National Communication to the United Nations Framework Convention on Climate Change, Hanoi, 2010

| Stakeholders | Role |
|---|--|
| Ministry of Construction (MOC) | Implementing partner and key central government proponent for EE in buildings, including commercial and high-rise residential buildings. Responsible for managing and operating day-to-day project implementation. |
| Ministry of Industry and Trade (MOIT) | Responsible party involved in developing policies, standards and regulations for energy end-use equipment. MOIT will also provide technical advice, co-develop and review activities related to training, certification system for energy auditors and energy managers in the building sector. |
| Ministry of Finance (MOF) | Responsible party involved in co-development of incentive/penalty scheme(s), mechanisms to support EE in the building sector. |
| Ministry of Science and Technology (MOST) | Participating agency involved in developing policies and providing technical advice on EE standards for energy intensive appliances and equipment in buildings, building construction materials and provision of technology transfer. |
| Local Governments and Local Authorities (Provincial and District Departments of Construction – DOC - and Departments of Urban Planning - DUPA) | Local agencies responsible for monitoring EE compliance during and after the construction phase and reviewing EE compliance against previously defined zone restrictions for new development, urban development plans, and environmental ordinances who will be involved in and benefit from capacity building on integration of EE in project design, energy auditing and certification of EE compliance. |
| Center for Energy Efficiency in Buildings (CEEBS) | CEEBS under MOC will be involved in gathering relevant data, delivering technical training for energy managers, energy auditors, and conducting research and development on EE in buildings. CEEBS' capacity will also be enhanced through knowledge sharing during training and workshops. |
| Energy Conservation Centers (ECCs) in Hanoi and Ho Chi Minh | Local agencies responsible for provision of research, consultation and capacity building to government and private sector organizations to implement EE&C. ECCs has already been involved in development of energy database and energy benchmarking for buildings. |
| Academia (Hanoi University of Architecture, HCMC University of Architecture, National University of Civil Engineering, and other universities and institutes) | Universities and institutes will be involved in the development of capacity building for organizations and individuals involved in design, development and implementation of EE buildings. |
| Building Developers (Vietnam National Construction Consultants Corp., CONINCO., JSC, Housing and Urban Development Corporation) | Building developers will be involved in strengthening EEBC compliance during the design phase of new construction projects, and co-financing EE technologies and application in demonstration projects. Building developers will also benefit from capacity building, training, workshops and seminars. |
| Building Practitioners (Designers, Design Consultants, Building Sector Consultants, Contractors, Operators) | Building practitioners (organizations and individuals) play critical roles in delivering EE performance of buildings. They will be engaged in development and implementation of capacity building programs and development of demonstration projects. They will be identified and firmed up during project implementation. |

| Stakeholders | Role |
|--|--|
| Viet Nam Association of Civil Engineering Environment (VACEE), Viet Nam Association of Architects (VAA) and Viet Nam Green Building Council (VGBC) | Professional and industry association will play an active role in disseminating information and raising the awareness of different stakeholders on EE in buildings by using their current networks, and participate in development of demonstration projects. |
| Technology/Equipment Suppliers | These are partners for promoting EE and training/ workshops/ seminar activities. They will also support project activities with their expertise on technology and equipment through EE equipment exhibitions and by identifying demonstration opportunities. |
| Other stakeholders such as building owners, energy managers, groups of building technical managers (e.g. hotel chief engineers) tenants and occupants who directly pay for the energy consumed | These stakeholders will support investment (co-financing) in EE technologies, materials and products that can reduce their energy costs. Co-financing commitments have been provided by the following buildings which will participate as demonstrations: HITC Building, Hanoi Sheraton Hotel, Melia Hanoi Hotel, FPT telecom Building, JW Marriot Hanoi Hotel, Majestic Hotel, Cendeluxe Hotel, Michelia hotel, Vinpearl Resort, Somerset Service Apartment, Riverside Renaissance Hotel, Intercontinental Hotel, and Pedagogical University of HCMC. |

17. Figure 2 below illustrates key agencies involved in EEBC development and enforcement. MOC which is the state management authority was mandated to formulate the EEBC, while its enforcement is under the mandate of DOCs, the provincial level authorities. This implementation approach relies heavily on effective and seamless coordination between the state management authority (MOC) and provincial enforcement authorities (DOCs).

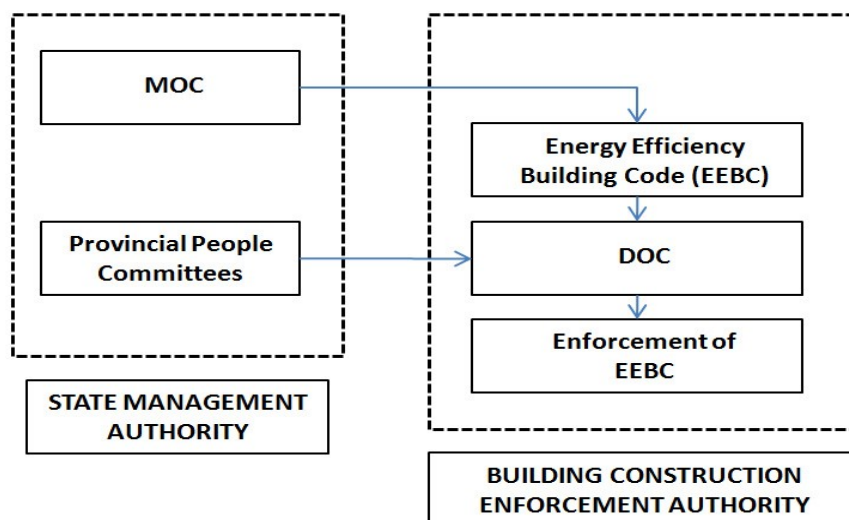


Figure 2: Coordination structure - EEBC Enforcement Authorities

1.4 BARRIER ANALYSIS

18. Similar to many developing economies, implementation of mandatory technical requirements in Viet Nam has encountered a long list of technical, financial and

informational barriers. Based on stakeholder interviews, requirements stipulated in the 2005 EEBC are technically complex. Together with limited technical capacity and low awareness of building practitioners (building designers, contractors, and operators), implementation of the 2005 EEBC have virtually been stagnant. To enhance the effectiveness of EEBC implementation, the Department of Science, Technology and Environment, under MOC, together with the Viet Nam Association of Civil Engineering and Environment, began development of an improved version of the EEBC in 2012. The revised Vietnamese EEBC (QCVN 09:2013/BXD) was later approved and enacted by MOC in late 2013 (under Circular No. 15/2013/TT-BXD).

19. The revised EEBC provides mandatory technical standards to achieve energy efficiency in the design and construction or retrofit of buildings (office buildings, hotels, hospitals, schools, retails, department stores, residential buildings, among others), with gross floor area of 2,500 m² or larger.
20. It is found during the PPG stakeholder consultation that although DOCs and building practitioners are aware of the existence of the revised EEBC, technical knowledge on compliance evaluation is somewhat limited. It has been widely recognized by MOC, DOC and other stakeholders in the building industry that additional support mechanisms are not currently available to ensure the implementation effectiveness of the revised EEBC, and to promote the EE building design beyond the EEBC requirements. For instance, comprehensive capacity building and awareness programs for regulators and building practitioners, intelligent and user-friendly decision support tools, guidelines and accessible technical supports that would assist the compliance process, fiscal and non-fiscal incentives that would stimulate interests of developers and investors in going beyond the code requirements, and proven savings as the results of compliance with EEBC or even beyond the code requirements.
21. Although support mechanisms have been initiated through the baseline projects discussed in the proceeding section they are unlikely to effectively and completely remove the barriers at a pace required to implementation of the revised EEBC and promotion of EE in the building sector. This can be attributed to various reasons highlighted below:
 - Training and capacity building activities have been implemented by consultants in an ad-hoc manner. Institutional frameworks to support sustainable training and capacity building have not been systematically addressed by ongoing activities.
 - Each training workshop organized to date has been in a form on a one-day event which is unlikely to build in-depth knowledge and understanding of participants in, for instance, using and applying the compliance checklist and EE building designs.
22. Considering this, several barriers hampering effective implementation of the revised EEBC and promotion of EE in the building sector have not yet been addressed, and it is questionable if energy savings and GHG emission reductions will be realized over the next few years. Table 4 below summarizes the barriers identified during the project development stage. These barriers will be individually or collectively addressed by the Project activities discussed in the strategy section.

Table 4: Summary of Barriers on Implementation of EEBC and EE in the Building Sector in Viet Nam

| Policy/Regulatory Barrier |
|---|
| <p>Lack of Capacity to Develop Comprehensive Supporting Mechanisms and Tools for EEBC Compliance: Following the approval of the revised EEBC (2013), MOC with technical support from international donor agencies has initiated activities to develop technical regulations, guidelines and standards for supporting DOCs and other stakeholders (such as building practitioners) in meeting the requirements specified in the revised EEBC. Note that the guideline documents appear to be a simplified version of various requirements stipulated in the revised EEBC, and the compliance checklist tool is only available as an Excel spreadsheet tool. These guidelines and tools were launched after mid-2014, and information on effectiveness of these basic tools for different groups of users (e.g. regulators, architects, designers, and contractors) is not available during the preparation of the project document.</p> <p>Based on stakeholder interviews during the project document preparation phase, DOCs, building project developers and building designers do not understand the process of monitoring, verification and evaluation of EEBC compliance, e.g. when and how compliance checking and inspections shall take place, and what would be penalties and other consequences imposed for non-compliance buildings. Considering this, the more comprehensive step-by-step guidelines on the code tailored to match needs of different groups of users (e.g. regulators and designers), the more likely it is to be accepted, understood and used properly.</p> |
| <p>Lack of Resources for Upgrading EEBC Requirements: There are ongoing developments in building construction materials and construction techniques, as well as energy efficient appliances and equipment commonly used in buildings. Moreover, seasonal climatic variations in the Northern and Southern regions of Viet Nam are significantly different, and different building construction requirements may need to be considered for these two regions. Considering this, it is necessary to periodically review and upgrade relevant EEBC requirements to reflect these new developments. To date, MOC has limited resources and capacity in this respect, and has not yet prepared a roadmap for review and upgrading EEBC requirements.</p> |
| Technical Barrier |
| <p>Lack of Technical Capacity in Energy Efficient Building Design: The adoption of, and transition to the application of modern energy efficient designs and techniques/practices is a slow process due to requirements to build in-country capacities. Concerns regarding shortage of technical experts and consultants as well as skillful workforce providing building energy efficiency related services have been expressed by building regulators, developers and designers in Viet Nam. For example, DOC personnel assigned for verification of building designs prior to issuance of building construction permissions are mainly architects whose technical knowledge on civil and electrical engineering may need to be strengthened to cope with the requirements of the revised building code.</p> |
| <p>Lack of Credible Information on Energy Efficient Building Products and Equipment: Although a wide range of energy efficient equipment and materials are already available in Viet Nam, only energy efficiency data of electrical appliances and lighting products has recently been verified by MOIT. The energy efficiency data of building construction materials in Viet Nam are based mostly on suppliers' and manufacturers' claims, and scattered among suppliers and users without a centralized database for easy access. To date, there have been no efforts in verifying, consolidating or connecting this important information to the revised EEBC. The scarcity of "credible" information on energy performance, hinder the selection of appropriate building materials and equipment, especially those meeting or exceeding requirements specified in the revised EEBC.</p> |

Lack of Tools and Guidelines for Technical Assessment and Evaluation: Although the revised EEBC issued in 2013 provides details on material specifications and calculations of thermal resistance, local building practitioners and stakeholders still cannot apply relevant computation during the building design phase. Implementation experience in many countries have shown that development of tools and guidelines that assist regulators and designers in conducting technical assessments and evaluations will greatly improve the effectiveness of EEBC implementation.

Lack of Competent Energy Service Companies (ESCOs) to Support EE Investments in the Building Sector: Existing ESCOs in Viet Nam are merely engineering consulting firms with limited experience in operation and management of energy performance contracts. Capacities of local ESCOs are restricted to design rather than implementation and verification of actual projects, and building managers and developers are not convinced to engage ESCOs to support design and implementation of EE projects.

Information and Knowledge Barrier

Lack of Knowledge of the Revised EEBC: Stakeholder interviews during the project document preparation phase show that a number of regulators (DOCs), building developers, and building designers are basically aware of the revised EEBC, however understanding and knowledge regarding the requirements specified in the EEBC are highly questionable. With this situation, designers and building owners/developers pursue the building design concepts without EE in mind. This is a critical barrier to effective implementation of energy efficient building designs in the long term.

Lack of Awareness of Energy Efficiency Opportunities: Average Specific Energy Consumption (SEC) for different types of commercial and high-rise residential buildings in Viet Nam do exist (mainly from ad-hoc surveys and simulations). However, benchmarking guidelines and detailed up-to-date SEC data and statistics for comparison which can help building designers and users to assess the energy efficiency of their buildings and develop strategies to improve it further are not available. The building practitioners (designers/architects, engineers, owners/managers) are in general unaware of energy efficiency opportunities and cost effective techniques and therefore are not able to realize the benefits.

Lack of Easy Access to Information on Commercial Building EE: There is no easily accessible information on EE building, e.g. comprehensive real life case studies; technology demonstrations and information; index of professional services and suppliers; financing information/opportunities; information offices with professional experts to guide and support e.g. building owners or developers; regular and sufficiently detailed up-to-date statistics and energy performance information for buildings for comparison and benchmarking

Lack of Successful Demonstrations on Cost-Effective, New and Innovative Building EE Concepts: There are few real life building projects that demonstrate how to go about making a building energy efficient in the long run (both new built construction and retrofit projects). There are very few projects that showcase cost-effective and sustained EE performance levels of buildings following the commissioning period, and also on the utilization of state-of-the-art technologies to further improve EE in a cost effective manner.

Institutional Barrier

Lack of Institutional Arrangement to Support Capacity Building and Dissemination of Information on EE Buildings: Knowledge and know-how on EE building designs, constructions, operations and managements in Viet Nam reside in different institutes and organizations, e.g. universities, Energy Conservation Centers (ECCs). Accessing information and data, particularly those relevant to EEBC from different places are time consuming while availability and quality of findings cannot be guaranteed.

Financial Barrier

Absence of Effective Financing Models for Building EE Investments: Financing commercial building EE projects in Viet Nam is generally treated as regular financing, and in general the collateral financing approach is applied. Suitable and effective financial mechanisms and fiscal products (e.g. off-balance sheet financing, tax incentives) to support EE buildings designs and investments are not yet available in Viet Nam. Recent economic slowdown in the country has further hampered interests of government and private financial institutes to introduce new and innovative financial products for building developers and investors.

Market Barrier

Lack of Market Incentives for Development of EE Buildings since tenants do not have demand for EE buildings: Office space for rent constitutes a major portion of the overall stock of commercial and high-rise residential buildings in Viet Nam, and similar to other countries, building developers and investors are not responsible for utility costs. Energy efficiency and green buildings have not yet been the key criteria sought by tenants, therefore building developers and investors in Viet Nam rarely integrate EE features in their new project developments.

Unattractive economic benefits of EE investments for electricity end-users due to subsidized electricity tariffs: Although electricity tariffs in Viet Nam have been on the rising trend since 2011, the tariff has not yet reflected the true generation, transmission and distribution costs, and the electricity prices remain low in comparison with other countries in Southeast Asia. The low electricity prices have concealed the real and attractive economic benefits of EE investments, and electricity end-users usually do not consider EE investments as priority actions.

23. The identified barriers were discussed, verified and confirmed during a consultation workshop that was conducted in early August 2014 with the project stakeholders. These barriers as well as the associated root causes will be addressed through a combination of complementary activities presented in the Strategy section. The project framework design which was initially presented in the approved PIF was discussed and revised during the workshop. The project activities to address the aforementioned issues/concerns were also reviewed and confirmed. The agreed project results framework is shown in Section II.

1.5 BASELINE ANALYSIS

24. The project baseline primarily consists of the activities, projects and programs on energy efficiency improvements as well as ongoing initiatives aimed at creating an enabling environment to facilitate related climate change mitigation efforts that specifically emphasize EE in the buildings sector. Following the approval of the revised EEBC 2013, several programs, projects and activities have been initiated to strengthen its enforcement. As for those ongoing and planned activities, projects and programs that complement the Project, relevant activities from these have been considered as baseline activities and are discussed below.
25. The Ministry of Construction (MOC) has been spearheading a wide range of ongoing projects and activities primarily focused at capacity development, awareness and piloting buildings to showcase EEBC compliance. Through the “Promotion of Energy Efficiency in Vietnam Building Sector Project” (2013-2017) MOC is initiating activities such as (a) development and implementation of green building regulations and incentives, e.g. basic compliance checklist with revised EEBC for building designers and provincial departments of construction (DOCs); (b) drafting and issuing a circular guiding the implementation of the revised EEBC; reviewing and developing incentive and penalty schemes; (c) organizing introductory training courses on the revised EEBC for officers of DOCs in 63 provinces; (e) demonstrating EEBC compliance in 3

buildings each in Hanoi, Danang and HCMC; (f) formulating National Green Building Strategy; and, (g) testing an EE building sustainability module within a tertiary level (e.g. university) curriculum. The project budget is US\$ 1.7 million.

26. Similarly, through the “Low Carbon Transition in Energy Efficiency Sector Project” (2014-2016), the Ministry is specifically targeting building practitioners by (a) developing technical regulations, guidelines and standards for enforcement of EEBC; (b) conducting capacity building trainings for construction licensing officials at the central level and at the provincial level; (c) monitoring and inspecting compliance activities i.e. deployment of the building code; adjustment of policy, regulation and operating procedures; and, (d) demonstrating EEBC application in two buildings in northern and southern areas. The budget for this project is US\$ 700,000.
27. The recently launched Viet Nam Clean Energy Program (VCEP, 2014-2018) budgeted at US\$ 3m and implemented by the MOC aims to assist in the implementation of the National Green Growth Strategy to reduce long-term emission in the building sector. Relevant activities include formulation of building energy performance database as well as development of energy efficiency benchmark for types of typical buildings in different climate zones.
28. In parallel, the project on “Strengthening Capacity and Institutional Reform for Green Growth and Sustainable Development in Viet Nam” (CIGG, 2015-2018) is being implemented by the Ministry of Planning and Investment (MPI) in collaboration with UNDP Viet Nam. The project supports activities such as (a) design and implementation of MRV for tracking and reporting of mitigation actions and GHG emission targets; (b) design training of trainers program on climate change and green growth with pilot training in one province. The training materials and program will be adjusted to cover energy efficiency in the construction sector. The baseline project will also undertake policy analyses in energy intensive end use sector as inputs for policy discourse. It also includes review of banking sector products and tools; capacities of commercial banks to process buildings EE investment applications. The project envisions to assess existing investment funds, environmental protections funds and foreign funds, and, identify gaps and opportunities for green investments and lending. Eventually, it plans to introduce a green growth investment network to facilitate dialogue and information-sharing and best practices between private sectors, investors and government officials. Training and technical support are being envisaged for project developers, private sector and investors to get access financial mechanisms supportive of green projects.
29. Capacity Building for Implementation of National Climate Change Strategy Project (CBICS, 2014 – 2017) with a budget of USD 4.6 million is being implemented under the flagship of MONRE & MARD with technical and financial support from UNDP Viet Nam. The project aims to build capacity in planning, implementation and monitoring of the National Strategies on Climate Change. The beneficiary of the trainings will be the National Committee on CC Office and CC focal points at ministries including the Ministry of Construction. The project aims to strengthen the management, coordination and information sharing within the framework of the National Strategy on Climate Change – this includes sharing of relevant data and information from the energy sub-sector such as the construction sector. It also includes formulation and implementation of training courses on major energy intensive sectors for target groups (e.g., local officials, managers and technicians) from the central to the local levels including the Standing Committee of the National Assembly, National Assembly deputies, the Party Central Propaganda Commission, the Ho Chi Minh National Academy of Politics and Public Administration, ministries, local governments, NGOs, scientists and businesses.

30. MOC is currently coordinating with DOCs to fully implement the revised EEBC, and training programs to enhance awareness and knowledge of regulators (DOCs) and building practitioners on requirements and enforcement of the revised EEBC have been implemented by MOC. An EEBC compliance checklist based on Excel spreadsheets aims at assisting regulators and designers in the compliance checking process is part of the training. Although supporting regulation, tools and capacity building programs are being developed or implemented through the baseline activities to facilitate the implementation of the revised EEBC, it is clear that each group of stakeholders involved in different phases of a building construction project has different level of knowledge and capabilities, therefore a single toolkit will not fit well with all stakeholders.
31. Considering a fast pace of EE technology development, shorter product life cycle, or even impacts of climate change these days, requirements stipulated in the revised EEBC issued in 2013 will become outdated sooner than expected. Therefore, it is important for MOC to lay out a medium and long-term plan to review and improve the revised EEBC over the next five to ten years to reflect development of EE technologies and new construction techniques. Currently, there are two relevant building certification schemes/programs in Viet Nam, i.e. the LOTUS Certification promoted by the Viet Nam Green Building Council (VGBC), and the EE Buildings Contest initiated by MOIT. Although there are some overlapping efforts on the ongoing certification schemes and the EEBC in Viet Nam, there are no assessment on how the existing schemes would complement the enforcement and implementation of the revised EEBC, and promote EE in commercial and high-rise residential buildings in a sustainable manner.
32. Several studies on building SEC have also been undertaken in the past where the resultant SEC data produced by these studies have been generally presented in kWh/m²/year. Although some SEC studies show minimum, average and maximum SEC for different types of buildings, available SEC data is not sufficient to perform comparative analysis and determine specific ranges or profiles of SEC for high EE or low EE buildings of the same type, e.g. average SEC values for the top 20% most energy efficient office buildings. In addition, SEC data for buildings of the same type but different utilizations, such as 4-star hotels with accommodation services versus catering services, should be segregated to enable real 'apple-to-apple' comparison. However, these levels of detailed data are not available from the previous SEC studies. The results and lessons learned from completed projects and activities will serve as rationale for implementing the project activities.

Baseline Scenario:

33. Considering various ongoing activities that directly and indirectly enhance EE in the building sector in Viet Nam, the baseline scenario is a continuation of the present business as usual situation, which follows from existing government policy, activities, legislation and institutions/mandates. The baseline, or business-as-usual (BAU), scenario will most likely be characterized by the following:
 - Stock for each type of non-compliant commercial and high-rise residential buildings in Hanoi and Ho Chi Minh City (HCMC) will increase at the same average annual growth rate from 2012 onward;
 - The revised EEBC in Viet Nam approved in late 2013 has not yet been fully enforced due to lack of sustainable supporting implementation mechanisms. Although training tools and materials were developed, and several introductory workshops have been organized, these activities were implemented with limited in-

depth learning and involvement of local institutions, for examples, all introductory and training workshops were designed as one-day workshops, and all sessions were conducted by international and national consultants. In the baseline scenario, these initial supporting mechanisms will not be sustained after conclusion of these activities. It is envisaged that only 20% of new buildings constructed each year meet all requirements as stipulated in the revised EEBC¹⁶;

- Implementation of capacity building programs that offer in-depth knowledge and understanding on the revised EEBC and respective EE building designs is limited, leaving majority of building practitioners with inadequate knowledge to deliver EE building designs and implementation;
 - Promotion of EE buildings continue to primarily focus on code compliance of buildings and weak promotions for EE building designs that target “beyond code” requirements for commercial building designs;
 - Continued difficulty to access financing for building EE projects due to small project size to justify high transaction costs of the financial institutions, collateral based project financing modalities, lack of innovative financing mechanisms and an appropriate guarantee facility;
 - Owners and managers of some types of buildings (e.g. office buildings) are somehow not interested in EE retrofitting due to highly subsidized electricity price, relatively short daily operating hours and hence longer payback period in comparison with normal practice adopted by other end-use sectors, e.g. the industrial sector;
 - Successful demonstration showcases will remain few, mainly focused on EEBC designs of new buildings, and building EE retrofits. The dissemination of the results to relevant target groups remains ineffective due to lack of comprehensive monitoring and evaluation results;
 - Information on new and innovative building EE technologies and suppliers/experts remains scattered and hard to find. This will continue to hamper the market access and effectiveness; and,
 - Energy management efforts in buildings will remain low priority to building owners;
 - Less than 5% of the overall commercial and high-rise residential building stock implementing EE retrofits.
34. Under the BAU scenario (without the GEF project), new commercial and high-rise residential buildings that will be built in Hanoi and HCMC each year will comprise non-EEBC compliant and fully EEBC compliant buildings. For new buildings that will be fully compliant with the revised EEBC (2013), energy consumption will be reduced by 12% to 22% depending upon building types in comparison with the typical and non-compliant designs. For non-compliant buildings, SECs is expected be more or less similar to the current building energy performance. The assumption on SECs for typical building designs without EEBC compliance and EEBC building designs are given in Table 5. It is also assumed that without interventions of the Project the SECs highlighted below will be gradually reduced at the rate of 0.5% per year due to introduction of better quality building construction materials and building equipment, as well as better building design techniques.

¹⁶ Under the BAU scenario, compliance with the EEBC would only be expected to increase marginally, to an estimated 20% over the next 10 years due to the training provided under VNEEP and relevant activities in the building sector undertaken by TA funded by IFC/WB, DEA and USAID.

Table 5: Assumption on SEC of Typical Building Designs and EEBC Compliance Buildings

| Building Type | Average SEC (kWh/m ² /year) | | % EE Improvement due to EEBC Compliance ^{1/2} |
|---------------------------------------|---|-------------------------|--|
| | Typical Building Design (non-EEBC Compliant) ^{1/1} | EEBC Compliant Building | |
| Office and Government Building | 164 | 128 | 22% |
| Education | 95 | 80 | 16% |
| Hospital | 132 | 116 | 12% |
| Hotel | 200 | 158 | 21% |
| Residential | 38 | 33 | 14% |
| Retail & Commercial | 280 | 238 | 15% |
| Weighted Average for All Types | 190 | 155 | 23% |

Note: ^{1/1} SEC values of typical non-EEBC compliant building designs are based on surveyed and modeling data summarized in Table 2.

^{1/2} % EE improvements due to EEBC compliance are based on the assessment of energy savings from the revised building energy code of Thailand published in 2010 by the Joint Graduate School of Energy and Environment, and School of Energy Environment and Materials, King Mongkut's University of Technology Thonburi, Thailand

35. The total electricity consumption by the service (commercial, hotels and restaurants) and residential sector, as reported by EVN is about 41,500 GWh in 2010. The energy consumption of the building sector in Hanoi and HCMC based on analysis of building stock and SEC is estimated at about 1,290 GWh in 2016, and this is forecast to increase to 1,874 GWh by end of the project in 2019. The CO₂ emissions from the building sector in Hanoi and HCMC due to electricity consumption are expected to be about 795 ktons in 2016 and 1,155 ktons by end-of-project. Figure 3 shows the business-as-usual forecast energy consumption and CO₂ emissions in the building sector in Viet Nam.

36. Without the project, improvements in building energy performance will only come slowly in pace with partial enforcement of the revised EEBC and phasing out of obsolete technologies, rather than being at the forefront of technology development. This is largely a consequence of the fact that without awareness/knowledge of the cost implications of design and construction of low EE buildings, without access to attractive and reliable financing to build better, without effective implementation of the revised EEBC, and without supportive networks of information, incentives and expertise, there is little pressure on the market to move faster than a least-building-construction-cost philosophy would demand.

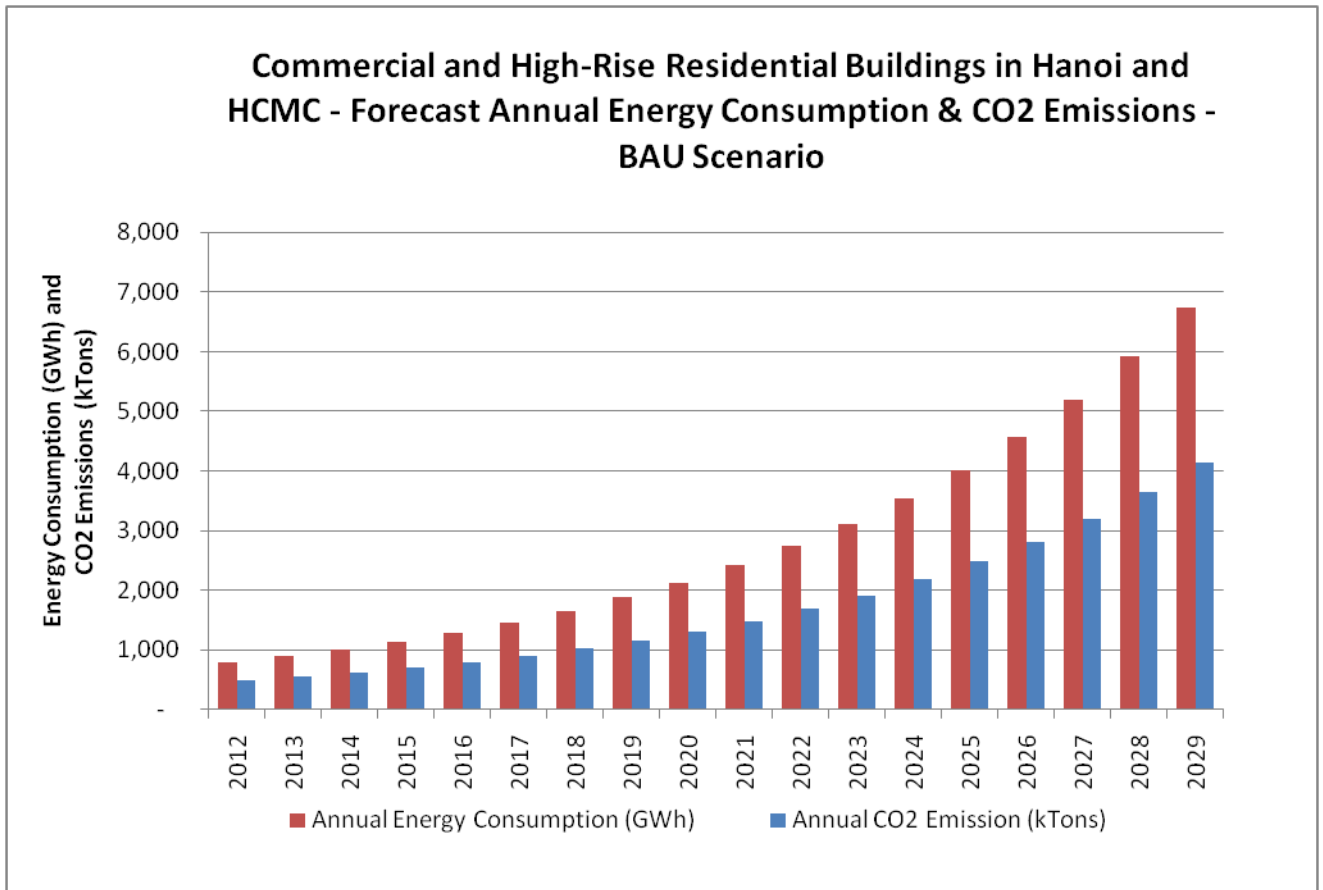


Figure 3: Business-As-Usual Energy Consumption and CO₂ Emission by Commercial and High-rise Residential Buildings in Hanoi and HCMC

PART II: STRATEGY

2.1 POLICY CONFORMITY

37. The project is aligned with the GEF Climate Change Objective 2: Promote Market Transformation for Energy Efficiency in Industry and the Building Sector. The project has been designed to contribute to all key expected outcomes, i.e. appropriate policy, legal and regulatory frameworks adopted and enforced; sustainable financing and delivery mechanisms established and operational, and; GHG emissions avoided.

2.2 PROJECT RATIONALE AND SUMMARY OF ALTERNATIVE SCENARIO

38. The baseline efforts to promote EE in the building sector in Viet Nam have delivered limited impacts to date due to unconnected strategies and unsynchronized efforts of state management and local enforcement authorities. Barrier analysis has revealed a number of cross-cutting issues to be addressed to remove barriers, including policy/regulatory, technical, information and awareness, institutional, financial and market barriers, and to enhance greater compliance of the EEBC and move forward the EE buildings in Viet Nam beyond the code requirements. It is widely recognized among building sector practitioners in Viet Nam that in order to transform the buildings market, a comprehensive policy package is required that aims to control (via restrictive regulations with sufficient lead time and guidance), motivate (via incentives), and call for attention (via awareness-raising).

39. The proposed alternative to the baseline scenario is an enhanced GHG emission reduction from Viet Nam's buildings sector. Under the alternative scenario, a number of activities will be implemented to improve EE in the Vietnamese building sector through various means, including strengthening of policies and regulatory regimes, strengthening of financial support mechanisms and capacity in financial institutions to engage in building EE projects, awareness raising and provision of tools and information, implementation of a number of building demonstration projects and dissemination of the results and technologies used, and strengthening of capacity of building practitioners to implement energy efficiency projects in buildings.
40. The realization of the alternative scenario will be manifested by the following:
- Strengthened implementation of the revised EEBC in Viet Nam through implementing regulations/guidelines and supporting technical tools, and compliance with the EE building code of new building constructions in Viet Nam's two main cities is expected to reach 50% by the end of the project;
 - Technical skills of DOC's staff in assessment of new design and retrofit building are improved; architects' and engineers' expertise on EE building through training and information provided by CEEBs is enhanced so that they will contribute significantly to increased number of EE buildings.
 - EE service providers and ESCOs are capable of implementing EE building project;
 - Enhanced access to certified and proven EE technologies for building designers, contractors and managers;
 - New and improved fiscal and non-fiscal incentives, as well as financial evaluation tools are introduced stimulating building owners/managers' interest in EE investments;
 - Enhanced awareness and strengthened capacity within decision makers and financial institutions on EE in buildings through among others a number of targeted communication campaigns;
 - Building regulators, developers, designers, contractors and managers are capable of benchmarking EE performance of their buildings against other local buildings of similar types and also against international practices, creating an enabling environment for market driven and self-motivated EE improvements;
 - Improved confidence in economic, environmental and social benefits of building developers, designers, contractors and managers in applying EE building technologies through proven results from a number of building demonstration projects.

In the alternative scenario, most of the new buildings that will be built in Viet Nam will primarily adopt better design approaches (building orientations, shading, natural lighting and ventilation) and commercially available EE building materials to comply with the revised EEBC 2013. The better design and construction practices can reduce the average SEC of large commercial buildings in Viet Nam, i.e. offices, hotels, hospitals and retail buildings, by 12% to 22%. It is envisaged that, as a result of the project activities, the percentage of new and retrofitted buildings which are compliant with the revised EEBC will increase from the current estimated 20% in 2015 to 50% by end-of-project. This is possible considering that all building construction materials and equipment are locally available and accessible, and application design practices are known well to building designers. This will be reinforced through the adoption of implementing regulations and guidelines, as well as supporting technical tools including building energy simulation and benchmarking models, together with the intensive awareness and educational campaigns. Moreover, it is also envisaged that, through the results of new financial mechanism, ESCO support, demonstration projects and dissemination activities, the percentage of the total building stock to implement EE projects will dramatically increase by end-of-project. Summarized in the table below are

comparison of baseline and alternative (GEF supported) scenarios adopted in the project document.

Table 6: Comparison of Baseline and Alternative (GEF supported) Scenarios

| Description | Baseline Scenario | Alternative Scenario (EECB) |
|---|--|---|
| Growth rate of building stock in Viet Nam | BAU | |
| Compliance with the revised EEBC | 20% | 50% |
| Awareness and knowledge on EEBC and EE building Designs | Inadequate awareness and knowledge on EEBC and EE building designs | Improved awareness, knowledge and technical skills of DOCs and building practitioners nationwide on EEBC and EE building designs strengthening the effectiveness of EEBC enforcement |
| Access to financial support for EE building implementation | No fiscal incentive and policy to support EE building design and implementation | Fiscal incentives and financial evaluation tools are accessible to developers and practitioners, stimulating greater EE investments in the building sector |
| Confidence in economic, environmental and social benefits of EE building investments | Limited number of successful demonstration projects on EE buildings, no monitoring and verification data available | Improved confidence in economic, environmental and social benefits of building developers, designers, contractors and managers in applying EE building technologies through proven results from a number of building demonstration projects |
| Access to EE technologies for buildings | No access portal available | Enhanced application of EE technologies, EE building materials and practices. |

41. The estimated annual electricity and GHG emission savings from commercial and high-rise residential buildings in Hanoi and HCMC by end-of-project in 2019 will be 32 GWh, and approx. 20,000 tCO₂e respectively. Table 7 summarizes direct and cumulative electricity and GHG emission savings estimated based on the GEF EE Tool.

Table 7: Electricity and GHG Emission Savings

| Parameter | Annual | | Cumulative | |
|--|--------|--------|------------|-----------|
| | 2016 | 2019 | 2016-2019 | 2020-2029 |
| Direct Electricity Savings (MWh) | 1,947 | 32,495 | 61,137 | 322,395 |
| Direct GHG Emission Savings (tCO₂) | 1,200 | 20,028 | 37,680 | 198,701 |

| Parameter | Annual | | Cumulative | |
|---|--------|------|------------|-----------|
| | 2016 | 2019 | 2016-2019 | 2020-2029 |
| Direct Post-project GHG Emission Savings (tCO2) | | | | 961,277 |
| Indirect Bottom-up Emission Savings (tCO2) | | | | 123,069 |
| Indirect Top-down Emission Savings (tCO2) | | | | 236,382 |

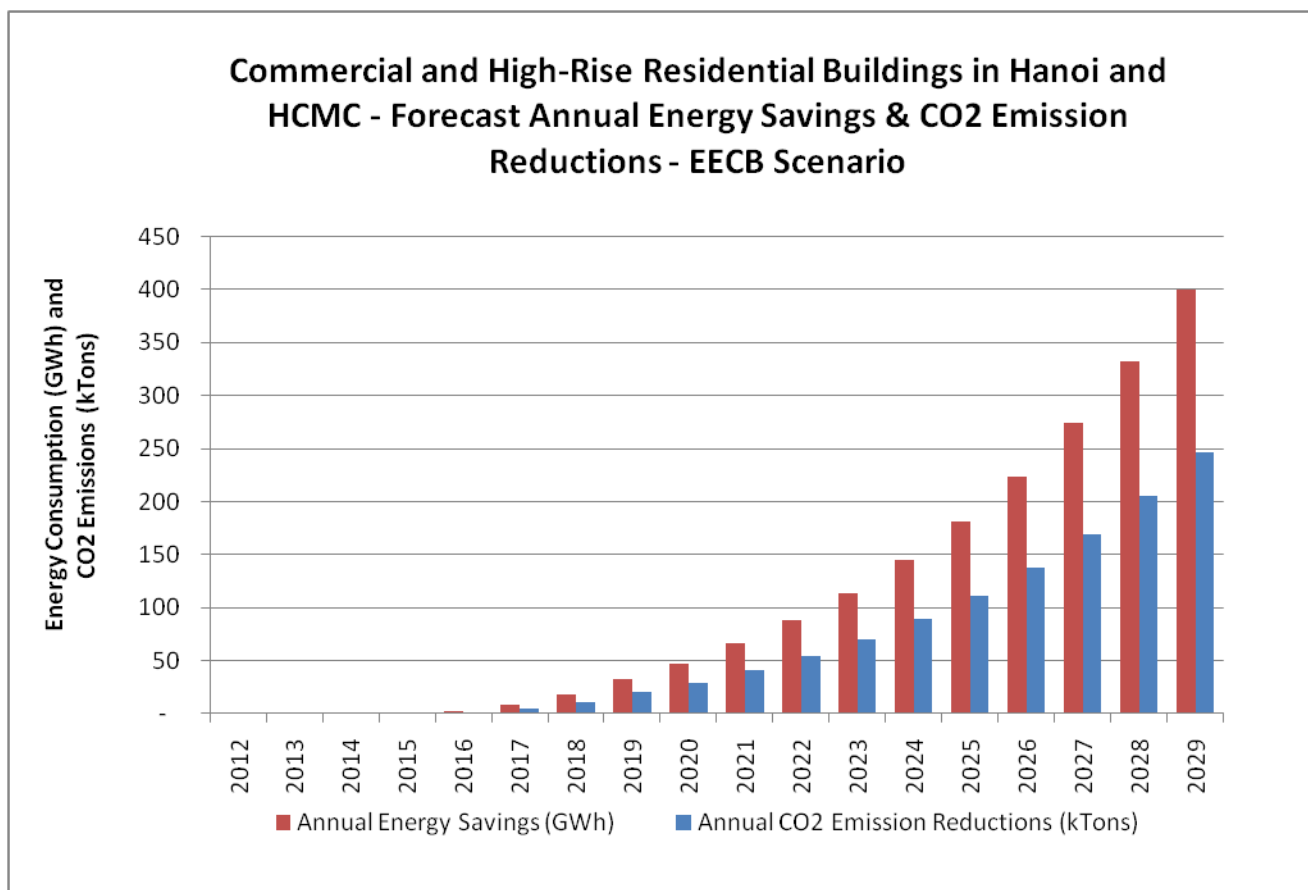


Figure 4: Annual Electricity Savings and CO₂ Emission Reductions from Commercial and High-rise Residential Buildings in Hanoi and HCMC in the Alternative Scenario

2.3 PROJECT GOAL, OBJECTIVE, OUTCOMES AND OUTPUTS

42. The “Energy Efficiency Improvement in Commercial and High-Rise Residential Building in Viet Nam” Project has the goal to reduce intensity of GHG emissions from the building sector in Viet Nam. The project objective is to improve the energy utilization performance of commercial and high-rise residential buildings in Ho Chi Minh and Hanoi. The primary target buildings are those with gross floor areas exceeding 2,500 m², including government and private sector offices, hotels, hospitals, shopping centers, educational institutes, condominiums and service apartments. The realization of this objective will be facilitated through the removal of barriers to the stringent enforcement of the revised EECB, and to the greater uptake of building energy efficiency technologies, systems, and practices.

43. Specifically, the proposed project will reduce carbon emissions by an estimated 20 ktons of CO₂ per year by end of the project (cumulative total of about 37.7 ktons of CO₂ up to end of project). Ten years after the project end, CO₂ emissions are forecast to be about 6% lower in annual emissions than in the absence of the Project.
44. The Project objective will be achieved through implementation of three (3) components each consisting of a number of complementary activities designed to remove barriers to the widespread adoption of the recently revised EEBC and applications of EE technologies in the building sector in Viet Nam.
 - Component 1: Improvement and Enforcement of Energy Efficiency Building Code
 - Component 2: Building Market Development Support Initiatives
 - Component 3: Building EE Technology Applications and Replications

The abovementioned components will address the barriers discussed in the barrier analysis section, and expected outcomes of the three components are the following:

- Enforced, improved and comprehensive policy, legal, and regulatory frameworks on the energy efficient design, construction and operation of commercial and high-rise residential buildings;
- Strengthened compliance of the energy efficiency building code for commercial and high-rise residential buildings in Hanoi and HCMC;
- Increased local capacity in the EE design, construction, and operation of commercial and high-rise residential buildings;
- Increased use of EE building materials and application of EE building technologies in Hanoi and HCMC.

The abovementioned outcomes will all collectively lead to greater adoption of EEBC in the building sector in Viet Nam, and will be realized through the delivery of complementary outputs that would result from the activities that will be carried out under the proposed project. The diagram on the following page shows linkages between components, outcomes and outputs. Details on outcomes, outputs and activities of each component are discussed under the project activities section.

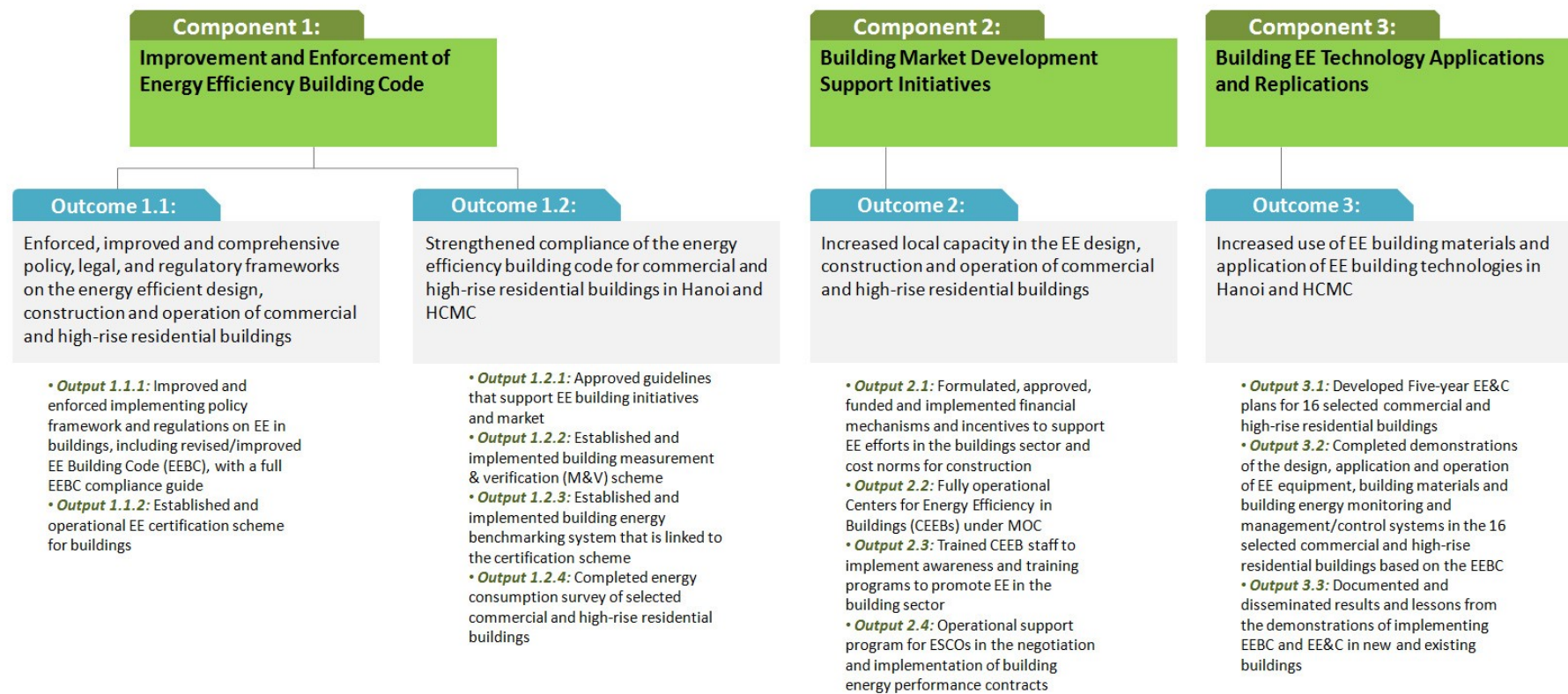


Figure 5: Components, Outcomes and Outputs of the EECB Project

2.4 PROJECT ACTIVITIES

45. The following paragraphs describe the various activities under each project component.

COMPONENT 1: Improvement and Enforcement of Energy Efficiency Building Code

46. Under Component 1, capacities of MOC and DOCs will be strengthened through improved policy support mechanisms, standards, and guidelines regarding enforcement of EEBC in Viet Nam. Advocacy and promotional activities will also be implemented to lobby and secure government approval of the improved policy support mechanisms. In addition, comparative energy performance schemes (energy benchmarking and certification) for buildings will be developed to energize building stakeholders to advocate EE building initiatives in Viet Nam.
47. This component will comprise activities on: development of computerized compliance toolkits (software and web tools) and guidelines; development of standards and database for construction materials and EE appliances and equipment; preparation of technical studies to implement an enhanced version the revised EEBC with higher EE performance target and specific requirements for different climatic zones; development of Monitoring and Verification (M&V) scheme; conduct of Specific Energy Consumption (SEC) studies and development of SEC database, and; development of a comparative energy certification/labeling scheme.
48. The successful implementation of the envisioned activities will deliver the necessary outputs that would contribute to the realization of the following expected outcomes: Outcome 1.1: Enforced, improved and comprehensive policy, legal, and regulatory frameworks on the energy efficient design, construction and operation of commercial and high-rise residential buildings, and; Outcome 1.2: Strengthened compliance of the energy efficiency building code for commercial and high-rise residential buildings in Hanoi and HCMC. The respective outputs of the outcomes under Component 1 are summarized in Table 8.

Table 8: Expected Outcomes, Outputs and Activities of Component 1

| Expected Outcomes | Expected Outputs | Proposed Activities |
|---|---|--|
| Outcome 1.1: Enforced, improved and comprehensive policy, legal, and regulatory frameworks on the energy efficient design, construction and operation of commercial and high-rise residential buildings | Output 1.1.1: Improved and enforced implementing policy framework and regulations on EE in buildings, including revised/improved EE Building Code (EEBC), with a full EEBC compliance guide | Activity 1.1.1.1: Development of compliance guidelines and toolkits Activity 1.1.1.2: Development and promotion of testing standards and energy performance data for building construction materials and end-use equipment Activity 1.1.1.3: Preparation of technical and economic justifications, roadmap and action plan to strengthen EE promotions in the building sector in Viet Nam Activity 1.1.1.4: Implementation of advocacy and promotional programs for the EEBC compliance guide |
| | Output 1.1.2: Established and operational EE certification scheme for buildings | Activity 1.1.2.1: Development an EE certification approach/methodology for buildings Activity 1.1.2.2: Design and implementation of a building certification/labeling scheme |

| Expected Outcomes | Expected Outputs | Proposed Activities |
|---|--|--|
| Outcome 1.2: Strengthened compliance of the energy efficiency building code for commercial and high-rise residential buildings in Hanoi and HCMC | Output 1.2.1: Approved guidelines that support EE building initiatives and market | Activity 1.2.1.1: Development of beyond-code guidelines for a higher level of EE in building designs and operations Activity 1.2.1.2: Promotion and implementation support of beyond-code guidelines to target users |
| | Output 1.2.2: Established and implemented building measurement & verification (M&V) scheme | Activity 1.2.2.1: Development and implementation of M&V scheme |
| | Output 1.2.3: Established and implemented building energy benchmarking system that is linked to the certification scheme | Activity 1.2.3.1: Development of SEC profiles for buildings Activity 1.2.3.2: Development, establishment and implementation of building energy benchmarking system Activity 1.2.3.3: Development and implementation of Information Disclosure Program for commercial and high-rise residential buildings |
| | Output 1.2.4: Completed energy consumption survey of selected commercial and high-rise residential buildings | Activity 1.2.4.1: Selection of target commercial and high-rise residential buildings Activity 1.2.4.2: Conduct of energy consumption surveys of selected commercial and high-rise residential buildings |

49. The activities that will be carried out under this component will all contribute to the delivery of the abovementioned outputs, and details of each are described as follows:

Output 1.1.1: Improved and enforced implementing policy framework and regulations on EE in buildings, including revised/improved EE Building Code (EEBC), with a full EEBC compliance guide

50. The activities to deliver this output will collectively improve the enforcement of the 2013 EEBC through development of comprehensive implementation guidelines that will better fit knowledge and skills of key stakeholders, such as, regulators (e.g. DOCs), building project developers, building designers, to support administration and implementation of the revised EEBC. Different sets of compliance toolkits will be developed and tailored to suit characteristics and profiles of each user group. Adoption and utilization of the compliance guidelines and toolkits among different user groups will be assured through implementation of advocacy and promotional programs. The activities will also include technical support for MOC to lay out a medium and long-term plan to review and improve the 2013 EEBC over the next five to ten years to reflect development of EE technologies and new construction techniques. The output will be achieved through successful delivery of alternative activities as described below.

Activity 1.1.1.1: Development of compliance guidelines and toolkits

51. This activity involves the conduct of a comprehensive review of implementing guidelines available to support enforcement of the revised EEBC 2013 and implementation of EE in general in buildings, such as the EEBC user guide and the compliance checklist. Based on findings from the review, applicability and usefulness of the supporting guidelines and toolkits shall be substantiated, including: EEBC implementing guidelines/handbooks for different groups of building stakeholders (e.g. regulators, building developers, building designers, etc.); a customized building code

compliance software and web tools, capable of projecting SEC of buildings, associated investment costs and financial analysis, based on different parameters of building envelopes and energy end-use systems, and designed to best suits the requirements of users in Viet Nam; a comprehensive database of building construction materials and energy end-use equipment for buildings which could be an integral part of the building code compliance software.

52. Focus group meetings participated in by key stakeholders will be conducted to confirm relevance of compliance guidelines and toolkits, and conclude key elements and features which will best strengthen enforcement of EEBC and promotion of EE in buildings. As for the building simulation software, key features, functions and/or plug-in, should include but not necessarily limited to, database of local materials and equipment, weather database by geographical locations, economic evaluation function, and user friendly Graphic User Interface (GUI) in Vietnamese and English. The software will be able to support all types of commercial and high-rise residential buildings in Viet Nam.
53. This activity will also involve preparation of promotional and training materials for each set of guidelines and toolkits, e.g. an e-Learning module to enhance adoption and utilization of the building simulation software. The promotional and training materials produced under this activity will support the implementation of Activity 1.1.1.4.

GEF support is for the technical assistance required in the development of comprehensive implementation guidelines and toolkits, and respective promotional and training materials.

Activity 1.1.1.2: Development and promotion of testing standards and energy performance data for building construction materials and end-use equipment

54. Under this activity, MOC will coordinate with MOST to develop national test standards for priority building construction materials, and review available national test standards for building construction materials, as well as electrical appliances and equipment commonly used in buildings in Viet Nam to determine if necessary improvement should be undertaken. Following the development and improvement of national test standards, comprehensive energy performance testing for building construction materials shall be conducted by testing facilities designated by MOC and MOST. As for the end-use equipment, the project will coordinate with the ongoing energy standards and labeling program implemented by MOIT to determine additional energy performance testing required.
55. Following the testing phase, compilation of available energy performance data of building materials, electrical equipment and perhaps steam boilers commonly used in commercial and high-rise residential buildings in Viet Nam will be undertaken. These include, but not necessarily limited to, building construction materials (e.g. envelope materials, glazing, insulation and painting), as well as electrical appliance and equipment (e.g. lighting products, air-conditioners, water heaters, steam boilers). In addition to the testing data developed by this project, other potential information resources will include MOIT's energy standards and labeling program, previous testing and energy performance standards for electrical equipment and lighting products, and studies undertaken by GEF funded BRESL project, and certified testing data available from manufacturers, suppliers and accredited testing laboratories. Findings from this activity will be made available through the project website for public access, and integrated into the customized building simulation software developed under Activity 1.1.1.1. This activity will also involve preparation of promotional materials and training modules for the developed testing standards.

GEF support is for the technical assistance required in the review and development of national test standards for building construction materials and end-use equipment, and the conduct of energy performance testing.

Activity 1.1.1.3: Preparation of technical and economic justifications, and roadmap and action plan to strengthen EE promotions in the building sector in Viet Nam

56. This activity will involve an analysis of macro- and micro-level economic benefits of EE in new and existing buildings based primarily on comparison of typical building designs, constructions and operations in Viet Nam against the full compliance with the revised EEBC. The analysis will also include adoption of best commercially available EE technologies in designs, constructions and operations to understand the potential EE beyond the revised EEBC. Considering that seasonal climatic variations in the Northern and Southern regions of Viet Nam are significantly different, an analysis of different building construction requirements will be conducted for these two regions to assess EE potential. The building simulation software and energy performance database developed under the project will serve as the key resources in undertaking this activity.
57. Following the completion of the analysis, a review will be undertaken vis-à-vis the country's overall and sectoral EE targets, as well as international experience and lessons learned. Findings from the review and assessment will layout the key elements and targets of a roadmap and 5-year action plan for improvement of the EEBC and promotion of EE in the building sector in Viet Nam. The roadmap would also include possible improvements to best enforce EEBC in Viet Nam. The identified key elements and targets of the roadmap will be presented to and discussed with MOC's management level through formal and informal meetings. After the initial approval, detailed short and long term action plan will be prepared, and draft versions of the roadmap and action plans will be reviewed and discussed with relevant stakeholders in a national consultation workshop prior to conclusion and submission to MOC for the final approval.

GEF support is for the technical assistance required in the analysis of economic benefits, the review and assessment of the EE targets, and the preparation of the roadmap and 5-year action plan.

Activity 1.1.1.4: Implementation of advocacy and promotional programs for the EEBC compliance guide

58. This activity will involve preparation of comprehensive advocacy and promotional programs which will employ promotional and training materials prepared by other Activities (e.g. an e-Learning module to familiarize building practitioners and students in design schools and institutes with features and usage of the building simulation software). The comprehensive advocacy and promotional programs will take into consideration capacity of the newly established "Centers for Energy Efficiency in Buildings" (CEEBs) which will be engaged as appropriate, for example, CEEBs will be assigned as the service centers providing free-of-charge building design consultations for building developers in Hanoi and HCMC, and offer regular training programs for the revised EEBC and EE buildings in general for other stakeholders.
59. The promotional program related to policies and regulatory frameworks will primarily focus on direct communication with regulators, building designers, professional associations and design schools, and key communication activities would include

typical seminars and training workshops as well as online repository of documents produced under this outcome. The activity will also develop standard designs for specific types of commercial buildings which will be used during the training. As for the advocacy program, the project aims at demonstrating macro-level and provincial-level benefits of the revised EEBC 2013, as well as economic analysis (benefit-to-cost ratio) of different levels of EE implementations for building investors, developers and designers. Communication activities for the advocacy program will be in a similar nature as those of the promotional program, but will be in a smaller scale. In addition, a more focus and direct communication through round table and brown-bag meetings will be used in the advocacy program. It is envisaged that the advocacy program will secure necessary approvals at the state management level and the local enforcement authority level, and facilitate enforcement and implementation of compliance guidelines and toolkits, and the EEBC upgrading plan developed by the EEBC project.

GEF support is for the technical assistance required in the preparation and implementation of the advocacy and promotional programs.

Output 1.1.2: Established and operational EE certification scheme for buildings

60. This output will facilitate the development and implementation of an EE certification approach/methodology for buildings and a subsequent building certification/labeling scheme. The EE certification approach/methodology will also strengthen the EE certification component in larger building certification schemes/programs in Viet Nam, e.g. the LOTUS certification promoted by the Viet Nam Green Building Council (VGBC). The following activities will contribute to the realization of Output 1.1.2.

Activity 1.1.2.1: Development an EE certification approach/methodology for buildings

61. Considering rapid development and adoption of other energy/green building certification and rating schemes for commercial buildings in many countries, a review of EE certification components in relevant building certification/labeling programs will be carried out, and this will involve consolidation and review of available information regarding building energy labeling and green building schemes that are currently ongoing and/or were implemented in Viet Nam and in other countries. This is to learn about the criteria, mechanisms, results and impacts of the scheme, as well as lessons learned and best practices from those ongoing or implemented programs.
62. Based on findings from the review, a list of appropriate approaches/methodologies for EE certification for buildings in Viet Nam will be prepared. Under each proposed approach/methodology, criteria for EE certification (e.g. energy by end-use systems or whole building) and certification mechanisms (e.g. simple checklists or detailed calculations) will be discussed. These certification options will be discussed with MOC and other key stakeholders to ensure that the selected option will complement to and will later be adopted by other relevant EE schemes in Viet Nam (e.g. the LOTUS scheme of Vietnam Green Building Council, and EE building contest by MOIT). Following the consultation, recommendations on the best options will be prepared for adoption by MOC.

GEF incremental support is for the technical assistance required in the review of EE certification approaches/methodologies for buildings, and the stakeholder consultation.

Activity 1.1.2.2: Design and implementation of a building certification/labeling scheme

63. Based on the selected EE certification approach/methodology for buildings, detailed design of a building certification/labeling scheme suitable for the Vietnamese context will be prepared. During the design phase, rating and grading of energy performance for buildings in Viet Nam shall be conducted using data gathered by the project and other baseline activities. This is to ensure that the proposed EE rating or grading will match the current EE profiles in the country. Establishment of EE rating/grading will also consider the compatibility with other building rating schemes in the country, for example a higher tier of the proposed building certification/labeling scheme would match the EE building contest organized by MOIT or the ASEAN Center for Energy (ACE). Contents of the detailed design shall include, but not limited to: types of buildings covered by the scheme; EE certification approach/methodology and rating indexes; implementation mechanisms; post-approval monitoring and evaluation, and; implementation plan.
64. The building certification/labeling scheme shall be designed as a mandatory scheme, and existing collaborations between MOC and DOCs, with supports from CEEBs, shall be utilized to support the implementation phase. However the scheme could initially be implemented on as a voluntary scheme before transiting to a mandatory scheme in a later stage. Detailed design of the building certification/labeling scheme will be prepared in consultation with stakeholders prior to conclusion and implementation by MOC.

GEF support is for the technical assistance required in the detailed design, conclusion and implementation of the building certification/labeling scheme.

Output 1.2.1: Approved guidelines that support EE building initiatives and market

65. This output is a set of “beyond-code” guidelines that will enhance adoption of EE technologies and practices among building practitioners in Viet Nam to move beyond the EEBC requirements and to achieve a higher level of EE in building designs and operations. Baseline activities that will be subsumed into the set of Component 1 activities that are lined up to deliver this output includes development of technical regulations, guidelines and standards for enforcement of EEBC as well as capacity building trainings for construction licensing officials at the central level and at the provincial level under the “Low Carbon Transition in Energy Efficiency Sector Project” and as elucidated in section 1.4 of the project document. This output will also be delivered through implementation of direct education and awareness raising campaigns targeting at building practitioners, and EE technology suppliers.

Activity 1.2.1.1: Development of beyond-code guidelines for a higher level of EE in building designs and operations

66. This activity will involve the preparation of “beyond-code” guidelines that will allow building practitioners to enhance utilization of the building simulation software and the energy performance database on construction materials and electrical equipment commercially available in Viet Nam to design more energy efficient buildings than the minimum requirements specified in the 2013 EEBC. The guidelines will also discuss how to minimize the possible rebound effects in EEBC compliant buildings due to additional procurements of electrical appliances and equipment, and higher usage of buildings. The draft guidelines will be prepared in consultation with MOC, building practitioners, professional networks, EE technology suppliers, and industry associations (e.g. hotel association). Following the formulation of the guidelines, an active and timely communication campaign for building practitioners, professional networks, EE technology suppliers, industry associations (e.g. hotel association) will be designed and implemented.

GEF support is for the technical assistance required in the development of the guidelines for building designs and operations.

Activity 1.2.1.2: Promotion and implementation support to beyond-code guidelines to target users

67. The CEEBs will play active roles in promoting the guidelines and demonstrating how to implement the beyond-code guidelines for the target audience. In addition to the regular communication campaign, annual ad-hoc seminar/business matching meetings will be organized during the course of project implementation. This will enhance awareness of building practitioners on more advanced EE technologies, and also allow integration of new and advanced EE technologies into the building simulation software.

GEF support is for the technical assistance required in the promotion of the guidelines for building designs and operations.

Output 1.2.2: Established and implemented Measurement & Verification (M&V scheme)

68. This output is a protocol that will enable “credible” Measurement and Verification (M&V) of energy savings as results of EE implementations in commercial and high-rise residential buildings become available. The delivery of this output will be realized from the enhanced baseline activities of the MOC’s “Low Carbon Transition in Energy Efficiency Sector Project” and the “Strengthening Capacity and Institutional Reform for Green Growth and Sustainable Development in Viet Nam” that will benefit from the development of a monitoring, reporting and verification tool for tracking and reporting on mitigation actions and GHG emission targets. These baseline activities are reinforced through the alternative scenario activities as described below.

Activity 1.2.2.1: Development and implementation of M&V scheme

69. This activity will involve the review and assessment of relevant international M&V protocols, as well as common approaches being adopted by EE consulting firms and ESCOs in Viet Nam. It is envisaged that the relevant international M&V protocols would include but not limited to the latest edition of the International Performance Measurement and Verification Protocol (IPMVP)¹⁷, M&V Operational Guide¹⁸, as well as relevant CDM methodologies for buildings approved by United Nations Framework Convention on Climate Change (UNFCCC), e.g. AMS.II.C and AMS.II.E. Following the review and assessment, recommendations for selection of M&V protocol and proposed approach to enhance its utilization and enforcement will be discussed with relevant stakeholders and MOC, and the suitable M&V protocol for Viet Nam will then be prepared together with the action plan. It is envisaged that the M&V protocol will be made available through the project website and, specific and focused promotional and capacity activities for the M&V protocol will be prepared in synergy with activities under other outputs and then executed in a coordinated manner.

GEF support is for the technical assistance required in the review and preparation of the M&V protocol.

¹⁷ IPMVP® is registered trademark of Efficiency Valuation Organization (EVO®), www.evo-world.org

¹⁸ <http://www.environment.nsw.gov.au/energyefficiencyindustry/measurement-verification.htm>

Output 1.2.3: Established and implemented building energy benchmarking system that is linked to the certification scheme

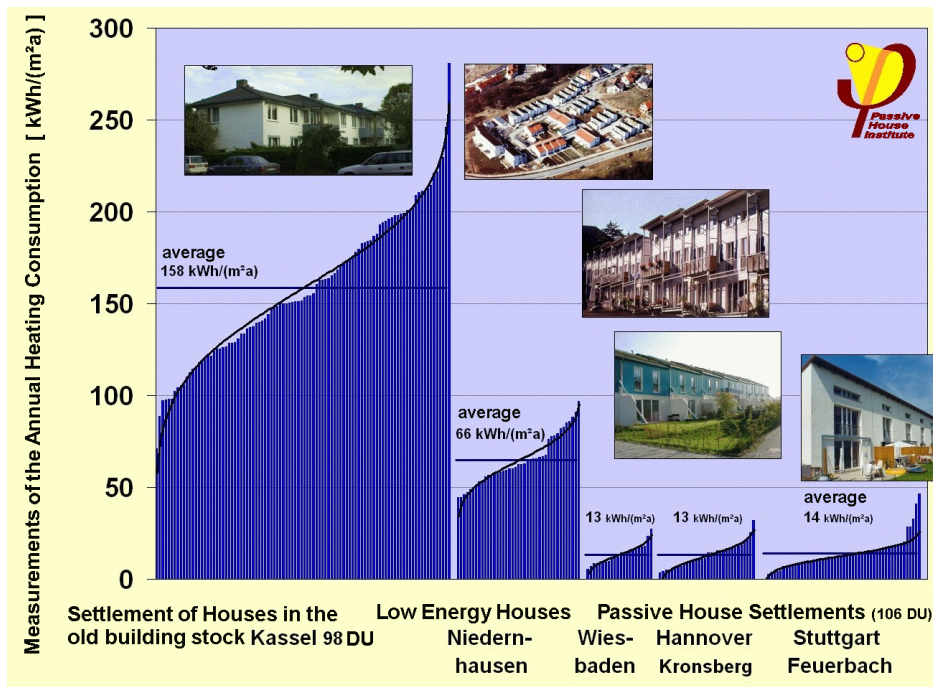
70. This output is a building energy benchmarking system that will create an enabling environment for market competition for EE building investments. The delivery of this output will involve implementation of following GEF incremental activities together with the baseline activities launched through the Vietnam Clean Energy Program (see section 1.4) which includes formulation of building energy performance database as well as development of energy efficiency benchmark for types of typical buildings in different climate zones.

Activity 1.2.3.1: Development of SEC profiles for buildings

71. This activity will involve the conduct of a review of past SEC studies in Viet Nam¹⁹ and similar energy using index studies undertaken in other countries, and conduct additional analysis and assessment as necessary. Specifically, the detailed review and analysis of the survey of commercial and high-rise residential buildings will be conducted to establish SEC profiles of different types of buildings, as shown in Figure 6.
72. The review will also include analyzing how other countries utilize SEC as indicators and goals to improve EE in commercial buildings and develop recommendations to adapt them to the conditions and needs of Viet Nam. This activity will also compile commercial building stock data which is currently scattered among different agencies, and propose a mechanism for periodical updates.

GEF support is for the technical assistance required in the review and analysis of SEC studies in Viet Nam and in other countries, and the compilation of building stock data.

¹⁹ In general SEC of a building is a total energy consumption over a specific period of time (usually one year) divided by normalization factors to produce a performance indicator that can be used to compare different buildings of the same type. The total energy consumptions are usually presented in kilowatt-hour (kWh) or mega joules (MJ). It should be noted that MJ is used to reflect combination of electricity and types of energy used in buildings, including oil, gas and biomass. The normalization factors are typically based on physical characteristics of buildings, such as building floor areas (in m²), number of guestrooms or guests in case of hotels, number of beds in case of hospital. Based on the said approach, SEC data is available in different units, including kWh/m²/year, MJ/m²/year, MJ/guest, MJ/room/day, and MJ/bed/day.



Source: Passive House Standard, http://www.passivhaustagung.de/Passive_House_E/Passivehouse_measured_consumption.html

Figure 6: Examples of SEC Profiles

Activity 1.2.3.2: Development, establishment and implementation of building energy benchmarking system

73. Based on the SEC profiles prepared under Activity 1.2.3.1, an appropriate building energy benchmarking system for Viet Nam will be developed. It is envisaged that the benchmarking system will provide a comprehensive set of performance indicators for different types of commercial and high-rise residential buildings, for example, SEC values in kWh/m²/year, MJ/m²/year, MJ/guest, MJ/room/day, and MJ/bed/day. The benchmarking system should be able to show a percentile rank when a specific SEC value is compared with the SEC profiles. The evaluation and analysis models used in development of the SEC profiles will serve as the standard protocol for determination of building SEC in Viet Nam. It will also serve as the core element of the building certification/labeling scheme which will be developed under Activity 1.1.2.2, and other initiatives that would require comparison of building energy performance.

GEF support is for the technical assistance required in the review and analysis of SEC studies in Viet Nam and in other countries, and the compilation of building stock data.

Activity 1.2.3.3: Development and implementation of Information Disclosure Program for commercial and high-rise residential buildings

74. This activity is for enhancing the utilization of the building energy benchmarking system among private sector through implementation of a voluntary Information Disclosure (ID) program. The ID program aims at provoking EE consciousness of building owners, managers and operators of large commercial and high-rise buildings in Viet Nam, through publishing of comparative energy consumption and energy benchmarking data of major types of commercial buildings in Viet Nam, i.e. offices, hotels, hospitals (public and private), and retails and department stores. The ID program requires recruitment of large and high profile buildings to join the program, working with building managers to categorize, assess and validate energy consumption and energy benchmarking data for each type and sub-type of commercial and high-rise residential buildings in Viet Nam, and preparation of energy consumption data and conversion into figures/formats

that would be more stimulating for the building sector, e.g. Carbon Footprint, GHG emission, typical cost required to reduce energy consumption/GHG emission, and publishing of voluntary disclosure data once a year. During the Project, the ID program will be implemented in a voluntary manner to familiarize commercial building stakeholders with requirements and benefits of the program. A study will be carried out towards the end of the project to determine whether the ID program would be implemented in a mandatory manner after the completion of the Project.

GEF support is for the technical assistance required in the design and management of the voluntary disclosure program, in assessment and validation of energy consumption/ benchmarking data and in preparation and publishing of data.

Output 1.2.4: Completed energy consumption survey of commercial and high-rise residential buildings

75. This output is a comprehensive set of data on energy consumptions, operations and usages. This is expected to be delivered from the implementation of baseline activities undertaken by VCEP (refer to section 1.4) and GEF incremental activities that identify and compile energy consumption data of commercial and high-rise residential buildings that will serve as good representations of the building sector in Viet Nam. The findings will serve as the foundations for establishments of the building energy benchmarking systems (Output 1.2.3) and the building certification systems (Output 1.1.2).

Activity 1.2.4.1: Selection of target commercial and high-rise residential buildings

76. Considering various past and ongoing activities, a thorough review of commercial and high-rise residential buildings included in the previous surveys will be conducted. This is to understand the basic building profile data, such as building type, type of usage (such as accommodation vs service hotels) and classification (such as Grade A, B and C office buildings), age of buildings, floor area, number of floors, location and orientation. Based on these initial profiles, selection criteria for a minimum of 100 buildings will be established. This will also help firm the scope of the survey being planned under the baseline project. The focused geographical coverage of the EECB building survey will be Hanoi and HCMC. It is envisaged that the target buildings for this survey will complement the survey to be undertaken by the baseline project by focusing on the priority group of commercial buildings that MOC intend to establish the benchmarking system (output 1.2.3). The list of target buildings will be developed based on the previous building surveys, data provided by DOCs and EECs in Hanoi and HCMC, building lists publish by property management companies. Following the final selection of the target buildings, each building will be officially informed to seek cooperation and agreement regarding site visits and data sharing.

GEF support is for the technical assistance required in the review of building profiles, the development of criteria for target buildings, and the selection of survey samples.

Activity 1.2.4.2: Conduct of energy consumption surveys of commercial and high-rise residential buildings

77. Following the conclusion and confirmation of the target commercial and high-rise residential buildings, energy consumption surveys will be conducted in 2 phases), (1) analysis of background information on building profiles and historical energy consumption data (electricity and other fuels) analysis, and; 2) site visits to verify background information and to understand operational and management aspects of each building. The site visit phase will be likely in a form of walk-through energy audit, and a questionnaire will be developed to serve as a check list during the survey.

Findings from the surveys will be consolidated, analyzed and included in the survey report. More detailed data will be made available in tabular format (i.e. database tables or spreadsheet) for further analysis and usage by relevant activities under Component 1.

GEF support is for the technical assistance required in the preparation of the survey plan, the implementation of survey activities, and the preparation of the survey report.

COMPONENT 2: Building Market Development Support Initiatives

78. This component broadly seeks to enhance the capacity of the building sector stakeholders to design, finance and implement EE measures, and it will comprise various activities on: development of a suitable financial support mechanism together with toolkits for economic evaluations; establishment of the Centers for Energy Efficiency in Buildings (CEEBs), which are expected to play an important role in implementing capacity building programs to support enforcement of the revised EEBC and implementation of EE in the building sector. Capacity building and training programs will be extended to Energy Service Companies (ESCOs), energy service providers, and selected consulting firms on EE technologies, energy auditing, cost-benefit analysis and lifecycle analysis. An energy consumption survey will be carried out in 100 commercial and high-rise residential buildings, the results of which will feed into the building energy benchmarking system, M&V systems and building certification/labeling scheme under Component 1.
79. The successful implementation of the aforementioned activities will deliver Outcome 2 of the project, i.e. increased local capacity in the EE design, construction, and operation of commercial and high-rise residential buildings, and the outputs that will contribute to this specific outcome summarized in Table 9. The activities that will be carried out under this component to contribute to the delivery of the outputs are described below.

Table 9: Expected Outcomes, Outputs and Activities of Component 2

| Expected Outcomes | Expected Outputs | Proposed Activities |
|--|--|--|
| Outcome 2: Increased local capacity in the EE design, construction and operation of commercial and high-rise residential buildings | Output 2.1: Formulated, approved, funded and implemented financial mechanisms and incentives to support EE efforts in the buildings sector and cost norms for construction | Activity 2.1.1: Development and approval of innovative financing mechanisms for EE buildings Activity 2.1.2: Development of an economic evaluation toolkit for EE building projects and a detailed implementation plan Activity 2.1.3: Formulation of a detailed implementation plan, approval and operationalization of the financial mechanism for EE investments in buildings |
| | Output 2.2: Fully operational Centers for Energy Efficiency in Buildings (CEEBs) under MOC | Activity 2.2.1: Conduct of situation analysis of CEEBs in Hanoi and HCMC Activity 2.2.2: Enhancement of organizational frameworks and operational plans Activity 2.2.3: Provision of operational supports for CEEBs to meet the revenue targets |
| | Output 2.3: Trained CEEB staff to implement awareness and training programs to promote EE in the building sector | Activity 2.3.1: Design and development of a capacity building program for CEEBs Activity 2.3.2: Implementation of a capacity building program for CEEBs |
| | Output 2.4: Operational support program for ESCOs | Activity 2.4.1: Design and implementation of a capacity building program for ESCOs |

| Expected Outcomes | Expected Outputs | Proposed Activities |
|-------------------|--|---|
| | in the negotiation and implementation of building energy performance contracts | Activity 2.4.2: Design and implementation of a communication and outreach program for ESCOs |

Output 2.1: Formulated, approved, funded and implemented financial mechanisms and incentives to support EE efforts in the buildings sector and cost norms for construction

80. This output is a set of formulated, approved and implemented financial mechanisms and incentives to support EE efforts in the building sector, and it will be delivered through the following activities.

Activity 2.1.1: Development and approval of innovative financing mechanisms for EE buildings

81. This activity involves the review and evaluation of existing policy measures related to implementation of building EE in Viet Nam as applied to building design, construction and operations. These may include but not necessarily limited to the financial mechanisms to for EE investments promoted and managed by VNEEP, the Viet Nam Environmental Protection Fund, VietinBank, the IFC-EDGE standard program, and the Viet Nam Development Bank. Similar policies found in other countries, like those in ASEAN member countries, that are aimed at promoting EE in buildings will also be reviewed. It will also involve the evaluation of possible policy support activities, strategies and incentives that can be considered for building developers, managers and owners/investors. Findings from the evaluation will serve as a guideline for development of a suitable financial support mechanism and fiscal products to support EE building initiatives in Viet Nam.

82. During the project preparation phase, the following potential financing models and fiscal policies for EE investments in commercial and high-rise residential buildings in Viet Nam were identified.

- **Equipment Leasing:** EE equipment leasing through commercial leasing companies will be reviewed to understand relevant terms and conditions and possible mechanisms to be established to support this financing option. Understanding of commercial building stakeholders on tax benefits from the leasing scheme will also be explored as a part of the review.
- **Risk Sharing/Credit Guarantee Facility:** Currently, there is no risk sharing/credit guarantee facility dedicated for EE project investments in the building sector. The existing credit guarantee facility in Viet Nam was developed to support investments in the industrial sector, and its utilization to support EE building projects is somewhat limited. Considering this, it is envisaged that establishment of a dedicated facility or increase the scope of the existing guarantee facility to cover the building sector will enhance access to EE project financing for the EE building project hosts which do not have strong financial statuses and balance sheets.

During the formulation phase of the suitable financial support mechanism, the abovementioned financing models will be reviewed against the findings from the review and evaluation of existing policy measures in Viet Nam and in other countries. The review process will be a coordinated effort between the project and relevant ministries (e.g. MOF and MOIT), as well as local banks (such as Vietinbank and Techcombank) and EE technology suppliers and manufacturers. These local banks, suppliers and

manufacturers will be engaged in the review and formulation process through a call for expression of interest.

83. The review of the potential financing models will also be conducted from the perspective of building project hosts in a more qualitative manner for different levels of EE financing for new and retrofitted EE building projects. The focus of the review will be on bankable projects which have not been able to acquire financial support from past and current government and commercial financing tools. The review will also ensure that any new financing tools/products to be introduced by financial institutes, donors and other building EE programs in Viet Nam over the next 12 months will be included. The project will also assess how much financing will be extended to EE building projects through the new models.
84. Following the review process, the feasible options initially identified will then be investigated and selected for detailed design and implementation. Cost and benefit analyses at the macro level will also be conducted to understand economic justifications for each policy recommended. Following the confirmation on economic justifications, a stakeholder consultation meeting will be organized to discuss and endorse selection of the most suitable financial mechanism.

GEF support is for the technical assistance required in the review, evaluation and detailed design of the suitable financial support mechanism.

Activity 2.1.2: Development and promotion of an economic evaluation toolkit

85. After the selection, an economic evaluation toolkit together with a detailed implementation plan for the selected financial mechanism will be developed. The economic evaluation toolkit will be developed as a user friendly tool for building developers, investors and financiers, requiring only key project input data (e.g. project cost, annual savings), but yet computing all important financial analysis results, such as Return on Investment (ROI), Net Present Value (NPV) and Internal Rate of Return (IRR). The evaluation toolkit will be developed as a ready-to-plug-in component of the building simulation software. This is to enable sharing of the technical specifications and standard prices database of building construction materials, and electrical appliance and equipment developed under Component 1. This will be coupled with promotion, dissemination and awareness activities, and training workshops on the economic evaluation toolkit tailored to match knowledge and requirements of building developers, managers, investors and financiers.

GEF support is for the technical assistance required in the development of the economic evaluation toolkit.

Activity 2.1.3: Formulation of a detailed implementation plan, approval and operationalization of the financial mechanism for EE investments in buildings

86. Upon having selected the most appropriate financial mechanism in activity 2.1.1, a comprehensive fund management and implementation plan will be prepared detailing the fund capital structure, terms, conditions, financing and implementation structures, roles and responsibilities of fund investors and participants, diversification strategy, etc. The activity will also identify a fund manager and secure co-financing commitments from investors. Review and confirmation from stakeholders involved in the implementation phase will be sought before the fund is adopted. The plan will be tabled for approval by the MOC and relevant ministries including Ministry of Planning and Investment and Ministry of Finance and relevant financial institutions.

87. A financial institution where the fund mechanisms shall actually reside will be identified. A core unit or fund manager for the administration and implementation of financial mechanism will be established within the implementing institution such as a government financial institution. Once the fund secures approval, implementation will kick off, and policy and management guidelines executed.
88. A capacity building and training program will be designed to develop the necessary level of appreciation on Buildings EE projects among the staff and to enhance their technical skills on the administration and management of the fund. Underlying training activities of the fund manager shall form part of the overall training program.
89. Production of awareness and promotional materials for the selected financial mechanism, and a quick guide/ manual for the economic evaluation toolkits, and implementation of a series of awareness, promotional and training activities in accordance with the agreed plan. The communication and training activities are to inform and stimulate interests of building developers, managers, and investors in using the selected financial mechanism to support their EE investments. In addition, a series of more focused round table discussions, meetings and workshops with commercial banks/financial institutions which are not yet part of the implementation phase will be organized to demonstrate market potential, and to stimulate their interest in initiating their own commercial financing schemes in parallel with the selected financial mechanism to be implemented. Evaluation of the effectiveness of the selected financial mechanism in support building EE investments will be carried out on an annual basis.

GEF support is for the technical assistance required in the formulation of the implementation plan and design and execution of the capacity building, awareness and training activities.

Output 2.2: Fully operational Centers for Energy Efficiency in Buildings (CEEBs) under MOC

90. This output will ensure sound and sustainable operation of CEEBs under MOC through upgrading of organizational frameworks and operational plans, and generating of revenues through provision of technical support services on EE buildings to prospective clients in Viet Nam. The delivery of this Output will be achieved through the following alternative activities.

Activity 2.2.1: Conduct of situation analysis of CEEBs in Hanoi and HCMC

91. This will involve conduct of a comprehensive institutional review of CEEBs in Hanoi and HCMC. The institutional review will cover various aspects of organizational establishment and operation, such as relevant legal frameworks, mandate, infrastructure, human resources, reputation and relationship with key stakeholders in the building sector (e.g. building developer, building practitioners and suppliers), capacity to reach and acquire external financial support, etc. In addition, a comprehensive review of relevant past and ongoing efforts related to EE buildings in Viet Nam (such as Vietnam Green Building Database and Network, funded by REEEP) will be conducted to their roles and quality of their services, and then a SWOT analysis will be undertaken for the CEEBs in Hanoi and HCMC. Findings from the review will be evaluated to determine the most appropriate approach to enable operation of CEEBs.

GEF support is for the technical assistance required in the conduct of a comprehensive institutional review of CEEBs and relevant past and ongoing efforts related to EE buildings in Viet Nam.

Activity 2.2.2: Enhancement of organizational frameworks and operational plans

92. To effectively administer and maintain the operation of the CEEBs, a comprehensive organization frameworks and operational plans will be prepared to ensure the sound operation and upkeep of the centers. A specific operational plan for each CEEB will be prepared with consideration on various issues necessary to support enforcement of the revised EEBC and implementation of capacity building programs for stakeholders in the building sector, including services offered, human resource, equipment and tools, operational expenses, potential revenue generation during and after the project, monitoring and evaluation of the center's performance. Draft organizational frameworks and operational plans will be reviewed and agreed to by MOC and each host agency, prior to adoption and implementation.

GEF support is for the technical assistance required in the development of the organizational frameworks and operational plans for CEEBs.

Activity 2.2.3: Provision of operational supports for CEEBs to meet the revenue targets

93. Based on the agreed organizational frameworks, operational plans, and specifically the revenue generation targets, the project will work with each CEEB to prepare a detailed business and marketing plan during and beyond the project. Implementation milestones of the business and marketing plan for each CEEB will match timelines of activities under Output 2.3 and 2.4. The project will support CEEBs to meet the revenue targets through implementation of business and marketing activities and delivery of quality services as per the agreements with clients.

GEF support is for the provision of technical and administration supports for CEEBs to carry out business and marketing activities.

Output 2.3: Trained CEEB staff to implement awareness and training programs to promote EE in the building sector

94. This output will ensure sound technical and financial knowledge of CEEB staff which are critical to the success of project design, development and implementation of building EE projects. The project on "Strengthening Capacity and Institutional Reform for Green Growth and Sustainable Development in Viet Nam" (CIGG) (refer to section 1.4) will be subsumed as the baseline for the delivery of this output. Scope of the activities supported by the CIGG project - such as design of modules for training of trainers (TOT) program and implementation of technical trainings in select provinces - will be enhanced and expanded by GEF incremental activities. The delivery of the output is achieved through the realization of the following alternative activities.

Activity 2.3.1: Design and development of a capacity building program for CEEBs

95. Design and development of a capacity building program for CEEBs will utilize the phase-step approach as follows: a) capacity building needs assessment of CEEB staff; b) design and development of the capacity building program including Monitoring and Evaluation (M&E), and Quality Assurance (QA) mechanisms; c) preparation of training tools and materials, and; d) implementation of the capacity building program.
96. In assessing capacity building needs of CEEB staff, surveys will be conducted to assess and evaluate the existing capacity of staff attached CEEBs in Hanoi and HCMC. The needs assessment will enable the prioritization of the different types of

training, seminars, workshops, and on-the-job training that will be developed for CEEB staff. Following the needs assessment, design and development of the overall capacity building program for CEEB staff will be carried out. All implementing regulations/guidelines, compliance toolkits, certification and benchmarking systems, and software developed under the project will be part of the capacity building program.

97. There will be two (2) major types of training programs will be prepared for CEEB staff, i.e.: 1) technical training programs, and; 2) financial training programs. The training programs will include classroom presentations, exercises and on-site activities which will be designed to deliver in-depth knowledge and hands-on experience to CEEB staff in EE technologies, energy audits, technical and financial evaluation, M&V, energy benchmarking, as well as marketing and communication of EE. A special training-for-trainers (TOT) session will also be developed and integrated into the overall training program. Following the conclusion of the training program structure, a complete work plan of capacity building programs will be prepared, and this will include details on technical and financial resources required, potential external resource speakers, training tools and materials (including utilization of relevant outputs produced by other outcomes and components under the project), as well as appropriate Monitoring and Evaluation (M&E) and certification schemes for the training courses.

GEF support is for the technical assistance required in the design and development of the capacity building program for CEEBs.

Activity 2.3.2: Implementation of a capacity building program for CEEBs

98. Following the conclusion of the training program and work plan, all relevant training materials and training tools will be developed, and the training courses will be conducted as per the work plan, prepared in Activity 2.3.1. The training and demonstration kits for EE technologies, systems and applications could be housed at the Hanoi Energy Management Staff Training Center of ECC in Hanoi to maximize their utilizations. To ensure that CEEB staff understands and the necessary skills are successfully developed, it is expected formal tests (examination papers) and informal tests (quizzes, peer-review, supervisor's assignments) will be conducted. For CEEB staff who will be assigned as the trainers, additional training will be organized to ensure that all necessary technical knowledge and presentation techniques are well understood. Each training event will be evaluated based on the established M&E and certification schemes. A report incorporating all training materials and curriculum as well as the evaluation for each training activity will be prepared. The documentation of each training event is consolidated to form part of the training database, which will be included in the project website.

GEF support is for the technical assistance required in the development of training materials, and the implementation and evaluation of the capacity building program for CEEBs.

Output 2.4: Operational support program for ESCOs in the negotiation and implementation of building energy performance contracts

99. This entire output will be delivered through GEF incremental activities and enhance capacity of existing or potential Energy Service Companies (ESCOs) in Viet Nam. Capacity building will be a major component of the support program, and design and implementation of capacity building activities will follow the approach and structure proposed for Output 2.3, but they will be tailored to suit the ESCOs' requirements. The operational support program will comprise two (2) key components: capacity building,

and; communication and outreach, and details of activity for respective components are discussed below:

Activity 2.4.1: Design and implementation of a capacity building program for ESCOs

100. Design and development of a capacity building program for ESCOs will utilize the same phase-step approach as discussed in Activity 2.3.1, i.e.: a) capacity building needs assessment of existing and potential ESCOs; b) design and development of the capacity building program including M&E, and QA mechanisms; c) preparation of training tools and materials, and; d) implementation of the capacity building program. Based on stakeholder interviews during the project preparatory phase, ESCOs in Viet Nam are generally those providing consultancy services on EE, EE technologies and equipment, as well as installation, maintenance and equipment servicing (not equipment owners), and only few of them have experience with Energy Performance Contracting (EPC).
101. Considering this, the training activities for ESCOs will particularly focus on EE project development (including energy audits), project implementing agreement/contract, project financing, project management, and M&V of energy savings. In development of EE building project, sound technical and financial knowledge are critical to the success of project design, development and implementation, and these two areas of knowledge will be the focus of the capacity building program. As for the project financing and implementing agreement, the training will cover how to package sound financial proposals for financial institutions, and the fundamental structure of contracts, including guaranteed saving and shared saving contract structures and issues that need to be addressed to reduce or deal with EE project risks. The training on project management will focus on the approaches to reach the desired outputs, assessment of resources required (equipment and manpower), schedule activities and mechanisms to control resource for the successful and timely completion. Similar to the training program for CEEB staff, implementation plan including M&E, QA and preparation of training tools and materials will be prepared after conclusion of the training program structure.
102. The training courses will be conducted as per the agreed work plan. Formal tests (examination papers), informal tests (quizzes and peer-review) and analysis using actual case studies will be conducted. Each training event will be evaluated based on the establish M&E scheme. A report incorporating all training materials and curriculum as well as the evaluation for each training activity will be prepared. The documentation of each training event is consolidated to form part of the training database, which will be included in the Project website.

GEF support is for the technical assistance required in the design and implementation of the capacity building program for ESCOs.

Activity 2.4.2: Design and implementation of a communication and outreach program for ESCOs

103. Following the capacity building activities, enhanced capabilities of the local ESCOs will be conveyed to stakeholders in the building sector in Viet Nam, and a communication and outreach campaign directing at investors, developers, property managements, professional networks, EE technology and equipment suppliers, and financial institutes will be designed and implemented. It is envisaged that the communication strategies will involve organization focused outreach activities, e.g. informal round table or luncheon meetings (such as dinner talks, building CEO forum), a series of workshops/ seminars/ meetings for building owners/designers/managers and building management

companies to inform and introduce the concept of, and the plans for the introduction of energy efficiency in their premises and facilities, rather than large scale/mass media communications. Production of technical and non-technical information packages for effective communication will be a part of this activity.

GEF support is for the technical assistance required in the design and implementation of a communication and outreach program for ESCOs.

COMPONENT 3: Building EE technology applications and replications

104. This component will target the enhancement of energy efficiency performance in both new construction and the retrofit/refurbishment in 16 buildings in Hanoi and Ho Chi Minh areas, with the application of the technical specifications and guidance provided in the improved EEBC. Five-year energy conservation plans will be developed for the 16 selected commercial and high-rise residential buildings. Once the five-year plans are in place, the design, application and operation of EE equipment, building materials and building energy monitoring and management/control systems will be demonstrated in the 16 selected buildings based on the EEBC project.
105. By demonstrating pilot models for the uptake of EE&C management activities in building design and operation, this component will provide both crucial evidence and documentations, and significantly contribute to the building of capacity in EE design and implementation for commercial buildings. The expected outcome from this component is the increased use of EE building materials and application of EE building technologies in HCMC and Hanoi. Results and lessons learned will be documented and disseminated for wider information and application. The outputs that will contribute to this specific outcome summarized in Table 10.

Table 10: Expected Outcomes, Outputs and Activities of Component 3

| Expected Outcomes | Expected Outputs | Proposed Activities |
|---|--|--|
| Outcome 3: Increased use of EE building materials and application of EE building technologies in HCMC and Hanoi | Output 3.1: Developed Five-year EE&C plans for 16 selected commercial and high-rise residential buildings | Activity 3.1.1: Conduct of detailed energy audits in the selected demonstration buildings Activity 3.1.2: Development of five-year EE&C plans for the selected demonstration buildings |
| | Output 3.2 Completed demonstrations of the design, application and operation of EE equipment, building materials and building energy monitoring and management/control systems in the 16 selected commercial and high-rise residential buildings based on the EEBC | Activity 3.2.1: Preparation of the final design of the EE implementations in demonstration sites and procurement of EE equipment and Activity 3.2.2: Installation EE equipment and systems, and conduct of M&V activities |
| | Output 3.3 Documented and disseminated results and lessons from the demonstrations of implementing EEBC and EE&C in new and existing buildings | Activity 3.3.1: Documentation of results and lessons from the demonstration projects Activity 3.3.2: Dissemination of successful case studies on demonstration projects |

Output 3.1: Developed Five-year EE&C plans for the selected commercial and high-rise residential buildings

106. This output is a set of five-year EE&C plans that respond to current situation in each demonstration site. EE&C recommended in the plan will take into account various

considerations including magnitude of savings, return on investment, and resources required. The following activities will be carried out to deliver this output:

Activity 3.1.1: Conduct of detailed energy audits in the selected demonstration buildings

107. The pre-feasibility analyses that were conducted during the project preparation phase will be reviewed to determine and verify the initial EE&C implementation requirements. Detailed energy audits will then be conducted by the EEBC project with supports from the demonstration hosts. The initial scope of detailed energy audits includes: 1) analysis of current energy use and operating costs, and establishment of energy balance and baseline; 2) detailed study of existing equipment/ systems/ operations that offer opportunities for energy saving; 3) evaluation of saving type and potential including guaranteed amount; 4) required finance to implement EE&C measures including a cash flow projection for the project, and; 5) development of saving monitoring and verification methodology and associated costs. It should be noted that a detailed energy audit will generally provide a series of EE&C measures, prioritized based on technical and economic evaluations.

GEF support is for the technical assistance required in the conduct of detailed energy audits in the selected demonstration buildings, and the preparation of the audit reports.

Activity 3.1.2: Development of five-year EE&C plans for the selected demonstration buildings

108. Prior to integrating priority EE&C recommendations into the five-year EE&C plan for each demonstration building, a review of the external supporting mechanisms that would facilitate the smooth and effective implementation of the EE&C plan will be carried out with each demonstration host. Among these are: 1) availability and scope of technical assistance for implementation of demonstration projects from the project and other international development agencies; 2) appropriate financing assistance mechanisms available from local and international financial resources, include the financial mechanism to be developed under Component 2, and; 3) availability and capacity of EE technology suppliers and service providers that could support maintenance and re-commissioning of installed EE technologies and systems to prolong EE performance. These will help lay out realistic implementation timeline of priority EE&C measures throughout the five-year plan. A draft five-year EE&C plan for each demonstration building will be prepared and discussed with the demonstration project host prior to conclusion and adoption for the implementation phase. Drawing from the early lessons learned from the demonstration projects the implementation plan will be adjusted for use after EOP for projects that are anticipated to be replicated.

GEF support is for the technical assistance required in the review of the external supporting mechanisms, and the development of 5-year EE&C plans for the selected demonstration buildings.

Output 3.2 Completed demonstrations of the design, application and operation of EE equipment, building materials and building energy monitoring and management/control systems in the selected commercial and high-rise residential buildings based on the EEBC

109. This output comprises of the completed demonstrations of successful implementation of EE&C measures to comply with the EEBC requirements in new and retrofitted buildings, and also demonstrate feasibility of applying EE&C measures to go beyond the code requirements. Implementation and operation of demonstration projects will lead to improvement of the level of knowledge, skills and competency of personnel

attached to the demonstration buildings through direct involvement. The following activities will be carried out to deliver this output:

Activity 3.2.1: Preparation of the final design of the EE&C implementations in demonstration sites and procurement of EE equipment and systems

110. Implementation of EE&C measures beyond the code requirements through demonstrations in nine (9) hotel buildings, three (3) office buildings, two (2) school/university buildings, and two (2) high-rise residential buildings. The final listing of demonstration projects that officially confirmed their co-financing commitments are given in Annex B. Based on the initial identification of EE&C measures during the project preparation phase, and findings from the detailed energy audits, the detailed engineering designs, the comprehensive technical and economic evaluations, and the preparation of M&V protocol and plan for the proposed EE implementation will be carried out. Instruments and equipment necessary for M&V activities will also be included in the final design documents. CEEBs will take lead in supporting the detailed engineering designs. After conclusion of the engineering designs, the demonstration hosts will be assisted in all necessary steps that will enable successful procurements of the chosen EE equipment and systems, including but not limited to preparing technical specifications EE equipment and systems, short listing of potential suppliers, and developing criteria for evaluation and selection of qualified EE equipment and systems.

GEF support is for the technical assistance required in the detailed engineering designs, the technical and economic evaluations, the preparation of M&V protocol and plan, and the support for the procurement phase. GEF support is also required for the procurements of M&V instrument and equipment which are the incremental costs of EE implementation.

Activity 3.2.2: Installation of EE equipment and systems, and conduct of M&V activities

111. Prior to delivery of EE equipment and systems each project site, installation of instruments and equipment for M&V activities will be carried out, and baseline data for each demonstration project will be gathered by the demonstration host with supports from the project. For retrofitted buildings, these will include, but not necessarily limited to, compilation of historical energy consumptions, installation of measuring instruments/equipment, operating performance (level of activities and services delivered). For new EE commercial buildings, these will include evaluation of design specifications, and design energy consumption. The operating performance targets for each demonstration project will also be established. Following delivery of EE equipment and systems to the project site, the demonstration hosts will be supported in the installation and commissioning of EE equipment and system. Key issues during the installation phase that could impact energy efficiency and operating performance and durability (lifetime) of EE equipment and systems, such as ambient temperature, ventilation, relevant civil and mechanical works, will be reviewed and confirmed by the project.
112. After completion of the commissioning and test-run period, post-installation monitoring of each demonstration in accordance with the M&V plan will be carried out by the demonstration host. All parameters gathered in during the pre-installation phase (baseline) will be monitored and recorded. Duration of monitoring and measurements depend upon types of EE equipment and systems installed, and operating performance due to seasonal variation. In case seasonal variation has no or little impact on the EE performance, the monitoring and measurement duration can be less than one month. In case seasonal variation has significant impact on the EE performance, the monitoring and measurement duration can range from three months

to one year. Following the completion of pre- and post-installation monitoring, the M&V report will be prepared in accordance with the M&V protocols (e.g. IPMVP) agreed to during the design phase. Measurement data retrieved from the M&V instruments and equipment shall be reviewed and validated on an annual basis to verify performance of the EE equipment and systems installed.

GEF support is for the technical assistance required in the provision of support to the demonstration hosts in the installation and commissioning of EE equipment and systems, and the implementation of M&V activities.

Output 3.3 Documented and disseminated results and lessons from the demonstrations of implementing EEBC and EE&C in new and existing buildings

113. This output will improve the level of awareness and knowledge of local building practitioners both in the government and private sectors from visible real-life demonstrations of the principles and technologies advocated to make buildings more energy efficient. The following activities will be carried out to deliver this output

Activity 3.3.1: Documentation of results and lessons from the demonstration projects

114. This activity involves preparation of the demonstration project profiles (as case studies) of the EEBC and EE&C demonstrations in buildings that will be carried out under the project. Wherever possible, discussion on sustaining energy savings, minimizing possible rebound effects, and comparing similar EE implementations in other countries will be included in the profiles. A presentation format of each demonstration project report will be prepared and the completed demonstration project reports will be entered into the project website and database. At least two demonstration project profiles on EE lighting implementations are expected to be produced by year two of the project. The remaining demonstration project profiles will be prepared and delivered by EOP. In addition to printed materials, one to two video/documentaries/short films highlighting success of the demonstration projects, benefits of the revised EEBC and the overall results of the project, together with communication strategy will be prepared. This activity will also involve the conduct of an assessment of the viability of commercial and high-rise residential buildings in Viet Nam (offices, hotels, hospitals, and retail buildings) to adopt and disseminate those successfully demonstrated EE technologies/practices during the project implementation period.

GEF support is for the technical assistance required in the documentation of results and lessons from the demonstration projects, the preparation of the demonstration project profiles, and the development of video/ documentaries/ short films.

Activity 3.3.2: Dissemination of successful case studies on demonstration projects

115. This activity involves general dissemination of findings on demonstration projects to stakeholders in the building sector and general public, as well as organization of a seminar/workshop to specifically discuss and promote the results of the demonstration projects together with the financing mechanism developed under Component 2. For the general dissemination, the project aims to employ various communication activities to be implemented under the Project, such as awareness enhancement activities, capacity building activities, to maintain frequency of the key messages to target audience. Moreover, the Project staff will actively participate in local and international events related to promoting of EE in commercial buildings, so that the message on the successful case studies will get across. In particular, regional workshop will be

organized through UNDP to exchange best practices and experiences with existing UNDP-GEF projects related to Buildings Energy Efficiency.

116. Prior to closing of the project, a seminar/workshop will be organized. In the seminar/workshop, the demonstration hosts (i.e., building owners/managers) will present EE&C measures that they have implemented and highlight EE&C technology involved, the investment required and financing options, results, energy savings achieved, actual project economics, estimated GHG emission reductions, and their respective recommendations. The workshop will also assess the overall performance of the demonstration program and will come up with recommendations large scale replication of the successes in Viet Nam.

GEF support is for the technical assistance required in the organization of dissemination activities.

2.5 PROJECT INDICATORS

117. The key project indicators are shown in the table below.

| Indicator | Target |
|--|-------------|
| Cumulative CO2 emission reduction from the building sector by End-Of-Project (EOP, Year 2019), tCO2e | 37,680 |
| Cumulative energy savings of from the commercial building by EOP (Year 2019), MWh | 61,137 |
| No. of new people gainfully employed in the building sector in Viet Nam by EOP | 60 |
| % of new buildings are fully compliant with the revised EEBC 2013 by EOP | 50 |
| % of existing commercial and high-rise residential buildings that adopt EE technologies and practices and achieve at least 10% electricity savings by EOP | 20 |
| % of DOCs and 50% building practitioners nationwide reference EEBC compliance toolkits and guideline developed by the baseline and the projects by EOP | 70 |
| % of applications for new commercial and high-rise residential building constructions submitted to DOCs comply with the EEBC 2013 by EOP | 50 |
| No. of national testing standards for energy performance of building construction materials promulgated by EOP | At least 5 |
| No. of existing and new commercial buildings and high-rise residential buildings in Viet Nam certified as EE buildings by EOP | At least 20 |
| % of building practitioners nationwide reference the EE design guideline to go beyond the code requirements by EOP | 50 |
| % of commercial and high-rise residential buildings reference the M&V schemes in EE implementation by EOP | 70 |
| % of overall commercial and high-rise residential building stakeholders are satisfied with availability and quality of energy benchmarking data by EOP | 70 |
| No. of financial mechanism/incentive for commercial and high-rise residential buildings approved and implemented by EOP | At least 1 |
| % of stakeholders in the building sector are satisfied with services provided by CEEBs by EOP | 70 |
| No. of commercial and high-rise residential buildings implement EE projects using the ESCO models by EOP | 10 |
| No. of demonstrations that adopted EE equipment, building materials and building energy monitoring and management/control systems promoted by the project by EOP | 21 |

| | |
|---|-------------|
| No. of M&V exercises completed in accordance with the guidelines proposed by the project by EOP | 16 |
| No. of new EE building projects designed based on or influenced by, the results of the demonstration projects, by EOP | At least 50 |

118. During the project inception and conclusion of the implementation work plan, the project will develop an output level Monitoring & Evaluation framework, and appropriate indicators for each output, for example energy savings achieved by demonstration projects, number of buildings participating in the information disclosure program, number of training sessions and trainees, etc. The target values for these indicators will be monitored as per the overall project M&E framework throughout project implementation.

2.6 RISKS AND ASSUMPTIONS

119. While all possible efforts have been made to ensure the effective design and implementation of the project activities in the project design phase, there are inevitably some unavoidable residual risks that will have to be carefully monitored and managed during the project to ensure its success. To address these risks, the project has to establish effective means to monitor and to the extent possible mitigate these risks. Mitigation measures include active and continuous involvement in project activities and decisions of the groups of people that might pose a risk to the project implementation and sustainability. Generally speaking the project will try to establish win-win situations so that all parties can unite behind the results of the project activities.

120. The major risks to the success of the project is continued political commitments toward EE and continued stable economic growth in Viet Nam. The first major risk is seen in the form of government's commitments in establishment of policy and regulatory frameworks, as well as supporting mechanisms, such as promotional supports, electricity tariff that incentivizes EE implementation. Although the second is heavily influenced by global, regional and in-country developments that are outside the influence of the project, the first can be mitigated to a certain extent by the project itself. This is done by making an effort to involve the Government of Viet Nam and its institutions in the activities. In the project, the Vietnamese Government will be directly involved through MOC, DOCs and other government institutions. The project will also endeavor to get the backing from high level political players by involving them in public events, give high level briefings and listen to their advice on how best to proceed with the more politically sensitive activities in the project.

121. The key risks to the project implementation and the realization of outcomes will be monitored throughout the implementation of the Project. The Project Result Framework includes a detailed overview of critical assumptions anticipated during project preparation. An initial risk assessment, also used to inform the project design, was prepared during project preparation and is detailed in the Offline Risk Log in Annex E - Risk Analysis. This Risk Log will serve as a management tool and will be reviewed and updated during the project inception and implementation.

2.7 INCREMENTAL REASONING

122. While there has been significant progress over the past decade in the development of building codes in Southeast Asia, the process of implementing energy efficiency improvements in the buildings sector in Viet Nam is still slow. The Government of Viet Nam has adopted some relevant policies that support energy efficiency in the construction and building sectors. However, MOC's EEBC issued in 2005 has not been

implemented in practice due to lack of institutional capacity, clear implementation guidelines, and lacks a monitoring and inspection mechanism. Although MOC issued the revised EEBC in 2013, the stakeholder consultation during the project preparation found that most of the key barriers that impeded the implementation of the 2005 EEBC still exist.

123. The baseline activities discussed in section 1.5, are only expected to contribute marginally to stronger compliance with the revised EEBC particularly in a long-term, mainly due to their limited project timeframes and scopes of implementation. Although these baseline activities were initiated and tailored to suit MOC's requirements, they were not specifically designed to be well coordinated and complement one another to minimize overlapping, and it is unclear if these will contribute synergistically in the achievement of the MOC's energy efficiency targets for the Vietnamese buildings sector.
124. Without the GEF intervention through actions that will remove barriers to the improved enforcement of the revised EEBC and the widespread application of EE building technologies, it will likely take some years to achieve benefits in terms of energy savings, energy supply cost reductions and GHG emission reductions. GEF incremental activities in this project are built on the baseline activities, and they will provide vital support to MOC in effectively enforcing the EE&C Law with regard to EE in the buildings sector, while helping to set up fiscal incentives and facilitate access to commercial financing, and greatly enhancing the level of awareness of building professionals on the benefits of EE.
125. Considering the estimated direct CO₂ emission reductions of 37,680 tCO₂e until End-of-Project (EOP), and cumulative Direct CO₂ emissions avoided over the lifetime of 236,382 tCO₂e that can collectively be attributed to the project, this translates to an approximate Unit Abatement Cost (UAC) of US\$13.5/tCO₂ (i.e. GEF\$ per ton CO₂). The estimated UAC of the project is based on a very conservative estimation approach that has been applied to determine direct GHG reductions and does not consider either post-project direct emissions reductions that will be accomplished through financial mechanism or indirect emissions reductions achieved through replication of technology investments and additional demonstration projects.
126. When comparing the estimated UAC of this project against alternative EE lighting projects in Viet Nam that deliver GHG reduction benefits through electricity savings, it is found that this project is more cost effective than the Local Development and Promotion of LED Technologies for Advanced General Lighting Project, which focuses on the supply side of quality LED lighting in Viet Nam and offers a UAC of US\$21.7/tCO₂eq. This project is also more cost effective than the average value of UACs delivered by similar GEF funded building energy efficiency projects in other countries with UACs ranging from US\$4.3 to US\$37.3 per tonne of CO₂eq²⁰. The estimated UAC of this project is also in accord with the findings from the GEF/UNDP's publication, entitled "Promoting Energy Efficiency in Buildings: Lessons Learned from International Experience", which illustrates (Figure 1) that there is a large potential for GHG emission reduction activities that cost below US\$20/tCO₂eq in non-OECD countries.

²⁰ Malaysia: Buildings Sector Energy Efficiency Project (BSEEP), UAC estimated at US\$4.3/t CO₂eq; Promoting Energy Efficiency in Commercial Buildings in Thailand (PEECB), UAC estimated at US\$37.3/t CO₂eq; India: IND Energy Efficiency Improvements in Commercial Buildings, UAC estimated at US\$5.7/t CO₂eq; the Improving Energy Efficiency in the Residential Buildings Sector of Turkmenistan project estimated the UAC at US\$15.8/tCO₂eq.

127. The UAC will be tracked using a monitoring and evaluation system that the project will develop. This UAC figure will be re-evaluated and updated during the project inception particularly in quantifying the potential energy savings from the confirmed demonstration projects and projected replications and in coming up with the CO2 emission reduction estimates.

Table 11: Global Benefits of the EECB Project

| | Cumulative Direct Energy Savings (GWh) | Cumulative CO2 Emission Reductions, (tCO2e) |
|--|---|--|
| Direct Savings by EOP (2016-2019) | 61 | 37,680 |
| Direct Lifetime Savings (2016-2029) | 384 | 236,382 |
| Direct Post Project CO2 Emissions Savings | | 961,277 |
| Indirect Bottom-up Emission Savings | | 123,069 |
| Indirect Top-down Emission Savings | | 246,353 |

2.8 COUNTRY OWNERSHIP

128. Viet Nam ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1994, the Kyoto Protocol in 2002 and approved the National Target Program to Respond to Climate Change in 2008. The 2NC report was prepared and submitted to the UNFCCC in 2010, and enhancement of EE has been highlighted, among the key measures that the country has been considering for the reduction of GHG emissions. Specifically, promoting EE&C in the commercial/institutional sector has been regarded as short and long term measures for climate change adaption and GHG mitigation in the 2nd National Communication report.
129. This project does not only directly address the issues recognized in the 2NC report, but also complement the NTP on EE, the VNEEP implemented by MOIT, and the national EE&C Law approved in June 2010, in which MOC has been assigned to lead the promotion and enforcement of EE in the building sector. MOC is the designated executing agency for this GEF-funded project, and also the key implementing partner for VNEEP coordinated by MOIT.
130. During the project preparation, numerous stakeholders' discussion and consultations activities, aside from the consultation workshop, were conducted to discuss the issues and concerns (i.e. barriers) regarding the enforcement of EECB and application of building EE technologies in Viet Nam. The consultation workshop came up the consensually agreed project goal and objectives, outcomes, outputs and activities that are proposed to be carried out under the project, including the project implementation and management arrangements.
131. It should be noted that under Component 3 of the project, the demonstrations are only partially funded by GEF, and partners' cash and in-kind contributions are among the co-financed activities of the project. Commitments in matching the project's technical

assistance and incremental cost support with available in-country resources and funds clearly demonstrates project ownership by the building industry, which will benefit from the removal of the identified barriers to EE implementation in the building sector in Viet Nam.

2.9 SUSTAINABILITY, REPLICABILITY AND IMPACTS

132. Sustainability is an integral element of the Project activities and is ensured through the outputs of most of the project components. The sustainability of the institutional elements of the project will be ensured through the establishment and capacity building of additional institutions, such as CEEBs, and the adoption of collaborative approaches and strategies that seek to foster and reinforce the long-term sustainability of institutional and coordination structures with regards to enforcement and upgrade of EEBC, and implementation of EE in the building sector.
133. Moreover, comprehensive enforcement and implementation guidelines for revised EEBC, additional financial mechanisms, technical guidelines on building EE technology design, installation, operation and maintenance together with educated consumers, building practitioners and policy/decision makers, as well as capable EE technology and service providers will help reinforcing sustainability in a long term. Engaging financial institutions (banks and/or leasing companies) early in the development phase also ensures that the proposed financial mechanisms/instruments will be designed to be effective under the rules, regulations and practices of the financial industry in Viet Nam, and yet responsive to the needs their clients. It is envisaged that knowledge in the financing options for the building sector, and understanding in the overall market potential, will stimulate adoption of these financial mechanisms/instruments by local banks, and market competition mechanisms will ensure a long-term sustainability of the proposed financial mechanisms/instruments.
134. The Project is designed to have a balanced mix of capacity building and enabling environment activities tailor-made to the specific market and regulatory environment in Viet Nam. Such balanced mix of activities is expected to promote the enforcement of the revised EEBC and the application of building EE technologies. Replication is an integral component of the project design as the expected energy savings from the application of EE technologies in the building sector in Viet Nam (and the corresponding GHG emissions reduction from the reduced electricity demand) rely on the replication of the relevant Project activities. This is an important part of the project strategy and is a reason for the emphasis put on information and capacity building related activities. Considering the continued rapid growth of the building stock in Viet Nam, there is tremendous potential for replicating the demonstrated EE building technologies and techniques.
135. With the proposed GEF intervention, it is anticipated that EE compliance in buildings will increase from 20% in 2015 to 50% in 2019. As a result, based on baseline estimates, the incremental cumulative energy savings directly resulting from the GEF intervention from would be about 384 GWh and the avoided GHG emissions are estimated at 236,382 tons of CO₂e over the lifetime of the Project. These figures have been estimated in accordance with the expected energy savings of around 12% to 22% depending upon building types, and an assumed rate of improved EE compliance in buildings of 7.5% per year (2016-2019).

Global Benefits

136. The project is forecast to facilitate and influence actions that will result in the reduction of GHG emissions from the country's buildings sector by end-of-project by about 2.3%

as compared to a the GHG emissions in a business-as-usual scenario. The average increase in GHG emission reductions during the course of the project is about 8%, compared with 8.7% without the EEBC project.

National Benefits

137. Among the key national socioeconomic benefits that the project will bring about are:
- Savings of electricity in the buildings sector consequently leading to reduced electricity costs and increased savings for facility owners;
 - Reduced electricity usage contributes to lesser demand on the national grid and improved grid reliability;
 - Reduced CO₂ emissions thereby reducing the long term risk of climate change;
 - Significant capacity built, whereby 70% of building practitioners and professionals are enabled to design EE buildings on a large scale;
 - Improved access to financing for EE in buildings, including implementation of at least one new and improved financing tool/model for commercial building EE investments;
 - More stringent implementation of mandatory policy instruments to promote EE in buildings, specifically the revised EEBC;
 - Awareness on EE technologies and practices and financial arrangements for commercial building EE investments generated amongst professionals, decision makers, and the general public, and at least 70% of commercial building stakeholders become aware and agree to greater availability and quality of the information on EE buildings;
 - A number of design tools developed, including a new user-friendly building energy simulation model which will be widely used by commercial building practitioners;
 - Enhanced access to pertinent and comprehensive information on technologies, practices, designs, operations and managements, and M&V for EE in commercial and high-rise residential buildings;
 - Greater potential for EE investments in the building sector as a result of demonstration projects.
 - Ensures improved comfort of building occupants.

Gender benefits

138. The project will strengthen and enhance involvement of women in technical design and technology training for buildings in Viet Nam through its capacity building programs, in which the inclusion of women will be emphasized in the training-of-trainers (TOT) objectives. With this approach, more women will be trained to be skilled designers and operators by the project. The project will also ensure that gender considerations are embedded to equally engage men and women in the decision making process during project implementation. The project will also support MOC to include policies, strategies, or action plans that promote gender equality.

PART III: MANAGEMENT ARRANGEMENT

139. The project will be executed under National Implementation Modality (NIM) as per the NIM project management implementation guidelines agreed by UNDP and the Government of Viet Nam. The Project Implementing Partner (IP) will be MOC, and UNDP is the GEF Implementing Agency (IA) for the project. MOC will sign the Project Document with UNDP and will be accountable to UNDP for the disbursement of funds and the achievement of the project objective and outcomes, according to the approved work plan. As per Harmonized Approach to Cash Transfers to Implementing Partners (HACT) framework, the micro assessment of this IP was undertaken with low risk rating. Direct cash transfer modality will be applied and subsequent quality assurance activities will be in line with the HACT scheme. UNDP will provide overall management and guidance from its Country Office in Hanoi and the Bangkok Regional Hub (BRH) in Bangkok, and will be responsible for monitoring and evaluation of the project as per normal GEF and UNDP requirements. MOC will designate a senior official of the Department of Science, Technology and Environment as the *National Project Director (NPD)* for the project. The NPD will be responsible for overall guidance to project management, including adherence to the Annual Work Plan (AWP) and achievement of planned results as outlined in the ProDoc, and for the use of GEF funds through effective management and well established project review and oversight mechanisms. The NPD also will ensure coordination with various ministries and agencies provide guidance to the project team to coordinate with UNDP, review reports and look after administrative arrangements as required by the Government of Viet Nam and UNDP.
140. The overall program management structure of the project is shown below:

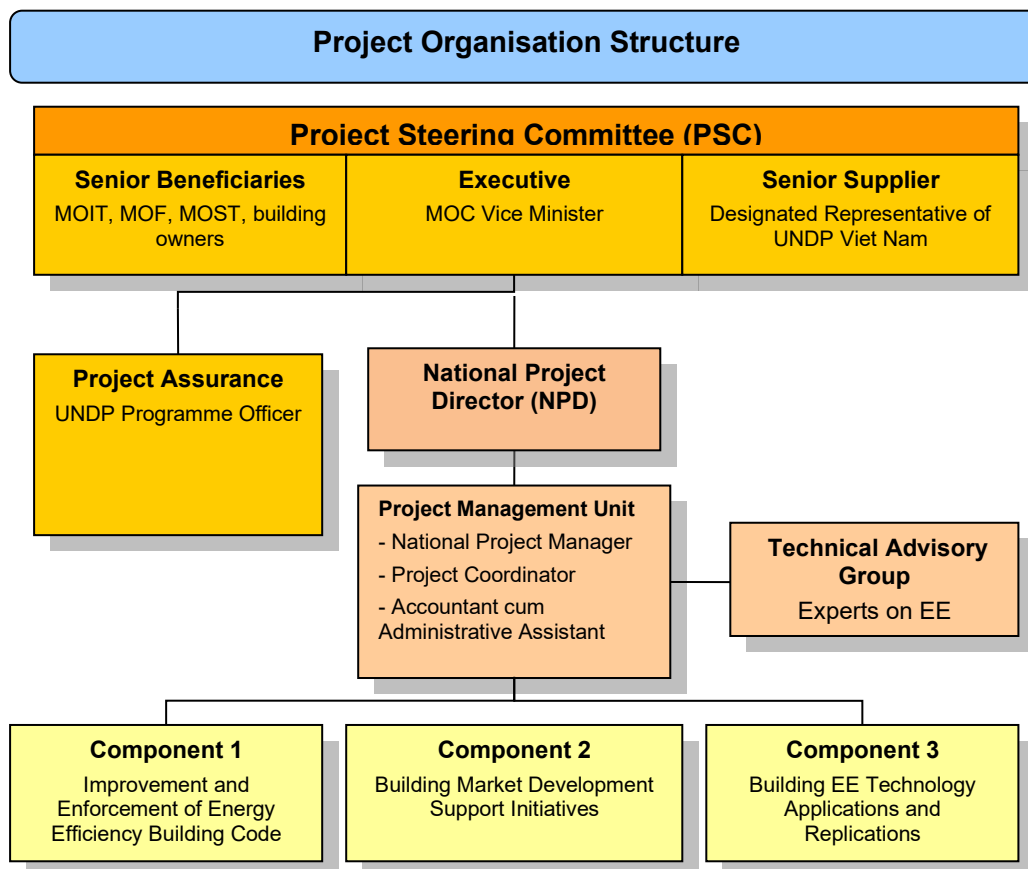


Figure 7: EECEB Project Management Structure

141. The project will establish a Project Steering Committee (PSC). PSC will have oversight of the Project Management Unit (PMU). The PSC will consist of a Chairperson (MOC Vice Minister); with PSC members from MOIT, MOF, MOST, UNDP Viet Nam, building owners and appropriate representatives from research- and development. The primary functions of the PSC will be to provide the necessary direction that allows the Project to function and achieve its policy and technical objectives, and to approve the annual Project plans and M&E reports. In addition, the PSC plays a critical role in project evaluations by quality assurance of the evaluation process and products, and using evaluations for performance improvement, accountability and learning. Project reviews by PSC are made at designated decision points during the running of the project, or as necessary when raised by the Project Manager. The first PSC meeting shall be organized within the first twelve months after the project inception, and the subsequent meetings shall be at least once a year.
142. Project Management Unit (PMU) will report to the Director General of the Department of Science, Technology and Environment under MOC. The PMU will be in charge of overall project administration and coordination with project sites and relevant organizations, under the overall guidance of the PSC. The PMU will be responsible to MOC, the PSC and UNDP for implementing the Project, planning activities and budgets, recruiting specialists, conducting training workshops and other activities to ensure the Project is executed as per approved work plans. The PMU will consist of a National Project Manager, Project Coordinator, and Accountant cum Administrative Assistant.
143. As a GEF implementing agency, UNDP also has a role of project assurance. This role will be exercised by the UNDP Programme Officer responsible for the project, based in the UNDP Country Office (CO).
144. Both the PMU and the NPD will implement mechanisms to ensure ongoing stakeholder participation and effectiveness with the commencement of the Project by conducting regular stakeholder meetings, issuing a regular project electronic newsletter, conducting feedback surveys, implementing strong project management practices, and having close involvement with UNDP Viet Nam as the GEF implementing agency.
145. The principles of partnerships will be adopted in the implementation of the project. MOC, as the Implementing Partner, will enter into agreements with national government agencies, appropriate research and development institutes, consultants, NGOs, and universities in the implementation of selected outputs and activities. Key related implementing partners at the state management level, would include Ministry of Industry and Trade (MOIT), Ministry of Finance (MOF), Ministry of Science and Technology (MOST). While the key implementing partners at the local government level would include Provincial and District Departments of Construction – DOC - and Departments of Urban Planning – DUPA.
146. The state enterprises, professional associations and/or private sector such as Viet Nam Electricity (EVN), Energy Conservation Centers (ECCs) in Hanoi and HCMC, Viet Nam Association of Civil Engineering Environment (VACEE), Viet Nam Association of Architects (VAA) and Viet Nam Green Building Council (VGBC) will be engaged in the project implementation.
147. Establishment of Technical Advisory Group (TAG) to provide technical support to the PMU will be reviewed and decided during the course of project implementation. TAG comprises a flexible network of national and international experts on issues related to EE building policies, EE building designs, EE implementation and M&V, building operation and maintenance, etc. TAG will work on specific ad-hoc assignments,

primarily via Internet communication. The TAG is chaired by the Project Director. TAG members may be invited from Government departments, United Nations, pilot hosts, private sector representatives, national and international consultants, universities and colleges, and research and development institutes. Occasionally, TAG members could be hired to provide technical advisory service on particular issues related to the project.

148. The project will coordinate with ongoing EE promotion and implementations related to the building sector, including: (i) National Targeted Program on Energy Efficiency and Conservation (NTP EE&C) - component 5 on Energy Efficiency and Conservation in buildings²¹; (ii) UNDP/GEF regional project, Barrier Removal to the Cost-Effective Development and Implementation of Energy Efficiency Standards and Labeling (BRESL)²²; (iii) National Program on Technology Transfer (TT) – including R&D/TT on energy conservation and renewable energy managed by MOST²³; and, (iv) UNEP/GEF/MONRE project, Phasing out incandescent lamps through market transformation in Viet Nam.²⁴
149. In order to accord proper acknowledgement to GEF for providing funding, a GEF logo should appear on all relevant GEF project publications, including among others, project hardware purchased with GEF funds. Any citation on publications regarding projects funded by GEF should also accord proper acknowledgment to GEF.

PART IV: MONITORING FRAMEWORK AND EVALUATION

150. The project will be monitored through the following M&E activities. The M&E budget is provided in the table below.
151. Project start: A Project Inception Workshop should be held within the first 4 months of project start with those with assigned roles in the project organization structure, UNDP country office and where appropriate/feasible regional technical policy and program advisors as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan.
152. The Inception Workshop should address a number of key issues including:
 - a) Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and RCU staff vis-à-vis the project team. Discuss the roles, functions, and responsibilities

²¹ VNEEP's overall energy savings target is 5-8% of total national energy consumption during 2011-15. Component 5 under VNEEP has two main sets of activities: organizing training courses on EE&C measures in buildings for provincial Department of Construction staff and applying EE&C measures in five selected pilot buildings. Since the bulk of the activities of Component 5 of this project will form part of the proposed GEF project (as baseline activities), the project development team will coordinate with the VNEEP owner/implementer in various aspects of the activities implementation such as in: (1) Design (e.g., modification or augmentation) of the baseline activities to facilitate GEBs; (2) Implementation of the baseline activities; (3) Budget allocations; (4) Monitoring of the activities and indicators; and, (5) Reporting of the results and impacts of the activities.

²² The objective of the regional BRESL initiative is to rapidly accelerate the adoption and implementation of energy standards and labels for appliances and equipment. Under the BRESL project, Viet Nam has introduced new minimum standards for air conditioners and will develop energy efficiency standards and labels for fluorescent tube ballast, fans, electric motors, refrigerators, CFLs and rice cookers. Coordination will be done in the potential incorporation in the EEBC of EE specifications in the selection and sizing of electricity consuming appliances/equipment in commercial and high-rise residential buildings.

²³ For the National Program on Technology Transfer, any findings that are relevant to energy conservation in the buildings sector will be incorporated into the EEBC project.

²⁴ This project will complement the UNEP/GEF project, which aims to phase out incandescent lamps and promote energy saving lamps, especially CFLs.

- within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.
- b) Based on the project results framework and the relevant GEF Tracking Tool if appropriate, finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
 - c) Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
 - d) Discuss financial reporting procedures and obligations, and arrangements for audit.
 - e) Plan and schedule Project Steering Committee meetings. Roles and responsibilities of all project organization structures should be clarified and meetings planned. The first Project Steering Committee meeting should be held within the first 12 months following the inception workshop.
153. An Inception Workshop report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.
154. Project Implementation Work Plan: Immediately following the inception workshop, the project implementation work plan will be prepared. The work plan will outline the general timeframe for completion of key project outputs and achievement of outcomes. The work plan will map and help guide project activity from inception to completion. To ensure smooth transition between project design and inception, the inception workshop and work planning process will benefit from the input of parties responsible for the design of the original project, including as appropriate relevant technical advisors.
155. Quarterly: Progress made shall be monitored in the UNDP Enhanced Results Based Management Platform. Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS. Risks become critical when the impact and probability are high. Note that for UNDP GEF projects, all financial risks associated with financial instruments such as revolving funds, microfinance schemes, or capitalization of ESCOs are automatically classified as critical on the basis of their innovative nature (high impact and uncertainty due to no previous experience justifies classification as critical). Based on the information recorded in Atlas, a Project Progress Reports (PPR) can be generated in the Executive Snapshot. Other ATLAS logs can be used to monitor issues, lessons learned etc. The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.
156. Annually: Annual Project Review/Project Implementation Reports (APR/PIR) is prepared to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July). The APR/PIR combines both UNDP and GEF reporting requirements. The APR/PIR includes, but is not limited to, reporting on the following:
- Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative);
 - Project outputs delivered per project outcome (annual);
 - Lesson learned/good practice;
 - AWP and other expenditure reports;
 - Risk and adaptive management;
 - ATLAS QPR;
 - Portfolio level indicators (i.e. GEF focal area tracking tools) are used by most focal areas on an annual basis as well.

157. Periodic Monitoring through site visits: UNDP CO and the UNDP RCU will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the Project Steering Committee may also join these visits. A Field Visit Report/BTOR will be prepared by the CO and UNDP RCU and will be circulated within one month after the visit to the project team and Project Steering Committee members.
158. Mid-term of project cycle: The project will undergo an independent Mid-Term Evaluation at the mid-point of project implementation (project months 25-26). The Mid-Term Evaluation will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the UNDP Evaluation Office Evaluation Resource Center (ERC). The relevant GEF Focal Area Tracking Tools will also be completed during the mid-term evaluation cycle.
159. End of Project: An independent Final Evaluation will take place three months prior to the final Project Steering Committee meeting and will be undertaken in accordance with UNDP and GEF guidance. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF.
160. The Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response which should be uploaded to PIMS and to the UNDP Evaluation Office Evaluation Resource Center (ERC). The relevant GEF Focal Area Tracking Tools will also be completed during the final evaluation.
161. During the last three months, the project team will prepare the Project Terminal Report. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results.
162. Learning and knowledge sharing: Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums. The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation through lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects. Finally, there will be a two-way flow of information between this project and other projects of a similar focus.
163. Communications and visibility requirements: Full compliance is required with UNDP's Branding Guidelines. These can be accessed at

<http://intra.undp.org/coa/branding.shtml> , and specific guidelines on UNDP logo use can be accessed at: <http://intra.undp.org/branding/useOfLogo.html>. Amongst other things, these guidelines describe when and how the UNDP logo needs to be used, as well as how the logos of donors to UNDP projects needs to be used. For the avoidance of any doubt, when logo use is required, the UNDP logo needs to be used alongside the GEF logo. The GEF logo can be accessed at: [http://www.thegef.org/gef/GEF logo](http://www.thegef.org/gef/GEF_logo). The UNDP logo can be accessed at <http://intra.undp.org/coa/branding.shtml>.

164. Full compliance is also required with the GEF's Communication and Visibility Guidelines (the "GEF Guidelines"). The GEF Guidelines can be accessed at: [http://www.thegef.org/gef/sites/thegef.org/files/documents/C.40.08 Branding the GEF %20final_0.pdf](http://www.thegef.org/gef/sites/thegef.org/files/documents/C.40.08_Branding_the_GEF_%20final_0.pdf). Amongst other things, the GEF Guidelines describe when and how the GEF logo needs to be used in project publications, vehicles, supplies and other project equipment. The GEF Guidelines also describe other GEF promotional requirements regarding press releases, press conferences, press visits, visits by Government officials, productions and other promotional items. Where other agencies and project partners have provided support through co-financing, their branding policies and requirements should be similarly applied.

Table 12: M&E Work Plan and Budget

| Type of M&E activity | Responsible Parties | Budget US\$ <i>Excluding project team staff time</i> | Time frame |
|---|--|---|---|
| Inception Workshop and Report | <ul style="list-style-type: none"> ▪ Project Manager ▪ UNDP CO, UNDP GEF | Indicative cost: 10,000 | Within first two months of project start up |
| Measurement of Means of Verification of project results. | <ul style="list-style-type: none"> ▪ UNDP GEF RTA/Project Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members. | To be finalized in Inception Phase and Workshop. | Start, mid and end of project (during evaluation cycle) and annually when required. |
| Measurement of Means of Verification for Project Progress on <i>output and implementation</i> | <ul style="list-style-type: none"> ▪ Oversight by Project Manager ▪ Project team | To be determined as part of the Annual Work Plan's preparation. | Annually prior to ARR/PIR and to the definition of annual work plans |
| ARR/PIR | <ul style="list-style-type: none"> ▪ Project manager and team ▪ UNDP CO ▪ UNDP RTA ▪ UNDP GEF Directorate | None | Annually |
| Periodic status/ progress reports | <ul style="list-style-type: none"> ▪ Project manager and team | None | Quarterly |
| Mid-term Evaluation | <ul style="list-style-type: none"> ▪ Project manager and team ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team) | Indicative cost: 30,000 | At the mid-point of project implementation. |
| Final Evaluation | <ul style="list-style-type: none"> ▪ Project manager and team, ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team) | Indicative cost : 30,000 | At least three months before the end of project implementation |
| Project Terminal Report | <ul style="list-style-type: none"> ▪ Project manager and team ▪ UNDP CO ▪ local consultant | 0 | At least three months before the end of the project |
| Audit | <ul style="list-style-type: none"> ▪ UNDP CO ▪ Project manager and team | Indicative cost per year: 4,000 | One per program cycle and additional audit if any based on |

| Type of M&E activity | Responsible Parties | Budget US\$ <i>Excluding project team staff time</i> | Time frame |
|--|--|--|--------------------------|
| | | | the adjusted risk rating |
| Spot Check | <ul style="list-style-type: none"> ▪ UNDP CO ▪ Project Manager and team | Indicative cost per year 2,000 | Yearly |
| Visits to field sites | <ul style="list-style-type: none"> ▪ UNDP CO ▪ UNDP RCU (as appropriate) ▪ Government representatives | For GEF supported projects, paid from IA fees and operational budget | Yearly |
| TOTAL indicative COST Excluding project team staff time and UNDP staff and travel expenses | | US\$ 82,000 (+/- 5% of total budget) | |

165. Audit Clause: The Government will provide the Resident Representative with certified periodic financial statements. The required Audit of financial statements relating to the status of UNDP (including GEF) funds will be conducted according to UNDP financial regulations, rules and audit policies by the legally recognized auditor, or by a commercial auditor engaged by the UNDP.

PART V: LEGAL CONTEXT

166. This Project Document shall be the instrument referred to as such in Article I of the Standard Basic Assistance Agreement between the Government of Viet Nam and the United Nations Development Program, signed by the parties on 21 March 1978. The host country-implementing agency shall, for the purpose of the Standard Basic Assistance Agreement, refer to the government co-operating agency described in that Agreement.

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

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

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

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

SECTION II: PROJECT RESULTS FRAMEWORK

| |
|--|
| Primary applicable Key Environment and Sustainable Development Key Result Area (same as that on the cover page, circle one): 1. Mainstreaming environment and energy OR 2. Catalyzing environmental finance OR 3. Promote climate change adaptation OR 4. Expanding access to environmental and energy services for the poor. |
| Applicable GEF Strategic Objective and Program: The GEF Climate Change Objective 2: Promote Market Transformation for Energy Efficiency in Industry and the Building Sector |
| Applicable GEF Expected Outcomes: 1) Appropriate policy, legal and regulatory frameworks adopted and enforced; 2) Sustainable financing and delivery mechanisms established and operational, and; 2) GHG emissions avoided. |
| Applicable GEF Outcome Indicators: 1) EE regulations adopted and enforced; 2) Number of EE projects, and; 3) Tons of CO2 equivalent |

| Strategy | Indicator | Baseline | Targets | Source of Verification | Assumptions |
|--|--|---------------------|----------------------|--|--|
| GOAL: Reduced intensity of GHG emissions from the building sector | <ul style="list-style-type: none"> Cumulative CO2 emission reduction from the building sector by End-Of-Project (EOP, Year 2019), tCO2e | 1,568 ²⁵ | 37,680 ²⁶ | <ul style="list-style-type: none"> Project final report Reports published by MOC, MOIT, EVN and other relevant government agencies Reports published by project partners (e.g. Industry/Professional Associations, Building Managements and Developers) | <ul style="list-style-type: none"> Commitment to EE in the building sector by the government remains firm. Economic growth improved or at least remains constant |
| OBJECTIVE: Improved energy utilization performance of commercial and high-rise residential buildings in Ho Chi Minh and Hanoi | <ul style="list-style-type: none"> Cumulative energy savings from the commercial building by EOP (Year 2019), MWh | 2,528 ²⁷ | 61,137 ²⁸ | <ul style="list-style-type: none"> Project final report Reports published by MOC, MOIT, EVN and other relevant government agencies Reports published by project partners (e.g. Industry/Professional Associations, Building Managements and Developers) | <ul style="list-style-type: none"> Commitment to EE in the building sector by the government remains firm. Economic growth improved or at least remains constant Institutional capacity to support EEBC enforcement built and sustained |

²⁵ Cumulative CO2 emission reduction in the baseline scenario is a result of 0.5% annual reduction in baseline energy consumption due to adoption of EE technologies and EE investments in commercial and high-rise residential buildings in Viet Nam in absence of GEF intervention. The calculation is based on the guideline and Excel spreadsheet tool published by GEF in March 2013.

²⁶ Cumulative CO2 emission reduction in the EECB project scenario is a result of better compliance with the revised building code (from 20% without GEF intervention to 50% at the end of project), together with direct emission reductions from demonstration projects and their replications.

²⁷ See footnote 23

²⁸ See footnote 24

| Strategy | Indicator | Baseline | Targets | Source of Verification | Assumptions |
|--|---|---|--|---|--|
| | <ul style="list-style-type: none"> % of new buildings that are fully compliant with the revised Energy Efficiency Building Code by EOP | 20 ²⁹ | 50 | <ul style="list-style-type: none"> Project final reports MOC's reports Reports issued by DOCs in Ho Chi Minh City and Hanoi Data compiled by Energy Conservation Center in Ho Chi Minh City and Hanoi Reports published by project partners (e.g. Industry/Professional Associations, Building Managements and Developers) | <ul style="list-style-type: none"> Commitment to EE in the building sector by the government remains firm. Economic growth improved or at least remains constant Institutional capacity to support EEBC enforcement built and sustained |
| | <ul style="list-style-type: none"> % of existing commercial and high-rise residential buildings that adopt EE technologies and practices and achieve at least 10% electricity savings by EOP | <ul style="list-style-type: none"> Less than 5% | <ul style="list-style-type: none"> 20%³⁰ | <ul style="list-style-type: none"> Project final reports MOC's reports Demonstration project reports | <ul style="list-style-type: none"> Economic growth improved or at least remains constant Electricity tariff to be revised to better reflect generation costs and incentivize EE implementation |
| | <ul style="list-style-type: none"> No. of people gainfully employed in the building sector in Viet Nam by EOP | <ul style="list-style-type: none"> 20³¹ | <ul style="list-style-type: none"> 60³² | <ul style="list-style-type: none"> Project final reports Demonstration project reports | <ul style="list-style-type: none"> Economic growth improved or at least remains constant |
| COMPONENT 1: Improvement and enforcement of energy efficiency building code | | | | | |
| OUTCOME 1.1: Enforced, improved and comprehensive policy, legal, and regulatory frameworks on the | <ul style="list-style-type: none"> % of DOCs and building practitioners nationwide that reference EEBC compliance toolkits and guideline developed by the baseline and the projects by EOP | <ul style="list-style-type: none"> 30% of DOCs nationwide 20% of building practitioners | <ul style="list-style-type: none"> 70% of DOCs nationwide (at least) 50% of building | <ul style="list-style-type: none"> Survey reports and feedback documented | <ul style="list-style-type: none"> Provincial governments and DOCs actively respond to the EE commitment made by MOC |

²⁹ The revised 2013 EEBC cannot be effectively enforced due to various barriers identified in the ProDoc.

³⁰ Baseline and EOP indicators based on consultation with local stakeholders and national experts during the ProDoc preparation

³¹ Staff employed by CEEBs, demo projects and certified EE buildings

³² See footnote 31

| Strategy | Indicator | Baseline | Targets | Source of Verification | Assumptions |
|---|--|--|--|--|--|
| energy efficient design, construction and operation of commercial and high-rise residential buildings | <ul style="list-style-type: none"> % of applications for new commercial and high-rise residential building constructions submitted to DOCs comply with EEBC 2013 by EOP | <ul style="list-style-type: none"> 20%³³ | <ul style="list-style-type: none"> 50% | <ul style="list-style-type: none"> DOC reports | <ul style="list-style-type: none"> Provincial governments and DOCs actively respond to the EE commitment made by MOC |
| | <ul style="list-style-type: none"> No. of national testing standards for energy performance of building construction materials promulgated by EOP | <ul style="list-style-type: none"> 0³⁴ | <ul style="list-style-type: none"> 5 | <ul style="list-style-type: none"> Standard gazettes published by STAMEQ, MOST | <ul style="list-style-type: none"> Local stakeholder support in enhancing availability of EE building construction materials remain firm |
| | <ul style="list-style-type: none"> No. of existing and new commercial buildings and high-rise residential buildings in Viet Nam certified as EE buildings by EOP | <ul style="list-style-type: none"> 0³⁵ | <ul style="list-style-type: none"> 20 | <ul style="list-style-type: none"> EECB project reports | <ul style="list-style-type: none"> Economic growth improved and building owners, developers and managers recognize EE as a competitive strategy |
| OUTCOME 1.2: Strengthened compliance of the energy efficiency building code for commercial and high-rise residential buildings in Hanoi and HCMC | <ul style="list-style-type: none"> % of building practitioners nationwide that reference the EE design guideline to achieve a higher level of EE than the EEBC requirements by EOP | <ul style="list-style-type: none"> 20%³⁶ | <ul style="list-style-type: none"> 50% | <ul style="list-style-type: none"> Survey reports and feedback documented | <ul style="list-style-type: none"> Involvements of building practitioners remain strong |
| | <ul style="list-style-type: none"> % of commercial and high-rise residential buildings referencing M&V schemes in EE implementation by EOP | <ul style="list-style-type: none"> 0%³⁷ | <ul style="list-style-type: none"> 70% | <ul style="list-style-type: none"> EECB project reports Survey reports and feedback documented | <ul style="list-style-type: none"> Requirements of building owners, developers, managers and practitioners in validating EE remain firm |
| | <ul style="list-style-type: none"> % of overall commercial and high-rise residential building stakeholders that are satisfied with availability and quality of energy benchmarking data by Year 4 | <ul style="list-style-type: none"> 20%³⁸ | <ul style="list-style-type: none"> 70% (at least) | <ul style="list-style-type: none"> Survey reports and feedback documented | |
| COMPONENT 2: Building market development support initiatives | | | | | |
| OUTCOME 2: | <ul style="list-style-type: none"> No. of financial mechanisms and | <ul style="list-style-type: none"> 0 | <ul style="list-style-type: none"> 1 | <ul style="list-style-type: none"> EECB project reports | <ul style="list-style-type: none"> Commitment to EE in the |

³³ See footnote 26

³⁴ No national testing standards for energy performance of building construction materials

³⁵ No development or implementation of EE certification/labeling for commercial and high-rise residential buildings in Vietnam.

³⁶ There is no current plan for development of EE design guidelines planned by MOC.

³⁷ There are no M&V schemes for EE implementation in buildings recommended by MOC.

³⁸ Some types of energy benchmarking systems for the building sector in Viet Nam will be developed by USAID's TA.

| Strategy | Indicator | Baseline | Targets | Source of Verification | Assumptions |
|---|--|-------------------|--------------------|---|--|
| Increased local capacity in the EE design, construction, and operation of commercial and high-rise residential buildings | incentives for commercial and high-rise residential buildings approved and implemented by EOP | | | | building sector by the key ministries (MOF, MOC and MOIT) remains firm |
| | • % of stakeholders in the building sector that are satisfied with services provided by CEEBs by EOP | • 0 ³⁹ | • 70% (at least) | • Survey reports and feedback documented | • Commitments on operation of CEEBs by project partners remains firm |
| | • % of CEEB trainees that are engaged in EE building designs, implementation and M&V by EOP | • 0 | • 50% | • A survey report on adoption and utilization of knowledge from the training program | |
| | • No. of commercial and high-rise residential buildings that implement EE projects using the ESCO models by EOP | • 5 ⁴⁰ | • 10 | • Data compiled by Energy Conservation Center in Ho Chi Minh City and Hanoi • Reports published by project partners (e.g. Industry/Professional Associations, Building Managements and Developers) | • ESCOs are established and in operation in Viet Nam |
| COMPONENT 3: Building EE technology applications and replications | | | | | |
| OUTCOME 3: Increased use of EE building materials and application of EE building technologies in Hanoi and HCMC | • % of new and retrofitted commercial and high-rise residential buildings that are partly or entirely based on EE building materials and applications being promoted and demonstrated by EOP | • 5% | • 30% | • EEBC project reports | • Economic growth improved or at least remains constant |
| | • No. of demonstration projects that adopted EE equipment, building materials and building energy monitoring and management/control systems promoted by the EEBC project by EOP | • 5 | • 21 ⁴¹ | • Documentation of each demonstration project | • Commitments of demonstration project hosts remain strong |
| | • No. of completed M&V exercises in accordance with the guidelines proposed by the project by EOP | • 0 | • 16 | • Annual M&V report of each demonstration project | • Commitments of demonstration project hosts remain strong |

³⁹ There is no comprehensive capacity building program being planned for CEEB

⁴⁰ Estimations by the Energy Conservation Centers in Hanoi and Ho Chi Minh City

⁴¹ This includes 16 demonstration projects to be implemented by the EEBC project and 5 demonstration projects have been implemented by IFC/WB and DEA. The PIF proposed 20 demonstration sites for the EEBC projects, however the number of demonstration projects concluded during the project design phase is 16 projects and these have already offered a good mix of different types of commercial and high-rise residential buildings in Viet Nam as well as EE technologies and practices to be implemented. Co-financing committed by the 16 project hosts for the EEBC project has already exceeded the initial amount of co-financing specified in the PIF. Fewer number of demonstration projects also offer a better focus for the project management team.

| Strategy | Indicator | Baseline | Targets | Source of Verification | Assumptions |
|----------|---|---|--|---|---|
| | <ul style="list-style-type: none"> No. of new EE building projects designed based on or influenced by, the results of the demonstration projects, by EOP | <ul style="list-style-type: none"> 5 | <ul style="list-style-type: none"> 50 | <ul style="list-style-type: none"> Documentation of completed replication projects | <ul style="list-style-type: none"> Economic growth improved or at least remains constant |

SECTION III: BUDGET AND WORK PLAN

| | | | |
|--|---|-----------------------|----------|
| Award ID: | 00084022 | Project ID(s): | 00092225 |
| Award Title: | Energy Efficiency Improvement in Commercial and High-Rise Residential Buildings in Viet Nam | | |
| Business Unit: | VNM10 | | |
| Project Title: | Energy Efficiency Improvement in Commercial and High-Rise Residential Buildings in Viet Nam | | |
| PIMS no. | 5245 | | |
| Implementing Partner (Executing Agency) | Ministry of Construction (MOC) | | |

| GEF Outcome/Atlas Activity | Responsible Party | Fund ID | Donor Name | Atlas Budgetary Account Code | Atlas Budget Description | Amount Year 1 (USD) | Amount Year 2 (USD) | Amount Year 3 (USD) | Amount Year 4 (USD) | Total (USD) | See Budget Note: |
|--|-------------------|---------|------------|------------------------------|------------------------------------|---------------------|---------------------|---------------------|---------------------|----------------|------------------|
| OUTCOME 1.1: Enforced, improved and comprehensive policy, legal, and regulatory frameworks on the energy efficient design, construction and operation of commercial and high-rise residential buildings | MOC/UNDP | 62000 | GEF | 71200 | International Consultants | 45,000 | - | - | - | 45,000 | 1 |
| | | | | 71300 | Local Consultants | 18,000 | 27,000 | 9,000 | - | 54,000 | 2 |
| | | | | 71400 | Contractual Services – Indv. | 6,000 | 6,000 | - | - | 12,000 | 3 |
| | | | | 71600 | Travel | 4,000 | 6,000 | 2,000 | - | 12,000 | 4 |
| | | | | 72100 | Contractual services Companies | 28,000 | 31,000 | 11,000 | 5,000 | 75,000 | 5 |
| | | | | 75700 | Training, Workshops and Conference | 12,000 | 14,000 | 8,000 | 4,000 | 38,000 | 6 |
| | | | | 74200 | Audio Visual & Print Prod Costs | 13,500 | 13,500 | 4,500 | 1,500 | 33,000 | 7 |
| TOTAL OUTCOME 1.1 | | | | | | 126,500 | 97,500 | 34,500 | 10,500 | 269,000 | |
| Outcome 1.2: Strengthened compliance of the energy efficiency building code for commercial and high-rise residential buildings in Hanoi and HCMC | MOC/UNDP | 62000 | GEF | 71200 | International Consultants | 30,000 | 90,000 | - | - | 120,000 | 8 |
| | | | | 71300 | Local Consultants | 54,000 | 60,000 | - | - | 114,000 | 9 |
| | | | | 71400 | Contractual Services - Indv | 6,000 | 6,000 | 12,000 | 12,000 | 36,000 | 10 |

| GEF Outcome/Atlas Activity | Responsible Party | Fund ID | Donor Name | Atlas Budgetary Account Code | Atlas Budget Description | Amount Year 1 (USD) | Amount Year 2 (USD) | Amount Year 3 (USD) | Amount Year 4 (USD) | Total (USD) | See Budget Note: | |
|--|-------------------|---------|------------|------------------------------|------------------------------------|---------------------|---------------------|---------------------|---------------------|----------------|------------------|----|
| | | | | 71600 | Travel | 7,000 | 3,500 | - | - | 10,500 | 11 | |
| | | | | 72100 | Contractual services Companies | - | 50,000 | 3,000 | - | - | 53,000 | 12 |
| | | | | 75700 | Training, Workshops and Conference | 2,000 | 10,000 | 4,000 | 4,000 | 20,000 | 13 | |
| | | | | 74200 | Audio Visual & Print Prod Costs | 7,000 | 3,000 | 1,500 | 1,500 | 13,000 | 14 | |
| TOTAL OUTCOME 1.2 | | | | | | 156,000 | 175,500 | 17,500 | 17,500 | 366,500 | | |
| OUTCOME 2: Increased local capacity in the EE design, construction, and operation of commercial and high-rise residential buildings | MOC/UNDP | 62000 | GEF | 71200 | International Consultants | 135,000 | 75,000 | - | - | 210,000 | 15 | |
| | | | | 71300 | Local Consultants | 66,000 | 90,000 | 72,000 | 36,000 | 264,000 | 16 | |
| | | | | 71400 | Contractual Services - Indv | 24,000 | 24,000 | 24,000 | 24,000 | 96,000 | 17 | |
| | | | | 71600 | Travel | 5,000 | 17,000 | 10,000 | 4,000 | 36,000 | 18 | |
| | | | | 72100 | Contractual services Companies | - | - | 40,000 | 30,000 | 30,000 | 100,000 | 19 |
| | | | | 75700 | Training, Workshops and Conference | 8,000 | 20,000 | 16,000 | 8,000 | 52,000 | 20 | |
| | | | | 74200 | Audio Visual & Print Prod Costs | 18,000 | 13,500 | 12,000 | 6,000 | 49,500 | 21 | |
| TOTAL OUTCOME 2 | | | | | | 256,000 | 279,500 | 164,000 | 108,000 | 807,500 | | |
| Outcome 3: Increased use of EE building materials and application of EE building technologies in HCMC and Hanoi | MOC/UNDP | 62000 | GEF | 71200 | International Consultants | 15,000 | 135,000 | 105,000 | - | 255,000 | 22 | |
| | | | | 71300 | Local Consultants | 96,000 | 120,000 | 108,000 | 81,000 | 405,000 | 23 | |
| | | | | 71400 | Contractual Services - Indv | 12,000 | 12,000 | 12,000 | 12,000 | 48,000 | 24 | |

| GEF Outcome/Atlas Activity | Responsible Party | Fund ID | Donor Name | Atlas Budgetary Account Code | Atlas Budget Description | Amount Year 1 (USD) | Amount Year 2 (USD) | Amount Year 3 (USD) | Amount Year 4 (USD) | Total (USD) | See Budget Note: |
|---------------------------------|-------------------|---------|------------|------------------------------|------------------------------------|---------------------|---------------------|---------------------|---------------------|------------------|------------------|
| | | | | 71600 | Travel | 32,000 | 48,000 | 48,000 | 40,000 | 168,000 | 25 |
| | | | | 72100 | Contractual services - Companies | 128,000 | 128,000 | 160,000 | 224,000 | 640,000 | 26 |
| | | | | 75700 | Training, Workshops and Conference | - | 3,000 | 6,000 | 20,000 | 29,000 | 27 |
| | | | | 74200 | Audio Visual & Print Prod Costs | 12,000 | 18,000 | 18,000 | 12,000 | 60,000 | 28 |
| TOTAL OUTCOME 3 | | | | | | 295,000 | 464,000 | 457,000 | 389,000 | 1,605,000 | |
| Project Management Unit | MOC/UNDP | 62000 | GEF | 71200 | International Consultants | - | - | 22,500 | 22,500 | 45,000 | 29 |
| | | | | 71300 | Local Consultants and local staff | 3,750 | 3,750 | 8,750 | 8,750 | 25,000 | 30 |
| | | | | 71600 | Travel | - | - | 5,000 | 5,000 | 10,000 | 31 |
| | | | | 74100 | Professional Services | 2,000 | 2,000 | 6,000 | 2,000 | 12,000 | 32 |
| | | | | 72200 | Equipment and Furniture | 6,000 | 3,000 | - | - | 9,000 | 33 |
| | | | | 75700 | Training, Workshops and Conference | 5,000 | 2,000 | 2,000 | - | 9,000 | 34 |
| | | | | 74500 | Miscellaneous | 10,000 | 10,000 | 10,000 | 10,000 | 40,000 | 35 |
| TOTAL PROJECT MANAGEMENT | | | | | | 26,750 | 20,750 | 54,250 | 48,250 | 150,000 | |
| PROJECT TOTAL | | | | | | 860,250 | 1,037,250 | 727,250 | 573,250 | 3,198,000 | |

| Budget Note | |
|--------------------|---|
| 1 | International Consultants and international technical specialist (12 staff weeks) to provide expertise and technical assistance in supporting development guidelines and toolkits (e.g. software); supporting development of testing standards; reviewing technical and economic justifications and EEBC roadmap; supporting development of building certification/labeling scheme; |

| Budget Note | |
|--------------------|--|
| 2 | Local Consultants (72 staff weeks) to provide expertise and technical assistance in reviewing documents and preparing implementing guidelines/handbooks; development of national standards; conducting technical and economic analysis and preparing EEBC roadmap; development of building certification/labeling scheme; |
| 3 | Contracted staff to provide assistance in supporting implementation of project activities; development of the EEBC website; |
| 4 | Travel cost associated with project activities and consultation workshops; |
| 5 | Contractual services - Companies for development of building simulation software, material and equipment database, e-Learning module, production of training material; testing services for building construction materials; production of promotional and awareness materials; |
| 6 | consultation workshops in Hanoi and HCMC; |
| 7 | Cost of printing, communication, courier, translation, etc. |
| 8 | International Consultants and international technical specialist (32 staff weeks) to provide expertise and technical assistance in supporting development of M&V scheme; supporting analysis of SEC profiles for buildings; supporting analysis and development of energy benchmarking system; providing inputs in development and implementation of information disclosure program; |
| 9 | Local Consultants (152 staff weeks) to provide expertise and technical assistance in development of M&V scheme; analysis of SEC profiles for buildings; conducting analysis and development of energy benchmarking system; development and implementation of information disclosure program; selection of target buildings; management of building survey activities; |
| 10 | Contracted staff to provide assistance in supporting implementation of project activities; |
| 11 | travel cost associated with project activities and consultation workshops; |
| 12 | Contractual services - Companies for production of promotional tools and materials; conducting building surveys; |
| 13 | consultation and training workshops; |
| 14 | Cost of printing, communication, courier, translation, etc. |
| 15 | International Consultants and international technical specialist (56 staff weeks) to provide expertise and technical assistance in supporting development of innovative financial mechanisms; supporting development of an economic evaluation toolkit; supporting design and preparation of organizational frameworks and operational plans; design and development of a capacity building program for CEEBs; design and implementation of capacity building programs for ESCOs; design and implementation of communication and outreach programs for ESCOs; |
| 16 | Local Consultants (352 staff weeks) to provide expertise and technical assistance in design and development of innovative financial mechanisms; design and development of an economic evaluation toolkits, and management of a service provider; conducting situation analysis of CEEBs; design and preparation of organizational frameworks and operational plans; design and development of a capacity building program for CEEBs; implementation of a capacity building program for CEEBs; design and implementation of capacity building programs for ESCOs; design and implementation of communication and outreach programs for ESCOs; |
| 17 | Contracted staff to provide assistance in supporting implementation of project activities; |
| 18 | Organization of training activities in Hanoi and HCMC; |
| 19 | Contractual services - Companies for development of an economic evaluation toolkit; production of training materials and toolkits; production of promotional and awareness materials for ESCOs; |
| 20 | consultation and dissemination workshops in Hanoi and HCMC; training workshops and on-the-job training in Hanoi and HCMC; |
| 21 | Cost of printing, communication, courier, translation, etc. |
| 22 | International Consultants and international technical specialist (68 staff weeks) to provide expertise and technical assistance in supporting final designs and procurements of EE measures; supporting implementation of EE measures and M&V activities; |
| 23 | Local Consultants (540 staff weeks) to provide expertise and technical assistance in conducting detailed energy audits in demo buildings; development of 5-year EC plans for demo buildings; final designs and procurements of EE measures; management of EE measure implementation and M&V; documentation of results and lessons learned from demo buildings; coordinating dissemination activities for demo buildings' results; |
| 24 | Contracted staff to provide assistance in supporting implementation of project activities; |

| Budget Note | |
|--------------------|---|
| 25 | Conducting site visits to demo projects; dissemination workshops and activities in Viet Nam; |
| 26 | Procurement and installation of instruments for pre- and post-implementation M&V; production of demo site case studies and promotional materials; |
| 27 | Organization of dissemination workshops and events in Viet Nam; |
| 28 | Cost of printing, communication, courier, translation, etc. |
| 29 | Cost of International Consultants for mid-term evaluation; final evaluation; |
| 30 | Cost of Local Consultants for mid-term evaluation; final evaluation and staff to provide assistance in supporting administration and implementation of project activities |
| 31 | Travel for mid-term evaluation; final evaluation; |
| 32 | Cost of audits and spot checks |
| 33 | Cost of general office equipment |
| 34 | Cost of organization of inception workshops, PSC meetings and review meetings; |
| 35 | Budget set up for Cost of printing, communication, courier, translation and Provision of support services (UNDP Cost Recovery Charges) for recruitment, procurement, financial payment and travel arrangement. LOA for UNDP support services will be available at DOA stage. |

Summary of Funds

| Source of Funds | Amount | | | | Total |
|-----------------------|------------------|------------------|------------------|------------------|-------------------|
| | Year 1 | Year 2 | Year 3 | Year 4 | |
| GEF | 860,250 | 1,037,250 | 727,250 | 573,250 | 3,198,000 |
| UNDP | 555,000 | 555,000 | 555,000 | 555,000 | 2,220,000 |
| Government | 675,000 | 675,000 | 675,000 | 675,000 | 2,700,000 |
| Private Sector | 5,222,243 | 6,880,098 | 4,310,423 | 165,785 | 16,578,550 |
| TOTAL | 7,312,493 | 9,147,348 | 6,267,673 | 1,969,035 | 24,696,550 |

| Name of Co-financier (source) | Classification | Type | Amount | % |
|--|-------------------|---------|-----------|-------|
| UNDP | | | | |
| UNDP | GEF Agency | In-kind | 2,070,000 | 9.63% |
| UNDP | GEF Agency | Cash | 150,000 | 0.70% |
| Government | | | | |
| Ministry of Construction (MOC) | Nat'l Gov't | In-kind | 2,100,000 | 9.77% |
| ECC Hanoi | Gov't Institution | In-kind | 300,000 | 1.40% |
| ECC HCMC | Gov't Institution | In-kind | 300,000 | 1.40% |
| Private Sector | | | | |
| HITC Building | Private Sector | Equity | 128,700 | 0.60% |
| | | In-kind | 4,500 | 0.02% |
| USSR - VN Friendship Culture Palace of HaNoi | Private Sector | Equity | 595,750 | 2.77% |

| | | | | |
|---|----------------|---------|-------------------|-------------|
| | | In-kind | 4,250 | 0.02% |
| Hanoi Sheraton Hotel | Private Sector | Equity | 265,900 | 1.24% |
| | | In-kind | 4,000 | 0.02% |
| Melia Hanoi Hotel | Private Sector | Equity | 77,700 | 0.36% |
| | | In-kind | 3,750 | 0.02% |
| N05 Building | Private Sector | Equity | 32,500 | 0.15% |
| | | In-kind | 3,500 | 0.02% |
| FPT telecom Building | Private Sector | Equity | 2,994,750 | 13.93% |
| | | In-kind | 5,250 | 0.02% |
| JW Marriott Hanoi Hotel | Private Sector | Equity | 344,250 | 1.60% |
| | | In-kind | 5,750 | 0.03% |
| Hanoi energy management staff training center | Private Sector | Equity | 665,000 | 3.09% |
| | | In-kind | 35,000 | 0.16% |
| Majestic hotel | Private Sector | Equity | 248,950 | 1.16% |
| | | In-kind | 134,050 | 0.62% |
| Cendeluxe Hotel | Private Sector | Equity | 320,000 | 1.49% |
| | | In-kind | 80,000 | 0.37% |
| Michelia hotel | Private Sector | Equity | 100,000 | 0.47% |
| | | In-kind | 25,000 | 0.12% |
| Vinpearl Resort | Private Sector | Equity | 176,000 | 0.82% |
| | | In-kind | 44,000 | 0.20% |
| Saigon Office & Service Apartment | Private Sector | Equity | 320,000 | 1.49% |
| | | In-kind | 80,000 | 0.37% |
| Riverside renaissance hotel | Private Sector | Equity | 180,000 | 0.84% |
| | | In-kind | 20,000 | 0.09% |
| Intercontinental hotel | Private Sector | Equity | 162,000 | 0.75% |
| | | In-kind | 18,000 | 0.08% |
| Pedagogical University of HCMC | Private Sector | Equity | 6,650,000 | 30.93% |
| | | In-kind | 2,850,000 | 13.26% |
| Total Co-financing | | | 21,498,550 | 100% |

SECTION IV: ANNEXES

ANNEX A: CALCULATING GREENHOUSE GAS BENEFITS

The calculation of direct and indirect GHG emission reductions follows the methodology issued by GEF in “Calculating Greenhouse Gas Benefits of the Global Environment Facility Energy Efficiency Projects, Version 1.0, issued in March 2013, and the “GEF EE Tool v1.0” was used to calculate greenhouse gas benefits based primarily on the following three methodology modules:

1. Building Code Module
2. Demonstration and Diffusion Module
3. Financial Instrument Module

For the demonstration and diffusion module and the financial instrument module, a replication factor of 2 has been applied, based on the consideration that while the project can offer profitable EE implementation models, the replications in most cases will still be restricted to availability of funds and technical capacity of the project owners. As for the top down approach, a Level 2 Causality Factor of 40%, (GEF contribution is modest, and substantial) has been applied. Other key assumptions used in calculation of greenhouse gas benefits are summarized in the following table.

Table 13: Assumptions used in Calculation of Greenhouse Gas Benefits

| General Parameter | Project Information | |
|--|-------------------------|--|
| First Year of Project | 2016 | |
| Year of Project Close | 2019 | |
| Length of Analysis Period (Years After Project Close) | 10 | |
| Annual Construction Growth Rate (Commercial and High-Rise Residential Buildings) | 14% (see note 1) | |
| Grid Electricity T&D Loss Rate (%) | 10% (see note 2) | |
| Grid Electricity Emissions (tCO ₂ /MWh) | 0.5603 (see note 3) | |
| Total Floor Area of Building Stock (m ²) | 6,722,000 (see note 1) | |
| Floor Area (m ²) Subject to Code Built in Year 2016 | 894,000 (see note 1) | |
| Cumulative Floor Area (m ²) Subject to Code Built in Year 2016-2029 | 34,584,000 (see note 1) | |
| Annual Reduction in Baseline Energy Consumption | 0.5% (see note 4) | |
| Market Assumption (see note 5) | BAU Scenario | EECB Scenario |
| Annual Electricity Consumption (kWh/m ²) | 190 kWh/m ² | 155 kWh/m ² |
| Percent New Square Meters Built Compliant with Code | 20% (see note 6) | 25% (1 st year) 30% (2 nd year) 40% (3 rd year) 50% (4 th year) |

- Note:
1. Estimation based on 2012 data published by various property management companies in Viet Nam
 2. Based on a default value in the GEF EE Tool V.1.0 which is equivalent to the World Bank data.
 3. EF for 2012, published by DNA/Department of Meteorology, Hydrology and Climate Change, Ministry of Natural Resource and Environment
 4. Assumption by the Project Preparation Team
 5. For each scenario, annual electricity consumption based on weighted average EUI (SEC) for typical building designs and EE compliant building designs.
 6. Based on discussion with MOC and national experts.

Estimation of the total market potential for emission savings is summarized in the table below.

Table 14: Estimation of the Total Market Potential for Emission Savings

| Description | Energy Consumption (GWh) | Emission (tCO2) |
|--|--------------------------|-----------------|
| Cumulative Baseline Scenario (2016-2029) | 7593 | 4,254,172 |
| Cumulative Full EE Potential Scenario (2016-2029) (see note 1) | 6494 | 3,638,339 |
| Total Market Potential (Cumulative Savings 2016-2029) | 1099 | 615,833 |

Note: 1. All new buildings from 2016-2029 meet the revised EEBC 2013, and all stock in 2015 are 10% more efficient

The overall results and GHG benefits by component produced by the GEF EE Tool V.1.0 are presented below.

Table 15: Overall Results

| All Components | Cumulative | | | Annual | | | |
|---|------------|-----------|-----------|--------|---------|---------|---------|
| | Total | 2016-2019 | 2020-2029 | 2016 | 2019 | 2025 | 2035 |
| Direct Electricity Savings (MWh) | 383,531 | 61,137 | 322,395 | 1,947 | 32,495 | 32,495 | 25,508 |
| N/A | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| N/A | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| N/A | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Direct Total Energy Savings (GJ) | 1,380,712 | 220,092 | 1,160,620 | 7,007 | 116,982 | 116,982 | 91,828 |
| Direct GHG Emission Savings (tCO2) | 236,382 | 37,680 | 198,701 | 1,200 | 20,028 | 20,028 | 15,721 |
| Direct Post-project GHG Emission Savings (tCO2) | 961,277 | | 961,277 | 0 | 0 | 91,564 | 573,634 |
| Indirect Bottom-up Emission Savings (tCO2) | 123,069 | | 123,069 | | | | |
| Indirect Top-down Emission Savings (tCO2) | 246,353 | | 246,353 | | | | |
| Building Codes Components | | | | | | | |
| Building Codes Components | Cumulative | | | Annual | | | |
| | Total | 2016-2019 | 2020-2029 | 2016 | 2019 | 2025 | 2035 |
| Direct Electricity Savings (MWh) | 299,912 | 44,834 | 255,078 | 1,565 | 25,508 | 25,508 | 25,508 |
| N/A | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| N/A | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| N/A | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Direct Total Energy Savings (GJ) | 1,079,684 | 161,404 | 918,280 | 5,632 | 91,828 | 91,828 | 91,828 |
| Direct GHG Emission Savings (tCO2) | 184,845 | 27,633 | 157,212 | 964 | 15,721 | 15,721 | 15,721 |
| Direct Post-project GHG Emission Savings (tCO2) | 955,531 | | 955,531 | | | 91,564 | 573,634 |
| Indirect Bottom-up Emission Savings (tCO2) | | | | | | | |
| Demonstration & Diffusion Components | | | | | | | |
| Demonstration & Diffusion Components | Cumulative | | | Annual | | | |
| | Total | 2016-2019 | 2020-2029 | 2016 | 2019 | 2025 | 2035 |
| Direct Electricity Savings (MWh) | 70,848 | 13,748 | 57,100 | 382 | 5,710 | 5,710 | 0 |
| N/A | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| N/A | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| N/A | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Direct Total Energy Savings (GJ) | 255,053 | 49,493 | 205,560 | 1,375 | 20,556 | 20,556 | 0 |
| Direct GHG Emission Savings (tCO2) | 43,666 | 8,473 | 35,192 | 235 | 3,519 | 3,519 | 0 |
| Direct Post-project GHG Emission Savings (tCO2) | | | | | | | |
| Indirect Bottom-up Emission Savings (tCO2) | 105,577 | | 105,577 | | | | |
| Financial Components | | | | | | | |
| Financial Components | Cumulative | | | Annual | | | |
| | Total | 2016-2019 | 2020-2029 | 2016 | 2019 | 2025 | 2035 |
| Direct Electricity Savings (MWh) | 12,771 | 2,554 | 10,217 | 0 | 1,277 | 1,277 | 0 |
| N/A | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| N/A | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| N/A | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Direct Total Energy Savings (GJ) | 45,976 | 9,195 | 36,780 | 0 | 4,598 | 4,598 | 0 |
| Direct GHG Emission Savings (tCO2) | 7,871 | 1,574 | 6,297 | 0 | 787 | 787 | 0 |
| Direct Post-project GHG Emission Savings (tCO2) | 5,746 | | 5,746 | | | | |
| Indirect Bottom-up Emission Savings (tCO2) | 17,491 | | 17,491 | | | | |

Table 16: Indirect Top-Down Impacts

| | User-Specified |
|--|----------------|
| Total Market Potential (tCO2) | 615,883 |
| Causality factor | 40% |
| Indirect Top-Down Emission Reductions (tCO2) | 246,353 |

Notes

All new buildings from 2016-2029 meet the revised EEBC 2013, and all stock in 2015 are 10% more efficient.

ANNEX B: SUMMARY OF DEMONSTRATION PROJECTS

| No. | Demonstration Project | Location | Type of Building | Estimated Annual Energy Savings (kWh) | Estimated Investment Required (US\$) | Tentative Energy Efficiency Technology /Technique to be Demonstrated |
|-----|---|----------|---|---------------------------------------|--------------------------------------|--|
| 1 | Retrofitting of Lighting Systems and Installing Solar PV in HITC Building | Hanoi | Office (Private) - Retrofitted Building | 286,972 | 133,200 | Replacement of existing inefficiency reflectors with EE reflectors, Retrofitting with T5 efficient lighting systems, Installation of dimmers and occupancy sensors, Energy monitoring, management and control according to occupancy and daylight availability, Upgrade device temperature control center, Installing the solar panel system . |
| 2 | Retrofitting of HVAC and lighting in USSR - VN Friendship Culture Palace of Hanoi. | Hanoi | Public Building (State) Retrofitted Building | 560,347 | 600,000 | Replaced air cooling chiller with water-cooled Chiller, Replacement of existing inefficiency reflectors with EE reflectors, Retrofitting with T5, LED efficient lighting systems, Installation of dimmers and occupancy sensors, Energy monitoring, management and control according to occupancy and daylight availability; |
| 3 | Retrofitting lighting systems; Glass; HVAC; and Installation of BAS in Hanoi Sheraton Hotel | Hanoi | Hotel (Private) Retrofitted Building | 669,038 | 269,900 | Retrofitting lighting systems: use of high efficiency lighting system; energy monitoring, management and control according to occupancy and daylight availability at the common areas; installation of heat pump-solar hybrid hot water system |
| 4 | Retrofitting lighting systems; Replace boiler with heat pump in Melia Hanoi Hotel | Hanoi | Hotel (Private) Retrofitted Building | 529,753 | 81,450 | Replacement of existing inefficiency reflectors with EE reflectors, Retrofitting with T5, LED efficient lighting systems, Installation of dimmers and occupancy sensors; Replace boiler with heat pump. |
| 5 | Retrofitting lighting systems and ventilation basement garage of The Housing complexes combining offices - N05 Building | Hanoi | Residential - (Private) Retrofitted Building | 238,272 | 36,000 | Retrofitting lighting systems : Use of high efficiency lighting system; energy monitoring, management and control according to occupancy and daylight availability; Improving ventilation basement garage |
| 6 | Construction of a new data center of FPT telecom Building | Hanoi | Office (Data center buildings) Retrofitted Building | 636,250 | 3,000,000 | Use of high efficiency main IT equipment, Use of high efficiency lighting system, Use of high efficiency cooling system, Energy monitoring, management and control according to occupancy and report. |
| 7 | Retrofitting lighting systems; building envelope and installation of Heat pump/Solar Hybrid of the JW MARRIOTT HANOI HOTEL. | Hanoi | Hotel (Private) Retrofitted Building | 1,003,314 | 350,000 | Retrofitting lighting systems : Use of high efficiency lighting system; Paste insulating film for building glass cover; Retrofitting Solar Water Heater with Heat pump/Solar Hybrid |
| 8 | Construction of a new building for Hanoi energy management staff training center | Hanoi | School (State) New Building | 124,020 | 700,000 | Implementation of energy monitoring, management and control according to occupancy and daylight availability. |
| 9 | Energy Efficient Lighting and BAS for Majestic Hotel | HCMC | Hotel (Private) Retrofitted Building | 201,042 | 383,000 | Implementation of ISO 50001; Installation of BAS: Control and monitoring energy consumption; Retrofit 7,650 unit of compact 14 W to LED with 5 W (operation time: 8hours/day) |

| No. | Demonstration Project | Location | Type of Building | Estimated Annual Energy Savings (kWh) | Estimated Investment Required (US\$) | Tentative Energy Efficiency Technology /Technique to be Demonstrated |
|-----|---|-----------|--|---------------------------------------|--------------------------------------|---|
| 10 | Retrofitting of HVAC and Lighting Systems in Cendeluxe Hotel | Phu Yen | Hotel (Private) Retrofitted Building | 322,271 | 400,000 | Replacement of 200 units of metal halide 250 W with LED 150 W (operation time: 8hours/day); Installation of 3 VSD for 3 chilled pumps, Replacement of electric water heater to heat pump: replace 380 EWHs that capacity is 3,5 kW/unit to 01 center hot water that use heat pump with 23 kW. |
| 11 | Installation of Solar PV for Michelia hotel | Nha Trang | Hotel (Private) Retrofitted Building | 175,200 | 123,800 | Installation of 20kW Solar PV to supplement electricity supply |
| 12 | LED Lighting Retrofit in Vinpearl Resort | Nha Trang | Hotel (Private) Retrofitted Building | 102,200 | 220,000 | Retrofit 4000 units of 12W CFLs with 5W LED |
| 13 | Retrofitting of HVAC in Somerset Service Apartment | HCMC | High-Rise Residential (Private) Retrofitted Building | 1,093,248 | 400,000 | Replacement the old chillier with 3.2 COP with a new 5.12 COP chiller |
| 14 | Installation of BAS in Riverside Renaissance Hotel | HCMC | Hotel (Private) Retrofitted Building | 141,824 | 200,000 | Installation of Building Automation System (BAS) |
| 15 | Retrofitting of HVAC and Lighting Systems in Intercontinental Hotel | HCMC | Hotel (Private) Retrofitted Building | 290,515 | 180,000 | Replacement of 58 standard motors with high efficiency motors; Replacement of 3,150 units of 50W halogen lamps with 3W LED lamps |
| 16 | Pedagogical University of HCMC | HCMC | School (Private) Retrofitted Building | 91,556 | 217,109 | Replacement of CFLs and FTLs with LED lamps and T5 fluorescent lamps respectively |
| | | | School (Private) New Building | 108,517 | 9,500,000 | Installation of CFLs, LED lamps, Inverter AC and VRV AC. |

ANNEX C: CO-FINANCING LETTERS

Co-financing Letters are submitted as a separate file.

ANNEX D: ANNUAL TARGETS

| Strategy | Indicator | Baseline | Annual Targets | | | |
|--|--|---|--|--|--|--|
| | | | Year 1 | Year 2 | Year 3 | Year 4 |
| GOAL: Reduced intensity of GHG emissions from the building sector | <ul style="list-style-type: none"> Cumulative CO2 emission reduction from the building sector, tCO2e | | 1,200 | 6,235 | 17,653 | 37,680 |
| OBJECTIVE: Improved energy utilization performance of commercial and high-rise residential buildings in Ho Chi Minh and Hanoi | <ul style="list-style-type: none"> Cumulative energy savings from the commercial building, MWh | | 1,947 | 10,117 | 28,642 | 61,137 |
| | <ul style="list-style-type: none"> % of new buildings that are fully compliant with the revised Energy Efficiency Building Code | 20 | 25 | 30 | 40 | 50 |
| | <ul style="list-style-type: none"> % of existing commercial and high-rise residential buildings that adopt EE technologies and practices and achieve at least 10% electricity savings | Less than 5% | At least 5% | 10% | 15% | 20% |
| | <ul style="list-style-type: none"> No. of people gainfully employed in the building sector in Viet Nam | 4 | 14 | 14 | 18 | 14 |
| COMPONENT 1: Improvement and enforcement of energy efficiency building code | | | | | | |
| OUTCOME 1.1: Enforced, improved and comprehensive policy, legal, and regulatory frameworks on the energy efficient design, construction and operation of commercial and high-rise residential buildings | <ul style="list-style-type: none"> % of DOCs and building practitioners nationwide that reference EEBC compliance toolkits and guideline developed by the baseline and the projects | <ul style="list-style-type: none"> 30% of DOCs nationwide 20% of building practitioners | <ul style="list-style-type: none"> 40% of DOCs nationwide (at least) 25% of building practitioners | <ul style="list-style-type: none"> 55% of DOCs nationwide (at least) 35% of building practitioners | <ul style="list-style-type: none"> 65% of DOCs nationwide (at least) 45% of building practitioners | <ul style="list-style-type: none"> 70% of DOCs nationwide (at least) 50% of building practitioners |
| | <ul style="list-style-type: none"> % of applications for new commercial and high-rise residential building constructions submitted to DOCs comply with EEBC 2013 | <ul style="list-style-type: none"> 20% | <ul style="list-style-type: none"> 25% | <ul style="list-style-type: none"> 30% | <ul style="list-style-type: none"> 40% | <ul style="list-style-type: none"> 50% |
| | <ul style="list-style-type: none"> No. of national testing standards for energy performance of building construction materials promulgated | <ul style="list-style-type: none"> 0 | <ul style="list-style-type: none"> 1 | <ul style="list-style-type: none"> 2 | <ul style="list-style-type: none"> 2 | <ul style="list-style-type: none"> 0 |
| | <ul style="list-style-type: none"> No. of existing and new commercial buildings and high-rise residential buildings in Viet Nam certified as EE buildings | <ul style="list-style-type: none"> 0 | <ul style="list-style-type: none"> 0 | <ul style="list-style-type: none"> 5 | <ul style="list-style-type: none"> 5 | <ul style="list-style-type: none"> 10 |
| OUTCOME 1.2: Strengthened compliance of the energy efficiency building code for commercial and high-rise | <ul style="list-style-type: none"> % of building practitioners nationwide that reference the EE design guideline to achieve a higher level of EE than the EEBC requirements by EOP | <ul style="list-style-type: none"> 20% | <ul style="list-style-type: none"> 25% | <ul style="list-style-type: none"> 35% | <ul style="list-style-type: none"> 45% | <ul style="list-style-type: none"> 50% |

| Strategy | Indicator | Baseline | Annual Targets | | | |
|--|---|----------|-----------------|--------|--------|------------------|
| | | | Year 1 | Year 2 | Year 3 | Year 4 |
| residential buildings in Hanoi and HCMC | • % of commercial and high-rise residential buildings referencing M&V schemes in EE implementation | • 0% | • 5% | • 25% | • 50% | • 70% |
| | • % of overall commercial and high-rise residential building stakeholders that are satisfied with availability and quality of energy benchmarking data | • 20% | • 20% | • 30% | • 50% | • 70% (at least) |
| COMPONENT 2: Building market development support initiatives | | | | | | |
| OUTCOME 2: Increased local capacity in the EE design, construction, and operation of commercial and high-rise residential buildings | • No. of financial mechanisms and incentives for commercial and high-rise residential buildings approved and implemented | • 0 | • 0 | • 1 | • 0 | • 0 |
| | • % of stakeholders in the building sector that are satisfied with services provided by CEEBs | • 0% | • 10% | • 30% | • 50% | • 70% (at least) |
| | • % of CEEB trainees that are engaged in EE building designs, implementation and M&V | • 0% | • 0% | • 10% | • 30% | • 50% |
| | • No. of commercial and high-rise residential buildings that implement EE projects using the ESCO models | • 5 | • 0 | • 2 | • 3 | • 5 |
| COMPONENT 3: Building EE technology applications and replications | | | | | | |
| OUTCOME 3: Increased use of EE building materials and application of EE building technologies in Hanoi and HCMC | • % of new and retrofitted commercial and high-rise residential buildings that are partly or entirely based on EE building materials and applications being promoted and demonstrated | • 5% | • 5% (at least) | • 10% | • 20% | • 30% |
| | • No. of demonstration projects that adopted EE equipment, building materials and building energy monitoring and management/control systems promoted by the EEBC project | • 5 | • 2 | • 6 | • 8 | • 0 |
| | • No. of completed M&V exercises in accordance with the guidelines proposed by the project | • 0 | • 0 | • 2 | • 6 | • 8 |
| | • No. of new EE building projects designed based on or influenced by, the results of the demonstration projects | • 5 | • 5 | • 10 | • 15 | • 20 |

ANNEX E: OFFLINE RISK LOG

Summary of Risks and Mitigation Measures for the EECB Project

| Risk | Mitigating Measure | Level of Risk |
|--|---|---------------|
| Institutional and Operational Risk | | |
| Lack of government commitment to EE | <p>The government has taken significant steps to provide a policy and regulatory framework toward EE in the industrial and building sectors. In addition, by decision of the Prime Minister, it is mandatory to implement the National Target Program on Energy Efficiency and Conservation (2006-2010, 2011-2015), which includes a specific component related to EE in the construction and buildings sector.</p> <p>The EE&C Law approved by the National Assembly in June 2010 has further demonstrated the government's commitment toward EE, and the building sector is clearly highlighted as the main target for EE improvements. MOC's roles and responsibilities are also clearly defined in relevant EE&C decrees. The EECB project involves MOC as the lead implementing agency and this assures the government commitment to EE promotions in the building sector.</p> | Low |
| Lack of institutional capacity to implement and manage the project | <p>MOC's institutional and technical capacity and experience in EE projects will ensure sound management and implementation of the project. MOC has dedicated management staff and a number of full-time staff responsible for EE. Besides, MOC's research and academic institutions such as the Construction Science and Technology Institution, Construction Materials Institution and Urban and Rural Planning Institute have been involved in a number of energy conservation projects ranging from development of standards and technical guidelines on EE, energy audits, research, surveys, recommendations and implementation of EE techniques in buildings, and EE</p> | Medium |

| Risk | Mitigating Measure | Level of Risk |
|--|---|---------------|
| | <p>monitoring and evaluation, etc.</p> <p>Since 2004, MOC has been involved in a number of key EE programs including a demand-side management (DSM) project with the deliverable of formulation and promulgation of the EE building code 2005. Within the framework of VNEEP 2, MOC takes the lead in implementation of Component 3 (Energy Efficiency and Conservation in Building, with two main projects of Improving capacity on EE&C and conducting EE&C activities in building design and management and Develop pilot models and disseminate EE&C management activities in building operation). Critically, it participated in the formulation of the Energy Efficiency and Conservation Law which was passed on June 2010.</p> <p>Although MOC has continuously strengthened its capacity in managing EE projects, the EECB project will further enhanced its institutional capacity in EE project implementation and management through establishment of two CEEBs in Hanoi and HCMC. The EECB project will also implement a comprehensive capacity building program for these two CEEBs to ensure that they can provide necessary supports to sustain the enforcement of the EEBC and EE implementations in the building sector as a whole.</p> | |
| Stakeholder coordination - Too many stakeholders may prevent efficient decision-making | Identification of the appropriate lead agency and appropriate number of members for the National Steering Committee and the Technical Advisory Committee during the project design stage | Low |
| Climate Change Risk | | |

| Risk | Mitigating Measure | Level of Risk |
|---|--|---------------|
| <p>Over the past 50 years, the average temperature in Viet Nam has increased by 0.7°C and is expected to increase further, leading to increased demand for air conditioning, which could offset the energy savings achieved by the project.</p> | <p>In updating the EE building code, greater attention will be paid to expected climate change impacts, particularly higher temperatures. Measures such as advanced insulation techniques and passive solar design can reduce the expected increase in air conditioning loads. High-efficiency electrical appliances, especially in commercial buildings, can also reduce the electricity demand for air conditioning. In addition to the revised EEBC issued in 2013, the EEBC project will also layout a roadmap for upgrading the Vietnamese EEBC to respond available greater EE in building construction materials and electrical appliances.</p> <p>Furthermore, raising awareness among building occupants is important, as building users generally respond to a warmer climate by choosing options that increase cooling energy consumption rather than other means, such as insulation, shading or ventilation, which consume less energy. It is envisaged that there will be some public awareness activities under component 2 and that CEEB staff will engage in outreach and communications.</p> | <p>Medium</p> |
| Market Risk | | |
| <p>Low electricity tariffs could serve as a disincentive to EE</p> | <p>Viet Nam Electricity, the state-owned utility, raised average electricity prices by five percent in December 2012, the second increase in less than six months. Under a regulation that took effect in June 2011 (Prime Minister decision No. 24/2011/QD-TTg dated 15/4/2011), the utility is allowed to raise power prices every three months based on changes in fuel costs or exchange rates. Input costs, including prices for coal and gas, have risen. Nonetheless, electricity prices remain low in comparison to other regional countries. MOC</p> | <p>Medium</p> |

| Risk | Mitigating Measure | Level of Risk |
|---|---|---------------|
| | and the CEEBs will coordinate with the utility and relevant ministries ⁴² to set the electricity tariff at a level that reflects the true cost. | |
| The market response of building owners, developers and end-users may not be as swift as anticipated. The desired behavioral change may not happen effectively within the project period due to unstable growth of the building sector in Viet Nam | <p>As a result of the promulgation of the EE&C Law (2010), the implementation of the revised EEBC issued in 2013 is now strongly supported by a clear legal framework, not only by a decision of MOC as the previous EEBC in 2005. MOC, however, will accelerate the implementation of activities related to the enforcement of the incentive / penalty scheme, as well those pertaining to raising public awareness of such policy tools.</p> <p>At the beginning of the implementation schedule, the project will develop an effective communications plan and organize a set of relevant promotional activities targeting these stakeholders, so that long-term benefits of EE are well recognized. Successful case studies of EE implementation in the building sector will be drafted and the information will be shared with decision-makers.</p> | Medium |
| Lack of support from building sector professionals | The project will involve of the professionals in all stages of the project so that the outcomes are in agreement with the consensus amongst such groups | Low |
| Failure to secure consumer interest may result into low demand for EE buildings and thereby slow rate of market transformation. This will also result | <p>EE in buildings have inherent economic benefits in addition to energy reduction and emissions reduction which is expected to attract the stakeholder response.</p> <p>The project activities have provision to create awareness, training and capacity building of the stakeholders.</p> | Low |

⁴² According to Prime Minister Decision No. 24/2011/QĐ-TTg, MOIT and MOF have responsibility to approve the power price change requested by EVN.

| Risk | Mitigating Measure | Level of Risk |
|---|--|---------------|
| into reduced incentives for building designers/ owners to improve design. | | |
| Technical/ Technological Risk | | |
| Some technology suppliers may bring in very new technologies that may not be suitable to the local market. | MOC will limit available technologies for demonstrations to those that have been tested in a similar market, especially technologies with actual energy savings performance data from building owners and developers. This is to ensure that the project will not be promoting “untested” technologies that may not be compatible with climatic conditions or demand-side energy utilization behavior (and culture) in Viet Nam, or perhaps, may pose unforeseen safety and environmental hazards. This will be done through the demonstration projects and EE technologies inventory. | Low |
| Poor performance of demonstrated technologies, non-achievement of projected energy savings and increased investment or maintenance costs for energy efficient technologies. | The project will carry out detailed technical designs of EE measures and conduct review of available technologies to ensure that proper EE technologies will be selected and demonstrated. An implementation agreement with each project host will be established, and a focal point with authority will be appointed to facilitate effective implementation of the demonstration project. Adequate capacity building for project host personnel will also be undertaken to ensure operation, management and maintenance of EE measures will be carried out in an efficient manner. | Low |
| Overall | | Low |

ANNEX F: TERMS OF REFERENCE

KEY PROJECT MANAGEMENT POST

National Project Manager (NPM):

Duties and Responsibilities: The incumbent will report to the National Project Director and will be responsible for implementation of the project, including mobilization of all project inputs, setup, implementation and maintenance of project's internal control arrangements, supervision of project staff, consultants and oversight of sub-contractors. The PM will be the leader of the Project Team (PT) and shall liaise with the government, UNDP, and all stakeholders involved in the Project. S/he will be specifically responsible for (a) overall management of the project, (b) work closely with project stakeholders and ensure the project deliveries as per project document and work plan, (c) ensure technical coordination of the project and the work related to regulatory, institutional, financial and implementation aspects, (d) mobilize all project inputs in accordance with UNDP procedures and GEF principles, (e) finalize the ToR for the consultants and subcontractors and coordinate with Business Solution Center for recruitment, procurement and contracting, (f) supervise and coordinate the work of all project staff, consultants and sub-contractors, (g) ensure proper management of funds consistent with UNDP requirements, and budget planning and control, (h) prepare and ensure timely submission of monthly reports, quarterly consolidated financial reports, quarterly consolidated progress reports, annual, mid-term and terminal reports, and other reports as may be required by UNDP; (i) submit the progress reports and key issue report to the **Project Steering Committee**, (j) prepare quarterly and annual work plan, (k) arrange for audit of all project accounts for each fiscal year (l) undertake field visit to ensure quality of work, (m) undertake any activities that may be assigned by UNDP and **Project Steering Committee**, and (n) gender mainstream in project design, implementation and monitoring.

Qualifications and Experience: The incumbent should have a minimum Bachelor degree in Engineering with MBA/Master degree or Masters in energy/environment or other relevant academic discipline and profession qualifications with at least five (5) years professional experience at senior level. S/he should have extensive experience and technical ability to manage a large project and a good technical knowledge in the fields related to private sector development, climate change, energy efficiency, the construction and building materials sector and institutional development and/or regulatory aspects. Demonstrated understanding and experience of gender equality issues in energy efficiency construction and Familiarity with UNDP gender equality strategy will be an advantage. S/he must have effective interpersonal and negotiation skills proven through successful interactions with all levels of project stakeholder groups, including senior government officials, financial sectors, private entrepreneurs, technical groups and communities. S/he should have ability to effectively coordinate a complex, multi-stakeholder project and to lead, manage and motivate teams of international and local consultants to achieve results. Good capacities for strategic thinking, planning and management and excellent communication skills both in English and Vietnamese are essential. Knowledge of UNDP project implementation procedures, including procurement, disbursements, reporting and monitoring will be an added advantage.

Admin Assistant (AA):

Duties and Responsibilities: The incumbent report to the National Project Manager and will be responsible to provide overall administration services of the Project in support of the Project Accountant and NPM such as processing payments. S/he will be responsible to provide

information to UNDP Project web, RRCM reporting and administrative trouble shooting. S/he will also perform (a) word processing, drafting routine letters/messages/reports, mailing (b) arrange travel, itinerary preparation for project related travels, (c) assist to arrange workshops/seminar/training programs and mailing, (d) work at reception desk and make appointments and schedule meeting, (e) assist in work-plan and budgeting, (f) photocopying, binding and filing, (g) maintenance of all office equipment and keeping inventory/records of supplies and their usage and any other duties assigned by Project Manager or concerned officials (this would include providing administration to the management of Component 4).

Qualifications and Experience: The incumbent should have at least a Bachelor degree in any discipline from a recognized university. S/he should have at least 3 years relevant working experience with foreign aided projects or international development or organizations. Computer proficiency in MS Office (Word, Excel and PowerPoint) and other common software is a prerequisite. Diploma in computer/secretarial science is desirable but not essential. Basic knowledge in procurement, petty cash handling, logistics supports, and filing systems is a basic requirement. Knowledge of UNDP project implementation procedures, including procurement, disbursements, and reporting and monitoring is preferable. Fluent both in written and spoken English and Vietnamese is required.

Project Accountant (ACC):

Duties and Responsibilities: The incumbent will report to the National Project Manager and will be responsible to provide overall financial services of the project. S/he will be responsible to provide information to UNDP Project web, RRCM reporting and administrative trouble shooting. S/he will also prepare work-plan budgets and Project expenditure and any other duties assigned by Project Manager or concerned officials (this would include providing administration to the management of Component 4).

Qualifications and Experience: The incumbent should have at least a Bachelor degree in finance and accounting or in relevant field. S/he should have at least 3 years relevant working experience with foreign aided projects or international development or organizations. Computer proficiency in MS Office (Word, Excel and PowerPoint) and other common software is a prerequisite. Diploma in computer/secretarial science is desirable but not essential. Basic knowledge in procurement, petty cash handling, and accounting systems is a basic requirement. Knowledge of UNDP project implementation procedures, including procurement, disbursements, and reporting and monitoring is preferable. Fluent both in written and spoken English and Vietnamese is required.

NATIONAL CONSULTANTS

Qualifications and Experience: All national consultants should have a minimum Bachelor degree in Engineering with relevant profession qualifications, and at least five (5) years of professional experience. Advanced degrees in energy/environment or other relevant academic discipline would be a plus. Good capacities for planning and management and excellent communication skills both in English and Vietnamese are essential. Knowledge of UNDP project implementation procedures, including procurement, disbursements, and reporting and monitoring will be an added advantage.

Building EE Policy Expert:

Duties and Responsibilities: The incumbent will be responsible in:

- Reviewing policy/legislative/regulatory frameworks applied in the buildings sector in Viet Nam and other countries (developed and developing), particularly incentives program;
- Working with MOC to coordinate with DOCs and relevant government agencies to prepare guidelines and handbooks to strengthen implementation of EEBC in Viet Nam;
- Design and development of supporting mechanisms to strengthen enforcement of EEBC;
- Preparing technical and economic justifications, and roadmap and action plan to revised EEBC and to strengthen EE promotions in the building sector in Viet Nam;
- Reviewing available information regarding building EE certification and labeling and green building schemes that are currently ongoing and/or were implemented in Viet Nam and in other countries;
- Assessing appropriate options for MOC to promote building EE certification and labeling and green building schemes for commercial and high-rise residential buildings;
- Preparing recommendations on the best options in consultation with stakeholders prior to conclusion and submission to MOC

Building Energy Simulation Model Expert:

Duties and Responsibilities: The incumbent will be responsible in:

- Conducting survey and assessment of utilization patterns and capacity of Building Energy Simulation software being used in Viet Nam;
- Conducting detailed assessment of features and functions of the two (2) most popular simulation models to understand their applicability to the Vietnamese context;
- Evaluating capacity of users and their needs on extra features and functions of the simulation software;
- Preparing recommendations on features and functions of the simulation software and relevant capacity building activities;
- Selecting the most appropriate the simulation software and undertake necessary modification works for EEBC in Vietnam;
- Preparing promotional and training programs and an e-Learning module to familiarize building practitioners and students with features and usage of the customized model;
- Developing standard designs for specific types of commercial buildings which will be used during the training;
- Designing contents and structures of the promotional and training program;

Building Material Standards and Testing Expert:

Duties and Responsibilities: The incumbent will be responsible in:

- Compilation and verification of data on the availability and quality of EE construction material technologies and practices applied in Viet Nam;
- Identify potential information resources for energy performance data of construction materials from manufacturers, suppliers and accredited testing laboratories;

- Coordinating with the national standard body and testing laboratories in Viet Nam for initial product testing;
- Preparing a report to publish findings through the project website for public access;
- Integrating new and additional performance database into the building simulation model to be developed under the EECB project;

Building Measurement & Verification (M&V) Expert:

Duties and Responsibilities: The incumbent will be responsible in:

- Reviewing any Measurement and Verification (M&V) protocol previously developed by MOC or other agencies in Viet Nam well as common approaches being adopted by ESCOs and EE consulting firms in Viet Nam;
- Reviewing the latest edition of International Performance for Measurement and Verification Protocol (IPMVP) against the Vietnamese practices;
- Providing recommendation on improvements of M&V protocols and enhancement of its utilization with relevant stakeholders;
- Summarize findings and propose recommendation of improvements and implementation approaches to MOC;

Building Energy Management Expert:

Duties and Responsibilities: The incumbent will be responsible in:

- Reviewing past SEC studies and similar energy using index studies undertaken in other countries, and conduct additional analysis and assessment as necessary;
- Reviewing how other countries utilize SEC as indicators and goals to improve EE in the building sector;
- Coordinating building survey activities and reviewing building survey data and preparing SEC for the building sector in Viet Nam;
- Developing recommendations to adapt SEC as indicators, goals and measures to the conditions and needs of Viet Nam;
- Preparing a document which outlines detailed information on the results and evaluation of demonstration projects on EE technologies and practices;
- Conducting assessment of the viability of commercial and high-rise residential buildings in Viet Nam to adopt those successful EE implementations and adoption progress during the EECB implementation period;
- Preparing the project replication plan will be undertaken and submit to MOC for review and approval;

EE Financing Expert:

Duties and Responsibilities: The incumbent will be responsible in:

- Analysis and assessment of existing financial schemes in Viet Nam from the perspective of financial institutions and building stakeholders;
- Reviewing the financial systems (government and private) in other countries (developed and developing) for financing building construction projects, as well as those that are lending to building EE projects;
- Providing pertinent recommendations on how to make better and more effective use of the existing incentive mechanisms for promotion of EE;

- Providing recommendations on new and innovative financial schemes for EE investment in commercial buildings;
- Developing the most appropriate scheme (or a combination of schemes) for enhancement of EE investments in commercial and high-rise residential buildings together with selection criteria for the financing schemes and the selection of eligible borrowers;
- Engaging relevant stakeholders as a working group to assess how much financing will be extended to EE building projects through the new schemes, and organizing a series of round table discussion, meetings and workshop with commercial banks/financial institutions to provide technical advice to banking/financial institutions to get their interest in providing financing based on the new schemes to prospective EE building projects;
- Analysis of cost and benefit ratios of proposed fiscal policies and preparing a report detailing the terms and conditions of the schemes, including assessment of source of finance;
- Conducting a series of formal and informal meetings with MOC's management level, and obtain necessary approvals;

EE Capacity Building Expert:

Duties and Responsibilities: The incumbent will be responsible in:

- Conducting capacity building/training needs assessment of CEEBs, ESCOs and the different stakeholders in the buildings sector
- Conducting a scoping study to develop an inventory of training institutions, resource speakers and experts that will be involved in the conduct of the training courses
- Designing relevant training programs addressing the identified needs of the target institutions and participants
- Advising the local situation concerning the conduct of training courses, and assist the International Consultant
- Designing a course syllabus for each training course to be prepared specifying the actual target participants, the actual resource speaker/s, and the teaching strategies to be adopted for each course, training duration, logistics needed, etc.
- Proposing a suitable framework for the implementation of the follow-up program and training needs
- Conducting training courses on EE technologies and practices for personnel attached to demonstration buildings and other buildings which express their willingness and capacity in replicating successes from the demonstration projects
- Organizing a seminar/workshop to discuss and promote the results of the demonstration projects to commercial building stakeholders

Energy Audit and EE Implementation Expert:

Duties and Responsibilities: The incumbent will be responsible in:

- Providing technical advisory services in the Detailed Feasibility Studies of Selected Demonstration Sites;
- Providing technical advice on meeting specific Demonstration Project Implementation Requirements;
- Establishing baseline data for the Demonstration Project Sites;
- Providing assistance in identification of appropriate financing of the operation and maintenance of each demonstration site;
- Assisting preparation of technical specifications and procurements;
- Acting as the focal points for demonstration project implementation;
- Working with project hosts during procurements, installations and commissioning;

- Working with demonstration hosts to regularly monitor implementation results using the M&V

International Senior Technical Specialist (ITS)

Duties and Responsibilities: The overall responsibility of the ITS is to provide technical advice and substantive support to the PMU and Government on overall implementation and in particular on the project quality issues. Specific responsibilities and tasks of the Consultant include:

- Provision of technical inputs for key project outputs
- Project Quality Monitoring and Evaluation ensuring that the effective implementation of the quality management plan
- Assisting NPM in implementing risk management plan
- Provision of policy advice to the Government

Qualification and Experience:

- Master Degree in business administration, economics, public administration, engineering; preferably with PhD. Degree in the same or any other relevant field;
- At least 10 years of experience in the field of energy efficiency including specialized experience in energy efficiency, policy development, and institutional capacity building;
- Excellent communication skills, full proficiency in English both written and verbal. Skilled presenter of ideas in one on one situations and in symposia;
- Experienced in initiating project development, implementation, monitoring and evaluation;
- Multidisciplinary professional experience preferred; and
- With good appreciation of, and strong links with relevant international organizations.

INTERNATIONAL CONSULTANTS

Qualifications and Experience: All international consultants should have a minimum Bachelor degree in Engineering with relevant profession qualifications, and at least seven (7) years of professional experience. Advanced degrees in energy/environment or other relevant academic discipline would be a plus. Good capacities for planning and management and excellent communication skills in English are essential. Knowledge of UNDP project implementation procedures, including procurement, disbursements, and reporting and monitoring will be an added advantage.

Building EE Policy Expert:

Duties and Responsibilities: The incumbent will be responsible in:

- Reviewing policy/legislative/regulatory frameworks applied in the buildings sector in other countries (developed and developing), particularly incentives program;

- Providing recommendations on strengthening existing measures or introducing new measures (certification, labeling, benchmarking, information disclosure, etc.) with appropriate scope and action plans in order to promote EE in the commercial building sector in a long term;
- Supporting national consultant in analysis of cost and benefit ratios of proposed fiscal policies;
- Proposing recommendations towards reaching agreements on mobilizing local and international financial institutions and local resources to support EE investments in the building sector in Viet Nam;

Building Energy Simulation Model Expert:

Duties and Responsibilities: The incumbent will be responsible in:

- Advising local consultant on issues related to international building energy simulation modeling;
- Providing recommendations on features and functions of building energy simulation models and relevant capacity building activities;
- Supporting local consultant on promotional and training programs and an e-Learning module to familiarize building practitioners and students with features and usage of the customized model;
- Advising contents and structures of the promotional and training program

EE Capacity Building Expert:

Duties and Responsibilities: The incumbent will be responsible in:

- Supporting national consultants in capacity building/training needs assessment of the different stakeholders in the buildings sector;
- Designing relevant training programs addressing the identified needs of the target institutions and participants;
- Supporting national consultants in designing a course syllabus for each training course to be prepared specifying the actual target participants, the actual resource speaker/s, and the teaching strategies to be adopted for each course, training duration, logistics needed, etc.;
- Providing recommendations for a 5-year sustainable follow-up program for capacity development in the buildings sector;
- Proposing a suitable framework for the implementation of the follow-up program and training needs

Building EE Certification and Labeling Expert:

Duties and Responsibilities: The incumbent will be responsible in:

- Reviewing available information regarding building energy efficiency certification, labeling, benchmarking and green building schemes that are currently ongoing and/or were implemented in other countries;
- Assessing appropriate options for MOC to improve effectiveness of building energy labeling and green building schemes implementation mechanisms for commercial and high-rise residential buildings;
- Recommending the best options in consultation with stakeholders prior to conclusion and submission to MOC;

Building Measurement & Verification (M&V) Expert:

Duties and Responsibilities: The incumbent will be responsible in:

- Advising national consultants on the latest edition of International Performance for Measurement and Verification Protocol (IPMVP) and other relevant protocols;
- Supporting national consultants in adoption or revision of international M&V schemes for Viet Nam;
- Recommending improvements of M&V protocol and discussing enhancement of its utilization with relevant stakeholders;
- Assisting national consultants in preparation of findings and propose recommendation of improvements and implementation approaches to MOC;

Building Energy Management Expert:

Duties and Responsibilities: The incumbent will be responsible in:

- Reviewing past SEC studies and similar energy using index studies undertaken in other countries, and conduct additional analysis and assessment as necessary;
- Reviewing how other countries utilize SEC as indicators and goals to improve EE in commercial and high-rise residential buildings;
- Preparing recommendations to adapt SEC as indicators, goals and measures to the conditions and needs of Viet Nam.

ANNEX G: SOCIAL AND ENVIRONMENTAL SCREENING

Project Information

| Project Information | |
|-------------------------------------|---|
| 1. Project Title | Energy Efficiency Improvement in Commercial and High-Rise Residential Buildings in Viet Nam |
| 2. Project Number | 00092225 |
| 3. Location (Global/Region/Country) | Viet Nam |

Part A. Integrating Overarching Principles to Strengthen Social and Environmental Sustainability

QUESTION 1: How Does the Project Integrate the Overarching Principles in order to Strengthen Social and Environmental Sustainability?

Briefly describe in the space below how the Project mainstreams the human-rights based approach

Through establishment of a comprehensive database of EE building construction materials, equipment and technologies as well as a directory of qualified building practitioners (designers, engineers, installers, etc.), the project will create an enabling environment for all individuals and organizations involved in design, construction and operation of buildings in Viet Nam to access and provide quality products and services to increase EE levels of buildings. The project will also determine specific training needs of different groups of stakeholders and comprehensive capacity building programs that will ensure meaningful participation of all stakeholders in the project. The human-rights based approach will be demonstrated and mainstreamed through the transparent identification and selection process of participants of the comprehensive capacity building programs that will be adopted by the project.

Briefly describe in the space below how the Project is likely to improve gender equality and women's empowerment

Although technical female staff in the building sector may appear to be an uncommon situation in the Asia region, involvements of women in technical design and technology training for buildings in Viet Nam are very common. These have been witnessed during project preparation phase. The project will reinforce and enhance the current situation through its capacity building programs, and ensure that inclusion of women is part of the training-of-trainers (TOT) objectives, and more women are trained to be skilled designers and operators by the project. The project will also support MOC to include policies, strategies, or action plans that promote gender equality.

Briefly describe in the space below how the Project mainstreams environmental sustainability

The project will support implementation of national environmental sustainability through promotion of energy savings and efficiency in the building sector which is recognized as the key area for greenhouse gas emission reduction in the National Climate Change Strategy (Decision 2139/QD-TTg dated 05 December 2011), and the National Environment Protection Strategy to 2020 with vision until 2030 (Decision no. 1216/QD-TTg). The project will also support the Viet Nam Green Growth Strategy approved in September 2012 (Decision No. 1393/QD-TTg) through enforcement of the energy efficiency building code, and promotions of energy efficiency designs and operations beyond the code requirements in new and retrofitted building. These will lead to greater adoption of clean and green material technology during design, construction and operation as solutions to achieve green growth and low carbon economy.

Part B. Identifying and Managing Social and Environmental Risks

| <p>QUESTION 2: What are the Potential Social and Environmental Risks?</p> <p><i>Note: Describe briefly potential social and environmental risks identified in Attachment 1 – Risk Screening Checklist (based on any “Yes” responses). If no risks have been identified in Attachment 1 then note “No Risks Identified” and skip to Question 4 and Select “Low Risk”. Questions 5 and 6 not required for Low Risk Projects.</i></p> | <p>QUESTION 3: What is the level of significance of the potential social and environmental risks?</p> <p><i>Note: Respond to Questions 4 and 5 below before proceeding to Question 6</i></p> | | | <p>QUESTION 6: What social and environmental assessment and management measures have been conducted and/or are required to address potential risks (for Risks with Moderate and High Significance)?</p> |
|---|---|--|---|--|
| <p>Risk Description</p> | <p>Impact and Probability (1-5)</p> | <p>Significance (Low, Moderate, High)</p> | <p>Comments</p> | <p>Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note that the assessment should consider all potential impacts and risks.</p> |
| <p>Risk 3: Risk due to Climate Change impacts</p> | <p>I = 3 P = 3</p> | <p>Moderate</p> | <p>Over the past 50 years, the average temperature in Viet Nam has increased by 0.7°C and is expected to increase further, leading to increased demand for air conditioning, which could offset the energy savings achieved by the project.</p> | <p>The project has been designed to address climate change risks on EE buildings through promotion of EEBC which will improve the building thermal performance against the climate impacts. In updating the EE building code, greater attention will be paid to expected climate change impacts, particularly higher temperatures. Measures such as advanced insulation techniques and passive solar design can reduce the expected increase in air conditioning loads. High-efficiency electrical appliances, especially in commercial buildings, can also reduce the electricity demand for air conditioning. The project will layout a roadmap for upgrading the Vietnamese EEBC to respond available greater EE in building construction materials and electrical appliances.</p> <p>Furthermore, raising awareness among building occupants is important, as building users generally respond to a warmer climate by choosing options that increase cooling energy consumption rather than other means, such as insulation, shading or ventilation, which consume less energy. These issues will be</p> |

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| | | | | addressed through public awareness activities under component 2 and that CEEB staff will engage in outreach and communications. |
| Risk 4: Health and safety risks during construction and operation. | I = 2 P = 2 | Low | Implementation of EE in buildings (new and retrofitted projects) may pose potential occupational health and safety risk due to physical and chemical hazards. These include potential physical hazards during installation of large EE equipment (chillers) or lighting systems for high ceiling areas, and chemical hazards during installation of air-conditioning and heat pump units | All relevant civil, mechanical and electrical works during implementation of EE in new and retrofitted buildings will be carried in accordance with the relevant Vietnamese national codes of practice to ensure safety of all workers and personnel involved. |
| Risk 5: Risk due to hazardous substances. | I = 2 P = 5 | Moderate | Implementation of EE in buildings (new and retrofitted projects) involves manufacture and trade of EE equipment and technologies which may contain hazardous substances (e.g. mercury in fluorescent lamps). EE retrofits also lead to generation of both hazardous and non-hazardous wastes | <p>One of the most common lighting technologies used in commercial and high-rise residential buildings is mercury-containing fluorescent lamps, and safe disposal of spent fluorescent lamps is to be properly addressed. EE fluorescent lamps promoted by the project contain less mercury than their predecessors, and more efficient LED lighting contains no mercury. However, LEDs are known to contain lead. Since specific environmental impacts of LEDs disposal are yet to be fully determined, latest research and management of disposed LEDs will be closely followed and considered during project implementation to mitigate potential impacts.</p> <p>The project formulation team have determined the quantities of inefficient fluorescent lamps that will be retrofitted in each demo project, and proper actions regarding collection, storage, and safe disposal of these lamp wastes will be carried out during the implementation phase. It should be noted that Viet Nam has promulgated Decision on take-back and treatment of discarded products (Decision 50/QD-TTg) in which fluorescent lamps are included, and several disposal facilities have already been in operation in Hanoi and HCMC. Safe disposal of mercury-containing lamps and other electrical and electronic wastes generated by the project will be carried out in accordance with the existing regulatory requirements using the existing in-country disposal facilities.</p> |

| QUESTION 4: What is the overall Project risk categorization? | | |
|--|-------------------------------------|---|
| Select one (see SESP for guidance) | | Comments |
| <i>Low Risk</i> | <input type="checkbox"/> | |
| <i>Moderate Risk</i> | <input checked="" type="checkbox"/> | The project includes activities with moderate risks of adverse social or environmental impacts. As a precautionary approach, a few likely impacts associated with the baseline projects have been identified but they are considered as low and limited in scale. The identified risks can be managed through compliance with relevant code of practices and regulatory frameworks that are already in place in Viet Nam. |
| <i>High Risk</i> | <input type="checkbox"/> | |
| QUESTION 5: Based on the identified risks and risk categorization, what requirements of the SES are relevant? | | |
| Check all that apply | | Comments |
| <i>Principle 1: Human Rights</i> | <input type="checkbox"/> | |
| <i>Principle 2: Gender Equality and Women's Empowerment</i> | <input type="checkbox"/> | |
| <i>1. Biodiversity Conservation and Natural Resource Management</i> | <input type="checkbox"/> | |
| <i>2. Climate Change Mitigation and Adaptation</i> | <input type="checkbox"/> | |
| <i>3. Community Health, Safety and Working Conditions</i> | <input type="checkbox"/> | |
| <i>4. Cultural Heritage</i> | <input type="checkbox"/> | |
| <i>5. Displacement and Resettlement</i> | <input type="checkbox"/> | |
| <i>6. Indigenous Peoples</i> | <input type="checkbox"/> | |
| <i>7. Pollution Prevention and Resource Efficiency</i> | <input checked="" type="checkbox"/> | Monitoring and evaluation of the identified risks during annual project review and mid-term review. |

Final Sign Off

| Signature | Date | Description |
|------------------|-------------|---|
| QA Assessor | | UNDP staff member responsible for the Project, typically a UNDP Programme Officer. Final signature confirms they have “checked” to ensure that the SESP is adequately conducted. |
| QA Approver | | UNDP senior manager, typically the UNDP Deputy Country Director (DCD), Country Director (CD), Deputy Resident Representative (DRR), or Resident Representative (RR). The QA Approver cannot also be the QA Assessor. Final signature confirms they have “cleared” the SESP prior to submittal to the PAC. |
| PAC Chair | | UNDP chair of the PAC. In some cases PAC Chair may also be the QA Approver. Final signature confirms that the SESP was considered as part of the project appraisal and considered in recommendations of the PAC. |

SESP ATTACHMENT 1. SOCIAL AND ENVIRONMENTAL RISK SCREENING CHECKLIST

| Checklist Potential Social and Environmental Risks | | |
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| Principles 1: Human Rights | | Answer (Yes/No) |
| 1. | Could the Project lead to adverse impacts on enjoyment of the human rights (civil, political, economic, social or cultural) of the affected population and particularly of marginalized groups? | No |
| 2. | Is there a likelihood that the Project would have inequitable or discriminatory adverse impacts on affected populations, particularly people living in poverty or marginalized or excluded individuals or groups? ⁴³ | No |
| 3. | Could the Project potentially restrict availability, quality of and access to resources or basic services, in particular to marginalized individuals or groups? | No |
| 4. | Is there a likelihood that the Project would exclude any potentially affected stakeholders, in particular marginalized groups, from fully participating in decisions that may affect them? | No |
| 5. | Is there a risk that duty-bearers do not have the capacity to meet their obligations in the Project? | No |
| 6. | Is there a risk that rights-holders do not have the capacity to claim their rights? | No |
| 7. | Have local communities or individuals, given the opportunity, raised human rights concerns regarding the Project during the stakeholder engagement process? | No |
| 8. | Is there a risk that the Project would exacerbate conflicts among and/or the risk of violence to project-affected communities and individuals? | No |
| Principle 2: Gender Equality and Women's Empowerment | | |
| 1. | Is there a likelihood that the proposed Project would have adverse impacts on gender equality and/or the situation of women and girls? | No |
| 2. | Would the Project potentially reproduce discriminations against women based on gender, especially regarding participation in design and implementation or access to opportunities and benefits? | No |
| 3. | Have women's groups/leaders raised gender equality concerns regarding the Project during the stakeholder engagement process and has this been included in the overall Project proposal and in the risk assessment? | No |
| 4. | Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and positions of women and men in accessing environmental goods and services? <i>For example, activities that could lead to natural resources degradation or depletion in communities who depend on these resources for their livelihoods and well being</i> | No |
| Principle 3: Environmental Sustainability: Screening questions regarding environmental risks are encompassed by the specific Standard-related questions below | | |
| Standard 1: Biodiversity Conservation and Sustainable Natural Resource Management | | |
| 1.1 | Would the Project potentially cause adverse impacts to habitats (e.g. modified, natural, and critical habitats) and/or ecosystems and ecosystem services? | No |

⁴³ Prohibited grounds of discrimination include race, ethnicity, gender, age, language, disability, sexual orientation, religion, political or other opinion, national or social or geographical origin, property, birth or other status including as an indigenous person or as a member of a minority. References to "women and men" or similar is understood to include women and men, boys and girls, and other groups discriminated against based on their gender identities, such as transgender people and transsexuals.

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| | <i>For example, through habitat loss, conversion or degradation, fragmentation, hydrological changes</i> | |
| 1.2 | Are any Project activities proposed within or adjacent to critical habitats and/or environmentally sensitive areas, including legally protected areas (e.g. nature reserve, national park), areas proposed for protection, or recognized as such by authoritative sources and/or indigenous peoples or local communities? | No |
| 1.3 | Does the Project involve changes to the use of lands and resources that may have adverse impacts on habitats, ecosystems, and/or livelihoods? (Note: if restrictions and/or limitations of access to lands would apply, refer to Standard 5) | No |
| 1.4 | Would Project activities pose risks to endangered species? | No |
| 1.5 | Would the Project pose a risk of introducing invasive alien species? | No |
| 1.6 | Does the Project involve harvesting of natural forests, plantation development, or reforestation? | No |
| 1.7 | Does the Project involve the production and/or harvesting of fish populations or other aquatic species? | No |
| 1.8 | Does the Project involve significant extraction, diversion or containment of surface or ground water? <i>For example, construction of dams, reservoirs, river basin developments, groundwater extraction</i> | No |
| 1.9 | Does the Project involve utilization of genetic resources? (e.g. collection and/or harvesting, commercial development) | No |
| 1.10 | Would the Project generate potential adverse transboundary or global environmental concerns? | No |
| 1.11 | Would the Project result in secondary or consequential development activities which could lead to adverse social and environmental effects, or would it generate cumulative impacts with other known existing or planned activities in the area? <i>For example, a new road through forested lands will generate direct environmental and social impacts (e.g. felling of trees, earthworks, potential relocation of inhabitants). The new road may also facilitate encroachment on lands by illegal settlers or generate unplanned commercial development along the route, potentially in sensitive areas. These are indirect, secondary, or induced impacts that need to be considered. Also, if similar developments in the same forested area are planned, then cumulative impacts of multiple activities (even if not part of the same Project) need to be considered.</i> | No |
| Standard 2: Climate Change Mitigation and Adaptation | | |
| 2.1 | Will the proposed Project result in significant ⁴⁴ greenhouse gas emissions or may exacerbate climate change? | No |
| 2.2 | Would the potential outcomes of the Project be sensitive or vulnerable to potential impacts of climate change? | Yes |
| 2.3 | Is the proposed Project likely to directly or indirectly increase social and environmental vulnerability to climate change now or in the future (also known as maladaptive practices)? <i>For example, changes to land use planning may encourage further development of floodplains, potentially increasing the population's vulnerability to climate change, specifically flooding</i> | No |
| Standard 3: Community Health, Safety and Working Conditions | | |
| 3.1 | Would elements of Project construction, operation, or decommissioning pose potential safety risks to local communities? | No |
| 3.2 | Would the Project pose potential risks to community health and safety due to the transport, storage, and use and/or disposal of hazardous or dangerous materials (e.g. explosives, fuel and other chemicals during construction and operation)? | No |
| 3.3 | Does the Project involve large-scale infrastructure development (e.g. dams, roads, buildings)? | No |

⁴⁴ In regards to CO₂, 'significant emissions' corresponds generally to more than 25,000 tons per year (from both direct and indirect sources). [The Guidance Note on Climate Change Mitigation and Adaptation provides additional information on GHG emissions.]

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| 3.4 | Would failure of structural elements of the Project pose risks to communities? (e.g. collapse of buildings or infrastructure) | No |
| 3.5 | Would the proposed Project be susceptible to or lead to increased vulnerability to earthquakes, subsidence, landslides, erosion, flooding or extreme climatic conditions? | No |
| 3.6 | Would the Project result in potential increased health risks (e.g. from water-borne or other vector-borne diseases or communicable infections such as HIV/AIDS)? | No |
| 3.7 | Does the Project pose potential risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during Project construction, operation, or decommissioning? | Yes |
| 3.8 | Does the Project involve support for employment or livelihoods that may fail to comply with national and international labor standards (i.e. principles and standards of ILO fundamental conventions)? | No |
| 3.9 | Does the Project engage security personnel that may pose a potential risk to health and safety of communities and/or individuals (e.g. due to a lack of adequate training or accountability)? | No |
| Standard 4: Cultural Heritage | | |
| 4.1 | Will the proposed Project result in interventions that would potentially adversely impact sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g. knowledge, innovations, practices)? (Note: Projects intended to protect and conserve Cultural Heritage may also have inadvertent adverse impacts) | No |
| 4.2 | Does the Project propose utilizing tangible and/or intangible forms of cultural heritage for commercial or other purposes? | No |
| Standard 5: Displacement and Resettlement | | |
| 5.1 | Would the Project potentially involve temporary or permanent and full or partial physical displacement? | No |
| 5.2 | Would the Project possibly result in economic displacement (e.g. loss of assets or access to resources due to land acquisition or access restrictions – even in the absence of physical relocation)? | No |
| 5.3 | Is there a risk that the Project would lead to forced evictions? ⁴⁵ | No |
| 5.4 | Would the proposed Project possibly affect land tenure arrangements and/or community based property rights/customary rights to land, territories and/or resources? | No |
| Standard 6: Indigenous Peoples | | |
| 6.1 | Are indigenous peoples present in the Project area (including Project area of influence)? | No |
| 6.2 | Is it likely that the Project or portions of the Project will be located on lands and territories claimed by indigenous peoples? | No |
| 6.3 | Would the proposed Project potentially affect the human rights, lands, natural resources, territories, and traditional livelihoods of indigenous peoples (regardless of whether indigenous peoples possess the legal titles to such areas, whether the Project is located within or outside of the lands and territories inhabited by the affected peoples, or whether the indigenous peoples are recognized as indigenous peoples by the country in question)? <i>If the answer to the screening question 6.3 is “yes” the potential risk impacts are considered potentially severe and/or critical and the Project would be categorized as either Moderate or High Risk.</i> | No |
| 6.4 | Has there been an absence of culturally appropriate consultations carried out with the objective of | No |

⁴⁵ Forced evictions include acts and/or omissions involving the coerced or involuntary displacement of individuals, groups, or communities from homes and/or lands and common property resources that were occupied or depended upon, thus eliminating the ability of an individual, group, or community to reside or work in a particular dwelling, residence, or location without the provision of, and access to, appropriate forms of legal or other protections.

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| | achieving FPIC on matters that may affect the rights and interests, lands, resources, territories and traditional livelihoods of the indigenous peoples concerned? | |
| 6.5 | Does the proposed Project involve the utilization and/or commercial development of natural resources on lands and territories claimed by indigenous peoples? | No |
| 6.6 | Is there a potential for forced eviction or the whole or partial physical or economic displacement of indigenous peoples, including through access restrictions to lands, territories, and resources? | No |
| 6.7 | Would the Project adversely affect the development priorities of indigenous peoples as defined by them? | No |
| 6.8 | Would the Project potentially affect the physical and cultural survival of indigenous peoples? | No |
| 6.9 | Would the Project potentially affect the Cultural Heritage of indigenous peoples, including through the commercialization or use of their traditional knowledge and practices? | No |
| Standard 7: Pollution Prevention and Resource Efficiency | | |
| 7.1 | Would the Project potentially result in the release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local, regional, and/or transboundary impacts? | No |
| 7.2 | Would the proposed Project potentially result in the generation of waste (both hazardous and non-hazardous)? | Yes |
| 7.3 | Will the proposed Project potentially involve the manufacture, trade, release, and/or use of hazardous chemicals and/or materials? Does the Project propose use of chemicals or materials subject to international bans or phase-outs? <i>For example, DDT, PCBs and other chemicals listed in international conventions such as the Stockholm Conventions on Persistent Organic Pollutants or the Montreal Protocol</i> | Yes |
| 7.4 | Will the proposed Project involve the application of pesticides that may have a negative effect on the environment or human health? | No |
| 7.5 | Does the Project include activities that require significant consumption of raw materials, energy, and/or water? | No |