United Nations Development Programme

Royal Government of Thailand

Review of GEF Project: Promoting Energy Efficiency in Commercial Buildings in Thailand (PEECB)

UNDP PIMS no.: 3937
GEF PMIS no.: 4165
UNDP Project Id.: 00078576

Mid-Term Review Report

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Final Report

September 2015

SYNOPSIS

Title of UNDP supported GEF financed project: Promoting Energy Efficiency in Commercial Buildings (PEECB) in Thailand.

UNDP PIMS no.: 3937

GEF Project ID: 4165

UNDP Project ID: 00078576

MTR time frame: May 2015 to July 2015

Date of MTR report: August 5, 2015

Region and Countries included in the project: South East Asia Region, Thailand

GEF Focal Area Objective: CC-SP1: Promote Energy Efficiency Buildings and Appliances

Implementing partner and other strategic partners: Department of Alternative Energy Development and Efficiency (DEDE), Royal Government of Thailand

MTR team members: Mr. Sandeep Tandon (International Consultant), Mr. Tien-ake Tiyapongpattana (National Consultant)

Acknowledgements:

The midterm reviewers wish to acknowledge with gratitude the time and effort expended by all project participants and stakeholders during the course of midterm review. The midterm reviewers would like to thank all stakeholders including UNDP Thailand, the Regional UNDP-GEF office in Bangkok, DEDE, and the entire PEECB Project Team for their hospitality, informative and passionate discussions on their experiences in implementing the PEECB project; your insights, and perspectives greatly helped to the review process, and identify ways to continue the momentum and sustain the initiatives for Promoting Energy Efficiency in Commercial Buildings in Thailand.

In particular, the midterm review team wishes to thank the Dr. (Ms). Sutharin, Khun Kwanruen, Mr. Meshal Abdullah of UNDP Thailand for arranging mission meetings; and to the PEECB Team comprising of Khun Kamol Tanpipat and Khun Phongkarn Piamsuttitam for various meetings and the field trips and meetings with demonstration partners. The team expresses its thanks to Khun Amaraporn Achavangkool, Energy Conservationist, DEDE who served as gracious hosts to the Mid-term Review team at the DEDE Office, and for helping the team to better understand the processes followed by the Government. The reviewers hope that this report will contribute towards work being undertaken by DEDE for removal of barriers to energy efficiency in commercial buildings and eventual market transformation of energy efficient commercial buildings in Thailand.

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ABBREVIATIONS

APR-PIR	Annual Project Review / Project Implementation Report
BMC	Bright Management Consulting Company Limited
BTOR	Back-to-Office Report
CBEEIC	Commercial Building Energy Efficiency Information Centre
CEO	Chief Executive Officer
CO	UNDP Country Office
CO_2	carbon dioxide
CPAP	Country Program Action Plan
DEDE	Department of Alternative Energy Development and Efficiency
DPW&TCP	Department of Public Works and Town & Country Planning
EE	Energy Efficiency
ENSOP	Engineering Solutions Provider Company Limited
EOP	End of Project
GEF	Global Environment Facility
GHG	Green House Gases
ISO	International Organization for Standardization
KW	kilowatt
KWh	kilowatt-hour
MD	Managing Director
MWh	megawatt-hour (million watt-hours)
MTR	Mid-Term Review
NGO	Non-Governmental Organization
NPD	National Project Director
OTTV	Overall Thermal Transfer Values
PB	Project Board
PCD	Pollution Control Department
PIR	Project Information Report
PM	Project Manager
PMU	Project Management Unit
PPM	Project Planning Matrix
ProDoc	Project document
QPR	Quarterly Project Report
RCU	UNDP/GEF Regional Coordination Unit
RTG	Royal Thai Government
RTTV	Roof Thermal Transfer Value
SEC	Specific Energy Consumption
TGBI	Thailand Green Building Institute
ToR	Terms of Reference
tCO_2	Tonne of Carbon Dioxide
toe	Tons of Oil Equivalent
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme

EXECUTIVE SUMMARY

Project Information Table

Project Title:	Promoting Energy Efficiency in Commercial Buildings (PEECB) in Thailand			
GEF Project ID:	4165		*at endorsement (US$)*	*at midterm review (US$)*
UNDP Project ID:	3937	GEF financing:	3,637,273	3,637,273
Country:	Thailand	IA/EA own:	-	-
Region:	South East Asia	Government:	6,500,000	6,500,000
Focal Area:	Climate Change	Others:	5,767,500	2,060,916
FA Objectives, (OP/SP):	CC-SP1; Promoting energy efficiency in buildings and appliances	Total co-financing:	12,267,500	8,560,916
Executing Agency:	UNDP	Total Project Cost:	15,904,773	12,198,189
Other Partners involved:	Department of Alternative Energy Development (DEDE)	ProDoc Signature (date project began):		14-Nov-2012
		(Operational) Closing Date:	31-12-2015	3-Apr-2017

Project Description

Thailand has experienced rapid economic growth in the past two decades with an equally rapid increase in electricity demand and generation to support the growing economy. In the previous decade the overall electricity peak demand grew by 56%. The power demand in the commercial sector in 2012 grew by 14.6% as compared to 2011 because of the economic recovery[1]. The sector stood third in terms of energy consumption (17%) after industrial (45%) and residential (23%) sectors. The electricity demand in 2012 in the Metropolitan Area and Provincial Areas of the country increased by 9.2% and 8.5% respectively compared to 2011. During the same year (2012) country's per capita carbon dioxide (CO_2) emissions stood at 3.53tons[2].

It is estimated that with an average economic growth rate of 4.5%, the energy demand in Thailand will increase from 71,000 ktoe/year to 151,000 ktoe/year between 2010 and 2030. In order to reduce the energy demand by 20% in 2030 (or country's energy intensity) Thailand will require implementation of energy conservation measures such as demand side management, application of energy efficiency technology in terms of equipment/appliances, machinery and improvements in manufacturing process, and buildings, including the change in energy consumption behaviour[3]. The assessment of energy savings that were facilitated through the application of the Thai New Building Energy Code (BEC) has shown that a range of 17% to 33% efficiency improvement can

[1] Energy Statistics of Thailand 2013: Report by Energy Policy and Planning Office

[2] Ibid

[3] Thailand 20-year Energy Efficiency Development Plan

be achieved through compliance with the new BEC using present technologies and practices in building design and equipment specifications.

The objective of GEF-UNDP-DEDE project on Promoting Energy Efficiency in Commercial Buildings (PEECB) in Thailand is to promote and facilitate the widespread application of building energy efficiency technologies and practices in commercial buildings in Thailand. It aims to support the improvement and construction of energy-saving buildings by strengthening national capacity in promoting environment management in a sustainable manner, by providing technical assistance to enhance the investments in energy efficiency practices/technologies in the commercial sector through introduction of the energy efficiency building design concept and the adoption of compliance to the new Thai Building Energy Code.

The project has been designed with three components that are expected to generate outputs and outcomes which will help to overcome existing barriers and lead towards:

- Enhanced awareness of the government, building sector on Energy Efficiency technologies and practices;
- Developing favourable policies that encourage EE technologies and practices in commercial buildings;
- Improving confidence in the feasibility and economic benefits of EE technologies and practices in commercial buildings through demonstration projects within the commercial building sector;

The proposed project is aligned with the identified priorities and needs in the 20-year Energy Efficiency Development Plan which gives emphasis to energy conservation as one of the main strategies for future climate change mitigation, because the majority of Thailand's buildings that were built in the 1980s and 90s consume much more energy as compared to the newly constructed buildings. With the lifecycles of earlier installed building systems (particularly centralized air conditioning systems) ending in the next few years, Thailand's cities present a great potential to boost the building sector's energy efficiency significantly.

The project will help to realize the objective of reducing the annual growth rate of Greenhouse Gas (GHG) emissions from the Thai commercial building sector.

Project Progress Summary

PEECB experienced some delays in its start-up (in Nov 2012) and the project implementation unit became functional by the second quarter of 2013 after selection of consulting firm Bright Management Consulting Company Limited (BMC) by DEDE to initiate activities of Component 1 and to provide overall project management support. In August 2013 DEDE engaged the consulting firm Engineering Solutions Provider Co. Ltd. (ENSOP) to implement activities of Component 2 and 3. The two consulting firms started to focus on the respective area of work, and the project experienced progress and led to achievements of some of the outputs.

The project faced some challenges after the start on account of two original project partners opting out from the demonstration projects due which, the project team had to seek out new private sector partners. Further, the political situation created inconvenience for the PMU to interact with DEDE officials since the DEDE office building was taken over by the protestors.

The project demonstrated adaptive management in both the situations and continued the work. Also, the PMU effectively managed the transition in DEDE with retirement of Director General and Deputy Director General and on-boarding of new National Project Director (NPD). However, the time spent in design and development of tasks under component 1 has been about two-years therefore, except few focus group discussion and seminars, the activities to engage stakeholders through outreach and training are few leading to slow progress on awareness creation. Also, on the policy development such as the procurement policy, step Building Energy Codes (BEC), M&V are in different stages of vetting by the government departments. The announcement of policies towards the later part of the project will have a direct effect on the objective level indicator which requires reporting of compliance to the BEC by the new building being constructed. Also the with somewhat uncertain timing of announcement of policies, the 40% compliance target is unlikely to be achieved. The progress of project activities and achievement are discussed in Chapter 3 in the report. A listing of key Project activities and events, in chronological order, are included below:

2012	November	Project commenced with the signing of Project Document
2013	April	Bright Management Consulting Company Ltd (BMC) appointed project consultant in by DEDE for Component 1 and for overall Management of Project
		Project Board (PB) constituted with representation from other government agencies
	May	Project Inception Workshop and 1st meeting of Project Board (PB) were held marking the operational start of the project. A 4-year Master Plan for the project including budgetary & resource plan was approved by PB
	August	DEDE contracted Engineering Solution Provider Co. Ltd (ENSOP) as main project consultant on components 2 and 3
	September	2nd meeting of PB held, approved the selection of new partners for demonstration projects
	October	1st Project Public Seminar was organized (120 participants)
	November	Study trip to Japan was organized for interaction with Nikken Sekkei Research Institute on low energy buildings, smart building and smart city
2014	February	3rd meeting of PB held
		Recruitment of demonstration building for energy efficiency improvements
2015	January	4th meeting of PB held
	February	Focus Group Meetings held to discuss the development of Building Energy Simulation Model (BESM), development of training courses, Meeting with ENSOP's international expert in Australia, Focus group Meeting on M&V Development
	March	2nd Public seminar organized to discuss building energy efficiency and Net Zero Energy Buildings

		Policy recommendation provided to DEDE on 'Building Energy Consumption Disclosure', which has been approved for pilot testing on 10 commercial buildings
		Communication with external stakeholders started in 2015 with quarterly newsletter and weekly TV programme "elec-ta-lon" to create awareness about energy efficiency

- The project management units hold Project Weekly Meeting with DEDE which are attended by officials of DEDE bureaus namely, Bureau of Energy Regulation and Conservation, Bureau of Human Resource Development and Bureau of Energy Efficiency Promotion.
- At the time of MTR mission, work was in progress on development of BESM, policy guidelines for Energy Efficiency Procurement Policy, Specific Energy Consumption for different type of commercial buildings, and Measurement and Verification protocol for energy systems used in commercial buildings

Mid-Term Project Ratings and Achievement Summary

These are provided in Table A below.

Table A: Summary Review of Project[4]

Measure	MTR Rating	Description
Progress Towards Results	Objective: Improved energy efficiency in the commercial building sector **Achievement Rating: 4 (Moderately Satisfactory)**	Project made slow start in the first year (in 2013) due to staggered selection process for engaging 2 project consultants. The project made progress in later half of 2013 however, slowed down due the political unrest which lasted for nearly six months. Though the project managed to carry out work and hold meetings with DEDE official in the PMU hosted by BMC. As a result one Project Board meeting could be held in 2014 and the project could complete the recruitment of demonstration buildings. The project has organised seminars and focus group discussion, and 12 private building owners agreed to join the project for demonstration of energy savings. Project management is functional however needs to get more active and focus on results of success indicators to achieve the overall project objective.
	Outcome 1: Enhanced awareness of government agencies and local authorities, the building sector, and financial institutes on designs and implementations of EE technologies and practices that are applicable to the Thai context **Achievement Rating: 3 (Moderately Unsatisfactory)**	▪ Work on preparation of Training Contents and Materials for technical as well as non-technical modules is in progress; ▪ Quarterly newsletters started in 2015, and being distributed to 200 recipients; ▪ Two public seminars on building energy efficiency have been organized; ▪ Study tour organized to Japan with the support of international EE consultant ▪ Building Energy Simulation Model is under development, expected to be ready for beta-testing by October 2015; ▪ Commercial Building Energy Efficiency Center yet to be established; ▪ Business linkages with EE technology suppliers, building owners and practitioners are yet to be established
	Outcome 2:Establishment, implementation of, and compliance to favourable policies and instruments that encourage EE technologies and practices for commercial buildings in Thailand **Achievement Rating: 4 (Moderately Satisfactory)**	• Policy on Building Energy Disclosure Program approved by DEDE • Policy on Energy Efficiency Procurement under preparation • Work on the development of detailed database on construction materials and energy efficiency equipment is in progress • Work on the preparation of detailed study on Specific Energy Consumption for Office Building is in progress • Preparation of M&V methodology for Air Conditioning and Lighting System is under progress
	Outcome 3: Improved confidence in investing in	▪ Recruitment of additional demonstration buildings to replace the selected buildings that previously withdrew from the project

[4] The Project outputs were rated based on the following scale: 6: Highly satisfactory (no shortcomings), 5: Satisfactory (minor shortcomings), 4: Moderately satisfactory, 3: Moderately unsatisfactory (significant shortcoming), 2: Unsatisfactory (major problems); and 1: Highly unsatisfactory (severe shortcomings)

	the application of EE technologies and practices in commercial buildings in Thailand **Achievement Rating: 4 (Moderately satisfactory)**	▪ Feasibility study report on energy saving potential for newly selected buildings in progress ▪ Baseline studies conducted for all demonstration buildings ▪ M&V guidelines for all demonstration buildings under preparation
Project Implementation & Adaptive Management	**3 (Moderately Satisfactory)**	• Adaptive Management exhibited by the project with the change of original demonstration partners and in 2014 by carrying out the project activities during the period of political unrest • Progress reporting in percentage basis instead of output indicator • Fewer meetings of Project Board than proposed in the ProDoc • PPM has a number of irrelevant and unachievable indicators which does not assist the PMU to focus on delivering results
Sustainability	**3 (Moderately Likely)**	• Mainly based on the participation of more than the originally targeted building owners. • Many building owners have multiple properties in which they have shown interest to expand EE measures • The selected demonstration buildings mostly belongs to influential groups in Thailand for instance (1) the owner of CP Tower and Grand Mecure Hotel is convinced that EE is important corporate management policy; (2) K-Bank: one of management policy is social and environmental responsibilities. The Bank has clear policy on EE and RE. Thus, the project can continue to the dialogue and convince the management to expand EE measures to many buildings under the bank's ownership; (3) Saint Gabriel College has influence financially and politically over other schools under supervision of Catholic Church in Thailand. The project can leverage on these partners to attract more builders to take active interest in building energy efficiency. • Currently, there not enough efforts being made by the project to actively engage associations in the building sector and important government institutions including those that are on board of this project. Having more supporter for EE within and outside the government will help to sustain the work on building energy efficiency in long-term; • Availability of Energy Conservation Fund to provide partial financial support for energy efficiency retro-fitting projects.

Conclusions

- The project has the potential to achieve its end of project (EOP) targets and stimulate the market for building energy efficiency. More time and attention of PMU members including BMC and ENSOP teams need to be devoted to the project to achieve EOP target in the remaining 22 months.

- Project presently is behind its schedule in terms of achieving the annual and overall targets. With $ 2.03 million remaining, there is a need to review, rework, and simplify project's Project Planning Matrix (PPM) so as to stay focused on indicators, and also re-define some of the

annual targets in the absolute terms instead of using comparative figures (percentage) to report progress. To simplify and expedite the process, MTR team has included a proposed PPM in Appendix F.

- Project need to focus on implementing Component 1 activities, especially setting up of Commercial Building EE Information Centre, project website for information dissemination, and Building Energy Simulation Model for training of key stakeholders including DPW&TCP.

- Reporting of project progress in quarterly progress reports should be against the outputs and targets mentioned in the project planning matrix (PPM) instead of percentage figures.

- Public recognition to pioneer energy efficiency demonstration projects jointly by UNDP and Senior Official from Ministry of Energy for the contribution in reducing the energy consumption and GHG emission can help to draw the attention of public and government agencies to the importance of building energy efficiency and improve the profile of PEECB.

Recommendations

Recommendation 1: *UNDP CO to engage a consultant to simplify log-frame and set clearly defined EOP targets*

The project's reporting on achieving annual targets presently follows a percentage based measurement which does not indicate progress of activities in concrete terms. Reporting of progress of each activity needs to follow an easy and absolute numbers based targets which will help progress monitoring and direct measurement of achievements. This would also make it easy to link *output* level achievement of target with the Component level targets and outcomes.

With the changed local circumstances due to political changes, the project needs to re-strategize and re-align the project indicators and some of the EOP targets. Although, the MTR team has reviewed the PPM in detail and commented upon some of the activity indicators (in Appendix F), however defining the targets require more consultations with local stakeholders. It is, therefore, recommended that UNDP CO engages a consultant to review the project planning matrix and revise the EOP targets in consultation with DEDE, PMU and ENSOP and UNDP. The revision of PPM should also be used to adjust the success indicators by applying the SMART criteria to simply the monitoring of progress based on the data/information generated by the project activities and establish an acceptable target number for reporting percentage progress to bring clarity and avoid duplication.

Recommendation 2: *Activate PB members with the objectives to (a) Utilize PEECB platform to synergize between initiatives of particular agencies to enhance effectiveness of EECB measures and GHG reduction; (b) Implement joint training between key players in the field of EE, Climate Change, and architecture*

Increased stakeholder engagement would help in the consultation process and finalization of policies that are being prepared by PEECB. It would also help to identify steps required to make the policies implementable. It is therefore recommended that the TAG be re-activated to discuss and finalise technical deliverables among inter-government agencies. For instance, DEDE, ONEP & TGO and DEDE, BMA, TCPO can discuss the work project doing

on M&V, energy savings and corresponding GHG reduction and identify ways to sustain the efforts and align these with the RTG's 20-year EEAP in which building sector is identified as one of the sectors for contributing to reduction in energy consumption.

Adequate engagement and active involvement of all possible PB stakeholders concerning the EECB ecosystem is an important factor to successful implementation of project, and ensure sustainability by creating environment through conducive policies and financing for replication. It is therefore, recommended that the project strengthens its engagement with various stakeholders concerning EECB ecosystem, covering all domains viz. various associations involved in the building sector, technology suppliers, technical service providers and practitioners (architects); regulatory agencies, academia/technical organisations, banks involved with DEDE on EE financing, governmental and non-governmental set-ups for a wider reach out of project interventions.

Recommendation 3: *Organize PB meetings more often to discuss and precipitate decisions to institutionalize and sustain EECB after EOP*

The project design has suggested two annual meetings of the project board. However, since 2014 till mid-2015, the project board has met once in a year. As the project has reached a stage where it can share some results (outputs) and develop consensus to move forward to spread the concept of EE, it needs the concurrence and strategic guidance of the PB to link the project outputs to the policies. It is, therefore, recommended that PB meetings are held more often at least once in 4 months, to precipitate decisions to institutionalise and find ways to sustain contributions being made by PEECB through demonstration, training and policies. This will help to ensure that various institutional structure are in place at EOP so that the work in the sector towards achieving the 2030 energy saving target setup by the Royal Government of Thailand.

Recommendation 4: *Strengthen outreach to raise profile and public attention of EECB to become national agenda through (a) Creation of 'EECB Award' which endorsed by all PB member agencies; (b) Organize high profile dinner talk on EECB by the 'Best Practices' ; (c) Public presentation on extrapolation of potential benefits from EECB and call for actions at all level*

It is observed that project visibility and spread/reach-out is still inadequate and needs to increase multi-folds. It is highly recommended that project gears up its awareness raising efforts by involving various stakeholders with monthly/quarterly outreach campaigns, use electronic and print media such as website, technical magazines and journals to raise public awareness and strengthen outreach efforts by sharing case studies and share the success of demonstration projects.

Recommendation 5: *Explore ways to accelerate the disbursement of subsidy to promote energy efficiency in CB – preferential treatment to EECB for a limited time*

The 12 demonstration sites identified with the willing participation of existing private commercial building owners. An initial assessment of energy saving potential and investment required is being re-assessed to establish base-line. Out of 12 demonstration projects, three have implemented some of the recommended energy saving measures whereas most of demo buildings are still waiting for subsidy from government to invest in energy efficiency. It

is also recommended that the project team discuss the ways to expedite disbursement of subsidy to building sector project and develop a mechanism to review the request of technical and financial support from private building owners and operators, which will continue to function after EOP. This would include developing steps for carrying out due diligence or technical review of the proposal received by DEDE/MOE and an acknowledgement of subsidy funds that will be disbursed in a defined time-frame. This will make the overall process clear for dissemination and may help to attract attention of more building owners to invest in energy efficiency with support from government's ENCON funds.

Recommendation 6**:** *Review the investment by demo project partners and re-assess the co-financing*

A review of the energy saving and GHG reduction potential from energy efficiency from the 12 demonstration project partners have provided insights to the potential investment requirement also. The total investment required for implementing energy efficiency by the partners is presented in table 3, however currently the overall investment (from other) is less compared to the co-financing contribution envisaged at the beginning of the project. Therefore, it is recommended that the UNDP CO reviews these figures together with PMU since the co-financing from other sources is directly linked to the demonstration projects and also the resulting energy savings and GHG reduction. It is further recommended that the co-financing figures may also be included in the periodic progress reporting in addition to reporting of results of the project outcomes and objectives.

Recommendation 7: *The two firms constituting the PMU must work more cohesively as a single entity and improve the project's Monitoring and Reporting by adhering to PPM, and develop the scope to engage experts to conduct survey of project stakeholders for monitoring progress of project indicators*

The Project Management Unit of PEECB is constituted by two agencies engaged by DEDE through a contractual arrangement. The responsibilities of activities under the three project components is divided among the two agencies. While each agency is working towards achieving the outputs and regularly interacts with the DEDE and other stakeholders, the work of barrier removal in the building sector requires working closely to take advantage of the information generated by activity implemented by one agency under one of the components and applying it as an input to other activities being implemented by another agency under other component. For instance, the policy work and the demonstration projects provide useful information to be added on to the project web-site and for the development of training courses. It is therefore, recommended that the two firms work more cohesively and synergistically as a single project implementing entity and improve the implementation of various project activities including the monitoring of project activities and reporting of the progress in the quarterly progress reports (QPR) which currently follows a percentage basis of reporting. This system of monitoring and progress reporting does not provide the reader a clear perspective of the achievements of the project and comparison with EOP targets. It also does not provide a way out to monitor the progress for various indictors which require collecting data for reporting purposes. Further, some of the quarterly progress reports submitted by PMU to DEDE are detailed and on average have more 225 pages. However, none of the reports give an indication of achieving the project outputs and the timeline to achieve the EOP targets. It is therefore recommended that the PMU starts reporting the progress of all the project outputs

and success indicators in terms of EOP targets listed in PPM. This would help to improve the monitoring of the project by DEDE and UNDP during meetings using PPM.

Recommendation 8**:** *Project the potential of energy savings, and resource mobilisation requirement for country-wide implementation of energy efficiency in commercial building*

The PEECB project has successfully recruited 12 demonstration project partners and each being a representative of different types of commercial buildings ranging from a college, to shopping mall, office building, hotel, hospital and a resort. These demonstration projects have provided credible data on investment required, annual energy saving, monetary saving (in Bhat), payback and annual GHG reduction. This information is useful to assess the size of the building energy efficiency market and the savings to owners and the RGT resulting from reduced energy consumption and GHG emissions. Further, this information can be presented in different forums, including the project website and Project Board meetings to discuss the possible options to sustain the project activities and draw attention of government and building sector stakeholders towards the importance of EE in commercial buildings and highlight the contributions of the project to catalyse the market. Using accurate number of commercial building in Bangkok Metropolitan Area and in the entire country, it is recommended that PMU should use the available information to extrapolate the potential of energy saving, GHG reduction possible from commercial building sector and also project the investment requirements in Bangkok Metropolitan Area and for the rest of the country and present it as a work being undertaken by the government to implement the 20-year EE plan acknowledging the support of UNDP and GEF.

1. INTRODUCTION

This report summarizes the findings of the Mid-Term Review (MTR) Mission for the UNDP-DEDE project entitled "Promoting Energy Efficiency in Commercial Buildings in Thailand" (herein referred to as the "Project" or PEECB) implemented by the United Nations Development Programme (UNDP) with financing support provided by the Global Environment Facility (GEF). The Midterm Review Mission for PEECB was held in Bangkok from July 06-13, 2015. The midterm review timeframe of this report cover the project progress from November 2012 to July 2015.

Purpose of Mid-Term Review and Objectives

The purpose of the mid-term review (MTR) for this PEECB is to *evaluate the progress towards attainment of global environmental objectives, project objectives and outcomes, capture lessons learned and suggest recommendations on major improvements.* The MTR serves as an agent of change and improvement in the project progress. It plays a critical role in supporting accountability. As such, the MTR serves to:

- Strengthen the adaptive management and monitoring functions of the Project;
- Enhance the likelihood of achievement of Project and GEF objectives by analysing project's strengths and weaknesses and suggesting measures for improvement;
- Enhance organizational and development learning;
- Enable informed decision-making;
- Create the basis for replication of successful Project outcomes achieved to date;
- Identify and validate proposed changes to the ProDoc to ensure achievement of all project objectives; and
- Assess whether it is possible to achieve the objectives in the given timeframe, taking into consideration the speed, at which the Project is proceeding.

In accordance with UNDP/GEF monitoring and evaluation (M&E) policies and procedures, all projects with long implementation periods are strongly encouraged to conduct MTRs. In addition to providing an independent in-depth review of implementation progress, the MTR is intended to be responsive to GEF Council decisions on transparency and better access to information during implementation. Key issues to be addressed by this MTR include:

- Project progress to date;
- The achievability of Project targets given the current outcomes;
- The necessity of resetting targets and resources; and
- Outreach to commercial building owners from the private sector.

The PEECB Project Document (ProDoc) provides details on the various efforts by the Royal Government of Thailand and Department of Alternative Energy Development (DEDE), Ministry of Energy to:

- Assess and facilitate energy savings, through the application of the Thai New Building Energy Code (BEC), published in year 2010, revealing that a range of 17% to 33% efficiency improvement can be achieved through compliance with the new BEC using present technologies and practices in building design and equipment specifications in Thailand; and

- Utilize project resources to augment these efforts through the awareness enhancement, building policy frameworks and demonstration of energy efficient practices and technologies to relevant stakeholders, and the subsequent adoption of these practices and technologies by owners and tenants of commercial buildings.

Midterm Review Methodology and Scope

The scope of the MTR covers the entire UNDP-GEF-DEDE project and its components as well as the co-financed components of the project. The MTR will assess Project implementation taking into account the status of Project activities, outputs and the resource disbursements made up to 30th June 2015. The MTR also reports the progress against objective, each outcome, outputs, activity (including sub-activities) and impact indicators listed in the project document. In addition, the progress against the objective and outcomes are assessed as to how these will be achieved within the project end date of 30 April 2017. The MTR is evaluating 32 months of the Project progress and achievements. The MTR reports concludes with recommendations for the key stakeholders of the project. The approach followed by the MTR uses the criteria of **relevance, effectiveness, efficiency, sustainability, and impact,** as defined and explained in the UNDP Guidance for Conducting Terminal Evaluations of UNDP-supported, GEF-financed Projects.

Table 1: Summary of Efforts of the Midterm Review Team

Review Tier	Key Actions
Macro level	• Review of project documents • Review relevant policies and programs/guidelines • Review progress reports • Courtesy calls, meetings and interview with policy makers • Meetings and interviews with project staffs • Interviews with national level key stakeholders
Meso level	• Review targets in PPM and project accomplishments • Find out capacity gaps and resource needed to meet the targets • Ask for recommendations of the organizational managers to move the project in other states
Micro level	• Meetings and interviews with stakeholders, program partners, and building sector professionals. • Solicit opinions of beneficiaries, government officials whether the project linkages are working and are relevant and timely. If not what improvements could be done

The evaluation team undertook a review of all existing project reports such as quarterly progress reports, project documents, project inception report, PIRs and reports provided by technical consultants engaged by PEECB, as well as information reports provided by BMC and ENSOP on MTR team's requests.

The MTR team conducted a 10-day Review mission in Bangkok from 6th – 13th July 2015 during which the team held various meetings and field visits as listed in Annexures C and D. The meetings were held with the project board members and site visits involved visits to a select demonstration project sites to learn about the proposed interventions and interact with owners and obtain their views. The mission ended with a de-briefing of preliminary findings of the MTR team, to officials of DEDE, and UNDP Country Office and GEF Regional Center in Bangkok. Preparation of the MTR Report has been carried out from home base after the mission. The report has undergone revision based on the feedbacks of DEDE, UNDP CO, GEF HO and Regional Office, PMU and project partners.

Limitations of the mid-term review includes interaction with the limited number of project stakeholders during the field mission due to non-availability of some of the stakeholders at the specified dates, limited interaction with NPD understand the project implementation arrangements, effect on project implementation due to changes in political situation, limited time to meet with banks which provide financing to EE projects. A joint review of the project documents, literature and reports, meeting minutes, interactions with local stakeholders could not been done as these were in the Thai language. The National Consultant helped in the translation of written materials while UNDP CO provided translation support through an interpreter, which greatly aided the work especially during the meetings. Time imposed major limitation during the mission to review the all reports and data generated by the project, meet with the various stakeholders and assimilate fully the project's achievements, constrained faced and overall management arrangements.

Structure of the Mid-Term Review Report

This Review report is presented as follows:

- An overview of project implementation from the commencement of operations after signing of ProDoc in November 2012;
- Review of project results based on project design and execution against the Project Planning matrix; and
- Conclusions, recommendations and lessons learned that will help the project to increase the likelihood of achieving various outputs, outcome and project goal.

This MTR is prepared according to "Guidance for Conducting Mid-Term Reviews of UNDP-Supported, GEF-Financed Projects" dated June 2014.

2. PROJECT BACKGROUND AND DESCRIPTION

Project Developmental Context

Thailand has experience rapid economic growth in the past two decades with an equally raid increase in electricity demand and generation to support the growing economy. In the previous decade the overall electricity peak demand grew by 56%. The power demand in the commercial sector in 2012 grew by 14.6% as compared to 2011 because of the economic recovery[5]. The sector stood third in terms of energy consumption (17%) after industrial (45%) and residential (23%) sectors. The electricity demand in 2012 in the Metropolitan Area and Provincial Areas of the country increased by 9.2% and 8.5% respectively compared to 2011. During the same year (2012) country's per capita carbon dioxide (CO_2) emissions stood at 3.53tons[6].

The Thai initial national communication report estimated that the commercial building sector contributed 3,400 ktones of CO_2 emissions. The study and analysis of the impact of the new Building Energy Code (BEC) published in 2010[7], estimated that the annual CO_2 emissions from the commercial building sector in Thailand in 2009 would be about 9,800 kilotons[8]. Although the CO_2 emission figures vary, all analyses and studies have concurred on the significance of past and future growth of the energy consumptions by the commercial building sector in Thailand. Considering the fact that the potential for improvements of energy efficiency are substantial in this sector, there are strong reasons to address the situation comprehensively through a project that will facilitate the widespread application of EE technologies and practices in this sector.

The assessment of energy savings that were facilitated through the application of the Thai New Building Energy Code (BEC), published in 2010, has shown that a range of 17% to 33% efficiency improvement can be achieved through compliance with the new BEC using present technologies and present practices in building design and equipment specifications in Thailand[9], e.g. utilization of EE lighting technologies for uniform lighting design and improvement of OTTV and RTTV. EE improvement beyond compliance with the new BEC 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.

The adoption of the new BEC in commercial buildings of over 2,000 m^2, which was promulgated in 2009, is still relatively limited in new buildings. Considering the situation of the new BEC, and limited EE implementation[10] in commercial buildings, there is a large un-tapped potential for improving the energy performance of existing as well as new commercial buildings in Thailand.

[5] Energy Statistics of Thailand 2013: Report by Energy Policy and Planning Office

[6] Ibid

[7] Assessment of energy savings from the revised building energy code of Thailand, 2009, JGSEE and KMUTT

[8] Based on the calculated combined margin emission factor of 0.5812 tCO_2/MWh (Table 10, The Study of emission factor for an electricity system in Thailand 2009): http://www.tgo.or.th/index.php?option=com_content&task=view&id=225&Itemid=90)

[9] Assessment of energy savings from the revised building energy code of Thailand, 2009, JGSEE and KMUTT

[10] EE implementations in commercial buildings in Thailand seem to be limited to replacement existing inefficient equipment with EE equipment (for cooling, heating and lighting applications), and process optimization. However many important aspects have not been addressed so strongly in terms of optimization of the building envelope as well as through comprehensive Energy Management augmented by further automation.

The proposed project is in line with the 20-Year Energy Efficiency Development Plan emphasize the importance of energy efficiency in commercial building. The commercial building sector is considered as an area where significant energy savings can be achieved. Additionally, the 4-year National Climate Change Strategies of Thailand (2008-2012) 'Strategy 2', on Climate Change Mitigation emphasizes the need to support improvement and building of energy-saving buildings at office, and commercial levels; as well as provide incentives and create awareness to increase energy efficiency in production and consumption[11].

The proposed project is also aligned with the identified priorities and needs in the Technology Needs Assessment (TNA) and the First National Communication (FNC) of Thailand, where in energy conservation is mentioned as one of the main priority areas. The Second National Communication of Thailand also emphasized energy conservation as one of the main strategies for future climate change mitigation.

Problems to be addressed by the Project

Energy conservation is currently not a main concern in the building sector, and many barriers prevent the adoption and implementation of energy efficiency measures and approaches. Many building developers and owners are unaware of the concept of efficient use of energy and are therefore not paying due attention towards using energy management and control techniques and practices in their buildings.

In terms of potential business opportunities for energy conservation in commercial buildings, the market has not yet grown to gain the attention of the local banks. In contrast to the industry sector, the number of project developed on cost saving through energy conservation in commercial building are comparatively less. The paybacks on the industrial energy efficiency projects are more attractive for the banks, so the building energy efficiency market still requires supporting fiscal policy measures in the forms of either tax incentives or subsidy from the government.

In terms of fiscal policy for energy conservation in Thailand, it is a government policy to support energy efficiency initiatives in the buildings sector. As a policy support program, the Royal Government of Thailand (RGOT) provides financial assistance to building owners for their EE projects (including EE technology applications). The financial assistance is given through the Energy Conservation Fund (ENCON Fund) which was established as per the ENCON Act. The source of funds for the ENCON Fund is from a petrol sales tax of THB 0.04 (USD 0.001) per litre on all petroleum products sold in Thailand. This provides annual inflows of approximately THB 2 billion (USD 50 million) per year. In 2005, the ENCON Fund had a balance of more than THB 14 billion (USD 350 million). The allocation of money from the ENCON Fund to activities that support energy efficiency and renewable energy is an important government priority.

Promotion of EE technologies and practices for commercial building and their applications requires removal of the following barriers:

(1) Awareness barriers - consists of low level of awareness about EE technology applications in buildings among local banks, building owners and managers; lack of convincing materials (or demonstrations) and lack of information on the costs and benefits of EE systems in buildings. Further, due to lack of knowledge of available financial resources and dedicated financing schemes for

[11] Thailand National Climate Change Strategies (2008-2012), Office of Natural Resources and Environmental Policy and Planning Ministry of Natural Resources and Environment, January 2008.

building EE projects; lack of knowledge in banks about building energy conservation business opportunities; risk aversion of building owners to invest in EE technologies;

(2) EE building policy and fiscal policy barriers consisting of lack of practical examples/guidelines on how to implement EE projects in commercial buildings; lack of enforcement of EE policies; lack of enforcement of energy consumption reporting requirements;

(3) Technical barriers consisting of limited experience with the technical, economic and environmental aspects of EE applications; lack of experience in incorporating specific technologies and practices to improve the energy utilization efficiency in new and existing buildings; lack of technical expertise on how to operate EE building systems.

The PEECB project has been designed to address these barriers, by implementing activities grouped into project components, each of which aimed at addressing specific type of barriers.

Project Description and Strategy

The objective of GEF-UNDP-DEDE project on Promoting Energy Efficiency in Commercial Buildings (PEECB) in Thailand is to promote and facilitate the widespread application of building energy efficiency technologies & practices in commercial buildings in Thailand. The project is in line with the GEF-4 Strategic Program No. 1, which targets Promoting energy-efficient buildings and appliances (CC-SP1).

It aims to support the improvement and construction of energy-saving buildings by strengthening national capacity in promoting environment management in a sustainable manner, by providing technical assistance to enhance the investments in energy efficiency practices/technologies in the commercial sector through introduction of the energy efficiency building design concept and the adoption of compliance to the New Thai Building Energy Code (BEC). The realization of this objective will be facilitated through the removal of barriers to the uptake of building energy efficiency technologies, systems, and practices.

The PEECB project has for its goal the reduction in the annual growth rate of Green House Gas (GHG) emissions from the Thai commercial building sector. The project has a goal of reducing 23.3kton of direct CO_2 emission reductions. Based on the logical framework analysis that developed during the project preparation, the expected outcomes of the project are the following:

- Outcome 1: Enhanced awareness of government agencies and local authorities, the building sector, and financial institutes on designs and implementations of EE technologies and practices that are applicable to the Thai context;
- Outcome 2: Establishment, implementation of, and compliance to favourable policies and policy instruments that encourage EE technologies and practices for commercial buildings in Thailand;
- Outcome 3: Improved confidence in investing in the application of EE technologies and practices in commercial buildings in Thailand;
- Outcome 4: Improved local technical and managerial capacities to design, manage and maintain EE technologies and practices;
- Outcome 5: Replication of demonstration projects within the commercial building sector

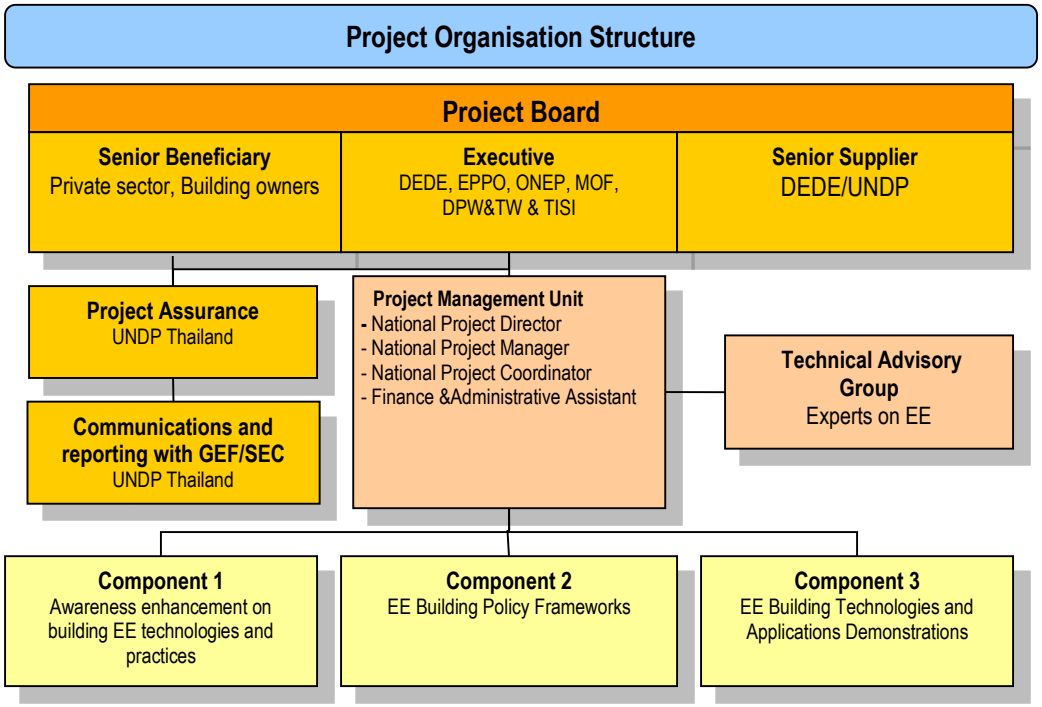
Eventually the last three outcomes were merged under one components as these are inter-related and the final project planning matrix thus consists of the three components.

Project Implementation Arrangements

The PEECB Project is being implemented by UNDP and executed by the Department of Alternative Energy Development and Efficiency (DEDE) a regulatory body under Ministry of Energy, Royal Government of Thailand.

Under this arrangement, UNDP assumes the overall management of the Project under the direction of the National Project Director (NPD) from DEDE. The day-to-day management of the Project is carried out by a Project Management Unit (PMU) under the overall guidance of the Project Board (PB). The PMU is functioning from the office of BMC and the Project Manager reports to the DEDE, the executing agency and the PB. The PB has been formulated to supervise and monitor the project and ensure cooperative and effective implementation of the project.

Figure 1: Project Management Organogram



The PB consists of representative from following key agencies -

1. Department of Alternative Energy Development and Efficiency - DEDE
2. United Nations Development Programme – UNDP
3. Office of Natural Resources and Environmental Policy and Planning – ONEP
4. Energy Policy and Planning Office, Ministry of Energy – EPPO
5. Department of Public Works and Town & Country Planning
6. Pollution Control Department - PCD, Ministry of Natural Resources and Environment
7. The Revenue Department
8. Department of City Planning, Bangkok Metropolitan Administrator
9. Thailand Greenhouse Gas Management Organization (Public Organization) – TGO

10. Thai Green Building Institute – TGBI

The principles of partnerships have been adopted in the implementation of the project. DEDE has contracted Bright Management Consulting Co. Ltd. on April 2013 for the implementation activities under Component 1, partly component 2 & 3 and project management. Similarly, Engineering Solution Provider Co., Ltd. (ENSOP) has been contracted by DEDE since August 2013 as the project consultant for implementing activities under Components 2 and 3.

Project Timing and Milestones

With the Project start date being November 2012, the original Project duration was 3 years with the terminal date of 31 December 2015. While there were no milestones as defined in the ProDoc, the public seminar on energy efficiency in the building could be considered a first milestone after the project inception workshop which was held in May 2013 followed by the private commercial building owners agreeing to participate in the demonstration and adoption of Disclosure Guidelines by DEDE as the third milestone in 2014.

As per the Prodoc, which was signed on 14th November 2012, the project's end date was 31st December 2015. The project's end date was extended to 3rd April 2017, as noted from the PIR.

Main Stakeholders

The main Project stakeholders include DEDE, EPPO, ONEP, TGO, BMA, and TGBI as well as associations and equipment suppliers operating in the building sector. The Project Board (PB) of the PEECB Project has been formulated to supervise and monitor the project to ensure cooperative and effective implementation of the project. The structure of PB consists of representative from key agencies namely:

- Department of Alternative Energy Development and Efficiency -DEDE
- Office of Natural Resources and Environmental Policy and Planning – ONEP
- Energy Policy and Planning Office, Ministry of Energy – EPPO
- Department of Public Works and Town & Country Planning
- Pollution Control Department -PCD , Ministry of Natural Resources and Environment
- The Revenue Department
- Department of City Planning, Bangkok Metropolitan Administrator
- Thailand Greenhouse Gas Management Organization (Public Organization) – TGO
- Thai Green Building Institute (TGBI)

- DEDE, Ministry of Energy (MoE) serves as the central authority and guides PEECB in meeting program objectives and in implementation of Policies and programmes of Royal Thai Government (RTG). Any change in energy efficiency related programs and/or policy need the approval of MoE;
- At the national level, key related agencies will include the Energy Policy and Planning Office (EPPO) under MOE. EPPO is a pivotal agency in the formulation and administration of energy policies and planning for the national sustainability. Some of the responsibilities EPPO is entrusted with include: (a) recommending energy policies and integrate/review energy management plans of the country; (b) recommending national strategies for energy

conservation and alternative energy promotion; (c) supervise, monitor and evaluate the effectiveness of national energy policy and energy management plans;

- Office of Natural Resources and Environmental Policy and Planning (ONEP) is under the Ministry of Natural Resources and Environment, and is the lead government agency which is involved in the preparation of 3rd national inventory report and also submits reports to the UNFCC on the country's annual GHG emissions.
- The Department of Public Works and Town & Country Planning (DPT), under Ministry of Interior, is responsible for urban development and planning as well as building standards and controls. Its mission is to create a better environment and a superior quality of life. Thailand's overall development strategy is segmented into national, regional, provincial and city/town, community levels. At the national, regional and provincial levels, master plans are created to provide a broad development framework for city/town and community levels. Local and community development plans address specific implementation issues and comply with overall master plans.
- Department of City Planning, Bangkok Metropolitan Administrator: The department of City Planning was initially started as a part of Public Works Department and became a part of Bangkok Metropolitan Administration in 1972. One of its mission is to preserve valuable natural and environmental resources in order to obtain the better quality of life of the people.
- Thailand Greenhouse Gas Management Organization: Was set up as an autonomous governmental organization as an implementing agency on greenhouse gas (GHG) emission reduction in Thailand. Its objectives include, promoting low carbon activities; investment and marketing on GHG emission reductions; establishing GHG information centre; reviewing CDM projects for approval; providing capacity development and outreach for CDM stakeholders and promoting low carbon activities, and performing its role as the Designated National Authority for CDM (DNA-CDM) projects in Thailand.
- Thai Green Building Institute: Was setup jointly by The Association of Siamese Architects and Engineering Institute of Thailand in 2008 with the main goal of developing knowledge and prepare guidelines for green building standards, for use in Thailand. The objective included creating awareness on the design and construction of sustainable green buildings and promote greater understanding of green building among the architects, engineers, government agencies. The institute was formally registered as an entity in September 2010. It works with various government and private sector organizations, holds various meetings and seminars on technical topics and organizes public events to promote green buildings.

3. KEY FINDINGS

Project Strategy

3.1.1 Project Design

To meet the goal of the project of reducing the annual growth rate of greenhouse gas (GHG) emissions from the Thai commercial building sector, the project design was based on the removal of existing barriers of awareness, appropriate regulatory policies and financial policies and technical barriers. The Project design also assumed that in 2011, expertise within building energy efficiency sector was only in its nascent stages and limited.

As such, the framework of the Project design is appropriate for barrier removal including:

- Strengthening institutional capacity at the national, state and local levels to implement the ECBC;
- Knowledge transfer to key stakeholders on ECBC ranging from awareness raising to technical training of professionals;
- Increasing confidence and experience in the pilot implementation of ECBC compliant buildings;

Overall the project is well designed to address the key issues concerning the energy efficiency in the commercial building sector in Thailand. Project follows a logical framework approach with a sound stakeholder involvement plan and a fair assessment of risks to reach out relevant target beneficiaries. It presents an ambitious estimation of emission reduction targets, and a detailed M&E plan prescribing success indicators and annual targets for project outcomes, with the assumption that the implementation of energy saving measures with private partners would begin from Year 1. The End of Project target for energy savings and GHG reduction factor, as per Prodoc, is based on the assumption that EE technologies are implemented and operational best practices are disseminated among two hotels, two hospitals, two office buildings and 10 hyper-mart stores across the country, which would lead to an annual reduction in energy consumption of 4,293 MWh. The assessment carried out by the project in 12 demonstration buildings, the annual energy saving is estimated at 6.6 MWh. The difference in the target and the actual annual energy saving is too vast. The project document clearly identifies the key domains for project interventions (in terms of 3 project components) and assigns adequate resources for achieving, both short terms and long term developmental objectives in the allocated project duration.

It is, however, observed that the project misses out on the participation of EE Technology, Financing, & Services providers, and Architect & Real Estate Builder Association as stakeholder (instead of just as beneficiaries), which is critical from the replication and scalability perspective of the project.

Also, it is observed that in the project's M&E plan there are too many 'Success Indicators' under every 'sub out-put' against each outcome of project components. This limits the clear-cut focus on high level achievements through strategic intervention made by the project. Further the measurement of year-wise 'Annual Targets' in percentage (%) terms creates an ambiguity having 'Zero' as Base line status and unknown and unequal population size for each case.

3.1.2 Results Framework

The 2011 results framework for PEECB can be found in Appendix E. The Project PPM was designed in 2010, consisting of 3 components with 46 indicators. The project's goal and objectives have multiple indicators – goal has 2 indicator and objective has 4 indicators. This would require sourcing and tracking data from different government agencies to show the overall progress of the project.

Fortunately these government agencies are also members of PB, thus making it convenient for the PMU to obtain the data from a credible source. The multiple indicators presents different perspective for different stakeholders. However some of the indicators under the three components which require reporting the proportion will need to establish an end-of-project targets, which can be undertaken in consultations with project stakeholders. Also, the present end date of 3rd April 2017 needs to reflect on the PPM. Accordingly, these changes have been marked in the PPM included in the Appendix F.

In the design of the project the numbers of components and outcomes were clubbed together which made the project focused and in line with the recently designed projects with three-outcomes which responds to the challenge that PEECB is trying to overcome. However, the PPM has for Component 1, two outcome level indicators and 13 output indicators; for Component 2, three outcome level indicators and 12 output indicators; for Component 3, five outcome level indicators and five output indicators. In all there are 46 indicators. Given the large number of indicators, a general overview of the PPM indicators is provided.

While there is rationale to the indicators provided in the PPM towards the achievement of an outcome, the number of indicators is excessive with most outputs burdened with more than one indicator. Moreover, there are few indicators that have become redundant due to reasons outside the control of the project, which can be removed from the PPM. A description of redundant indictors is provided below:

- "Cumulative CO_2 emission reductions from the commercial building sector by EOP (kton CO2 eq) in **Goal** and "% reduction in GHG emissions from the commercial buildings sector by EOP". These are same indicators, except the second indicator required reporting in percentage figures for the commercial building sector, for which baseline and annual growth data from a credible source will have to be used to calculate the percentage figure. Such information may be available from the Third National Communication report to UNFCCC which is expected to be released by ONEP towards end of 2015.
- "Cumulative energy savings from the commercial building sector by Year 2015, GWh" and "% Energy savings by EOP" in the Objective. Again, these are same indicators with different terms for measuring the 'energy saving'. To arrive at the percentage energy savings, the baseline figure for the energy consumption in building sector is required. Since the project is targeting 12 demonstration building out of nearly 2,000 commercial buildings in the country, the % energy savings figure would be too low for meaningful reporting.
- "% of new buildings fully complied with new Building Energy Code by EOP" and "% of new buildings in Thailand that are classified as energy efficient buildings by EOP" in the Objective. Both the indicators are ambiguous and do not provide a baseline number against which to measure the progress. It also, apparently, assumes that new Building Energy Code will be enforced in the 1st year of the project. Both the indicators are not relevant and central to the objective of the project which is to promote widespread application of building energy efficiency technologies in commercial buildings.

Some of the indicators require re-wording to provide more specificity of the targets. Examples include:

- "% of overall no. of building practitioners that are aware of EE technologies/techniques available and applied in demo projects by Year 2015" in Output 3.2.1 This could be changed to the number of success stories or demo building case studies published in technical journals";
- "% of overall no. of trainees that are gainfully employing learned skills on EE building design, operation and maintenance by Year 2015" from Output 1.3. This is not specific since it is does not clearly convey how the percentage figure is to be arrived and moreover, number of people

trained and applying the knowledge would also depend upon the demand for application of energy efficiency in the commercial buildings and therefore would require designing post-training surveys, immediately, to provide feedback to improve the content and delivery of training courses. An alternate arrangement could be to obtain feedback from an independent agency hired by the PEECB project to conduct post-training survey and follow-ups with the trainees. However, this indicator requires establishing a target for training certain number of building sector stakeholders by EOP;

- No. of new buildings constructed that are partly or entirely based on the information regarding success of the demonstrations by EOP, from Output 3.3. The indicator is ambiguous as the focus of the project is to remove barriers towards energy efficiency in the existing commercial building rather than new buildings, which will be more efficient due to application of improved designs, use of energy efficient lighting and cooling equipment as well as material usage.

In conclusion, the PPM needs to be consolidated to be more user-friendly and help in monitoring the project's progress. Changes have been suggested on indicators are also included in the Table 1 and also in greater clarity in Appendix E against the outputs, where ever required. These suggestions could be used as a basis for further discussion and decision on having a revised PPM during the PB meeting.

Progress towards Results

The challenge of removing barriers to efficient utilization of energy in existing commercial buildings and widespread use of energy efficient technologies in Thailand is linked to the need of working through a functional institutional arrangement to work on awareness creation, framing policies and projects for demonstration of technologies. The project is anchored in the Department of Alternative Energy Development and Efficiency (DEDE) and is being supported by Bureau of Energy Regulation and Conservation, Bureau of Human Resource Development and Bureau of Energy Efficiency Promotion. Additionally, since energy efficiency is topic which cuts across other sectors especially, for realizing GHG reduction, a Project Board (PB) has been set up since the early stage of the project by inviting representatives from related government agencies and professional associations related to energy efficiency in commercial buildings.

The Project Board has met four times since the project started effectively in April 2013 after engagement of BMC.

- The first project board (PB) meeting was held on 22 May 2013. The project's Inception Meeting was also held on that day. The objective of the first PB meeting was to introduce the PEECB project to the members and seeks the approval on the master plan and yearly plan.
- The second Project Board Meeting was held on 19 September 2013 and decided that the "Commercial Buildings" to be included in the PEECB have to be comply with the ENCON Act B.E. 2535 or the building types that have working space starting from 2,000 m^2 onward. The PB meeting also gave approval of the criteria of project demonstration buildings and project indicators.
- The third Project Board Meeting was held on the 4 February 2014. The meeting agreed to develop building energy simulation program; conduct training needs assessment; review content of the training courses to match the training needs; clarify framework of 'zero energy building'; publish quarterly e-news; conduct public information event during October/November 2014; and circulate monthly reports to keep update of the Project Board.

- The fourth Project Board Meeting was held on the 22 January 2015 (almost a year later). The members of Project Board from DEDE were replaced according to retirement of some senior staff. The PB suggested the project team to study MRV during the preparation of M&V policy draft to avoid conflicts between the two protocols which find application in different circumstances. In this meeting, the new list of 10 demonstration buildings was presented. The PB also suggested that instead of full PB meeting the project should organize more often of focus group among concern persons for particular issues.

The project faced challenges during the course of work. The progress of project was hampered by a number of factors including the delay caused by the government's recruitment process, the project only started full implementation in April 2013. In addition, the project faced situation due to two factors external to it.

1. An uncertain period due to political instability which lasted nearly six month, during which the DEDE office was occupied by protesters;
2. Withdrawal of the two of the demo sites from participation in the project led initiative

The project dealt with both the situations through adaptive management by developing selection criteria for the demonstration buildings and reaching out to additional partners and identifying an alternative venue for continuing meetings with DEDE officials.

The MTR team notes a major disconnect between the Project's Master Plan, which is being followed by the PMU for the project work and project output reporting as per the PPM. The master plan has listing of Outputs defined in the Project document however, there is no linkage with the success indicators and annual targets. Thus various outputs, especially under component 1, have missed their completion target of December 2014, and are likely to be completed towards the end of 3rd quarter in 2015. This implies that the outreach of the project activities to external stakeholders will get a shorter window since the project scheduled to end in April, 2017. Unless, efforts are applied by PMU and all the other project stakeholders by devoting time and focused attention to the outputs, the outcomes will fall short of the target which will directly impact the objective and goal of the project.

3.1.3 Progress towards Outcomes Analysis

In general, Project progress has been moderate to date with few indicators on the Project Planning Matrix (log frame) not likely to be achieve the EOP targets unless special efforts are made and enough time and attention are devoted by all the concerned agencies responsible for the implementation of the project. The progress of various components and activities can be seen on Table 1 with the colour-codes. It is noted that the outputs have multiple indicators which make the work of tracking the progress, very challenging. The main issues regarding progress are summarized below:

- Contributing to Output 1.1 (Establishment of the Commercial Building EE Centre) were the Project efforts to build a platform for the future sustainable information dissemination network for the commercial building sector. This activity is directly linked to Output 1.2 (A system of information exchange and dissemination of EE technologies and practices for commercial building stakeholders). The work on development of CBEEC and setting up of website is in progress at the time of MTR. The information which is important for the stakeholders for making investment decisions in building energy efficiency will be available much later in the project which can delay the building up of pipeline of similar project for replication;
- On Outputs 1.3, the work on the development of Building Energy Simulation Model (BESM) is in progress at the time of MTR. The model is expected to be available for trial during the last month of 2015. Some of the data generated under output 3.3.1 is being added to the database of BESM.

All the developmental and capacity building activities downstream of BESM development and training courses on EE technologies are, delayed and the impact measurement can be undertaken probably in 2016 to check if BESM is influencing any kind of decision making process towards improving the end-use efficiency in commercial buildings. And, training is helping in improving the end-use efficiency in existing commercial buildings. Acceptance of BSEM by other building sector stakeholders such as Town and Country Planning Office, BMA and TGBI will be important to improve the likelihood of these being used in the government agency's decision making process;

- As a contribution to Output 1.4 and 1.5 (Completed training courses on EE technologies and practices and financial assessment of EE applications in commercial buildings), the training courses are in the final stage of development and will be rolled out in the September 2015 along with support of DEDE.;
- For Output 1.6 (Established business linkages between suppliers of EE technologies, building owners, banks and building practitioners) the project is yet to undertake a meaningful interaction. Organizations such as industry associations, architects association and Thai Green Building Institute are potential partners who can greatly help the project to get more visibility through engaging with various project's ongoing capacity building efforts. The project need to find a way to get entry into the associations' activities of "Thai Green Building Expo";
- Under Output 2.1, (Updated and Effective Policy Measures on Energy Efficiency in Commercial Buildings) there is good progress with development of policies on Energy Efficiency Procurement (EE-Procurement) which is currently submitted to DEDE for review, The policy on "Energy Consumption Disclosure Programme" has been approved by DEDE and it is being pilot tested in 10-buildings. The review of existing policies on 'building labels' and is currently under progress;
- For Output 2.2, (Revised and Up-to-date Data and Information to Facilitate Policy Implementation of Commercial Building EE) work is in progress on development of details databased of locally available construction material and energy efficient equipment;
- For Output 2.3, (Approved and Implemented New and Improved Financing Models for Commercial Buildings) work on the review of existing 'Building Energy Code' according to building type is being carried through a detailed study on Specific Energy Consumption for office buildings;
- For Output 2.4, (Approved energy efficient promotion action plan (short and long term) to supplement DEDE activities) the development of monitoring and verification methodology for commercial building air conditioning and lighting system is under progress;
- For Output 3.3.1, criteria of selecting demonstration building was developed which covered the management support, energy saving potential. According the work has been carried out in recruiting 12 demonstration building partners against original 7 in the instance of withdrawal of 2 original partners;
- Outputs 3.2.1 the work is not expected to commence until the demonstration projects are complete, and Output 3.2.2. should be dropped since there is no longer any need for separate training courses for the personnel attached to the demonstration projects because in a large number of instance the existing technology or product is replaced with latest and most efficiency technology available in the market;

- Output 3.3.1 the work on developing project recommendations for energy efficiency replication in the commercial buildings is not expected to commence until at least the detailed studies for 12 demonstration projects are completed and these projects are financed;

Table 1 included below in this section presents the progress of various project indicators and is colour coded as prescribed by UNDP-GEF MTR reporting criteria.

Table 2: Progress towards Results Matrix (Achievement of outcomes against End-of-project Targets)

Strategy	Success Indicator	Baseline	Target	Midterm Level & Assess-ment	Achievement Rating	Justification for Rating
GOAL: Reduced intensity of GHG emissions from the commercial building sector	• Cumulative CO_2 emission reduction from the commercial building sector by End-Of-Project (EOP, ~~Year 2015~~), kton CO_2eq	0	230	0	MU	Thus far 3 projects out of 12 demo have invested in implementing energy efficiency measures
	• % reduction in GHG emissions from the commercial buildings sector by EOP	0	1.2%	0	MU	3 demo project has invested in EE options
OBJECTIVE: Promotion and facilitation of the widespread application of building energy efficiency technologies and practices in commercial buildings in Thailand	• Cumulative energy savings from the commercial building sector by Year 2015, GWh	0	396	0	MU	3 private players in 2015 have invested in EE implementation
	• % Energy savings by EOP	0	1.2%	0	MU	This is an EOP indicator.
	• % of new buildings that are fully compliant with the new Building Energy Code by EOP	20%	60%	0	MU	This is an EOP indicator.
	• % of new buildings in Thailand that are classified as energy efficient buildings by EOP	10%	40%	0	MU	This is an EOP indicator.
COMPONENT 1: Awareness Enhancement on Building EE Technologies and Practices						
OUTCOME 1: Enhanced awareness of the government, building sector and banks on EE technologies and practices	• % of overall commercial building stakeholders that agree to greater availability of pertinent information on EE technologies and practices through the PEECB project activities by EOP ~~Year 2015~~	0	80% (at least)	0	U	This is an EOP indicator which requires an independent firm to collect data to validate the achievements
	• % of overall commercial building stakeholders that are satisfied with availability and quality of information available from the PEECB project by EOP ~~Year 2015~~	0	70% (at least)	0	U	As mentioned above
OUTPUT 1.1: Establishment of the Commercial Building EE Information Centre (CBEEC)	• % of overall commercial building stakeholders that are satisfied with availability and quality of PEECB information services by EOP~~Year 2015~~	0	70% (at least)	0	MU	EOP indicator which will require the support of an independent agency to conduct survey and validate findings

Strategy	Success Indicator	Baseline	Target	Midterm Level & Assess-ment	Achievement Rating	Justification for Rating
OUTPUT 1.2: A system of information exchange and dissemination on EE technologies and practices for commercial building stakeholders	• % of overall commercial building stakeholders that agree to greater availability of pertinent information on EE technologies and practices through CBEEC as well as promotional and outreach activities by Year 2015	0	80% (at least)	0	MU	Reviewers suggest dropping this indictor as it is vague and difficult to measure
	• No. of users of the information exchange system by EOP	0	1,500	220	MS	3 focus Group Discussions and 2 seminars held with aggregate 220 participants
	• No. of satisfied users of the information exchange system each year Starting Year 2012	0	70% (at least)	0	U	The website need to be designed to capture basic information of visitors capturing their email and conducting an on-line survey of their satisfaction level.
OUTPUT 1.3: Developed and Promoted Energy Use Simulation Models for Commercial Building Design	• No. of modified BESMs with additional features (e.g. dual language user interface) by Year 2013	0	1	0	MS	The model is under preparation
	• % of overall no. of trainees that are gainfully employing learned skills on EE building design by Year 2015	0	70% (at least)	0	MS	The training modules being developed
	• No. of new buildings that were designed using the modified BESMs by EOP	0	60	0	U	BESM is yet to be launched
OUTPUT 1.4: Completed training courses on EE technologies and practices, and financial arrangement for commercial buildings	• No. of completed training courses on EE technologies and practices, and financial arrangement for commercial buildings by EOP	0	7	0	U	The training modules have been developed and training program will begin in Sept. 2015
	• % of overall no. of trainees that are gainfully employing learned skills on EE building design, operation and maintenance by Year 2015	0	70% (at least)	0	U	Trainings have not started at the time of MTR
	• % of trainees that are engaged in EE building project design, implementation and financing by EOP	0	50%	0	U	Training not yet started

Strategy	Success Indicator	Baseline	Target	Midterm Level & Assess-ment	Achievement Rating	Justification for Rating
OUTPUT 1.5: Completed training courses on financial assessment of EE application projects in commercial buildings	• No. of completed training courses on financial assessment of EE application projects in commercial buildings by EOP	0	7	0	U	Training modules are under preparation and will be ready for trial in October 2015
OUTPUT 1.6: Established business linkages between suppliers of EE technologies, building owners, banks and building practitioners	• No. of EE investment projects facilitated through business links by EOP	0	20	0	U	Business links are yet to be established by the project
	• No. of banks/FIs that have financed EE investment projects through the business links by EOP	0	5	0	U	This is linked with the release of funding for building EE by RTG
COMPONENT 2: EE Building Policy Frameworks						
OUTCOME 2: Effective implementation of favourable policies that encourage EE technologies and practices for commercial building in Thailand	• No. of new policy measures for commercial building EE approved and implemented by EOP ~~Year 2015~~	0	2	1	MS	Disclosure policy issued for pilot testing
	• No. of fiscal policies approved by DEDE for implementation by EOP ~~Year 2013~~	0	1	1	MS	Preparation of step BEC is in progress
	• No. of short and long term action plans for commercial building EE integrated into DEDE's national Energy Conservation Program by EOP	0	1	0	U	To be prepared as per the advice of TAG and stakeholders by EOP
OUTPUT 2.1: Updated and More Effective Policy Measures on Energy Efficiency in Commercial Buildings	• No. of new policy measures for commercial building EE approved and implemented by EOP ~~Year 2015~~	0	2	1	MS	Building disclosure policy issued and
	• No. of existing policy measures for commercial building EE modified and implemented by EOP ~~Year 2015~~	0	2	2	MS	Step BEC is under preparation
	• No. of recommendations on improved and innovative implementation approaches for EE rating / labelling / certification for commercial buildings in Thailand by EOP~~2013~~	0	2	1	MS	Building labelling scheme is under review
OUTPUT 2.2: Revised and Up-to-date Data and Information to Facilitate Policy Implementation of Commercial Building EE	• % of overall commercial building stakeholders that are satisfied with availability and quality of the energy performance database by EOP~~Year 2015~~	0	70% (at least)	0	U	Survey needs to be designed
	• No. of building energy use profiles established by Year **EOP** ~~2014~~	0	4	1	MS	SEC normalization under preparation
	• No. of commercial building EE project referencing the improved M&V schemes by EOP	0	20	0	U	M & V under preparation

Strategy	Success Indicator	Baseline	Target	Midterm Level & Assess-ment	Achievement Rating	Justification for Rating
OUTPUT 2.3: Approved and Implemented New and Improved Financing Models for Commercial Buildings	• No. of applicable fiscal policies on commercial building EE identified and formulated by EOP~~Year 2012~~	0	3	0	MS	Step BEC policy to promote fiscal incentive is under preparation
	• No. of fiscal policies approved by DEDE for implementation by EOP	0	1	1	MS	Step BEC policy to promote fiscal incentive is under preparation
	• No. of the approved policies that are implemented by EOP	0	1	1	MS	The 'disclosure policy' is being pilot tested and step BEC, procurement policy are under preparation
OUTPUT 2.4: Approved energy efficient promotion action plan (short and long term) to supplement DEDE activities	• No. of short and long term action plans for commercial building EE integrated into DEDE's national EE policy by EOP	0	1	0	MS	There is no progress on this specific activity.
	• No. of activities in the action plan that were considered for inclusion in the National Energy Conservation Program by EOP	0	5	0	MS	There is no progress on this specific activity.
	• No. of activities in the approved action plan incorporated in the National Energy Conservation Program that were implemented by EOP	0	2	0	U	There is no progress on this specific activity.
COMPONENT 3: EE Building Technologies and Applications Demonstrations						
OUTCOME 3.1: Improved confidence in applying EE technologies and practices in commercial buildings in Thailand	• No. of commercial building owners / managers expressing interests and commitments in implementing EE investments by EOP	10	40	12	MS	12 commercial building owners have given commitment
	• No. of building EE projects that adopted EE measures and designs being demonstrated and promoted by EOP	5	10	12	HS	12 commercial building owners have given commitment
OUTPUT 3.1.1: Installed and operational demonstration projects in selected buildings	• No. of demonstration project implemented and regularly monitored starting Year 2012	0	7	0	U	Three projects[12] on building EE partially implemented
	• No of completed M&V exercises in accordance with the M&V guideline updated by the PEECB Project	0	7	0	MS	Guideline is under preparation

[12] **EE measures implemented in (a) CP Tower 2 & Fortune town, (b) Aikchol I Hospital and (c) Aikchol II Hospital**

Strategy	Success Indicator	Baseline	Target	Midterm Level & Assess-ment	Achievement Rating	Justification for Rating
OUTCOME 3.2: Improved local technical and managerial capacity to design, manage maintain EE technologies and practices	• % of overall no. of demo building personnel that are gainfully employing learned skills on EE building design, operation and maintenance by EOP ~~Year 2015~~	0	70% (at least)	0	MS	Target number need to be set to measure and report % figures
	• No. of new buildings constructed that are partly or entirely based on the information regarding success of the demonstrations by EOP	0	20	0	U	No progress on this specific activity. Suggested revisiting the indicator to clearly define new buildings
OUTPUT 3.2.1: Documentation of the demonstration projects and available EE technologies in the markets and dissemination of demo project results	• % of overall no. of building practitioners that are aware of EE technologies/techniques available and applied in demo projects by EOP~~Year 2015~~	0	70% (at least)	0	MS	Suggested revising indicator as "number of success stories or demo building case studies published in technical journals"
OUTPUT 3.2.2: Completed training courses for personnel attached to the demo project	• % of overall no. of demo building personnel that are gainfully employing learned skills on EE building design, operation and maintenance by EOP	0	70% (at least)	0	U	Suggested linking the indicator with Output 1.4, and define target figure to measure and report % progress
OUTCOME 3.3: Replication of demonstration projects within the commercial building sector	• No. of new EE building projects designed based on, or influenced by, the results of the demonstration projects by EOP	0	20	0	U	This is linked to the capacity building and awareness creation work done by PEECB.
OUTPUT 3.3.1: Completed project documents/ recommendations for EE project replication in the commercial building sector	• No. of identified proven and feasible EE technologies and techniques that are applicable and applied in the Thai commercial building sector by EOP	0	5	3	MS	Some technologies[13] have been applied in the 3 demo projects for implementation with own funds. Other identified technologies will be implemented in 9 demo projects

Indicator Assessment Key

Green= Achieved	Yellow= On target to be achieved	**Red =** Not on target to be achieved

[13] High efficiency chillers have been installed in Aikchol I and Aikchol II hospital and high efficiency tank condenser in packaged air conditioner in CP Tower 2

In summary, the PPM has 46 indicators with many success indicators having reporting requirement of percent figure which increases the time required in collecting the overall numbers to derive the percentage. Further some of the Output indicators requires measuring 'satisfaction level' of stakeholders for reporting progress annually as well as EOP. While this information can be gathered through a well-designed survey targeted at the building sector stakeholders, such indicators may not provide a clear information since the satisfaction level is subjective and vary from one person to another. The information gathered from such surveys should also be used by the project as a feedback to make improvement in the quality and contents of project deliverables to improve the impact. A review of the recent PIRs reveals that only a small portion of the indicators on the PPM are used mainly due to several of the indicators lack of specificity of the targets, and due to the difficulties in actually measuring some of the indicators. Given the importance of the PPM in the effective and efficient management of the project, an independent agency will need to be engaged by the country office to carry-out the survey to establish the overall number base for the indictors which require reporting percentage progress.

3.1.4 Remaining Barriers to Achieving the Project Objective

The current summary of issues and concerns on implementation of EE in the Commercial Buildings sector includes the followings:

- **Lack of Easy Access to Information on Commercial Building EE:**
  - CBEEC is not yet functional and the PEECB project does not have a web-site;
  - System of information exchange and dissemination are not yet fully operational;
  - Building Energy Simulation Model is still in development (70% progress);

- **Lack of Awareness of Energy Efficiency Opportunities:**
  - Beside above actions, which are still in development stage, the PEECB did made a few actions on outreach to general public e.g. TV program related to RE and EE, and released two newsletter. However, the newsletter and the websites are developed using Thai language. GEF funded projects require all communication material to be in local as well as English;
  - The project has developed some linkages with other players in the sector such as ESCO association, University, industry, building associations, TGBI, who participate in the project seminars and workshop. The project is yet to develop these into strong links to engage key stakeholders and work collaboratively to achieve the outputs and outcomes;

- **Limited Adoption of EE Concept during the Building Design Phase:**
  - At the time of MTR mission, nine many of demo building projects are awaiting financial support from government. It is not clear whether building owner are waiting for government financing as a precondition for their investments;

- **Lack of Policy Implementation Guideline and Structure:**
  - Disclosure Policy is endorsed from decision-makers, for pilot-testing; Preparatory work on other policies harmonizing BEC for various building types, financing and procurement policies is in progress

- **Lack of Demonstrations on Cost-Effective, New and Innovative Commercial Building EE Concepts:**
  - Demonstration sites are in-progress: calculation/projection of cost-effectiveness in 2 demo sites are completed; 3 are in progress; and 7 will be completed by the end of 2015.

- **Lack of Technical Expertise on Energy Efficient Building:**

- Training curriculums are under development and training courses are being integrated by HRD Centre of DEDE. However, these training curriculums are not yet tested, and regular trainings are yet to be conducted.

- **Lack of Information on Energy Efficient Building Products and Equipment:**
  - List of technical options are prepared but yet it is to be disseminated as the CBEEC has not become fully functional;

- **Absence of Effective Financing Models for Commercial Building EE Investments:**
  - The Model is under preparation

Project Implementation and Adaptive Management

3.1.5 Management Arrangements

The management arrangements for this Project were in flux for the initial 10-months and stabilized after the selection of two consulting firms was completed by DEDE to implement the activities of three components. The Project Board was constituted during this period comprising of DEDE, ONEP, EPPO, BMA, TGO, TGBI and DPW&TCP. The Project Board (PB) has met four times since the 2013 and provided guidance and oversight to the project. The figure 1 presents project's organisation structure. The PMU reports to NPD and to the PB.

The setup of PMU which comprises of two consulting firms with responsibilities of different components - Component 1 and overall project management is with one firm (BMC) while Components 2 and 3 with the second firm (ENSOP) – is a unique arrangement. The project received support of international energy efficiency experts (Nikken Sekkei Research Institute, Japan) through contractual services agreement between BMC and NSRI. The international experts have hosted study tours, provided technical reports and participated in a public event, and are engaged with the project is until December 2015.

The original management arrangement was to have the PMU in DEDE led by National Project Director (NPD). The PMU, which is headed by a Project Manager (PM) would have support from National Project Coordinator (NPC) and group leaders for each of the components technical experts to cover specific components of the Project. The responsibility of overall management, monitoring and coordination of implementation of entire project according to UNDP rests with the PMU. Further, the responsibilities of the Project Manager were defined to run the project on day-to-day basis under the support of NPD and overall guidance of PB, and to ensure the project produces results within the specified time and cost.

In the case of PEECB the contractual arrangement between DEDE and the two consulting firms changes the equation in terms of reporting responsibilities and delivery of project outputs and the role of National Project Manager. Usually the Project Manager is dedicated full-time to the project while the NPD provides the guidance. The PMU misses out on creating synergy among the two firms for project delivery, for example, the target of Output 3.2.2 is linked with the delivery of Output 1.4.

UNDP provides support to the project through participation in PB meetings, project exchange events, and feedback on progress reports.. The performance of BMC and ENSOP are monitored and assessed according to the TORs of the respective contracts by an internal DEDE's project committee. DEDE project committee has full control over both subcontractors. The payments are linked to the progress made under the contract. However, as the indicators of outputs and outcomes are described in percentage terms in the contract, therefore payment is always clearly measurable but outputs and outcomes cannot be ascertained from the

percentage based progress reporting. Therefore, the outputs under the three components and activity progress as presented in Table 2 are not consistent with the progress reported by the PMU.

Additionally, the PMU was to have technical support from an ad-hoc Technical Advisory Group (TAG) constituted by national and international building EE experts including members from other government departments, UN, host of pilot demo projects, academic, research and development institute, as well as national and international consultant. The TAG is chaired by NPD to work on specific assignments. However, with the changes to the original management structure and absence of TAG, progress reporting on percentage basis has diluted the overall effectiveness of the project management arrangements e 2013 has been moderately satisfactory. Support from UNDP to DEDE and PMU in setting up of TAG to discuss the current achievements of the project and make these result oriented, as well as to streamline indicators in PPM would assist the PMU in more effective use of their time to monitor activities. These efforts would help the project to increase the overall effectiveness and efficiency in the achieving the targets set for various output and for the project.

3.1.6 Work Planning

The Project start-up was delayed by issues related to recruitment of qualified PMU team most notably the selection of firms to implement the activities of Components 1, 2 and 3. As a result, there was no work planning and no activity during the first year of the Project after signing of ProDoc until the Project Inception Workshop in May 2013.

Though there were many indicators on the Project Planning Matrix (PPM), the PMU did not make any attempts or efforts to pare-down the irrelevant activities or discuss the activities and reporting requirements of PPM. In summary, the progress of the Project is partly attributable to the political disturbance which disrupted the implementation plan since the decision making process involving government officials was hampered creating uncertainty. In addition the PMU did not make use of PPM for reporting the project progress as per the 'Detailed Monitoring and Evaluation Plan' (included in Part V of Prodoc), and instead used percentage figures to report progress of activities. The PMU has prepared "Master Plan" which it is following for work planning and scheduling of activities. However, it is observed that the links between 'master plan' and the project Outputs not in place. That is, how the completion of each activity of the master plan will lead to output targets. The quarterly progress report the progress of activities in percentage figure, and not in terms of what is achieved. . To summarise, this kind reporting has not provided a clear picture of overall progress against the project outputs and made monitoring by DEDE and UNDP CO difficult.

3.1.7 Finance and Co-Finance

A summary of the PEECB Project expenditures is provided in Table 2. The expenditures presented here are based on Combined Delivery Reports (CDRs), received from the UNDP Country Office. The slow progress of the Project is reflected in the slow rate of expenditure during its initial 30 months during where USD 1.6 million was expended up to June, 2015. Although it is expected that the expenditure will be incurred in the remaining months of 2015 however, the current expenditure of 44% are indicative that unless the project makes progress to achieve the target outputs and outcome, the balance USD 2.03million may not get fully utilized by the end of project. The percentage planned versus actual disbursement for project Outcome 1 is 50%; Outcome 2 is 51%, Outcome 3 is 32.75% and for Project Management it is 81%. In comparison to the Outputs for each of Project's 3 components, the expenditures for Outcome 1 and Outcome 2 appears to be on the higher side and for Project Management the expenditure is too high and inconsistent with the expenditure incurred under three components.

At the current rate the Project Management component will reach 100% expenditure without the three project components achieving all the EOP targets.

PEECB Co-financing details are presented on Table 3. Due to the change in the private sector partners, the Project co-financing has reduced from USD12,267,500 to USD 8,529,988, DEDE's contribution of USD 135,000 partly reflects its overall contribution. Although the potential of investment required in energy efficiency projects among 12 private sector partners, the investment have been made by three partners aggregating to USD 327,747. On the positive side, the project was successful in obtaining support from 12 private sector partners to invest in energy efficiency, however, unless the co-financing of the government is released to individual projects, some of the project developers may hesitate to make the full investments required.

The project should pay special attention to financing of initial 12 demonstration projects as these are important for the project's success and for spreading the concept of building energy efficiency which is a win-win for DEDE, ONEP, BMA due to the benefits from increased investment in energy efficiency, reduced GHG emissions, improved Building Energy Index and for building owners due to reduced expenditures in energy consumption. Thus, the project team will need to work towards increasing the investments, including DEDE co-financing. PMU also need to follow-up with DEDE to ensure the demonstration project receive the subsidy and document the process for sharing with other prospective building energy efficiency projects.

A review of the Combined Delivery Reports contributed to the analysis of the project's planned and actual expenditure. The low expenditure in 2013 validates the constraints faced by the project during the initial months after its start during which efforts were spent in procurement of consulting firms to support project's three components. The expenditures in 2014 have picked up and it is expected that by end of 2015 with project activities progressing, the percentage figure of the planned versus actual will improve further.

Table 3: Project Budget and Expenditures (in USD)

Outcome	2013	2014	2015	2016	Total Expenditure till June 2015	Total Planned for Project	% Expenditure	Total Remaining
Outcome 1: Enhanced Awareness of govt, building sector and banks on EE	173265	342319	83585	0	599169	1196400	50%	597231
Outcome 2: Effective implementation of EE favourable policies for commercial buildings	90315	177382	55259	0	322956	634673	51%	311717
Outcome 3: Facilitating Access to Energy Efficiency financing for commercial buildings	83745	227894	170411	0	482050	1471600	33%	989550
Monitoring and Evaluation	430	2995	0	0	3425	93500	4%	90075
Project Management	85742	75213	34241	0	195196	241100	81%	45904
Total (Actual)	433497	825802	343496	0	1602795	**3637273**	44%	**2034478**
Total (Cumulative Actual)	433497	1259299	**1602795**	0	All figures are in US Dollar			
Annual Planned Disbursement	1348700	806900	784200	0				
% Spent Actual vs Planned Disbursemer	32%	102%	44%	0%	Overall disbursement till June 2015			44%

Table 4: Details of Project Co-Financing

	Co-Financing Commitment		
Partner Agency	EOP Target (USD)	Made till June 2015 (USD)	Activities to date
Department of Alternative Energy Development and Efficiency	6,500,000	187,500	Monetized value of contribution made by DEDE personnel involved in the project activities and Office Space provided by DEDE is presented.
Aikchol I Hospital	230,153	199,225	Investment made in procurement of EE chiller
Aikchol II Hospital	130,153	112,307	Investment made in procurement of EE chiller
Centara Grand at Central World	133,538	0	Feasibility study and pay-back analysis carried out, investment expected in September 2015
Chaweng Garden Beach Resort	70,769	0	Feasibility study and pay-back analysis carried out, investment expected in September and November 2015
C.P. Tower 2 & Fortune town	36,923	16,215	Modification made in chillers to improve performance
Double A	378,050	0	Feasibility study and pay-back analysis carried out, investment expected in October 2015
Energy Complex	9,231	0	Feasibility study and pay-back analysis carried out, investment expected in October 2015
Grand Mercure, Bangkok	517,832	0	Feasibility study and pay-back analysis carried out, investment expected in August and December 2015
Kasikorn Bank	226,462	0	Feasibility study and pay-back analysis carried out, investment expected in December 2015
Provincial Electricity Authority	246,203	0	Feasibility study and pay-back analysis carried out, investment expected in December 2015
Saint Gabriel's College	22,845	0	Feasibility study and pay-back analysis carried out, investment expected in October 2015
Samrong General Hospital	58,755	0	Feasibility study and pay-back analysis carried out, investment expected in October 2015
Total:	**8,560,916**	**515,247**	

~~3.1.5~~3.1.8 Project-Level Monitoring and Evaluation Systems

The project's Monitoring and Evaluation (M&E) system used in the PIR consist of the indicators and outputs of the project PPM. However, as mentioned in Section 3.1.3, all the outputs have multiple indicators which makes it challenging to report progress since the success indicator where targets reporting is in percentage requires collecting the base figure for the commercial building sector (to be used in denominator of the fraction to calculate %). The information of the sectoral emission data were not shared with the reviewers by either ONEP or TGO as the preparation of Third National Communication is under progress, and until the report is released by the government such information will not be available in public domain. Some of the indicators, have ambitious annual and EOP targets which may be a tall order for the project to achieve in the time available. For instance, Objective level indicator "% of new buildings fully complied with the new Building Energy Code by EOP" has a target of 60% with a baseline figure of 40%. The MTR team feels that this may be difficult for the project to achieve especially if compliance to BEC is a voluntary requirement. Also, Outcome 1 indicator "% of overall commercial building stakeholders that are satisfied with availability and quality of information….", and similarly indicator in Section 3.2.1, are vague and difficult to measure

annually to give a clear position of the Outcome. Some such indicators are not cost-effective or efficient to monitor for quarterly progress reporting without having a target figure clearly defined such as surveys on the satisfaction of the training workshops. In the PPM included in Appendix E such indicators have been identified and changes have been suggested.

The project is following various M&E activities which started with the Project Inception workshop, Project Board meetings, submissions of QPR and annual PIR as well as regular weekly meetings between DEDE and PMU and ENSOP

~~3.1.6~~3.1.9 Stakeholder Engagement

Since mid-2013, the Project has made progress in developing partnerships with direct stakeholders, namely the SDAs, UDDs, architects, consulting firms, and state owned training institutions. Moreover, there is ample evidence given to the MTR team that the Project Board members from the other government department and agencies are not well connected with activities of the PEECB such as training, development of BESM, draft policy documents on M&V, Building Disclosure Program. Other than the members of various government organization/agencies, there has been some participation of the private players in conducting focus group discussions. In addition, members of the PSC are drawn from BMA, ONEP, TGO, Town and Country Planning Unit as well as DEDE and TGBI to provide broad but important perspectives in the decision making process to support the Project.

One of the major achievement in the stakeholder engagement efforts of the Project has been the success in exceeding the original target numbers of private sector owners of commercial buildings space. The effectiveness of this engagement, however, is more complex given that most commercial buildings will implement the energy saving measures at different time-line which will complicate calculating the energy saving impact of the project. Also, the financial commitment of these owners and developers to invest in EE projects in their own buildings/properties with and without DEDE (ENCON fund) support needs to be confirmed.

As per the observation made by the MTR team in terms of gender, this project is gender neutral. The representative of PB members are assigned according to their position within each organization and sometime when the main person is not available to participate in PB meeting - representative was selected according to their expertise not gender. In terms of demo site, although, gender is not the main selection criteria and is not an entry barrier as well. As a result, CEO/Owner of demo building are naturally mixed between male and female. Especially those family business, both male and female owners are equally making decision and participating in this project. Further, experts, project staff and trainees are not recruited with gender bias. All are recruited according to their expertise and willingness without any gender prejudice.

~~3.1.7~~3.1.10 Reporting

Although the Project has been carrying out adaptive management, changes in the Project implementation have been reported and shared through annual PIR. The PMU has been providing quarterly progress reports since 2013. The QPRs and AWPs has been prepared according to the Pro Doc and their ToR. However, some of the activities in the development phase for example, development of website, training curriculum, and information service centre remain pending from 2014 and needed to be continued in AWP 2015. The Project has started following the reporting format of PIR introduced by UNDP-GEF; however, the PMU will need pay attention towards reporting the progress using the indicators and the targets provided in the PPM for each output so as to provide developmental information to DEDE and UNDP Country office. Several of the QPR reviewed by the MTR team were very detailed technical reports going into hundreds of pages. The MTR noted that in QPRs and various presentations provided

by PMU during the mission, the project progress is presented in percentage figures, which are difficult to relate to any tangible outcome.

~~3.1.8~~3.1.11 Communications

The internal communications between the Project and its stakeholders is through the PB meetings and PB meeting minutes. The circulation of the meeting minutes is required to done soon after the meeting is conducted. Regular communication takes place between PMU and UNDP; PMU (BMC, ENSOP) and DEDE however, there are no regular communications between PMU and other members of PB. The PMU has started a quarterly newsletter since start of 2015 which is send to 200 recipients, which includes government agencies, private sector players.

Other than the quarterly newsletter and a weekly TV promotion, the project does not have any other mechanism for communicating with external stakeholders and sharing useful for information about the progress made by the project in overcoming the barriers identified during the project design (project document) to promote energy efficiency. The website created under the project is does not contain any detailed information and is not linked with the DEDE website or UNDP country website. To summarize, the project has limited communications with stakeholders about the work being done on efficient energy use in the commercial buildings, about the availability of energy efficient technologies, products and government's support through DEDE, as well as sustainable development benefits to the society and global environmental benefits.

Risk Management and Mitigation

The Prodoc has specified the greatest risk to the success of project is *political commitment* for which the suggested risk mitigation is to involve RTG and its institution in the project activities. The other risk factor mentioned is '*weak government support for commercial building EE'.* The MTR team's meeting with members of Project Board revealed that the project is lacking in building sufficient support from government and other building sector stakeholders to promoted energy efficiency. The MTR team's observation and recommendations 2, 3, 4, 5 and 8 are to be seen as risk mitigation measure as the project, with its achievements, is still in a good position to raise the importance of building energy efficiency and highlight contributions of DED, UNDP/GEF in supporting the implementation of RTG's 20-year energy efficiency action plan.

A review of the risk mitigation measures identified in the ProDoc is presented in the table 5 along with the MTR team's assessment of 'Level of Risk' based on the present situation and interaction with various project stakeholders.

Table 5: Review of Project Risks

Risk	Level of Risk (at project design)	Level of Risk (during MTR)	Remarks on Mitigation Actions
Weak government support for commercial building	Low	Low	Greater awareness creation among private players and through demonstration projects on the benefits can lead to voluntary actions by the private builders
Unstable growth of the commercial building sector in Thailand	Medium	Low	The growth of the building sector has improved with the economic recovery of the country

Lack of support from building sector professionals	Low	Low	No change in mitigation actions
Failure to secure consumer interest may result into low demand	Low	Low	No change in mitigation actions
Stakeholder coordination – too many stakeholder may prevent efficient decision making	Low	Medium	Stakeholder coordination is important since the building sector energy savings is joint responsibility of Ministry of Energy, Town and Country Planning Office, and BMA
Poor performance of demonstrated technologies and increased maintenance cost of energy saving technologies	Low	Low	Deployment of proven technologies and sufficient training of manpower to maintain the technologies can help to mitigate the risk of high operating costs.

Sustainability

The Project is currently on a track to be *moderately sustainable* based on possible issues on building. Momentum to achieve the targets for most of the output indicator, particularly those where the work is still in progress. Also, the release of THB 7.5 million subsidy by DEDE to seven demonstration projects will be critical for project's sustainability, since this will set the process by which other potential commercial buildings will be more inclined to consider investing in building energy efficiency. Sustainability of this project will depend on how the CB owners understand and buy-in the EE concept and approaches and its widespread effects, which the PMU need to emphasis on getting public attention and innovative advocacy approaches within the remaining project timeframe.

~~3.1.9~~3.1.12 Financial Risks to Sustainability

Financial risks to ECBC sustainability is moderate given that RGT has ENCON funding. Under this project capacity building support is being provided for creation of CBEEIC which will provide information on energy efficient technologies in the building sector. The EOP target of having 12 demonstration buildings in private sector will also demonstrate financial resources being directed towards Energy Efficiency in existing commercial buildings of different functions (hotel, shopping mall, offices, school, hospital). Thus, it is expected that adequate financial resources will be available by EOP from the government in the form of direct subsidy to sustain the demonstration project activities and encourage more private buildings to invest in efficient end-use of energy.

~~3.1.10~~3.1.13 Socio-Economic Risks to Sustainability

The socio-economic risks to PEECB sustainability are rated as *moderately likely*. The main reason for this is that the cost of energy efficiency technologies and retrofits are high for retrofitting the buildings with energy saving equipment, especially in case of chillers. Therefore additional support from government under its 80/20 Program in which 20% of subsidy of total investment is provided (this form of subsidy of 20% of total project cost will be of great help to move the sector for retrofits in the Bangkok Metropolitan Area. It is estimated that BMA has a little over 50% of nearly 2000 commercial buildings that are present in Thailand. Unless the project is able to demonstrate the benefits of EE application through real-life examples of 12 demonstration projects in the existing buildings and which have received 20% subsidy from the

government's ENCON fund, there will not be important lessons for sharing with the building sector stakeholder therefore the social-economic risk remains high. Currently progress of the project activities do not lead to a stage by EOP which ensures that there will be enough players in the market who will provide the required EE technical solutions and provide the details of the project to DEDE to seek financing for the project. The contribution by the project to accelerate the process of information dissemination through training, seminars, newsletter and web-site can change the situation and create greater awareness about the benefits of Energy Efficiency which, in turn, will create a demand in the market for services and technological interventions.

~~3.1.11~~3.1.14 Institutional Framework and Governance Risks to Sustainability

The institutional framework and governance risks to PEECB sustainability are rated as moderately sustainable. This is due to the involvement of DEDE, Ministry of Energy, Town and Country Planning Office as well as environment ministry in the implementation, monitoring and reporting of energy saving and GHG reduction from commercial buildings. Possibility of future demand of technical support in reducing energy consumption in the commercial buildings is likely to be responded by DEDE. However, the enforcement of revised Building Energy Codes will likely be also done by the Town and Country Planning Office, which provide approval at various stages of building construction, and has staff in other districts of the country. Therefore risk for sustaining the building energy efficiency work in future is relatively less.

~~3.1.12~~3.1.15 Environmental Risks to Sustainability

There is no environmental risk to PEECB sustainability since the project is designed to reduce use energy in commercial buildings through training and demonstration, which eventually reduced the greenhouse gas emissions. The project goal is consistent with, and supports the strategies and measures for energy conservation included in the RTG's 20-year Energy Efficiency Development Plan.

4. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

- The project has the potential to achieve its EOP targets and stimulate the market for building energy efficiency. More time and attention of PMU members including BMC and ENSOP teams need to be devoted to the project to achieve EOP target in the remaining 22 month

- Project presently is progressing behind its schedule in terms of achieving the annual and overall targets. With $ 2.03 million remaining, there is a need to review, rework, and simplify project's log frame or project planning matrix (PPM) so as to stay focused on indicators, and also re-setting some of the annual targets in the absolute terms instead of comparative figures (percentage). To simplify and expedite the process, MTR team has included a proposed PPM in Appendix E

- Project need to focus on implementing Component 1 activities, especially setting up of Commercial Building EE Information Centre, project website for information dissemination, and Building Energy Simulation Model for training of key stakeholders including DPW&TCP.

- Reporting of project progress in quarterly progress reports should be against the outputs and targets mentioned in the project planning matrix (PPM) instead of percentage figures.

- Public recognition to pioneer energy efficiency demonstration projects jointly by UNDP and Senior Official from Ministry of Energy for the contribution in reducing the energy consumption and GHG emission can help to draw the attention of public and government agencies to the importance of building energy efficiency and improve the profile of PEECB.

Recommendations

Recommendations

Recommendation 1: *UNDP CO to engage a consultant to simplify log-frame and set clearly defined EOP targets*

The project's reporting on achieving annual targets presently follows a percentage based measurement which does not indicate progress of activities in concrete terms. Reporting of progress of each activity needs to follow an easy and absolute numbers based targets which will help progress monitoring and direct measurement of achievements. This would also make it easy to link *output* level achievement of target with the Component level targets and outcomes.

The PPM has overall 46 indicators some of which are not SMART, few have ambitious targets while indicators have targets which are ambiguous. The End of Project target for energy savings and GHG reduction factor is based on the assumption that EE technologies are implemented and operational best practices are disseminated among two hotels, two hospitals, two office buildings and 10 hyper-mart stores across the country, which would lead to an annual reduction in energy consumption of 4,293 MWh. With the 12 number of demonstration buildings, the annual energy saving is estimated at 6.6MWh, which is much lower than projected in the ProDoc. Similarly, another Objective indicator on percentage of

new buildings that fully comply with new Building Energy Code has target of 60% from the baseline figure of 20%. Considering the total number of commercial buildings in Thailand to be approximately 2000, a 40% increase is a tall order for the project to achieve in the available time.

With the changed local circumstances due to political changes, the project needs to re-strategize and re-align the project indicators and some of the EOP targets. Although, the MTR team has reviewed the PPM in detail and commented upon some of the activity indicators (in Appendix F), however defining the targets require more consultations with local stakeholders. It is, therefore, recommended that UNDP CO engages a consultant to review the project planning matrix and revise the EOP targets in consultation with DEDE, PMU and ENSOP and UNDP. The revision of PPM should also be used to adjust the success indicators by applying the SMART criteria to simply the monitoring of progress based on the data/information generated by the project activities and establish an acceptable target number for reporting percentage progress to bring clarity and avoid duplication.

Recommendation 2: *Activate PB members with the objectives to (a) Utilize PEECB platform to synergize between initiatives of particular agencies to enhance effectiveness of EECB measures and GHG reduction; (b) Implement joint training between key players in the field of EE, Climate Change, and architecture*

The PMU should be more proactive in coordinating various project activities with building sector key stakeholders in addition to the government officials who are part of the PB.While the Project Board (PB) for PEECB project is in place and operational, it is observed that the Technical Advisory Group (TAG) is non- functional. Increased stakeholder engagement would help in the consultation process and finalization of policies that are being prepared by PEECB. It would also help to identify steps required to make the policies implementable. It is therefore recommended that the TAG be re-activated to discuss and finalise technical deliverables among inter-government agencies. For instance, DEDE, ONEP & TGO and DEDE, BMA, TCPO can discuss the work project doing on M&V, energy savings and corresponding GHG reduction and identify ways to sustain the efforts and align these with the RTG's 20-year EEAP in which building sector is identified as one of the sectors for contributing to reduction in energy consumption.

Adequate engagement and active involvement of all possible PB stakeholders concerning the EECB ecosystem is an important factor to successful implementation of project, and ensure sustainability by creating environment through conducive policies and financing for replication.

It is therefore, recommended that the project strengthens its engagement with various stakeholders concerning EECB ecosystem, covering all domains viz. various associations involved in the building sector, technology suppliers, technical service providers and practitioners (architects); regulatory agencies, academia/technical organisations, banks involved with DEDE on EE financing, governmental and non-governmental set-ups for a wider reach out of project interventions.

Recommendation 3: *Organize PB meetings more often to discuss and precipitate decisions to institutionalize and sustain EECB after EOP*

The project design has suggested two annual meetings of the project board. However, since 2014 till mid-2015, the project board has met once in a year. Some members, who could not participate in the recent meeting (of 2015) therefore are unware (since participation in last PB meeting in beginning of 2014) about the current progress and achievements of PEECB. The PB members are supportive to the operation plan presented by PMU and have made

useful suggestions during the meetings on use of tax measures as incentive to promote EECB and to increase public information especially at different stage of implementation to ensure the message reach the target groups.

As the project has reached a stage where it can share some results (outputs) and develop consensus to move forward to spread the concept of EE, it needs the concurrence and strategic guidance of the PB to link the project outputs to the policies. It is, therefore, recommended that PB meetings are held more often at least once in 4 months, to precipitate decisions to institutionalise and find ways to sustain contributions being made by PEECB through demonstration, training and policies. This will help to ensure that various institutional structure are in place at EOP so that the work in the sector towards achieving the 2030 energy saving target setup by the Royal Government of Thailand.

Recommendation 4: *Strengthen outreach to raise profile and public attention of EECB to become national agenda through (a) Creation of 'EECB Award' which endorsed by all PB member agencies; (b) Organize high profile dinner talk on EECB by the 'Best Practices' ; (c) Public presentation on extrapolation of potential benefits from EECB and call for actions at all level*

It is observed that so far project could organise only two awareness creation public seminars in Bangkok and released two newsletters since 2013. Also CBEEC project website, which is one of the key deliverables under component 1 of the project, is also not yet ready with its contents and yet to start functioning. Also 'Training Modules' are not ready at the time of MTR mission. This has hampered the project outreach against its targeted capacity and coverage, and effectiveness of the work done by the project cannot be measured.

It is observed that project visibility and spread/reach-out is still inadequate and needs to increase multi-folds. It is highly recommended that project gears up its awareness raising efforts by involving various stakeholders with monthly/quarterly outreach campaigns, use electronic and print media such as website, technical magazines and journals to raise public awareness and strengthen outreach efforts by sharing case studies and share the success of demonstration projects.

Recommendation 5: *Explore ways to accelerate the disbursement of subsidy to promote energy efficiency in CB – preferential treatment to EECB for a limited time*

The 12 demonstration sites identified with the willing participation of existing private commercial building owners. An initial assessment of energy saving potential and investment required is being re-assessed to establish base-line. Out of 12 demonstration projects, three have implemented some of the recommended energy saving measures whereas most of demo buildings are still waiting for subsidy from government to invest in energy efficiency. It is recommended that the project (UNDP, DEDE and PMU) holds a meeting with the demo project partners and identify the requirements and arrive at an understanding of their decision points for investing in energy efficiency and requirement of any additional assistance which PEECB may be able to provide. These key decision factors should be documented for future reference and continued support for building EE after EOP so that other building owners who may be interested in investing in energy efficiency have better understanding of the benefits of government's subsidy and requirements to avail it. The implementation of demonstration projects is also important to achieve the target energy saving and corresponding GHG reduction from the building sector.

It is also recommended that the project team discuss the ways to expedite disbursement of subsidy to building sector project and develop a mechanism to review the request of technical

and financial support from private building owners and operators, which will continue to function after EOP. This would include developing steps for carrying out due diligence or technical review of the proposal received by DEDE/MOE and an acknowledgement of subsidy funds that will be disbursed in a defined time-frame. This will make the overall process clear for dissemination and may help to attract attention of more building owners to invest in energy efficiency with support from government's ENCON funds.

Recommendation 6**:** *Review the investment by demo project partners and re-assess the co-financing*

A review of the energy saving and GHG reduction potential from energy efficiency from the 12 demonstration project partners have provided insights to the potential investment requirement also. The total investment required for implementing energy efficiency by the partners is presented in table 3, however currently the overall investment (from other) is less compared to the co-financing contribution envisaged at the beginning of the project. Therefore, it is recommended that the UNDP CO reviews these figures together with PMU since the co-financing from other sources is directly linked to the demonstration projects and also the resulting energy savings and GHG reduction. Efforts are required in the project to achieve the EOP targets is provided in the PPM. Similarly, the in-kind contribution of DEDE since the beginning of the project needs to be assessed and reported to track the overall project co-financing.

It is further recommended that the co-financing figures may also be included in the periodic progress reporting in addition to reporting of results of the project outcomes and objectives.

Recommendation 7: *The two firms constituting the PMU must work more cohesively as a single entity and improve the project's Monitoring and Reporting by adhering to PPM, and develop the scope to engage experts to conduct survey of project stakeholders for monitoring progress of project indicators*

The Project Management Unit of PEECB is constituted by two agencies engaged by DEDE through a contractual arrangement. The responsibilities of activities under the three project components is divided among the two agencies. While each agency is working towards achieving the outputs and regularly interacts with the DEDE and other stakeholders, the work of barrier removal in the building sector requires working closely to take advantage of the information generated by activity implemented by one agency under one of the components and applying it as an input to other activities being implemented by another agency under other component. For instance, the policy work and the demonstration projects provide useful information to be added on to the project web-site and for the development of training courses. It is therefore, recommended that the two firms work more cohesively and synergistically as a single project implementing entity and improve the implementation of various project activities including the monitoring of project activities and reporting of the progress in the quarterly progress reports (QPR) which currently follows a percentage basis of reporting. This system of monitoring and progress reporting does not provide the reader a clear perspective of the achievements of the project and comparison with EOP targets. It also does not provide a way out to monitor the progress for various indictors which require collecting data for reporting purposes. Further, some of the quarterly progress reports submitted by PMU to DEDE are detailed and on average have more 225 pages. However, none of the reports give an indication of achieving the project outputs and the timeline to achieve the EOP targets. It is therefore recommended that the PMU starts reporting the progress of all the project outputs and success indicators in terms of EOP targets listed in PPM. This would help to improve the monitoring of the project by DEDE and UNDP during meetings using PPM.

Recommendation 8**:** *Project the potential of energy savings, and resource mobilisation requirement for country-wide implementation of energy efficiency in commercial building*

The PEECB project has successfully recruited 12 demonstration project partners and each being a representative of different types of commercial buildings ranging from a college, to shopping mall, office building, hotel, hospital and a resort. These demonstration projects have provided credible data on investment required, annual energy saving, monetary saving (in Bhat), payback and annual GHG reduction. This information is useful to assess the size of the building energy efficiency market and the savings to owners and the RGT resulting from reduced energy consumption and GHG emissions. Further, this information can be presented in different forums, including the project website and Project Board meetings to discuss the possible options to sustain the project activities and draw attention of government and building sector stakeholders towards the importance of EE in commercial buildings and highlight the contributions of the project to catalyse the market. Using accurate number of commercial building in Bangkok Metropolitan Area and in the entire country, it is recommended that PMU should use the available information to extrapolate the potential of energy saving, GHG reduction possible from commercial building sector and also project the investment requirements in Bangkok Metropolitan Area and for the rest of the country and present it as a work being undertaken by the government to implement the 20-year EE plan acknowledging the support of UNDP and GEF.

Lessons Learned

1. The lack of a clear and concise PPM (with SMART indicators and achievable targets) to manage large programmes makes it difficult to measure project impacts and to adaptively manage future activities. The design of a PPM should be sensitive to the efforts required by project management teams to gather data required to monitor the indicators, and to apply adaptive management to the project whenever required by changing external circumstances. This would include efforts to monitor indicators that require studies or surveys to collect data; these efforts either need to be included in the AWP and budget allocations or if too costly, revised the indicator or remove the indicator from the PPM. Due attention needs to be given during the project formulation stage to the PPM which is prepared by professionals or subject matter experts and ensure the SMART indicators and achievable targets are included. This impacts the effectiveness of project management.

2. The monitoring of the project progress should follow the reporting structure and targets given in the PPM. A percentage based reporting is more suited for construction projects and not for development projects such as PEECB which is working towards barrier removal, awareness creation through policy development to stimulate market for energy efficiency and therefore, its progress and achievements can be monitored and measured in terms of deliverables.

3. Project implementation arrangements and spreading the responsibilities of project components among different agencies should follow the guidance of Prodoc which suggests group leaders for each of the project component being responsible for implementation of activities as well as coordination of work with other agencies and organisations to achieve component outputs and outcomes. This arrangement should be adhered to since it is designed to ensure efficiency and effectiveness of work.

Ratings

These are summarized in the below Table.

Table 5: MTR Ratings & Achievement Summary Table for PEECB

Measure	MTR Rating	Achievement Description
Progress Towards Results	Objective: Improved energy efficiency in the commercial building sector **Achievement Rating: 4 (Moderately Satisfactory)**	Project made slow start in the first year (in 2013) due to staggered selection process for engaging 2 project consultants. The project showed some progress in later half of 2013 however lost momentum which resulted in poor progress in 2014 with only one Project Board meeting during the entire year. Seminars and focus group discussion have been organized, and 12 private building owners agreed to join the project for demonstration of energy savings. Project management is functional however needs to get more active and focus on results to achieve the overall project objective.
	Outcome 1: Enhanced awareness of government agencies and local authorities, the building sector, and financial institutes on designs and implementations of EE technologies and practices that are applicable to the Thai context **Achievement Rating: 3 (Moderately Unsatisfactory)**	▪ Work on preparation of Training Contents and Materials for technical as well as non-technical modules is in progress; ▪ Quarterly newsletters starter in 2015, and being distributed to 200 recipients; ▪ Two public seminars on building energy efficiency have been organized; ▪ Study tour organized to Japan with the support of international EE consultant ▪ Building Energy Simulation Model is under development, expected to be ready for beta-testing by October 2015; ▪ Commercial Building Energy Efficiency Center yet to be established; ▪ Business linkages with EE technology suppliers, building owners and practitioners are yet to be established
	Outcome 2:Establishment, implementation of, and compliance to favourable policies and instruments that encourage EE technologies and practices for commercial buildings in Thailand **Achievement Rating: 4 (Moderately Satisfactory)**	• Policy on Building Energy Disclosure Program approved by DEDE • Policy on Energy Efficiency Procurement under preparation • Work on the development of detailed database on construction materials and energy efficiency equipment is in progress • Work on the preparation of detailed study on Specific Energy Consumption for Office Building is in progress • Preparation of M&V methodology for Air Conditioning and Lighting System is under progress
	Outcome 3: Improved confidence in investing in the application of EE technologies and practices in commercial buildings in Thailand **Achievement Rating: 4 (Moderately satisfactory)**	▪ Recruitment of additional demonstration buildings to replace the selected buildings that previously withdrew from the project ▪ Feasibility study report on energy saving potential for newly selected buildings in progress ▪ Baseline studies conducted for all demonstration buildings ▪ M&V guidelines for all demonstration buildings under preparation
Project Implementation & Adaptive Management	**3 (Moderately Satisfactory)**	• Adaptive Management exhibited by the project with the change of original demonstration partners and in mid-2014

		• Progress reporting in percentage basis instead of output indicator • Fewer meetings of Project Board than proposed in the ProDoc • PPM has a number of irrelevant and unachievable indicators which does not assist the PMU to focus on delivering results
Sustainability	**3 (Moderately Likely)**	• Mainly based on the participation of more than the originally targeted building owners. • Many building owners have multiple properties in which they have shown interest to expand EE measures • The selected demonstration buildings mostly belongs to influential groups in Thailand for instance (1) the owner of CP Tower and Grand Mecure Hotel is convinced that EE is important corporate management policy; (2) K-Bank: one of management policy is social and environmental responsibilities. The Bank has clear policy on EE and RE. Thus, the project can continue to the dialogue and convince the management to expand EE measures to many buildings under the bank's ownership; (3) Saint Gabriel College has influence financially and politically over other schools under supervision of Catholic Church in Thailand. The project can leverage on these partners to attract more builders to take active interest in building energy efficiency. • Currently, there not enough efforts being made by the project to actively engage associations in the building sector and important government institutions including those that are on board of this project. Having more supporter for EE within and outside the government will help in long-term to sustain the work on building energy efficiency; • Availability of Energy Conservation Fund to provide partial financial support for energy efficiency retro-fitting projects.

APPENDIX A – MISSION TERMS OF REFERENCE

1. INTRODUCTION

This is the Terms of Reference (ToR) for the UNDP-GEF Midterm Review (MTR) of the full -sized project titled Promoting Energy Efficiency in Commercial Buildings (PEECB) in Thailand (PIMS#3937) implemented through the Department of Alternative Energy Development and Efficiency (DEDE), Ministry of Energy, Thailand, which is to be undertaken in 2015. The project started on the 14 November 2012 and is in its fourth year of implementation. In line with the UNDP-GEF Guidance on MTRs, this MTR process was initiated before the submission of the second Project Implementation Report (PIR). This ToR sets out the expectations for this MTR. The MTR process must follow the guidance outlined in the document Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects (Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects.).

2. PROJECT BACKGROUND INFORMATION

The PEECB project is a four-year (2012-2015) collaboration project implemented through the Department of Alternative Energy Development and Efficiency (DEDE) under Ministry of Energy, Thailand. The project was designed to promote and facilitate the widespread application of building energy efficiency technologies and practices in commercial buildings in Thailand. The realization of this objective will be facilitated through the removal of barriers to the uptake of building energy efficiency technologies, systems, and practices. The project is in line with the GEF-4 Strategic Program No. 1, which is on Promoting energy-efficient buildings and appliances (CC-SP1). It is comprised of activities aimed at improving energy efficiency and promoting the widespread adoption of energy efficient building technologies and practices in the Thai commercial building sector).

This project's objective and primary outcome is to strengthen national capacity to manage the environment in a sustainable manner while ensuring adequate protection of the poor. Also as a secondary outcome, the project aims to support capacity development for countries to ensure that environment and energy are taken into account in drawing up and implementing national policies, strategies and programs, also considering the inclusion of multilateral environmental agreements.

Additionally the project also targets some key outcomes that correspond with the country's plan (CP) as its implementation is expected to support the development of an efficient community network in sustainable use of local natural resources and energy with engagement in policy and decision-making processes. As well as increasing the capacity of the national focal points in addressing policy and removal of barriers in pursuing local sustainable management of environmental flow and renewable energy. Ultimately leading to a strengthened policymaking process based on evidenced-based knowledge management.

As for the Country Program Action Plan (CPAP) outputs, the implementation of the project is expected to increase capacity of national agencies to set policy priorities and remove barriers to pursuing sustainable management of biodiversity, renewable energy and water resources in response to national priorities and incompliance with international treaties. Supporting the process and the practice of developing Evidence-based data for barriers removal and policy decision making.

As for the Country Program Action Plan (CPAP) outputs, the implementation of the project is expected to increase capacity of national agencies to set policy priorities and remove barriers to pursuing sustainable management of biodiversity, renewable energy and water resources in response to national priorities and incompliance with international treaties. Supporting the process and the practice of developing Evidence-based data for barriers removal and policy decision making.

The total project budget is USD. 15,904,773. The allocated resources including the co-financing amount are as follows:-

- GEF USD. 3,637,273
- Government (cash and In-kind) USD. 6,500,000
- Private Sector (cash and In-kind) USD. 5,767,500

3. OBJECTIVES OF THE MTR

The MTR will assess progress towards the achievement of the project objectives and outcomes as specified in the Project Document, and assess early signs of project success or failure with the goal of identifying the necessary changes to be made in order to set the project on-track to achieve its intended results. The MTR will also review the project's strategy, its risks to sustainability.

4. MTR APPROACH & METHODOLOGY

The MTR must provide evidence based information that is credible, reliable and useful. The MTR team will review all relevant sources of information including documents prepared during the preparation phase (i.e. PIF, UNDP Initiation Plan, UNDP Environmental & Social Safeguard Policy, the Project Document, project reports including Annual Project Review/PIRs, project budget revisions, lesson learned reports, national strategic and legal documents, and any other materials that the team considers useful for this evidence-based review). The MTR team will review the baseline GEF focal area Tracking Tool submitted to the GEF at CEO endorsement, and the midterm GEF focal area Tracking Tool that must be completed before the MTR field mission begins.

The MTR team is expected to follow a collaborative and participatory approach [1] ensuring close engagement with the Project Team, government counterparts (the GEF Operational Focal Point), the UNDP Country Office(s), UNDP-GEF Regional Technical Advisers, and other key stakeholders.

Engagement of stakeholders is vital to a successful MTR.[2] Stakeholder involvement should include interviews with stakeholders who have project responsibilities, including but not limited to Department of Alternative Energy Development and Efficiency (DEDE), Ministry of Energy; executing agencies, senior officials and task team/component leaders, key experts and consultants in the subject area, Project Board, project stakeholders, academia, local government and CSOs, etc. Additionally, the MTR team is expected to conduct field missions to Bangkok, Thailand.

The final MTR report should describe the full MTR approach taken and the rationale for the approach making explicit the underlying assumptions, challenges, strengths and weaknesses about the methods and approach of the review.

[1] For ideas on innovative and participatory Monitoring and Evaluation strategies and techniques, see UNDP Discussion Paper: Innovations in Monitoring & Evaluating Results, 05 Nov 2013.

For more stakeholder engagement in the M&E process, see the UNDP Handbook on Planning, Monitoring and Evaluating for Development Results, Chapter 3, pg. 93.

5. DETAILED SCOPE OF THE MTR

The MTR team will assess the following four categories of project progress. See the *Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects* for extended descriptions.

i. Project Strategy

Project design:

- Review the problem addressed by the project and the underlying assumptions. Review the effect of any incorrect assumptions or changes to the context to achieving the project results as outlined in the Project Document.
- Review the relevance of the project strategy and assess whether it provides the most effective route towards expected/intended results. Were lessons from other relevant projects properly incorporated into the project design?
- Review how the project addresses country priorities. Review country ownership. Was the project concept in line with the national sector development priorities and plans of the country (or of participating countries in the case of multi-country projects)?
- Review decision-making processes: were perspectives of those who would be affected by project decisions, those who could affect the outcomes, and those who could contribute information or other resources to the process, taken into account during project design processes?
- Review the extent to which relevant gender issues were raised in the project design. See Annex 9 of
  Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects for further guidelines.
- If there are major areas of concern, recommend areas for improvement.

Results Framework/Logframe:

- Undertake a critical analysis of the project's logframe indicators and targets, assess how "SMART" the midterm and end-of-project targets are (Specific, Measurable, Attainable, Relevant, Time-bound), and suggest specific amendments/revisions to the targets and indicators as necessary.
- Are the project's objectives and outcomes or components clear, practical, and feasible within its time frame?
- Examine if progress so far has led to, or could in the future catalyse beneficial development effects (i.e. income generation, gender equality and women's empowerment, improved governance etc...) that should be included in the project results framework and monitored on an annual basis.
- Ensure broader development and gender aspects of the project are being monitored effectively. Develop and recommend SMART 'development' indicators, including sex-disaggregated indicators and indicators that capture development benefits.

ii. Progress Towards Results

Progress Towards Outcomes Analysis:

Review the logframe indicators against progress made towards the end-of-project targets using the Progress Towards Results Matrix and following the *Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects*; colour code progress in a "traffic light system" based on the level of progress achieved; assign a rating on progress for each outcome; make recommendations from the areas marked as "Not on target to be achieved" (red).

Table. Progress Towards Results Matrix (Achievement of outcomes against End-of-project Targets)

Project Strategy	Indicator[3]	Baseline Level[4]	Level in 1st PIR (self-reported)	Midterm Target[5]	End-of-project Target	Midterm Level & Assessment[6]	Achievement Rating[7]
Objective:	Indicator (if applicable):						
Outcome 1:	Indicator 1:						
Etc.							

Indicator Assessment Key

Green= Achieved	Yellow= On target to be achieved	Red= Not on target to be achieved

In addition to the progress towards outcomes analysis:

- Compare and analyse the GEF Tracking Tool at the Baseline with the one completed right before the Midterm Review.
- Identify remaining barriers to achieving the project objective in the remainder of the project.
- By reviewing the aspects of the project that have already been successful, identify ways in which the project can further expand these benefits.

iii. Project Implementation and Adaptive Management

Management Arrangements:

- Review overall effectiveness of project management as outlined in the Project Document. Have changes been made and are they effective? Are responsibilities and reporting lines clear? Is decision-making transparent and undertaken in a timely manner? Recommend areas for improvement.
- Review the quality of execution of the Executing Agency/Implementing Partner(s) and recommend areas for improvement.
- Review the quality of support provided by the GEF Partner Agency (UNDP) and recommend areas for improvement.

Work Planning:

- Review any delays in project start-up and implementation, identify the causes and examine if they have been resolved.
- Are work-planning processes results-based? If not, suggest ways to re-orientate work planning to focus on results?
- Examine the use of the project's results framework/ logframe as a management tool and review any changes made to it since project start.

Finance and co-finance:

- Consider the financial management of the project, with specific reference to the cost-effectiveness of interventions.
- Review the changes to fund allocations as a result of budget revisions and assess the appropriateness and relevance of such revisions.
- Does the project have the appropriate financial controls, including reporting and planning, that allow management to make informed decisions regarding the budget and allow for timely flow of funds?

[3] Populate with data from the Logframe and scorecards
[4] Populate with data from the Project Document
[5] If available
[6] Colour code this column only
Use the 6 point Progress Towards Results Rating Scale: HS, S, MS, MU, U, HU

- Informed by the co-financing monitoring table to be filled out, provide commentary on co-financing: is co-financing being used strategically to help the objectives of the project? Is the Project Team meeting with all co-financing partners regularly in order to align financing priorities and annual work plans?

Project-level Monitoring and Evaluation Systems:

- Review the monitoring tools currently being used: Do they provide the necessary information? Do they involve key partners? Are they aligned or mainstreamed with national systems? Do they use existing information? Are they efficient? Are they cost-effective? Are additional tools required? How could they be made more participatory and inclusive?
- Examine the financial management of the project monitoring and evaluation budget. Are sufficient resources being allocated to monitoring and evaluation? Are these resources being allocated effectively?

Stakeholder Engagement:

- Project management: Has the project developed and leveraged the necessary and appropriate partnerships with direct and tangential stakeholders?
- Participation and country-driven processes: Do local and national government stakeholders support the objectives of the project? Do they continue to have an active role in project decision-making that supports efficient and effective project implementation?
- Participation and public awareness: To what extent has stakeholder involvement and public awareness contributed to the progress towards achievement of project objectives?

Reporting:

- Assess how adaptive management changes have been reported by the project management and shared with the Project Board.
- Assess how well the Project Team and partners undertake and fulfil GEF reporting requirements (i.e. how have they addressed poorly-rated PIRs, if applicable?)
- Assess how lessons derived from the adaptive management process have been documented, shared with key partners and internalized by partners.

Communications:

- Review internal project communication with stakeholders: Is communication regular and effective? Are there key stakeholders left out of communication? Are there feedback mechanisms when communication is received? Does this communication with stakeholders contribute to their awareness of project outcomes and activities and investment in the sustainability of project results?
- Review external project communication: Are proper means of communication established or being established to express the project progress and intended impact to the public (is there a web presence, for example? Or did the project implement appropriate outreach and public awareness campaigns?)
- For reporting purposes, write one half-page paragraph that summarizes the project's progress towards results in terms of contribution to sustainable development benefits, as well as global environmental benefits.

iv. Sustainability

- Validate whether the risks identified in the Project Document, Annual Project Review/PIRs and the ATLAS Risk Management Module are the most important and whether the risk ratings applied are appropriate and up to date. If not, explain why.
- In addition, assess the following risks to sustainability:

Financial risks to sustainability:

What is the likelihood of financial and economic resources not being available once the GEF assistance ends (consider potential resources can be from multiple sources, such as the public and private sectors, income generating activities, and other funding that will be adequate financial resources for sustaining project's outcomes)?

Socio-economic risks to sustainability:

- Are there any social or political risks that may jeopardize sustainability of project outcomes? What is the risk that the level of stakeholder ownership (including ownership by governments and other key stakeholders) will be insufficient to allow for the project outcomes/benefits to be sustained? Do the various key stakeholders see that it is in their interest that the project benefits continue to flow? Is there sufficient public / stakeholder awareness in support of the long term objectives of the project? Are lessons learned being documented by the Project Team on a continual basis and shared/ transferred to appropriate parties who could learn from the project and potentially replicate and/or scale it in the future?

Institutional Framework and Governance risks to sustainability:

- Do the legal frameworks, policies, governance structures and processes pose risks that may jeopardize sustenance of project benefits? While assessing this parameter, also consider if the required systems/ mechanisms for accountability, transparency, and technical knowledge transfer are in place.

Environmental risks to sustainability:

- Are there any environmental risks that may jeopardize sustenance of project outcomes?

Conclusions & Recommendations

The MTR team will include a section of the report setting out the MTR's evidence-based conclusions, in light of the findings.[8]

Recommendations should be succinct suggestions for critical intervention that are specific, measurable, achievable, and relevant. A recommendation table should be put in the report's executive summary. See the *Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects* for guidance on a recommendation table.

The MTR team should make no more than 15 recommendations total.

Ratings

The MTR team will include its ratings of the project's results and brief descriptions of the associated achievements in a *MTR Ratings & Achievement Summary Table* in the Executive Summary of the MTR report. See Annex E for ratings scales. No rating on Project Strategy and no overall project rating is required.

Table. MTR Ratings & Achievement Summary Table for *Promoting Energy Efficiency in Commercial Buildings (PEECB) in Thailand*

Measure	MTR Rating	Achievement Description
Project Strategy	N/A	
Progress Towards Results	Objective Achievement Rating: (rate 6 pt. scale)	
	Outcome 1 Achievement Rating: (rate 6 pt. scale)	
	Outcome 2 Achievement Rating: (rate 6 pt. scale)	
	Outcome 3 Achievement Rating: (rate 6 pt. scale)	
	Etc.	
Project Implementation & Adaptive Management	(rate 6 pt. scale)	
Sustainability	(rate 4 pt. scale)	

APPENDIX B – EVALUATIVE CRITERIA

Ratings for Progress Towards Results: (one rating for each outcome and for the objective)		
6	Highly Satisfactory (HS)	The objective/outcome is expected to achieve or exceed all its end-of-project targets, without major shortcomings. The progress towards the objective/outcome can be presented as "good practice".
5	Satisfactory (S)	The objective/outcome is expected to achieve most of its end-of-project targets, with only minor shortcomings.
4	Moderately Satisfactory (MS)	The objective/outcome is expected to achieve most of its end-of-project targets but with significant shortcomings.
3	Moderately Unsatisfactory (HU)	The objective/outcome is expected to achieve its end-of-project targets with major shortcomings.
2	Unsatisfactory (U)	The objective/outcome is expected not to achieve most of its end-of-project targets.
1	Highly Unsatisfactory (HU)	The objective/outcome has failed to achieve its midterm targets, and is not expected to achieve any of its end-of-project targets.

Ratings for Project Implementation & Adaptive Management: (one overall rating)		
6	Highly Satisfactory (HS)	Implementation of all seven components – management arrangements, work planning, finance and co-finance, project-level monitoring and evaluation systems, stakeholder engagement, reporting, and communications – is leading to efficient and effective project implementation and adaptive management. The project can be presented as "good practice".
5	Satisfactory (S)	Implementation of most of the seven components is leading to efficient and effective project implementation and adaptive management except for only few that are subject to remedial action.
4	Moderately Satisfactory (MS)	Implementation of some of the seven components is leading to efficient and effective project implementation and adaptive management, with some components requiring remedial action.
3	Moderately Unsatisfactory (MU)	Implementation of some of the seven components is not leading to efficient and effective project implementation and adaptive, with most components requiring remedial action.
2	Unsatisfactory (U)	Implementation of most of the seven components is not leading to efficient and effective project implementation and adaptive management.
1	Highly Unsatisfactory (HU)	Implementation of none of the seven components is leading to efficient and effective project implementation and adaptive management.

Ratings for Sustainability: (one overall rating)		
4	Likely (L)	Negligible risks to sustainability, with key outcomes on track to be achieved by the project's closure and expected to continue into the foreseeable future
3	Moderately Likely (ML)	Moderate risks, but expectations that at least some outcomes will be sustained due to the progress towards results on outcomes at the Midterm Review
2	Moderately Unlikely (MU)	Significant risk that key outcomes will not carry on after project closure, although some outputs and activities should carry on
1	Unlikely (U)	Severe risks that project outcomes as well as key outputs will not be sustained

APPENDIX C – MISSION ITINERARY (FOR JULY 6-13, 2015)

The mid-term review mission was conducted by Mr. Sandeep Tandon, (International Consultant) and Mr. Tien-ake Tiyapongpattana (National Consultant) in accordance with the objectives of the midterm review and obtained data relevant for making judgments regarding Project success and lessons learned.

Bangkok Thailand		
Day Date	**1st Half of the day**	**2nd Half of the day**
	Person(s) to meet, Address and Contact details	Person(s) to meet, Address and Contact details
Sunday 5 July	**Arrival in Bangkok**	
Monday 6 July	Briefing meeting with UNDP at Country Office, UN Building Rajdamnern Nok Avenue, Bangkok	Team meeting among evaluators for details preparation of the mission
Tuesday 7 July	Meeting with PMU team/ Meeting with Lead/Component Consultants *:* *1. BRIGHT Management Company Co. ,Ltd;* *2. Engineering Solution Provider Co. Ltd*	Field visit to demonstration site *CP-Tower 2 and Grand Mercure Fortune Hotel*
Wednesday 8 July	Meeting with Thailand Greenhouse Gas Management Organization (TGO), at Government Complex, Commemorating His Majesty, Chaeng Watatna Road, Laksi, Bangkok	Field visit to demonstration site *Kasikorn Bank Head office, Ratburana Building, 1 Soi Rat Burana 27/1, Rat Burana Road, Rat Burana, Bangkok*
Thursday 9 July	Meeting with NPD, NPC and Project Manager and Department of Alternative Energy Development and Efficiency, (DEDE), Ministry of Energy National Project Director : PEECB, Energy Conservation Expert, DEDE - Mrs. Amaraporn Achavangkool PEECB Project Committee, DEDE - Representative from Bureau of Energy Regulation and Conservation - Representative from Bureau of Energy Efficiency Promotion - Representative from Bureau of Energy Human Resource Development Project Consultant; BMC and ENSOP	Field visit demonstration site at *Aikchol Hospital*, 68/3 Moo 2, Prayasatija Road, Chonburi
Friday 10 July	Meeting at the Department of City Planning, Bangkok Metropolitan Administrator (BMA), 44 Vibhavadi Rangsit Road, Din Daeng, Bangkok ,	Field visit to demonstration site *Saint Gabriel's College*, and Meeting at Office of Natural Resources and Environment Policy and Planning (ONEP), 60/1 Soi Phibul Wattana 7, Rama 6 Road, Sanseanai, Phayathai, Bangkok
Saturday 11 July	Compilation of inputs gathered by MTR team	

Sunday 12 July	Review of project progress and preparation of de-briefing presentation by MTR team	
Monday 13 July	Skype meeting with International Energy Efficiency Consultants (based in Japan); Debriefing Presentation preparation	**Debriefing at DEDE to NPD and DEDE officials, PMU, UNDP Programme Manager and GEF RTA** Evening: MTR Consultant depart

APPENDIX D – LIST OF PERSONS INTERVIEWED AND DOCUMENTS REVIEWED

This is a listing of persons contacted in Bangkok (unless otherwise noted) during the midterm review period for the MTR only. The midterm review team regrets any omissions to this list.

DEDE	1. Mrs Amaraporn Achavangkul, Energy Conservation Expert (National Project Director), Department of Alternative Energy Development and Efficiency, Ministry of Energy
	2. Dr. Pongpan Vorasayan, Engineer
	3. Mr. Borwornpong Sunipasa, Engineer
	4. Mr. Suttichat Saengsuwan, Engineer
	5. Mr. Prakob Eamsa-ard, Engineer
UNDP	6. Ms Sutharin Koonphol, Programme Specialist – Team Leader Inclusive Green Growth and Sustainable Development
	7. Ms Rakshya Thapa, GEF- Regional Technical Adviser
	8. Ms Kwanruen Programme Analyst, Inclusive Green Growth and Sustainable Development
	9. Mr Meshal Abdullah, Programme Analyst, Inclusive Green Growth and Sustainable Development
BMC	10. Mr Kamol Tanpipat, Assistant Managing Director, (National Project Manager), Bright Management Consulting Company Ltd
	11. Mr Prakob Surawattananwan, Associate Dean for Academic Service and International Affairs, Faculty of Engineering, Kasetsart University
	12. Ms. Charoensri Huadmai, Project Administrative
	13. Mr. Pongpan Watcharawisit, EE specialist
	14. Ms. Boonjira Janangkakan,
	15. Dr. Shinji Yamamura, International Energy Efficiency Expert, NSRI, Japan *(Skype meeting)*
	16. Mr. Naoki TAkahashi, International Energy Efficiency Expert, NSRI, Japan *(Skype meeting)*
ENSOP	17. Mr Phongkarn Piamsuttitam, Managing Director, Engineering Solution Provider Company Limited
	18. Dr Jirachote Daosukho, Project Manager
	19. Mr. Grichawatch Techavanich, Engineer
	20. Mr. Kan Thampanichvong, Engineer
TGO Thailand	21. Dr. Jakkanit Kananurak, Director, Capacity Building and Outreach Office, Greenhouse Gas Management Organization
BMA	22. Mr. Asa Thongthammachart, Urban Planner Senior Professional Level, Chief of Western Area Development Planning Section, Urban Development Planning Division, City Planning Department, Bangkok Metropolitan Administration
	23. Ms. Thipawan Saenchan, Urban Planner, City Planning Department
	24. Ms. Piyanuch Siri, Urban Planner, City Planning Department
CP Land	25. Mr Sal Mulasastra, Vice President Facilities Management
	26. Mr. Viwat Iewsomjit, Senior Manager, Property Management Department

	27. Mr. Chatchanan Chotirat, Engineer Energy Saving and Auditing
Grand Mercure Fortune Hotel	28. Mr. Tadchai Tanyarak, Senior Engineer
Aikchol Hospital Public Company Limited	29. Ms Phortchana Manoch, Chairman of Executive Board,
	30. Mr Siriphot Manoch, Chief Brand Officer
	31. Mr. Thongchai Dermda, Chief of Maintenance Center
Kasikorn Bank	32. Mr. Komon Na Ratchasima, Engineering Management Technician
	33. Mr. Kasem Chomchue, Engineer
Saint Gabriel's College	34. Brother Assoc.Prof.Dr. Vinai Viriyavidhayavongs, Director
	35. Mr. Saman Ngamsa-ard, Vice Head of General Administrative Affairs
	36. Brother Apisit
ONEP	37. Dr. Natthanich Asvapooskul, Chief of Climate Mechanism Analysis and Development
	38. Ms. Da-res Kaewket, Environment Officer
	39. Ms. Thippawan Photiwut, Environment Officer

Documents Reviewed for this MTR includes:

1) Project Document
2) PIF
3) Project Inception workshop report
4) Combined Delivery Reports
5) UNDP reports
    a. AWPs (we have not received them(
    b. Project Implementation Reports
6) Quarterly progress reports of BMC and ENSOP
7) Presentation material provided by BMC and ENSOP
8) Reports of Nikken Sekkei Research Institute – International EE Consultants
9) Project Board minutes of meeting
10) Thailand 20-year Energy Efficiency Development Plan (2011-2030)

APPENDIX E – GHG TRACKING TOOL

Tracking Tool for Climate Change Mitigation Projects (For Mid-term Evaluation)

Special Notes: reporting on lifetime emissions avoided

Lifetime direct GHG emissions avoided: Lifetime direct GHG emissions avoided are the emissions reductions attributable to the investments made **until the mid-term evaluation**, totaled over the respective lifetime of the investments.
Please refer to the Manual for Calculating GHG Benefits of GEF Projects.

Manual for Energy Efficiency and Renewable Energy Projects
Manual for Transportation Projects

For LULUCF projects, the definition of "lifetime direct" applies. Lifetime length is defined to be 20 years, unless a different number of years is deemed appropriate. For emission or removal factors (tonnes of CO2eq per hectare per year), use IPCC defaults or country specific factors.

General Data	Results at Mid-term Evaluation	Notes
Project Title	Promoting Energy Efficiency in Commercial Buildings (PEECB) in Thailand	
GEF ID	4165	
Agency Project ID	3937	
Country	Thailand	
Region	EAP	
GEF Agency	UNDP	
Date of Council/CEO Approval	March 17, 2010	Month DD, YYYY (e.g., May 12, 2010)
GEF Grant (US$)	3,637,273	
Date of submission of the tracking tool	September 11, 2015	Month DD, YYYY (e.g., May 12, 2010)
Is the project consistent with the priorities identified in National Communications, Technology Needs Assessment, or other Enabling Activities under the UNFCCC?	1	Yes = 1, No = 0
Is the project linked to carbon finance?	0	Yes = 1, No = 0
Cumulative cofinancing realized (US$)	462747	
Cumulative additional resources mobilized (US$)	-	additional resources means beyond the cofinancing committed at CEO endorsement
Objective 2: Energy Efficiency		
Please specify if the project targets any of the following areas		
Lighting	1	Yes = 1, No = 0
Appliances (white goods)	0	Yes = 1, No = 0
Equipment	1	Yes = 1, No = 0
Cook stoves	0	Yes = 1, No = 0
Existing building	1	Yes = 1, No = 0
New building	1	Yes = 1, No = 0
Industrial processes	0	Yes = 1, No = 0
Synergy with phase-out of ozone depleting substances	0	Yes = 1, No = 0
Other (please specify)	0	
Policy and regulatory framework	4	0: not an objective/component 1: no policy/regulation/strategy in place 2: policy/regulation/strategy discussed and proposed 3: policy/regulation/strategy proposed but not adopted 4: policy/regulation/strategy adopted but not enforced 5: policy/regulation/strategy enforced
Establishment of financial facilities (e.g., credit lines, risk guarantees, revolving funds)	3	0: not an objective/component 1: no facility in place 2: facilities discussed and proposed 3: facilities proposed but not operationalized/funded 4: facilities operationalized/funded but have no demand 5: facilities operationalized/funded and have sufficient demand
Capacity building	2	0: not an objective/component 1: no capacity built 2: information disseminated/awareness raised 3: training delivered 4: institutional/human capacity strengthened 5: institutional/human capacity utilized and sustained
Lifetime energy saved		MJ (Million Joule, IEA unit converter: http://www.iea.org/stats/unit.asp) Fuel savings should be converted to energy savings by using the net calorific value of the specific fuel. End-use electricity savings should be converted to energy savings by using the conversion factor for the specific supply and distribution system. These energy savings are then totaled over the respective lifetime of the investments.
Lifetime direct GHG emissions avoided		tonnes CO2eq (see Special Notes above)

APPENDIX F – PROJECT PLANNING MATRIX

Suggested changes are marked in red font

Strategy	Success Indicator	Baseline	Target	Midterm Level & Assess-ment[14]	Achievement Rating	Justification for Rating
GOAL: Reduced intensity of GHG emissions from the commercial building sector	• Cumulative CO_2 emission reduction from the commercial building sector by End-Of-Project (EOP, Year 2015), kton CO_2eq	0	230	0	MU	Thus far32 projects out of 12 demo have invested in implementing energy efficiency measures
	• % reduction in GHG emissions from the commercial buildings sector by EOP	0	1.2%	0	MU	This is same as the previous indicator. Therefore its removal suggested
OBJECTIVE: Promotion and facilitation of the widespread application of building energy efficiency technologies and practices in commercial buildings in Thailand	• Cumulative energy savings from the commercial building sector by Year 2015, GWh	0	396	0	MU	Two private players in 2015 have invested in EE implementation
	• % Energy savings by EOP	0	1.2%	0		This is same as the previous indicator.
	• % of new buildings that are fully compliant with the new Building Energy Code by EOP	20%	60%	0		A BEC compliant building may not be built by EOP;
	• % of new buildings in Thailand that are classified as energy efficient buildings by EOP	10%	40%	0		Clear definition of 'new building' is required
COMPONENT 1: Awareness Enhancement on Building EE Technologies and Practices						
OUTCOME 1: Enhanced awareness of the government, building sector and banks on EE	• % of overall commercial building stakeholders that agree to greater availability of pertinent information on EE technologies and practices through the PEECB project activities by Year 2015	0	80% (at least)	0		This should be measured annually in numbers (integers) instead of % for ease of reporting

Strategy	Success Indicator	Baseline	Target	Midterm Level & Assess-ment[14]	Achievement Rating	Justification for Rating
technologies and practices	• % of overall commercial building stakeholders that are satisfied with availability and quality of information available from the PEECB project by Year 2015	0	70% (at least)	0		For % reporting, a target should be defined for information dissemination among different stakeholders.
OUTPUT 1.1: Establishment of the Commercial Building EE Information Centre (CBEEC)	• % of overall commercial building stakeholders that are satisfied with availability and quality of PEECB information services by Year 2015	0	70% (at least)	0		For % reporting, a target should be defined for information sharing.
OUTPUT 1.2: A system of information exchange and dissemination on EE technologies and practices for commercial building stakeholders	• % of overall commercial building stakeholders that agree to greater availability of pertinent information on EE technologies and practices through CBEEC as well as promotional and outreach activities by Year 2015	0	80% (at least)	0		For % reporting, a target should be defined for information sharing.
	• No. of users of the information exchange system by EOP	0	1,500	220	MS	3 focus Group Discussions and 2 seminars held with aggregate 220 participants
	• No. of satisfied users of the information exchange system each year Starting Year 2012	0	70% (at least)	0	U	For % reporting, a target should be defined for information sharing.
OUTPUT 1.3: Developed and Promoted Energy Use Simulation Models for Commercial Building Design	• No. of modified BESMs with additional features (e.g. dual language user interface) by Year 2013	0	1	0	MS	The model is under preparation and expected to launch trial version by Oct 2015
	• % of overall no. of trainees that are gainfully employing learned skills on EE building design by Year 2015	0	70% (at least)	3	MS	For % reporting, a target should be defined for information sharing.
	• No. of new buildings that were designed using the modified BESMs by EOP	0	60	2	U	BESM is yet to be launched

Strategy	Success Indicator	Baseline	Target	Midterm Level & Assess-ment[14]	Achievement Rating	Justification for Rating
OUTPUT 1.4: Completed training courses on EE technologies and practices, and financial arrangement for commercial buildings	• No. of completed training courses on EE technologies and practices, and financial arrangement for commercial buildings by EOP	0	7	2	MS	The training modules have been developed and training program will begin in Sept. 2015
	• % of overall no. of trainees that are gainfully employing learned skills on EE building design, operation and maintenance by Year 2015	0	70% (at least)	2		For % reporting, a target should be defined for information sharing.
	• % of trainees that are engaged in EE building project design, implementation and financing by EOP	0	50%	2		For % reporting, a target should be defined for information sharing.
OUTPUT 1.5: Completed training courses on financial assessment of EE application projects in commercial buildings	• No. of completed training courses on financial assessment of EE application projects in commercial buildings by EOP	0	7	0	MS	Training modules are under preparation and will be ready for trial in October 2015
OUTPUT 1.6: Established business linkages between suppliers of EE technologies, building owners, banks and building practitioners	• No. of EE investment projects facilitated through business links by EOP	0	20	0	U	Business links are yet to be established by the project
	• No. of banks/FIs that have financed EE investment projects through the business links by EOP	0	5	0	U	This is linked with the release of funding for building EE by RTG
COMPONENT 2: EE Building Policy Frameworks						
OUTCOME 2: Effective implementation of favourable policies that encourage EE technologies and practices for commercial building in Thailand	• No. of new policy measures for commercial building EE approved and implemented by Year 2015	0	2	4	MS	Disclosure policy issued for pilot testing
	• No. of fiscal policies approved by DEDE for implementation by Year 2013	0	1	4	MS	Preparation of step BEC is in progress
	• No. of short and long term action plans for commercial building EE integrated into DEDE's national Energy Conservation Program by EOP	0	1	0	U	This indicator is redundant as it is about the plan and not implementation
OUTPUT 2.1: Updated and More Effective Policy Measures on Energy	• No. of new policy measures for commercial building EE approved and implemented by Year 2015	0	2	4	MS	Building disclosure policy issued and

Strategy	Success Indicator	Baseline	Target	Midterm Level & Assess-ment[14]	Achievement Rating	Justification for Rating
Efficiency in Commercial Buildings	• No. of existing policy measures for commercial building EE modified and implemented by Year 2015	0	2	4	MS	Step BEC is under preparation
	• No. of recommendations on improved and innovative implementation approaches for EE rating / labelling / certification for commercial buildings in Thailand by 2013	0	2	3	MS	Building labelling scheme is under review
OUTPUT 2.2: Revised and Up-to-date Data and Information to Facilitate Policy Implementation of Commercial Building EE	• % of overall commercial building stakeholders that are satisfied with availability and quality of the energy performance database by Year 2015	0	70% (at least)	0	U	For % reporting, a target should be defined for information sharing.
	• No. of building energy use profiles established by Year **2015** ~~2014~~	0	4	3	MS	SEC normalization under preparation
	• No. of commercial building EE project referencing the improved M&V schemes by EOP	0	20	3	MS	M & V under preparation
OUTPUT 2.3: Approved and Implemented New and Improved Financing Models for Commercial Buildings	• No. of applicable fiscal policies on commercial building EE identified and formulated by Year 2012	0	3	0	U	Target year needs to be changed
	• No. of fiscal policies approved by DEDE for implementation by Year 2013	0	1	1	MS	Step BEC policy to promote fiscal incentive is under preparation
	• No. of the approved policies that are implemented by EOP	0	1	1	MS	The 'disclosure policy' is being pilot tested and step BEC and procurement policies are under preparation
OUTPUT 2.4: Approved energy efficient promotion action plan (short and long term) to supplement DEDE activities	• No. of short and long term action plans for commercial building EE integrated into DEDE's national EE policy by EOP	0	1	0	U	There is no progress on this specific activity.
	• No. of activities in the action plan that were considered for inclusion in the National Energy Conservation Program by EOP	0	5	0	U	There is no progress on this specific activity.
	• No. of activities in the approved action plan incorporated in the National Energy Conservation Program that were implemented by EOP	0	2	0	U	There is no progress on this specific activity.
COMPONENT 3: EE Building Technologies and Applications Demonstrations						
OUTCOME 3.1: Improved confidence in applying EE	• No. of commercial building owners / managers expressing interests and commitments in implementing EE investments by EOP	10	40	12	HS	12 commercial building owners have given commitment

Strategy	Success Indicator	Baseline	Target	Midterm Level & Assess-ment[14]	Achievement Rating	Justification for Rating
technologies and practices in commercial buildings in Thailand	• No. of building EE projects that adopted EE measures and designs being demonstrated and promoted by EOP	5	10	3	MS	3 private builders have implemented EE; other 9 are awaiting feasibility report and ENCON funding from RTG
OUTPUT 3.1.1: Installed and operational demonstration projects in selected buildings	• No. of demonstration project implemented and regularly monitored starting Year 2012	0	7	2	MS	Two projects on building EE partially implemented
	• No of completed M&V exercises in accordance with the M&V guideline updated by the PEECB Project	0	7	1	MS	Guideline is under preparation
OUTCOME 3.2: Improved local technical and managerial capacity to design, manage maintain EE technologies and practices	• % of overall no. of demo building personnel that are gainfully employing learned skills on EE building design, operation and maintenance by Year 2015	0	70% (at least)	0	U	For % reporting, a target should be defined for information sharing.
	• No. of new buildings constructed that are partly or entirely based on the information regarding success of the demonstrations by EOP	0	20	0	U	There is no progress on this specific activity.
OUTPUT 3.2.1: Documentation of the demonstration projects and available EE technologies in the markets and dissemination of demo project results	• % of overall no. of building practitioners that are aware of EE technologies/techniques available and applied in demo projects by Year 2015	0	70% (at least)	0	U	For % reporting, a target should be defined for information sharing.

Strategy	Success Indicator	Baseline	Target	Midterm Level & Assess-ment[14]	Achievement Rating	Justification for Rating
OUTPUT 3.2.2: Completed training courses for personnel attached to the demo project	• % of overall no. of demo building personnel that are gainfully employing learned skills on EE building design, operation and maintenance by Year 2015	0	70% (at least)	0	U	This output is redundant due to the comprehensive training courses being developed under output 1.4 and existing Operations and Maintenance training courses by DEDE's Bureau of Human Resource Development
OUTCOME 3.3: Replication of demonstration projects within the commercial building sector	• No. of new EE building projects designed based on, or influenced by, the results of the demonstration projects by EOP	0	20	2	U	Revision of EOP target suggested
OUTPUT 3.3.1: Completed project documents/ recommendations for EE project replication in the commercial building sector	• No. of identified proven and feasible EE technologies and techniques that are applicable and applied in the Thai commercial building sector by EOP	0	5	3	MS	Some technologies have been applied in the 3 demo projects for implementation with own funds

APPENDIX G – EVALUATION QUESTIONS MATRIX

Evaluative Criteria	Questions	Indicators	Sources[36]	Methodology[37]
Relevance: How does the project relate to the main objectives of the GEF focal area, and to the environment and development priorities at the local, Regional and national levels?				
Is the project relevant to National priorities and commitment under international conventions? *Yes, the project is relevant for the existing as well as growing building sector of Thailand.*	• Is the project country-driven? *Yes, the project activities aligns with the objective of 10-year Energy Efficiency plan of Thailand, which aims to improve the energy performance index of existing and new buildings*	Regular project review by DEDE	Key stakeholders	Interviews and document review
	Does the project adequately take into account the national realities, both in terms of institutional and policy framework in its design and implementation? *Capacity building efforts, policy preparation and demonstration activities being carried out by PEECB are supporting governments plan to improve energy efficiency in building sector.*	Meeting with project partners, visits to demo project locations	Information shared by program partners, Project management unit	Interviews and document review
	• How effective is the project in terms of supporting and facilitating the buildings industry in moving towards low carbon pathways through sustainable practices? *The Project has been effective in engaging owners and operators of commercial buildings to pay attention towards energy efficiency and make investments in energy efficient technologies to reduce energy consumption. The project is currently developing training materials and building energy simulation model to help improve the knowledge and decision making of government agencies, building sector professionals.*	Project progress reports, discussions with project partners	Information shared by program partners, Project management unit	, Interviews and document review
• Is the project internally coherent in its design? *The overall design of the project is fine, with few ambitious targets, which will pose challenge to the project*	• Are there logical linkages between expected results of the project (Project Planning Matrix) and the project design (in terms of project components, choice of partners, Structure, delivery mechanism, scope, budget, use of resources? *There are logical linkages between targets of the various outputs and outcomes of project components. There are couple of indicators which are ambiguous and not easy to measure. The project partners are both government and owners of large commercial spaces, however its linkage with various industry association appears to be weak.*	Prodoc and project progress reports		
	• Is the length of the project (project timeline) sufficient to achieve project outcomes? *The four and half year project timeline appears to be adequate to achieve the project outputs and most of the outcomes of these components.*	Project progress reports, discussions with project partners	Discussions with Programme officer, RTA, PMU	Interviews and document review

Effectiveness: The extent to which an objective has been achieved or how likely it is to be achieved?				
Does the project been effective in achieving the expected outcomes and objectives? *The project is making progress towards achieving the output indicators, however, the overall effectiveness is limited as activities on awareness raising are under preparation*	• Whether the performance measurement indicators and targets used in the project monitoring system are accomplished and able to achieve desired project outputs by mid-term? *With the exception of 1 output, most of the project outputs are lagging behind the mid-term target, however with focused attention and progress of various project activities, a number of outputs can be achieved by EOP.* Given the level of achievement of outputs and related inputs and activities to date, is the Project likely to achieve its goal and objective? *The project requires focused attention of PMU and DEDE in monitoring of the project progress by output and outcome, to keep the project on track to achieve goal*	Project progress reports and discussions	Information shared by program partners, Project management unit	Interviews and document review
• How is risk and risk mitigation being managed?	• How well are risks, assumptions and impact drivers being managed? *The action taken by PMU satisfactorily dealt with the risks during project implementation phase. Periodic review of the project risk is suggested to record the actions taken towards managing the risk, since the sustainability of the project and impact of its activities.*	Review of Project Planning Matrix	Project document and progress reports	Document review
	If the project progress is not good, what changes could have been made (if any) to the project design in order to improve the achievement of the project's expected results during rest of the project implementation period. • *The setting of indicators requires a thorough review to ensure these are SMART and their monitoring and report is easy*	Review of Project Planning Matrix	Project document and progress reports	Document review
Efficiency: Was the project implemented efficiently, in-line with international and national norms and standards and delivered results with the least Costly resources possible?				
• Was project support provided in an efficient way? Yes	• How does the project management systems, including progress reporting, administrative and financial systems and monitoring and evaluation system were operating as effective management tools aid in effective implementation and provide sufficient basis for evaluating performance and decision making? *Although progress reporting is being done on a quarterly basis, the progress is reported in percentage basis in place of output. This does not convey clear information on progress of various outputs and outcome towards the targets*	Review of project planning matrix	Progress reports, and meeting with project stakeholders	Interviews and document review
	• Is the project practicing adaptive management? If so, how effective was the adaptive management practiced under the project and lessons learnt? *The project had to adapt to the changed situation created by the withdrawal of two stakeholders who were interested in working with the project on demonstration of energy saving in the commercial buildings. As a result, the project had to devote extra efforts to find new partners and ensure the relevance of the outputs and project outcome.*	Project progress	Progress reports and visits to demonstration site	Interview and document review

	• Are the project management arrangements adequate and appropriate? How effectively is the project managed at all levels? *The overall management of the project is adequate however certain components requires more time and attention to ensure the development work is complete and starts delivering results. Project management should be oriented towards achieving the project targets, specified in the project planning matrix and not be driven by the objective of completing activities*	PIR and Project Planning Matrix	Progress reports and interaction with PMU	Document review and interviews
	• Details of co-funding provided and its impact on the activities (Refer to Table in section 6. Project Finance / Co-Finance*). Refer details in section 3.1.7 and tables 2 and 3* • Is the committed co-financing being materialized? If not, what are the problems encountered in using or accessing the committed co-financing? *Refer discussion in section 3.1.*7			Document review
	• How does the APR/PIR process has been helping to monitor and evaluate the project implementation and achievement of results? *Project Outcomes were reviewed and updated by PIU and UNDP CO during annual reporting the GEF regional office. The PIRs helped in keeping the project on track, result-oriented*.			
• How efficient are partnership arrangements for the project?	• Appropriateness of the institutional arrangement and whether there was adequate commitment to the project? *The institutional partnership of the project include several government department, agencies academic institution and commercial building owners and operators.* *The project need to increase interaction with the stakeholders and increase participation of other associations operating in the building sector to obtain greater leverage for the achievements of the project*			
Sustainability: To what extent are there financial, institutional, social-economic, and/or environmental risks to sustaining long-term project results?				
Will the project be sustainable on its conclusion and stimulate replications and its potential	Comment on the Sustainability of the project in view of the resources committed by the UNDP-GEF in the long term. *The resources (time and funds) provided by UNDP-GEF appears to be adequate to generate progress and develop momentum which can be sustained by other key stakeholders including the Royal Thai Government*	Project progress	Progress review and stakeholder interaction	Interviews and document review

	Commitment of the project sustainability subsequent to the conclusion of the project. *The project activities need to be accelerated so that various outputs and outcomes are achieved, which can be used to generate greater interest of various stakeholders in the building sector. In addition, the project need to have greater interaction with various association and other relevant stakeholder such as Thai Green Building Institute. The Project Board need to discuss the arrangement to be made in the coming months and steps required to make the project sustainable.*	Project progress	Progress review and stakeholder interaction	Interview and document review
Impact: Are there indications that the project has contributed to, or enabled progress towards maximizing environmental benefits?				
What was the project impact under different components? *Limited, since many of the project activities are still in development or preparatory stage.*	• Progress towards achievement of results of the 3 components is as follows: **COMPONENT 1: Awareness Enhancement on Building EE Technologies and Practices:……** -Commercial Building EE Center: Being develop as a virtual centre -Systematic information dissemination: Project website developed but without contents; few workshops and FGD held -Building Energy Simulation model is in development -Training courses: some curriculums developed/integrated into HRD training program of DEDE; systematic report of training results is needed -Newsletter started in 2015 & 2 Annual Seminar done **COMPONENT 2: EE Building Policy Frameworks…….** . Policy measures on EECB – under development Up-to-date data and information to facilitate policy – under development Improved fiscal policies and financing schemes – yet to be developed Energy Efficiency promotion plan – Approved **COMPONENT 3: EE Building Technologies and Applications Demonstrations** Component 3 Activities: Demonstration projects – 12 demo buildings confirmed by Oct 2014; Baseline studies began in March 2015 to assess the EE potential and investment options – 2 completed; 3 – progress; 7 – will be completed by Dec. 2015 Documentation of demonstration project – not yet started Documentation of EE technologies available in mkt – list prepared but report not yet shared with DEDE and UNDP Training course for personnel of demo project – not yet (linked to task under component 1)		Use key	

APPENDIX H – UNEG CODE OF CONDUCT FOR EVALUATORS/MIDTERM REVIEW CONSULTANTS[15]

Signed Copies of EVALUATION CONSULTANT CODE OF CONDUCT AND AGREEMENT FORM

Evaluators:

1. Must present information that is complete and fair in its assessment of strengths and weaknesses so that decisions or actions taken are well founded.
2. Must disclose the full set of evaluation findings along with information on their limitations and have this accessible to all affected by the evaluation with expressed legal rights to receive results.
3. Should protect the anonymity and confidentiality of individual informants. They should provide maximum notice, minimize demands on time, and respect people's right not to engage. Evaluators must respect people's right to provide information in confidence, and must ensure that sensitive information cannot be traced to its source. Evaluators are not expected to evaluate individuals, and must balance an evaluation of management functions with this general principle.
4. Sometimes uncover evidence of wrongdoing while conducting evaluations. Such cases must be reported discreetly to the appropriate investigative body. Evaluators should consult with other relevant oversight entities when there is any doubt about if and how issues should be reported.
5. Should be sensitive to beliefs, manners and customs and act with integrity and honesty in their relations with all stakeholders. In line with the UN Universal Declaration of Human Rights, evaluators must be sensitive to and address issues of discrimination and gender equality. They should avoid offending the dignity and self-respect of those persons with whom they come in contact in the course of the evaluation. Knowing that evaluation might negatively affect the interests of some stakeholders, evaluators should conduct the evaluation and communicate its purpose and results in a way that clearly respects the stakeholders' dignity and self-worth.
6. Are responsible for their performance and their product(s). They are responsible for the clear, accurate and fair written and/or oral presentation of study imitations, findings and recommendations.
7. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.

Evaluation Consultant Agreement Form[6] Agreement to abide by

the Code of Conduct for Evaluation in the UN System

Name of Consultant: _Mr. Sandeep Tandon, International Consultant

Name of Consultancy Organization (where relevant)**: Not Applicable_**

I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.

Signed at place on date: 27th May 2015, New Delhi

Signature: _____

[6] www.unevaluation.org/unegcodeofconduct

[15] www.undp.org/unegcodeofconduct

Signed Copies of EVALUATION CONSULTANT CODE OF CONDUCT AND AGREEMENT FORM

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7. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.

Evaluation Consultant Agreement Form Agreement to abide by

the Code of Conduct for Evaluation in the UN System

Name of Consultant: Mr. Tien-ake Tiyapongpattana, National Consultant

Name of Consultancy Organization (where relevant)**: Not Applicable**

I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.

Signed at place on date: 27th May 2015, Chiang Mai

Signature: