Global Environment Facility (GEF)

United Nations Development Programme (UNDP)

Ministry of Housing and Urban-Rural Development (MOHURD)

Mid-term review of the project on:

"Energy Efficiency Improvement in Public Sector Buildings in China (PSBEE)" (PIMS 5395)

Mid-term review report

GEF Project ID:	6930
UNDP Project ID:	5395
Project ID:	00094663
Focal Area:	Climate change
Evaluation timeframe:	July 2021 – December 2021
Review team:	Francisco Arango (lead international consultant) Gao Enyuan (national consultant) Sang Jing (national consultant)

December 2021

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Evaluation team

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Contents

Acronyms and abbreviations

APR	Annual Project Report
AWP	Annual Work Plan
BEAS	Building energy audit system
BETIX	Buildings energy technology information exchange
BIM	Building information modelling
CPD	Country Programme Document
CTA	Chief Technical Advisor
DOHURD	Department of Housing and Urban-Rural Development
EC&EE	Energy conservation and energy efficiency
EMIS	Energy management information system
EPC	Energy performance contract
ESCO	Energy service company
ESMVS	Energy savings measurement and verification system
GEF	Global Environment Facility
GHG	Greenhouse gas
IP	Implementing partner
IRR	Implementing rules and regulations
LC	Low-carbon
M&E	Monitoring and evaluation
MOHURD	Ministry of Housing and Urban-Rural Development
MTR	Mid-term review
NGOA	National Government Offices Administration
PBEMIS	Public buildings energy management information system
PIR	Project Implementation Review
PMO	Program Management Office
PRF	Project Results Framework
ProDoc	Project Document
PSC	Project Steering Committee
TAC	Technical Advisory Committee
tce	tonnes of coal equivalent
TE	Terminal evaluation
ToC	Theory of change
ToRs	Terms of reference
UNDP	United Nations Development Programme
UNEG	United Nations Evaluation Group

1. Executive Summary

Table 1. Project information table

Project details		Project milestones	
Project Title	Energy Efficiency Improvement in Public Sector Buildings in China (PSBEE)	PIF Approval Date:	14 September 2015
UNDP Project ID (PIMS #):	5395	CEO Endorsement Date:	12 June 2017
GEF Project ID:	6930	ProDoc Signature Date:	20 November 2018
UNDP Atlas Business Unit, Award ID, Project ID:	Award ID: 00087742 Project ID: 00094663	Date Project Manager hired:	October 2018
Country/Countries:	People's Republic of China	Inception Workshop Date:	26 June 2019
Region:	Asia-Pacific	Mid-Term Review Completion Date:	15 December 2021
Focal Area:	Climate change mitigation	Planned Closing Date:	November 2022
GEF Operational Programme or Strategic Priorities/Objectives:	CCM-1. Program 1. CCM-1. Program 2.	Revised Closing Date:	N.A.
Trust Fund:	GEF Trust Fund (GEF TF)		
Implementing Partner (GEF Executing Entity):	Ministry of Housing and Urban-Rural Development (MOHURD)		
Other execution partners:	N.A.		
Geospatial coordinates of project sites:	Not available.		

Project financing	at CEO endorsement (USD)	at mid-term review (USD)
[1] GEF financing:	8,932,420	3,737,120
[2] UNDP contribution:	100,000	0
[3] Government:	54,000,000	13,236,600
[4] Other partners:	16,000,000	56,278,600*
[5] Total co-financing [2+3+4]:	70,100,000	69,515,200*
Project total costs [1+5]	79,032,420	73,252,320

* Of the USD 56 million reported co-financing contributions by the private sector, only USD 4.44 million (8%) were supported by documentary evidence.

1.1. Project description

The objective of the project on "Energy Efficiency Improvement in Public Sector Buildings in China (PSBEE)" is to facilitate the energy-conserving and energy-efficient operation of buildings and building services in the public sector in China.[1] The ultimate goal of the project is to manage the increase in energy consumption and related greenhouse gas emissions from the public sector in China.[2] The project's strategy consists of a barriers removal approach to address the major obstacles for the adoption of energy conservation and energy efficiency (EC&EE) and low-carbon (LC) initiatives.[3] The main barriers stated in the project document (ProDoc) are:

- Inadequate policy and regulatory frameworks that promote and support EC&EE improvement initiatives in the public sector;

[1] UNDP Project Document (ProDoc), p. 11
[2] Ibid.
[3] Ibid., section III, pp. 8 - 9

- Absence of an overall evaluation system for reviewing and analyzing the existing energy management procedures and practices in public sector entities and their facilities;
- Limited market-oriented financing mechanism for funding EC&EE technologies/products in the public sector; and,
- Low level of capacity and awareness of public sector technical and management personnel on the application of EC&EE and LC technologies.[4]

The project's interventions are organized in four components on: (1) public sector EC&EE policy and regulatory frameworks, (2) energy performance monitoring and evaluation system for public sector buildings, (3) EC&EE improvement promotion and demonstration programs for public sector buildings, and (4) public sector EC&EE capacity and awareness enhancement program.[5] The outcomes of the project were formulated as follows:

- **Outcome 1**. Strict enforcement of approved enhanced policies and rules and regulations on energy efficiency and low-carbon operation and maintenance of public sector buildings;
- **Outcome 2**. Better control and enhanced management of the energy performance of public sector buildings;
- **Outcome 3.1.** Increased availability of resources (technical capacity, information, and financing) for EC&EE initiatives in public sector buildings and facilities;
- **Outcome 3.2.** Increased application of EC&EE technologies in public sector buildings and facilities; and,
- **Outcome 4**. Enhanced awareness and knowledge of public sector authorities and personnel and the citizenry on the cost-effective application of EC&EE technologies.[6]

A detailed presentation of the project outcomes, outputs and activities is provided in Annex J.

The project received a grant from the Global Environment Facility (GEF) for USD 8,932,420 and committed to mobilize USD 70,100,000 in cofinancing resources, including:

- Ministry of Housing and Urban-Rural Development (MOHURD): USD 30,810,000
- Local governments: USD 23,190,000
- Private companies: USD 16,000,000
- UNDP: USD 100,000[7]

Section 4.3.3 provides a detailed overview of the project financing, including cofinancing sources and budget allocation across project components.

The main project stakeholders are listed in the ProDoc as:

- MOHURD (implementing partner (IP)).
- Ministry of Education.
- Ministry of Health.
- National Energy Conservation Center.

[4] ProDoc, section II, p. 7
[5] ProDoc, section IV, pp. 11 - 43
[6] ProDoc, section VI, pp. 52 - 55
[7] ProDoc, section IX, p. 69

- Standardization Administration of China.
- Department of Energy Conservation in Department of Housing and Urban-Rural Development.
- Management/administration of designated pilot public sector buildings.
- Certification and verification entities; and,
- Energy Service Companies (ESCOs).[8]

Section 3.6 discusses the main roles and responsibilities of these stakeholders.

The project started on 20 November 2018 with the signature of the ProDoc and is expected to be operationally closed in October 2022.

1.2. Project progress summary

The project start was delayed by the change in IP and a comparatively slow implementation of the first-year project activities. The rate of implementation has improved during the second year and the project now reports significant progress under most project components and outcomes. The restrictions due to the COVID-19 pandemic have had an impact on the implementation of the project activities and are expected to continue to be a challenge to project implementation.

The progress under component one of the project, on the development of policy and regulatory frameworks, has been significant. Results include the adoption of relevant policies and guidelines on the measurement and verification of energy performance in public buildings. Technical standards for the implementation of energy efficiency measures in existing buildings and for the evaluation of energy efficiency in public buildings have been drafted and are under public consultation. Work on the replication of these policies and guidelines at the subnational (provincial) level has yet to start.

Progress under component two, on the development of an enhanced energy management system, reports mixed results. While the energy management information system (EMIS) has been developed and is operational, the energy audit system for public buildings has not been finalized. Delays in the development of the EMIS have held up the implementation of the public building EMIS (PBEMIS) database, which is a means of verification for several indicators in the project results framework (PRF). Project activities to carry out energy audits in public buildings are on hold until the audit system is completed.

The implementation of activities under component three has been affected by changes to the project scope, strategy, and to the selection of demonstration projects that had been completed during project design. As originally defined in the ProDoc, activities under component three of the project were going to support the implementation of two sets of demonstration projects: (i) twenty projects to demonstrate specific EC&EE and LC technologies and practices in public buildings, and (ii) twenty projects to demonstrate the application of a financial/incentives mechanism that the project was expected to design and adopt. At a meeting in January 2019, the number of demonstration projects was reduced to ten projects demonstrating technologies and practices, and ten project demonstration the application of a financial-incentives mechanism developed with support from the PSBEE project. The implementation of the first set of demonstration project was affected by the change of IP, that forced the project to replace the lineup of demonstration activities that had been completed during project design. The new portfolio of demonstration projects includes four (out of ten) private buildings (e.g. private office buildings, hotels, shopping malls, etc.) that fall outside the original scope of the PSBEE project. As defined in the ProDoc, the second set of demonstration projects was going to showcase a market-based financial incentive/mechanism to be

[8] ProDoc, section IV, pp. 44-45

designed by the PSBEE project and implemented in partnership with financial institutions. However, the project has not designed such financial incentive/mechanism and has instead built a portfolio to showcase *existing* financial mechanisms that are currently available in the market. This change in strategy is a material deviation from the original project design and one that was not adequately adopted and reported. As in the first set of demonstration projects, this second set also includes private buildings (five out of ten selected projects are in private buildings). More importantly, the demonstration projects selected under both categories (showcasing EC&EE and LC technologies, and demonstrating the application of a financial/incentives mechanism) have shortcomings related to their adherence to the incremental-cost reasoning proposed in the ProDoc, the application of cost-efficiency criteria, and their potential to deliver energy savings and GHG emissions reductions that are attributable to the PSBEE project and to the GEF grants awarded to these demonstration projects. See a detailed discussion in the presentation of results under outputs 3.1.5. and 3.2.2. in section 4.2.1.

The progress under component four on capacity building is solid, with a reported 3,147 people having been trained with support from the project. The project has established two provincial training centers in Beijing and Chongqing, and additional training centers in Tianjin, Suzhou, Guangzhou are in the process of being established. Likewise, the number of buildings where an energy management program has been adopted is reported as 446 and is on track to meet the end of project target of 1,000.

1.3. Mid-term review ratings and achievement summary table

The summary of the evaluation ratings used in the mid-term review (MTR) is provided in Table 2, below. A complete discussion of the ratings is provided in section 4.

Table 2. MTR ratings and achievement summary

Measure	MTR rating	Achievement description
Project Strategy	N.A.	The project design follows a conventional barriers removal strategy, with well defined components, outputs, and activities. Despite a few minor exceptions, the indicators, and targets in the PRF comply with the requirements for *SMART* indicators.
Progress Towards Results	Objective Achievement Rating: Unable to assess	Indicators at the objective level (i.e. fuel savings and jobs creation) have yet to be measured in accordance with the monitoring and evaluation provisions in the ProDoc.
	Outcome 1 Achievement Rating: 5	Solid progress has been made in the development of a policy and regulatory framework for energy efficiency in public buildings. Four policies and guidelines have been adopted, and additional guidelines and plans are under development. Two standards on energy efficiency in buildings have been drafted and are receiving public comments.
	Outcome 2 Achievement Rating: 4	An energy management information system has been implemented and building managers are reporting energy performance to the system. The design of an energy audit system has made progress, but it has not been completed and no building energy audits have been performed under the system.
	Outcome 3.1 Achievement Rating: 4	The public buildings energy management information system has not been commissioned, but significant progress has been made. Once the system is online, building managers will be able to report to the system. The work on the design of the market-based financing scheme only started during the second quarter of 2021.
	Outcome 3.2 Achievement Rating: 3	Ten projects demonstrating energy efficiency technologies and an additional ten projects showcasing various existing financial mechanisms have been selected and awarded grants. However,

		these projects do not meet key characteristics required for demonstration projects as defined in the ProDoc (e.g. contribution to incremental GHG emissions reductions, adherence to incremental-cost principles, cost-efficiency, etc.). No financial scheme for energy efficiency project in public buildings has been designed and adopted.
	Outcome 4 Achievement Rating: 5	Over 3,000 people have been trained in two provincial training centers, and three additional training centers will start operating soon. The target of this indicator is expected to be exceeded. The number of buildings with established energy management programs has met the mid-term target and more building are expected to adopt such programs.
Project Implementation and Adaptive Management	Rating: 4	The project team is skilled and efficient and has built strong partnerships. Opportunities for improvement are related to the areas of monitoring and reporting, managing changes to project scope, grant management, and accounting for co-financing contributions.
Sustainability	Rating: Moderately likely (ML)	Promoting energy efficiency in buildings has the support of stakeholders in the public and private sectors, including the national government. The institutional and governance risks to sustainability are reduced by a strengthened policy and regulatory framework. Financial risks to sustainability persist but could be managed by a revised strategy to remove financial barriers and an adequate exit strategy. No significant environmental risks to the sustainability of project results have been identified.

1.4. Summary of conclusions

This evaluation concluded that the project strategy and design were adequate and found evidence of progress towards achieving some of the project's intended objectives. The PSBEE project has made progress towards the objectives related to policy and regulatory development (outcome 1), and to the adoption of an energy performance management system for public buildings (outcome 2). The project has also made relevant progress setting up a model for developing the capacities of staff with responsibilities over the management of public buildings. This model, based on the establishment of provincial training centers, if expanded and maintained over time, could become an important driver for innovation and change in the public building sector. On the other hand, the process to select demonstration projects and award grants under component 3 diverted from the approach defined in the ProDoc and has demonstrated shortcomings. The role of the demonstration projects -and the substantial GEF-resources allocated to them- supporting the project´s strategy on barriers removal is unclear and their contribution to the project´s objectives is uncertain. Also, the project's current strategy and progress for removing financial barriers are uncertain and require an adjustment.

Other factors have affected project implementation, including a delay in signing the ProDoc, adjustments to implementation arrangements, changes to the lineup of demonstration projects agreed during project preparation, and the restrictions from the COVID-19 pandemic. These factors have contributed to a delay in the implementation of project activities that, unless corrected, could have an impact on the project's results and on the long-term sustainability of these results.

In conclusion, the project is on track to produce relevant contributions to removing the barriers for the adoption EC&CC and LC technologies and practices in public buildings. However, delays in project start and implementation could limit its true potential. Considering the analysis during this MTR, the evaluation

team considers that a no-cost extension to the project implementation period is necessary to meet the project's objectives.

The project management office (PMO) has demonstrated to be able to manage multiple activities and stakeholders simultaneously. Interviews with project stakeholders indicated that the project team is skilled and effective at implementing the project activities and resolving emerging issues. However, the PMO should request and obtain guidance from UNDP and would benefit from the expertise of external consultants to adequately address issues related to monitoring and reporting, incremental-cost reasoning, and the estimation of GHG emissions reductions.

The sustainability of the project outcomes was deemed as moderately likely by this evaluation. The evaluation found evidence, including through interviews with various stakeholders, that there is a good understanding of concepts on energy efficiency in public buildings and a shared recognition of the relevance of these concepts for the economic, social, and environmental wellbeing and development opportunities of citizens in China. The project is developing partnerships with various stakeholders that, if pursued and strengthened, will contribute to reducing the risks to the sustainability of project results.

1.5. Summary of recommendations

The following table summarizes the recommendations produced by this MTR.

Table 3. Recommendations summary

No.	Recommendation	Entity Responsible	Timeframe
1	Request UNDP and the GEF secretariat a 12-month no-cost extension of the project implementation period.	PMO/IP, PSC, and UNDP	2021
2	Complete an urgent review of the scope, budget and monitoring procedures of each demonstration project selected under outputs 3.1.5. and 3.2.2.	PMO/IP and UNDP	2021
3	Formulate an updated project strategy to remove financial barriers for the adoption of EC&CC and LC technologies and practices in public buildings and present it to the PSC for formal approval.	PMO/IP, PSC, UNDP	2021
4	Prepare a detailed monitoring plan and submit it for approval by the PSC.	PMO/IP, PSC, and UNDP	2021
5	Improve the process for proposing, approving, and documenting changes to the project scope.	PMO/IP, PSC, and UNDP	2021
6	Improve the process for documenting and accounting for co-financing contributions from project partners, especially from private sector stakeholders.	PMO/IP	2021 – end of project
7	Prepare and adopt an exit strategy that contributes to reducing risks to the sustainability of project results.	PMO/IP	2022
8	Recruit a part-time international chief technical advisor (ICTA) to provide strategic guidance and support to the PMO and key stakeholders. The ICTA could be a member of the PMO (ideally)	UNDP	2022

	or an international consultant tasked with providing ICTA services.		
9	Strengthen the oversight function of UNDP and their role supporting project teams monitoring and reporting project progress.	UNDP	2021 – end of project
10	Improve public access to project information and expand the scope and reach of activities to disseminate project products and information.	PMO/IP	2022 – end of project
11	Enhance partnerships with local (provincial, county, and municipal) governments of jurisdictions where there are public buildings managed by MOHURD.	PMO/IP, PSC	2022 – end of project
12	Renew efforts to build partnership with line ministries and bureaus at central and local levels, especially education and health authorities.	PMO/IP, PSC	2022 – end of project
13	Ensure that adequate mechanisms (including institutional and financial arrangements) are in place to ensure that energy efficiency standards will continue to be updated periodically.	PMO/IP	2022
14	Prepare a comprehensive and well-written project completion report.	PMO/IP, UNDP	Before start of terminal evaluation

2. Introduction

2.1. Purpose of the MTR and objectives

The objective of the MTR was to assess the project's progress towards meeting its objectives. The purpose of the MTR was to (i) promote accountability and transparency, and (ii) identify and record lessons learned and recommendations to improve project implementation and inform future operations. The MTR served to identify potential problems with project design and implementation, and to recommend actions to correct or improve specific aspects of the project. The MTR evaluated the project along four main dimensions: (i) project strategy (including project design), (ii) progress towards results, (iii) project implementation and adaptive management, and (iv) sustainability. The project's progress towards results was assessed against the expectations set in the ProDoc and against the achievement of the project targets as contained in the PRF, as amended during project execution.

2.2. Scope and methodology of the MTR

The MTR was an in-depth evaluation on the entire project based on (i) a desk-review of project documentation; (ii) semi-structured interviews with key informants; (iii) interviews with the project team; and (iv) interviews with UNDP staff. The MTR used a combination of both quantitative and qualitative evaluation methods. The MTR followed a participatory approach that engaged key stakeholders and kept them informed of the evaluation process. Due to restrictions from the global COVID-19 pandemic, in-person meetings were kept at a minimum and all safety precautions were followed.

The two main tools used to conduct the analysis were the evaluation criteria matrix and the theory of change (ToC). The evaluation criteria matrix was prepared based on the terms of reference (ToRs) for the MTR, UNDP/GEF evaluation standards and practices, including the principles and requirements set in the updated GEF evaluation policy (2019), the processes and methods recommended in UNDP's "Guidance for conducting midterm reviews of UNDP-supported, GEF-financed projects" (2014), the general standards set in the recently adopted "UNDP Evaluation Guidelines" (2021), and the results from the initial desk-review completed as part of the preparation of the inception report. The evaluation criteria matrix is presented in Annex B.

The MTR used a ToC analysis to assess the change process that the project was set to achieve. Since a ToC was not described and included in the ProDoc, the MTR team reconstructed a ToC based on the PRF and the proposed project strategy and actions. The ToC analysis was supported by the document review, and interviews with key stakeholders and the project team.

The desk review of the project documentation included: (i) the ProDoc and annexes; (ii) the GEF CEO endorsement request; (iii) annual work plans (AWPs); (iv) annual and quarterly progress reports; (v) Project Implementation Reviews (PIRs) reports; (vi) minutes of Project Steering Committee (PSC) meetings; (vii) GEF tracking tool; (viii) quarterly and annual financial reports; (ix) cofinancing evidence; (x) audit reports; (xi) technical reports of project outputs; (xii) project publications and outreach materials; and (xiii) other reports or documents that were useful to the MTR. A list of all documents reviewed by the evaluation team is presented in Annex E.

Given the restrictions from the global COVID-19 pandemic, most interviews had to be conducted remotely, by phone or videoconference. Interviews and email communications with the project management team were used to gather additional information and their insights on different aspects of the project design, implementation, and results. Interviews with key informants used as a guide a semi-structured questionnaire developed by the evaluation team. A complete list of persons interviews during this MTR is available in

Annex D. A site visit to Qingdao was completed by the national consultants on 26 – 27 July. Information and data were collected in accordance with the evaluation criteria matrix agreed at the inception phase and included in this report as Annex B.

2.3. Structure of the MTR report

The MTR report is presented following the structure recommended in UNDP's "Guidance for conducting mid-term reviews of UNDP-supported, GEF-financed projects":

- Section 1. Executive summary;
- Section 2. Introduction (purpose, objectives, scope, and methodology of the MTR);
- Section 3. Project description (development context, problems, barriers, objectives, implementation arrangements, milestones, and stakeholders);
- Section 4. Findings (project strategy, progress towards results, project implementation, and sustainability);
- Section 5. Conclusions and recommendations; and,
- Annexes (e.g. MTR ToRs, evaluation criteria matrix, list of documents reviews, list of persons interviewed, etc.)

2.4. Ethics

The terminal evaluation was conducted following the principles contained in the ethical guidelines for evaluations[9] adopted by the United Nations Evaluation Group (UNEG). The lead evaluator signed the Code of Conduct for Evaluators, and this is included in Annex F.

[9] UNEG, 2008, "Ethical Guidelines for Evaluations". Available under < http://www.unevaluation.org/document/detail/102>

3. Project Description

3.1. Development context

In 2018, buildings in China contributed to 22% of the total energy consumption in the country, totaling 1.09 billion tonnes of coal equivalent (tce).[10] Approximate 20% of this demand is attributable to public buildings.[11] Coal is the main energy source available to meet this demand, as it contributes with approximately 50% of the supply, followed by electricity (40%)[12], which in turn is also largely generated by coal.[13] From 2007 to 2015, the energy demand from public buildings grew 30%[14] and the trend is expected to continue as the country continues to develop and the government provides more and better services to citizens.[15] Modelling scenarios of energy consumption in public buildings in China estimate that, by 2035, energy demand will grow to 530 Mtcoe under a baseline scenario, and to 350 Mtcoe under a scenario with additional measures to reduce energy demand. Reversing this trend is critically important to limit greenhouse gas (GHG) emissions in China and to contribute to the goals of the United Nations Framework Convention on Climate Change (UNFCCC).

The adoption of energy conservation and energy efficiency (EC&EE) and low-carbon (LC) technologies and practices in buildings is an important part of the solution to the growing energy demand and GHG emissions from the building sector in China. The country has already made significant progress with the adoption of EC&EE technologies and practices, including:

- Adoption of mandatory energy efficiency standards;
- Adoption of a nationwide target of 10 million m^2 in new, ultra-low energy-consumption buildings;
- Renovation of 244 million m^2 of public buildings (by 2019);
- Compilation of energy information for 300,000 public buildings (by 2017);
- Completion of 16,000 energy audits of public buildings (by 2017); and,
- Monitoring of energy consumption in 18,000 public buildings (by 2017).[16]

There has also been progress in establishing a policy and regulatory framework to enable the adoption of EC&EE technologies and practices in public buildings:

- Incorporation of actions on energy efficiency in buildings in China's 13th Five-Year Plan (2016 – 2020), including the adoption of advanced standards on energy efficiency for buildings;
- Adoption, in 2015, of the "Design Standard for Energy Efficiency of Public Buildings" (GB 50189-2015);
- Adoption, in 2017, of the "13th Five-Year Plan for Energy Efficiency and Green Energy in Buildings";

[10] Tsinghua University, Taihor Energy. Roadmap for energy efficiency in Chinese public buildings. n.d. (report produced for the PSBEE project with financial support from GEF).
[11] UNDP. CEO endorsement request for the PSBEE project. 2017. p. 29.
[12] ProDoc, p. 6.
[13] According to statistics by the International Energy Agency, in 2019, coal contributed with 65% of the total electricity generation in China. Source: IEA website. Electricity information 2020. < https://www.iea.org/fuels-and-technologies/electricity>. Accessed 29 July 2021.
[14] ProDoc, p. 6.
[15] Tsinghua University, op. cit.
[16] Ibid.

- Adoption, in 2018, of the "Energy-saving design standards for residential buildings in severe cold and cold regions" (JGJ 26-2018); and,
- Adoption, in 2019, of the "Technical standard for nearly zero energy buildings" (GB/T 51350-2019).

Despite the progress made in the development of the basic framework for the adoption of EC&EE and LC technologies and practices, the market for these technologies is still at an initial development stage. The actions deemed necessary to develop this market include:

(i) Improvement of the regulatory framework, including laws, regulations, and administrative procedures;
(ii) Review and raise of the minimum requirements of existing technical standards, and adoption of new standards in fields not yet covered by existing standards (e.g. energy services in public buildings);
(iii) Adoption of adequate incentives to energy management in public buildings;
(iv) Allocation of energy efficiency targets and responsibilities across the different levels of the public administration;
(v) Disclosure of energy performance of public buildings to facilitate benchmarking; and,
(vi) Development of financial products for energy efficiency in public buildings.[17]

While the country has made significant progress in the adoption EC&CC and LC technologies and practices, prevailing barriers limit a faster and more efficient deployment of these measures, especially in public buildings. The PSBEE project was designed with the intention to contribute to the removal of those barriers.

3.2. Problems that the project seeks to address

The PSBEE project seeks to improve the conservation and efficient use of energy in the operation of public buildings in China, through the adoption of EC&CC and LC technologies and practices. The project follows a barriers removal strategy aimed at creating an enabling environment for the adoption of these technologies and practices. The barriers that are stated in the ProDoc are:

- Inadequate policy and regulatory frameworks that promote and support EC&EE improvement initiatives in the public sector;
- Absence of an overall evaluation system for reviewing and analyzing the existing energy management procedures and practices in public sector entities and their facilities;
- Limited market-oriented financing mechanism for funding EC&EE technologies/products in the public sector; and,
- Low level of capacity and awareness of public sector technical and management personnel on the application of EC&EE and LC technologies.[18]

According to the CEO endorsement request, the project is aligned to programs 1 and 2 under objective 1 of the climate change focal area under GEF-6 (CCM-1)[19] The scope of program 1 is to "promote timely development, demonstration and financing of low-carbon technologies and mitigation options", while

[17] Ibid.
[18] ProDoc, p. 7.
[19] CEO Endorsement request, p. 1.

scope of program 2 is to "develop and demonstrate innovative policy packages and market initiatives to foster new range of mitigation actions".[20] The project sought to contribute to these objectives by facilitating the adoption of EC&CC and LC technologies and practices in public buildings in China.

3.3. Immediate and development objectives of the project

The objective of the project is to facilitate the conservation and efficient use of energy in the operation of public buildings in China. The ultimate goal of the project is to manage the rate of growth of energy consumption and GHG emissions from the public sector in China.[21] The project seeks to achieve this objective by means of:

- Formulating and enforcing EC&EE support policies;
- Establishing and implementing public sector energy performance monitoring and evaluation systems;
- Adopting EC&EE financing mechanisms;
- Improving the capacity and awareness of the public sector; and,
- Providing information on EC&EE and LC technologies for buildings.[22]

3.4. Project implementation arrangements

The PSBEE project is implemented under the National Implementation Modality (NIM) following the Standard Basic Assistance Agreement between UNDP and the Government of China. The implementing partner (IP) is MOHURD. A full-time Project Management Office (PMO)[23] was set up at project inception and is based at the Department of Standards and Norms of MOHURD. The PMO is responsible for the day-to-day management of the project. The PMO includes a Project Executive Director, a Deputy Executive Director, a Technical Assistant, two Administrative Assistants, a Finance Assistant, and a Finance Advisor.[24]

The project is supported by a Project Steering Committee (PSC) and a Technical Advisory Committee (TAC). The PSC provides oversight, policy guidance and strategic decision-making. The committee is chaired by the National Project Director (NPD), and its members are representatives from UNDP's country office in China, MOHURD, the Ministry of Finance (MOF), the Ministry of Science and Technology (MOST), the China Banking and Insurance Regulatory Commission, and the People's Bank of China. The TAC provides expert advice to the implementation of technical aspects of the project. The TAC has a broad membership that includes representatives from:

- National Development and Reform Commission (NDRC)
- China Energy Conservation Association (CECA)
- China Society of Finance
- National Energy Conservation Center
- Energy Foundation and Management
- China Academy of Architectural Sciences
- China Reinsurance Office
- Beijing Equity Certification Center
- China Construction Research Institute
- Tianjin University
- Tsinghua University

[20] GEF. GEF-6 Programming Directions. 2014 pp. 58 – 64.
[21] ProDoc, p. 11
[22] Ibid.
[23] The PMO is sometimes also referred to in project documents as "Program Management Office", or "Project Management Unit".
[24] PSC. Minutes of 2021 meeting. p. 3.

- Beijing Architectural Design and Research Institute
- Beijing Construction University
- Beijing University of Technology
- Henan Institute of Architectural Sciences
- Shandong Institute of Construction Sciences
- Hunan University
- Chongqing Ninth Construction Company
- Hefei University of Technology
- Beijing Research Institute of Green Finance and Sustainable Development
- Green Finance Department of Industrial Bank
- China Construction Bank
- PICC Property Insurance Co., Ltd.[25]

3.5. Project timing and milestones

The project has a planned duration of four years (48 months), starting on the ProDoc's signature date on 20 November 2018. The planned closing date is therefore in November 2022. Table 4, below, lists the main project milestones.

Table 4. Project milestones

Milestone	Date
PIF approval	14 September 2015
CEO Endorsement	12 June 2017
ProDoc signature	20 November 2018
Inception workshop	26 June 2019
Project manager hiring	October 2018
Meetings of the project steering committee	15 September 2020 26 April 2021
Mid-term review	15 December 2021
Terminal evaluation (planned)	23 March 2021
Planned closing date	November 2022

Source: PIF, ProDoc, CEO Endorsement letter, PSC meetings.

3.6. Main stakeholders

Table 5 lists the main project stakeholders, as presented in the ProDoc.

Table 5. Project stakeholders, roles, and responsibilities

Stakeholder	Roles and Responsibilities in Project Implementation
Ministry of Housing and Urban-Rural Development	Responsible for communications and coordination with the Ministry of Finance and UNDP, liaison with local governments, and overall project management.
Ministry of Education of the People's Republic of China	Provision of assistance in the co-funding and implementation and management arrangements of demonstrations for the promotion of EC&EE and LC technology applications in school buildings and educational facilities.
Ministry of Health of the People's Republic of China	Provision of assistance in the co-funding and implementation and management of demonstrations for the promotion of EC&EE and LC technology applications in hospital buildings and medical facilities.

[25] Communications with the PMO.

Stakeholder	Roles and Responsibilities in Project Implementation
National Energy Conservation Center	Provision of assistance in the implementation of demonstrations for the promotion of EC&EE and LC technology applications in national and local government office buildings and building facilities.
Standardization Administration of China	Provision of assistance in the formulation of EC&EE and LC design standards for public sector buildings and provision of technical advice in the various EC&EE and LC standards setting activities for public sector buildings.
Department of Energy Conservation in Department of Housing and Urban-Rural Development	Provision of assistance in the design and implementation of the technical assistance, capacity development and demonstration activities of the project.
Management/ administration of designated pilot public sector buildings	Provision of advice and co-funding in design and implementation of the technical assistance and capacity development activities of the project.
Certification and verification entities	Provision of information in the design and implementation of the development of standards for energy-efficient and low-carbon management and evaluation techniques.
Energy Service Companies (ESCOs)	Provision of technical and funding assistance in the design of the activities on EC&EE and LC project financing, feasibility analyses of demonstrations, as well as in the design of EC&EE and LC training programs.

Source: Reproduced from ProDoc, pp. 44 - 45

4. Findings

4.1. Project Strategy

4.1.1. Project design

The PSBEE project follows a conventional strategy for barriers removal based on three main types of interventions that were grouped in four components on: (1) *policy, regulatory and standards support* aimed at removing policy and regulatory barriers (components one and two); (2) *demonstration of EC&EE and LC technologies and practices* designed to remove barriers related to low levels of capacity, knowledge, and skills, and improve access to financing (component three), and (3) *capacity building and awareness raising*, aimed at improving access to information on the design, development, and operation of energy efficient public buildings (components three and four). The MTR concluded that this strategy is adequate to address the problems described in the ProDoc and to reach the proposed project objectives.

The description provided in the ProDoc of the underlying problem and the status of energy efficiency practices and energy performance of public buildings in China is rather scarce, with little quantitative information and references to official documents or technical/scientific literature. Details on the status of standards and regulations are limited, with no references to current standards on energy efficiency in buildings or to official plans to promote energy efficiency in buildings and other relevant areas. Relevant baseline information, such as the number of energy audits in public buildings, was only partially complete. Additional details on the status on energy efficiency practices and energy performance of public buildings in China could have provided additional inputs to project design and may have resulted in slight changes to project activities (e.g. output 2.2.1. on piloting energy audits in public buildings).

The consistency of the project with national priorities is discussed in section B.1. of the CEO endorsement request, providing valid references to official plans to promote energy efficiency in buildings and other relevant areas including, inter alia, the country's Second National Communication to the UNFCCC, China's nationally determined contribution (NDC), the 13th Five-Year Plan of Energy Conservation by Public Sector, and the Law of the People's Republic of China on Energy Conservation.

Implicit in the project design is the years-long experience of UNDP and other GEF agencies on the implementation of the barrier removal approach in different contexts. The ProDoc refers to a few international experiences with similar projects (e.g. development of an energy management information system (EMIS) in Croatia). Considering that projects on energy efficiency in buildings are relatively common in the portfolios of GEF and other international climate finance sources, the project design team could have made additional references to such projects. Still, project stakeholders interviewed by the MTR team confirmed that such examples were considered during project design, but no explicit references were included in the project documents.

The ProDoc discusses gender considerations in section IV (p. 45) and included a gender analysis in Annex N (no gender plan was included as part of the proposal). The emphasis of the gender mainstreaming approach followed by the project design is on ensuring equal employment opportunities in the building construction and management sector, and in enterprises in the field of EC&EE and LC technologies and practices. A further dimension of gender mainstreaming that was not explored in the project design focuses on the different needs from women and vulnerable groups regarding the use of public spaces (e.g. accessibility, lighting to improve safety, etc.). These different needs can be incorporated in the development of standards for public buildings and in the design of demonstration projects and are a subject that the PSBEE project could support.

The ProDoc includes the report of the social and environmental safeguards screening following UNDP's policy. The project was classified as low-risk, listing potential risks from the release of pollutants, and from the disposal of hazardous or dangerous materials during the implementation of demonstration projects. In response to these risks, demonstration projects are required to undergo an assessment to minimize environmental and social impacts.

While the ProDoc did not include a formal discussion of the project´s ToC, the structure and description of the project´s components, outputs and activities are logic and presented in a clear and concise manner. The linkages and sequencing of activities and outputs were described explicitly in the narrative provided in section IV of the ProDoc. Key assumptions were listed in the PRF in section VI. For this MTR, the ToC was reconstructed based on the descriptions in the ProDoc, described in the following sub-section and represented graphically in Figure 1 (page 19 of this report).

Theory of change

The ProDoc states that the project's overall goal is a "well-managed growth rate of energy consumption and associated GHG emissions from the public sector in China", and that the project's objective is the "facilitation of the energy conserving and energy efficient operation of buildings and building services in the public sector in China". In the reconstructed ToC, the former is restated as the impact of the project, and the later as an intermediate state, which was not included in the ProDoc, but is required to connect the project stated outcomes with the project impact/goal.

The project's strategy included four causal pathways that converge to enable the adoption of EC&CC and LC technologies and practices in public buildings. The first causal pathway, implemented through component one, is aimed at removing policy and regulatory barriers. The outputs and activities under this component seek to review and adopt policies, regulations, standards, and plans for the adoption of EC&CC and LC technologies and practices in public buildings. The component seeks to have an impact on the national level, and replications of the solutions at the subnational (provincial) level. Along this pathway, the project aims at developing and adopting procedures on energy monitoring and reporting that support a proposed EMIS, and regulations on energy conservation in public buildings (output 1.3.). These policy developments, initially adopted at the national scale, are then to be evaluated, adjusted, and replicated at the sub-national level (output 1.4.). Likewise, the project seeks to develop a national roadmap for the adoption of EC&CC and LC technologies and practices in public buildings, followed by similar roadmaps at the subnational level (output 1.2.). Two additional outputs were added to component one during the inception report: output 1.7. on developing regulations for life energy efficiency management and evaluation for large public buildings, and output 1.8. on methodology research on regional energy planning and operation management for public buildings, and demonstration.

This pathway led to the first direct outcome, defined as "strict enforcement of approved enhanced policies and rules and regulations on energy efficiency and low-carbon operation and maintenance of public sector buildings.". An underlying assumption (assumption one in Figure 1) is that the project could (through output 1.1.) correctly identify the existing policies and regulations that impede the adoption of EC&CC and LC technologies and practices in public buildings. A second assumption along this pathway is related to the applicability at the subnational level of the policies and regulations that had been developed at the national level, and the willingness of subnational authorities and stakeholders to adopt them.

The second causal pathway, under component two, addresses the barrier related to the absence of an evaluation system for energy performance of public buildings. The proposed project solution for the lack of such system has two main elements: (i) the design and implementation of an EMIS (output 2.1.3) with a supporting database (PBEMIS) and an energy savings measurement and verification system (ESMVS)

(outputs 2.2.2. and 2.1.4.); and (ii) the design and implementation of a public building energy audit program (outputs 2.1.2. and 2.2.1.). During the inception report, two new outputs were added to component two: output 2.1.5. on establishing a green finance indicator system which supports the building energy efficiency improvement; and output 2.2.3. on investigating energy consumption of different types of public buildings.

The second pathway seeks to deliver outcome two of the project, stated as "better control and enhanced management of the energy performance of public sector buildings". An assumption to deliver the outcome requires that regulations developed under component one are effectively enforced to ensure that managers of public buildings report energy performance data to the EMIS and that they have the appropriate set of incentives to improve energy management. Likewise, the delivery of the outcome requires that building managers and other stakeholders (e.g. energy auditors, contractors, supervisors, etc.) find the information in EMIS accessible and useful to perform their duties (assumption 3).

A third causal pathway to address the barrier on limited financing mechanisms is implemented through a sub-set of activities and outputs under component three. These outputs aim at improving access to financing for investments on energy efficiency in buildings. The outputs under this pathway lead to the establishment of a market-based financing scheme (output 3.2.1.), that is piloted through ten demonstration projects (output 3.2.2.), whose results are assessed and disseminated (output 3.2.4.), to facilitate plans for scaling-up and replication (output 3.2.5.).

The third pathway, together with a fourth pathway, described next, contribute to two outcomes: 3.1. on "increased availability of resources (technical capacity, information, and financing) for EC&EE initiatives in public sector buildings and facilities"; and 3.2. on "increased application of EC&EE technologies in public sector buildings and facilities". A critical assumption along this pathway (assumption 4) is that financial institutions have an interest and can develop the necessary skills to offer the financial product(s) developed by the project to real estate developers, property management companies, and ESCOs, in terms that are attractive to these stakeholders, and in volumes that are large enough to make a difference in the market for EC&CC and LC technologies and practices in public buildings.

A fourth causal pathway seeks to raise awareness, build technical capacities, and improve access to information related to EC&CC and LC technologies and practices in public buildings. The pathway is implemented with outputs and activities under components three and four. The outputs along this pathway contribute to outcome 3.1. (see definition in previous paragraph) and to outcome four on "enhanced awareness and knowledge of public sector authorities and personnel and the citizenry on the cost-effective application of EC&EE technologies". As such, outputs along this pathway contribute to increasing the technical capacities and information available to support the adoption of EC&CC and LC technologies and practices. The two key outputs from component three that support this pathway are output 3.1.2. on a directory of EC&CC and LC technologies, and output 3.2.4. on the publication of results from the implementation of the demonstration projects. Component four delivers outputs to build the technical capacities of government officials and stakeholders in the public buildings sector, and to facilitate access to information. The main outputs under component four are training programs for staff at MOHURD and DOHURD (output 4.1.2.) and for practitioners in the buildings sector (output 4.1.3.), setting up training centers (output 4.2.2.) and implementing an information sharing network (output 4.2.1.). During the inception workshop, a sixth output was added to component four, on an information sharing platform for cities along the silk and belt route (output 4.2.3.). An assumption required to reach outcomes 3.1. and 4 is related to the project's capacity to generate effective partnerships for the delivery of training activities that would reach a significant number of practitioners in the buildings sector, and that those training activities would effectively build the capacities of these stakeholders (assumption 5).

Collectively, the five project outcomes lead to a state where stakeholders in the public buildings sector in China have improved access to EC&CC and LC technologies and practices, enabled by adequate policies and regulations, better technical capacities, information, and appropriate financial products. Beyond this state, the path to reach the project's goal requires EC&CC and LC technologies and practices to be adopted by the public buildings sector at a scale that is large enough to have a meaningful impact on the upward trends of energy consumption and GHG emissions (assumption 6). For that process to take place, key project products and processes need to be sustained over time (e.g. EMIS, financing scheme, training centers, information network, etc.).

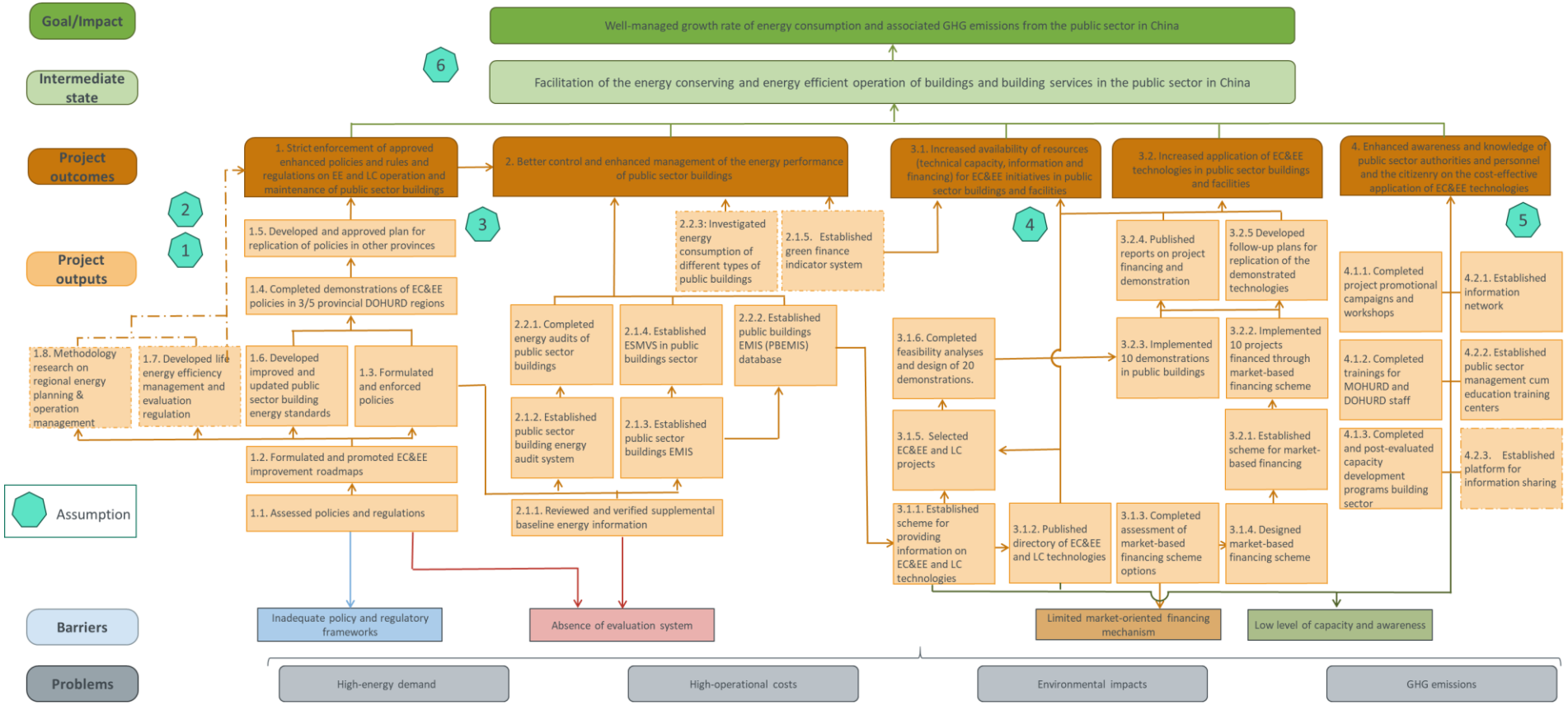


Figure 1. Reconstructed theory of change

4.1.2. Results framework

The PRF included indicators at the goal and objective levels, and for each of the four main components. The choice of indicators provides a good balance between measurement of project outcomes and delivery of outputs. Critical assumptions were listed in the PRF and a risk analysis was summarized in a risk log included in Annex H of the ProDoc. The assumptions listed were reasonable and sound. The risks registered in the risk log are reasonable and the proposed risk management measures are adequate. The analysis did not include risks related to externalities that could have a large disruptive effect on project implementation. In hindsight, it is evident that the global COVID-19 pandemic and the ensuing economic slowdown impacted project implementation and evaluability but, for obvious reasons, the pandemic could not have been predicted during project design.

The MTR completed an assessment of the degree to which these indicators meet the definition of SMART (specific, measurable, achievable, relevant, time-bound) indicators. The results from this assessment are shown on Table 6. Green means the indicator has the corresponding characteristic, yellow indicates partial compliance, and red denotes that the indicator does not meet the property assessed.

Table 6. SMART analysis of project results framework

Indicator	Baseline	Midterm target	End-of-project target	Smart analysis				
				S	M	A	R	T
Goal								
Cumulative CO_2 emissions reductions [$ktCO_2$]	0	18.6	55.7					
Comments. The indicator seems to refer to *direct* emissions reductions, but the definition is not explicit about that. The definition and the units of the indicator refer to tonnes of carbon dioxide (tCO_2), but a more appropriate unit of measurement is carbon dioxide *equivalent* (tCO_2e), which are also the units used to report in the GEF Tracking Tool.								
Annual growth rate of GHG emissions [%]	1.8	1.2	0.6					
Comments. The indicator refers to the growth rate of GHG emissions *from public buildings in China*, however, that only becomes clear in Annex L of the ProDoc on the estimation of GHG emissions reductions. The indicator also refers to *annual* growth rate, but the definition is not explicit about that. The main weakness of the indicator, regarding its achievability, results from the discussion of the baseline and targets. The ProDoc estimates that, under the baseline scenario, the growth rate would remain the same as in the baseline (1.8% p.a.), and that project interventions will reduce that rate to 0.6% p.a. by project end.[26] Considering the limited scope of the project interventions compared to the vast number of public buildings in China, that effect seems unlikely. Either the baseline does not consider all the factors at play (most likely), or the targets are unlikely to be achieved solely due to project interventions.								
Objective								
Cumulative fossil fuel savings due to project intervention [ktce]	0	2,174	6,523					
Comments. The indicator seems to refer to fossil fuel savings from the *entire* stock of public buildings in China, but that is not provided explicitly in the definition. The main weakness of the indicator results from the fact that no baseline scenario was defined to be compared with reports on fossil fuel consumption during the project implementation period. The indicator is to be measured based on reports from the PBEMIS database and assessed after the submission of the second and fourth PIRs. The PBEMIS database had not been completed by the time of the MTR.								
New jobs created with the application of EC&EE technologies and techniques in the public buildings sector in China [number]	0	At least 700	3,600					
Comments. The monitoring plan indicates that the means of verification for the indicator are a building industry survey and a sociological survey, but it is not explicit if these are project-specific surveys, or if these are implemented routinely by the sector. If they are project-specific surveys, their periodicity was not indicated in the ProDoc and the cost of completing them was not budgeted. The indicator is to be measured after the submission of the second and fourth PIRs. The surveys had not been completed by the time of the MTR.								

[26] ProDoc, Annex L.

Indicator	Baseline	Midterm target	End-of-project target	Smart analysis				
				S	M	A	R	T
Component 1.								
No. approved and enforced policies, and associated guidance and implementing rules and regulations (IRRs) [number]	0	2	8					
Comments. The type of policies and regulations to be approved and enforced are discussed in sections IV and VI (footnote) of the ProDoc, adding clarity and specificity to the indicator.								
No. of improved and updated public sector building energy standards [number]	0	1	2					
Comments. The type of standards to be updated are discussed in section IV of the ProDoc, adding some clarity and specificity to the indicator. References to specific standards on energy efficiency in place in China (e.g. "Design Standard for Energy Efficiency of Public Buildings" (GB 50189-2015)) could have clarified the scope of the activities and improved the specificity of the indicator.								
Component 2.								
No. of official building energy audits completed each year under the energy audit system starting Year 1 [audits/year]	0	8	12					
Comments. The indicator *per-se* meets the definition of a SMART indicator. The relevance of the indicator is noted since, according to project reports, more than 16,000 energy audits of public buildings had been conducted in China by 2017, putting into question the relevance of reporting on a dozen more audits per year. (More on the relevance of energy audit of public buildings in section 4.2. and in section 5.2. on recommendations)								
No. of public buildings that regularly submit energy supply and consumption reports annually to the EMIS [buildings/year]	0	At least 400[27] (At least 1,000[28])	At least 1,000[27] (2,200[28])					
No comments.								
No. of public buildings that are classified as energy efficient [number of buildings]	0	At least 400[27] (At least 1,000[28])	1,000[27] (2,200[28])					
Comments. It is noteworthy that the expected number of public buildings classified as energy efficiency is the same as the number of buildings reporting to the EMIS. This means that, either the threshold for a building to be classified as energy efficiency is not too stringent and most (all) buildings will be classified as such, or that only energy efficient buildings are expected to report to the EMIS. In the first case, it would most probably be appropriate to aim at higher thresholds for buildings in the energy standards to create incentives for higher energy performance. In the later case, having only energy efficient buildings reporting to the EMIS would reduce the usability of the information in the system, as it would fail to capture information on less energy efficient buildings, therefore establishing an information bias towards more energy efficient buildings (see section 5.2 on recommendations).								
Component 3.1.								
No. of public buildings utilizing the established system for providing information about the features, technical specifications and costs of new EC&EE and LC technologies each year, starting Year 2 [buildings/year]	0	At least 35	100					
No comments.								
No. of banks that are providing financing for EC&EE/LC projects through the market-based financing scheme for public buildings [number of banks]	0	3	5					
Comments. While the indicator meets the definition of SMART, perhaps a better indicator that captures the volume of resources allocated through the market-based financing scheme would have provided more relevant information to the sector.								
Component 3.2.								
No. of EC&EE/LC projects financed through the market-based financing scheme for public buildings [number of projects]	0	At least 5[29] (At least 10[27])	10[29] (20[27])					
Annex B of the ProDoc further clarifies that the projects that contribute to the target of this indicator are defined as "… projects that were implemented by public buildings and funded by the banks/FIs that are implementing the market-based financing schemes developed by the PSBEE Project",								

[27] Target modified during the inception workshop. Inception workshop report. 2019. p. 27
[28] Original target in the ProDoc.
[29] Target modified during the inception workshop. Inception workshop report. 2019. p. 29

Indicator	Baseline	Midterm target	End-of-project target	Smart analysis				
				S	M	A	R	T
No. of successfully implemented EC&EE/LC technology application demonstrations in public buildings [number of projects]	0	At least 5[29] (At least 10[27])	10[29] (20[27])					
No comments.								
No. of EC&EE/LC projects implemented in public buildings in other provinces that replicate the demonstrations [number]	0	At least 5	10					
No comments.								
Component 4.								
No. of trained public building personnel that are qualified and skilled in the design and cost-effective implementation and evaluation of EC&EE projects [number of trained people]	0	At least 1,500	3,600					
Comments. It is noted that the indicator refers specifically to people who are "qualified and skilled" and not only to people who have received training. The characteristic of specificity is marked in yellow since it is recommended to disaggregate by gender the targets of indicators for training activities to promote equal access to such activities and to obtain information on gender balance in the organizations and sectors where the trainings are provided.								
No. of public buildings with established energy management programs [that] are implementing EC&EE/LC projects [number of buildings]	0	At least 400[30] (At least 1,000[27])	At least 1,000[30] (2,200[27])					
No comments.								

[30] Target modified during the inception workshop. Inception workshop report. 2019. p. 30

4.2. Progress towards results

4.2.1. Progress towards outcomes analysis

The assessment of the project's progress towards results is provided on Table 7 against the mid-term targets in the PRF, as amended during project implementation. The main results and progress and the justification for the rating are described in the following paragraphs. Table 7 uses a color-code to indicate targets that have been (i) achieved (green), (ii) on target to be achieved (yellow), and (iii) not on target to be achieved (red).

Table 7. Progress towards results matrix

Project strategy	Indicator	Baseline level	Level in first PIR (2020)	Mid-term target	End-of-project target	Mid-term level and assessment	Achievement rating	Justification for rating
Goal. Reduction of greenhouse gas emissions through the widespread application of public building energy efficiency	Cumulative emissions reductions [$ktCO_2$]	0	N.R.[31]	18.6	55.7	[0][32]		The PSBEE project has partnered with the developers of 20 projects showcasing EC&EE/LC technologies in buildings. These projects are delivering GHG emissions reductions. However, these emissions reductions are attributable to the baseline projects implemented by these partners and not to interventions made with support from the GEF-financed project. For details see the discussion on outputs 3.1.5. and 3.2.2., below.
	Annual growth rate of GHG emissions [%]	1.8	N.R.	1.2	0.6	0.5		Target achieved, but most probably due to COVID-19 and not to long-term

[31] Not reported.

[32] The value for GHG emissions reduction is listed in square brackets, pending a review of recommended review of the scope of the demonstration projects selected under outputs 3.1.5. and 3.2.2.

Project strategy	Indicator	Baseline level	Level in first PIR (2020)	Mid-term target	End-of-project target	Mid-term level and assessment	Achievement rating	Justification for rating
								changes in the public buildings sector. A rebound in GHG emissions could be expected once the restrictions due to the pandemic are eased.
Objective. Facilitation of the energy conserving and energy efficient operation of buildings and building services in the public sector in China	Cumulative fossil fuel savings due to project intervention [ktce]	0	0	2,174	6,523	Not assessed	Not assessed	The indicator is to be measured based on reports from the PBEMIS database and assessed after the submission of the second and fourth PIRs. The PBEMIS database had not been completed by the time of the MTR.
	New jobs created with the application of EC&EE technologies and techniques in the public buildings sector in China [number]	0	0	At least 700	3,600	Not assessed	Not assessed	The indicator is to be measured by means of a building industry survey and a sociological survey, after the submission of the second and fourth PIRs. The surveys had not been completed by the time of the MTR.
Component 1. Public sector EC&EE policy and regulatory frameworks								
Outcome 1. Strict enforcement of approved enhanced policies and rules and	No. approved and enforced policies, and associated guidance and implementing rules and	0	0	2	8	5		The following policies and guidelines have been adopted: i) "Policy and regulation framework for energy saving measurement and

Project strategy	Indicator	Baseline level	Level in first PIR (2020)	Mid-term target	End-of-project target	Mid-term level and assessment	Achievement rating	Justification for rating
regulations on energy efficiency and low-carbon operation and maintenance of public sector buildings	regulations (IRRs) [number][33]							verification of public buildings". ii) "Standards, policies and operating mechanism of energy conservation measurement and verification". iii) "Guideline for energy efficiency evaluation and review of large public buildings". iv) "Management guideline for energy efficiency life management of large public buildings", and, v) Roadmaps for the adoption of policies in five provinces. Additional guidelines are under development and the work on plans for the replication of policies is scheduled to start in 2021.
	No. of improved and updated public sector building energy	0	0	1	2	0		Two draft standards are completing the process of public consultation:

[33] Policies and regulations that add to the target of this indicator are those listed in footnote 21 of the ProDoc (section VI. Project Results Framework): "These are policies on: (a) energy monitoring and reporting of public sector buildings, as well as on their energy performance evaluation; (b) energy savings verification system (ESVS) for public sector buildings including the associated guidelines and IRRs on the reporting and verification of energy savings realized from registered EC&EE projects; and, (c) improved and revised Regulations on Energy Conservation in Public Sector including the associated new set of guidance and institutional frameworks. Also included are developed and approved follow-up plan for the replication of piloted EC&EE improvement policies in public buildings in other provinces."

Project strategy	Indicator	Baseline level	Level in first PIR (2020)	Mid-term target	End-of-project target	Mid-term level and assessment	Achievement rating	Justification for rating
	standards [number]							(i) Draft standard on energy efficiency evaluation of public buildings; and, (ii) Draft technical standard for energy efficiency retrofitting of public buildings.
Component 2. Energy performance monitoring and evaluation system for public sector buildings								
Outcome 2. Better control and enhanced management of the energy performance of public sector buildings	No. of official building energy audits completed each year under the energy audit system starting Year 1 [audits/year]	0	0	8	12	0		The energy audit system has not been completed.
	No. of public buildings that regularly submit energy supply and consumption reports annually to the EMIS [buildings/ year]	0	0	At least 400[34] (At least 1,000[35])	At least 1,000[36] (2,200[35])	555		The EMIS is operational and building managers can report to the system. Only buildings that are classified as energy efficient report to the EMIS.

[34] Target modified during the inception workshop. Inception workshop report. 2019. p. 27
[35] Original target in the ProDoc.
[36] Target modified during the inception workshop. Inception workshop report. 2019. p. 11

Project strategy	Indicator	Baseline level	Level in first PIR (2020)	Mid-term target	End-of-project target	Mid-term level and assessment	Achievement rating	Justification for rating
	No. of public buildings that are classified as energy efficient [number of buildings]	0	0	At least 400[37] (At least 1,000[38])	At least 1,000[39] (2,200[38])	555		The EMIS is operational and building managers can report to the system. Buildings that report to the EMIS are selected by provincial governments.
Component 3. EC&EE improvement promotion and demonstration programs for public sector buildings								
Component 3.1. Facilitation of EC&EE and LC technologies application demonstrations								
Outcome 3.1. Increased availability of resources (technical capacity, information, and financing) for EC&EE initiatives in public sector buildings and facilities	No. of public buildings utilizing the established system for providing information about the features, technical specifications, and costs of new EC&EE low carbon technologies each year starting Year 2 [buildings/year]	0	0	At least 35	100	0		The work on the PBEMIS database was delayed by the late implementation of the EMIS but is expected to be finalized in 2021. Once the system is online, buildings will be able to provide information on EC&EE and LC technologies.
	No. of banks that are providing financing for	2	0	3	5	0		While the PMO reports that six financial institutions are financing building projects adopting EC&EE/LC

[37] Target modified during the inception workshop. Inception workshop report. 2019. p. 27
[38] Original target in the ProDoc.
[39] Target modified during the inception workshop. Inception workshop report. 2019. p. 11

Project strategy	Indicator	Baseline level	Level in first PIR (2020)	Mid-term target	End-of-project target	Mid-term level and assessment	Achievement rating	Justification for rating
	EC&EE/LC projects through the market-based financing scheme for public buildings [number of banks]							technologies, these are not banks that are providing financing for EC&EE/LC technologies through a market-based financial mechanism developed with support from the PSBEE project, as it was originally intended. The work on the design of the market-based financing scheme only started during the second quarter of 2021.[40]
Component 3.2. Implementation of EC&EE and LC technologies application demonstrations								
Outcome 3.2. Increased application of EC&EE technologies in public sector buildings and facilities	No. of EC&EE/LC projects financed through the market-based financing scheme for public buildings [number of projects][41]	0	0	At least 5[42] (At least 10[43])	10[44] (20[43])	[10][45]		The PSBEE project has awarded grants to proponents of ten projects showcasing different financial mechanisms, but not to projects financed through a market-based financial mechanism developed with support from the PSBEE project, as it was originally intended.

[40] APR for 2020, p. 22.
[41] The projects that contribute to the target of this indicator are defined as "… projects that were implemented by public buildings and funded by the banks/FIs that are implementing the market-based financing schemes developed by the PSBEE Project" (ProDoc, Annex B on Monitoring Plan, p. 88).
[42] Target modified during the inception workshop. Inception workshop report. 2019. p. 29
[43] Original target in the ProDoc.
[44] Target modified during the inception workshop. Inception workshop report. 2019. p. 29
[45] The number of demonstration projects is listed in square brackets, pending a review of the appropriateness of the process to award and disburse grants to projects showcasing various financial mechanisms. See the justification for the rating and the discussion on output 3.2.2.

Project strategy	Indicator	Baseline level	Level in first PIR (2020)	Mid-term target	End-of-project target	Mid-term level and assessment	Achievement rating	Justification for rating
								The work on the design of the market-based financing scheme only started during the second quarter of 2021.[46]
	No. of successfully implemented EC&EE/LC technology application demonstrations in public buildings [number of projects]	0	2	At least 5[47] (At least 10[48])	10[49] (20[48])	[10][50]		The PSBEE project has awarded grants to proponents of ten projects showcasing EC&EE/LC technology applications in different types of buildings, but not to projects using GEF-resources to design and implement demonstration projects that deliver *incremental* energy savings and GHG emissions reductions, as originally intended.

[46] APR for 2020, p. 22.
[47] Target modified during the inception workshop. Inception workshop report. 2019. p. 29
[48] Original target in the ProDoc.
[49] Target modified during the inception workshop. Inception workshop report. 2019. p. 29
[50] The number of demonstration projects is listed in square brackets, pending a review of the appropriateness of the process to award and disburse grants to projects showcasing various EC&EE/LC technology applications in buildings. See the justification for the rating and the discussion on outcome 3.1.5.

Project strategy	Indicator	Baseline level	Level in first PIR (2020)	Mid-term target	End-of-project target	Mid-term level and assessment	Achievement rating	Justification for rating
	No. of EC&EE/LC projects implemented in public buildings in other provinces that replicate the demonstrations [number]	0	0	At least 5	10	0		Activities to replicate demonstration projects have not started.
Component 4. Public sector EC&EE capacity and awareness enhancement program								
Outcome 4. Enhanced awareness and knowledge of public sector authorities and personnel and the citizenry on the cost-effective application of EC&EE technologies	No. of trained public building personnel that are qualified and skilled in the design and cost-effective implementation and evaluation of EC&EE projects [number of trained people]	0	813	At least 1,500	3,600	3,147		Training centers in Beijing and Chongqing are operational and have already trained approximately 1,800 and 1,300 persons, respectively. Additional training centers in Tianjin, Suzhou, Guangzhou are in the process of being established. It is noted that the indicator refers to "personnel that are qualified and skilled" and not only personnel that have received training. The project is only reporting on personnel that have received training and needs to implement means to verify that trained

Project strategy	Indicator	Baseline level	Level in first PIR (2020)	Mid-term target	End-of-project target	Mid-term level and assessment	Achievement rating	Justification for rating
								personnel are in fact "qualified and skilled".
	No. of public buildings with established energy management programs [that] are implementing EC&EE/LC projects [number of buildings]	0	0	At least 400[51] (At least 1,000[52])	At least 1,000[53] (2,200[52])	446		The EMIS is operational and building managers can report to the system. Buildings that report to the EMIS are selected by provincial governments.

[51] Target modified during the inception workshop. Inception workshop report. 2019. p. 30
[52] Original target in the ProDoc.
[53] Target modified during the inception workshop. Inception workshop report. 2019. p. 11

The evaluation of the achievement of results at the outcome and output level is based on the PRF and the reconstructed ToC developed for the MTR. This section presents a detailed description of outputs delivered under each project component.

Component 1. Public sector EC&EE policy and regulatory frameworks

Outcome 1. Strict enforcement of approved enhanced policies and rules and regulations on energy efficiency and low-carbon operation and maintenance of public sector buildings

Achievements

Output 1.1. Completed comprehensive assessment of applicable foreign and domestic EC&EE and LC policies and regulations for public sector buildings

In December 2020, the project completed and published a report on "Foreign and domestic energy conservation & management policies and regulations for public buildings". The report provides an overview of energy efficiency policies that was used as an input to the project´s work on policy and regulatory developments.[54]

Output 1.2. Formulated and promoted EC&EE improvement roadmaps

During 2019 and 2020, the project completed the following work on roadmaps for the promotion of EC&EE and LC technologies and practices in public buildings:

- "Current status and barriers of energy efficiency improvement in public buildings";
- "Analysis of energy use scenarios and energy efficiency objectives of public buildings";
- "Roadmap for energy efficiency improvements in public buildings"[55];
- "Roadmap for energy efficiency improvement of public buildings in five provinces and cities"[56]; and,
- Two conferences and 10 seminars to discuss and gather input for the policy and regulatory development work.

Key recommendations from the energy efficiency roadmaps have been incorporated in the "14th Five-Year Plan on Building Energy Efficiency" of Beijing, Changsha, Qingdao, Chongqing, and other provinces and cities.[57]

Output 1.3. Formulated and enforced policies including the associated guidance and implementing rules and regulations (IRRs) on energy monitoring and reporting, energy savings verification, and energy conservation in public buildings.

As part the work on policies and guidelines on energy monitoring and reporting, the project has made progress with the following products:

- Report on "Analysis of regulations and financial policy for energy saving and cost reduction in public buildings";

[54] APR for 2020, section B, p. 3.
[55] Tsinghua University, Taihor Technology. Roadmap for energy efficiency of Chinese public buildings. Promotion Road of Chinese Public Buildings Energy Efficiency. no date.
[56] Op.cit.
[57] APR for 2020, section B, pp. 4 - 5.

- "Policy and regulation framework for energy saving measurement and verification of public buildings";
- "Standards, policies and operating mechanism of energy conservation measurement and verification";
- "Guideline for energy efficiency evaluation and review of large public buildings";
- "Management guideline for energy efficiency life management of large public buildings".
- Draft report on "Public building energy information management system related policies and supporting incentives"; and,
- Draft report on "Detailed implementation rules and application guidelines".[58]

Output 1.4. Completed demonstrations on the application of EC&EE policies and systems in 3 to 5 provincial Department of Housing and Urban-Rural Development (DOHURD) regions

The outbreak of COVID-19 delayed the start of the activities under this output to the third quarter of 2021.[59] This constitutes a significant delay, given that the activities were planned to start during the third quarter of year one.[60] As shown in Figure 1, output 1.4. has a dependent output (i.e., Output 1.5.), which makes delays in the completion of output 1.4. more relevant to project implementation. Also, the replication of policies and project solutions in other regions in China is a key element to the project exit strategy and sustainability. Therefore, it is recommended that the project team includes a new entry in the risk log to facilitate a close monitoring of the implementation of the sequence of activities under outputs 1.4. and 1.5.

Draft guidelines for the evaluation and management of energy performance of large, public buildings in Qingdao have been produced, as well as draft provisions for measuring and verifying improvements in energy performance of public buildings in Ninghe District (Municipality of Tianjin).[61]

Output 1.5. Developed and approved follow-up plan for the replication of piloted EC&EE improvement policies in public buildings in other provinces

The start of the activities under this output have been delayed by the pandemic and the late start of the activities of the preceding output 1.4. As indicated in the discussion of output 1.4., the MTR team recommends defining a new risk to monitor implementation of outputs 1.4. and 1.5.

Output 1.6. Developed improved and updated public sector building energy standards

Two draft standards have been developed with support from the PSBEE project:

- Draft standard on evaluation of the energy efficiency of public buildings; and,
- Draft technical standard for energy efficient retrofitting of public buildings.

The draft standards are completing the public consultation process and would be considered for approval after that process concludes.

[58] APR for 2020, section B, pp.6 – 8, interviews with the PMO.
[59] Interviews with the PMO.
[60] ProDoc, Annex A. Multiyear work plan. p. 81.
[61] "Measures for the Administration of Energy Conservation Assessment and Review of Large-scale Public Buildings in Qingdao", no date; "Measures for the Whole Process Energy Conservation Management of Large-scale Public Buildings in Qingdao", no date; "Notice of Ninghe District Housing and Construction Committee on the Issuance of the Measures for Measuring and Verifying Energy Savings from Energy Efficiency Improvement in Public Buildings in Ninghe District", March 2021.

Output 1.7. Developed life energy efficiency management and evaluation regulation for large public buildings

Output 1.7. was added during the inception workshop. The following reports have been completed:

- "Management of energy efficiency over the life of large public buildings";
- "Appraisal of energy conservation in large public building";
- "Energy saving management and evaluation system for large public buildings";
- "Energy efficiency management over the life of large public buildings in Qingdao"; and,
- "Assessment and management of energy efficiency in public buildings in Qingdao".

Output 1.8. Methodology research on regional energy planning & operation management for public buildings, and demonstration

Output 1.8 was included during the inception workshop. Activities are scheduled to start during the third quarter of 2021.

Component 2. Energy performance monitoring and evaluation system for public sector buildings

Outcome 2. Better control and enhanced management of the energy performance of public sector buildings

Achievements

Output 2.1.1. Reviewed and verified supplemental baseline energy information in the various major types of buildings within the public sector

Output 2.1.1. was completed in December 2020. The products delivered as part of this output are:

- Report on "Research report on energy management information system of public buildings";
- Report on "Research on validation method of energy consumption baseline data of public buildings"; and,
- "Technical guidelines for the validation and reporting of energy consumption baseline data of public buildings"

Output 2.1.2. Established public sector building energy audit system

Activities under output 2.1.2. have made some progress. However, since the start of activities under output 2.2.1. (energy audits of public buildings) requires the implementation of the energy audit system under output 2.1.2., energy audits have not started. The following products have been completed under output 2.1.2.:

- Report on "Energy audit methods, system status and demand analysis of public buildings";
- "Guideline for energy audit of public buildings"; and,
- Seminar to discuss the energy audit system.

Output 2.1.3. Established public sector buildings EMIS

The platform to host the EMIS has been established and information on approximately 550 public buildings has been uploaded to the system. In addition to the platform, the following products have been finalized under output 2.1.3.:

- "Design scheme of public building energy information management system";

- "Manual of public building energy information management system";
- "Database structure of public building energy management information system"; and,
- "Management mechanism of public building energy management information system".

The EMIS is available under <http://111.20.64.6:8080/login>.

Output 2.1.4. Established ESMVS in public buildings sector

A design plan for the ESMVS has been prepared, the system has been implemented and is operational.

Output 2.1.5. Established green finance indicator system which supports the building energy efficiency improvement

Output 2.1.5. was included during the inception workshop in 2019. Activities under the output started in October 2020. A report on "Green finance supporting models for building energy efficiency improvement" has been completed.

Output 2.2.1. Completed energy audits of public sector buildings

Activities under output 2.2.1. have not started since the required energy audit system (output 2.1.2.) has not been finalized. Considering that more than 16,000 energy audits of public buildings had already been completed by 2017[62], the relevance of completing a few more audits with support from the project is arguably not a priority. Moreover, stakeholders interviewed for this MTR indicated that the policies and procedures for energy audits in public buildings in China are mature and effective.

Output 2.2.2. Established public buildings EMIS (PBEMIS) database

Activities under output 2.2.2. have not started as they require a finalized EMIS. Activities will start with a slight delay as compared to the planned start in Annex A of the ProDoc, that had it scheduled for the third quarter of the second year of project implementation.

Output 2.2.3. Investigation on energy consumption of different types of public buildings

Output 2.2.3. was added to the project design during the inception report. Activities under this output started in December 2019 and have produced a report on energy consumption in public buildings in northern China and a draft report on energy use in public buildings in Changsha, Chengdu, Nanjing, Shanghai, and Wuhan. An assessment of energy use in 200 public buildings located in localities with hot summers and warm winters was also completed.

Component 3. EC&EE improvement promotion and demonstration programs for public sector buildings

Component 3.1. Facilitation of EC&EE and LC technologies application demonstrations

Outcome 3.1. Increased availability of resources (technical capacity, information, and financing) for EC&EE initiatives in public sector buildings and facilities

Achievements

Output 3.1.1. Established scheme for providing information about the features, technical specifications, and costs of new EC&EE and LC technologies (including products) for the public sector

[62] Tsinghua University, Taihor Energy. op.cit.

Activities under output 3.1.1. started on October 2020. A draft version of a report on "Energy management data and information analysis for public buildings" has been produced.

Output 3.1.2. Published directory of recommended applicable and cost-effective new EC&EE and LC technologies (systems and products) for public sector building administrators/managers

Activities under output 3.1.2. are scheduled to start during the third quarter of 2021.

Output 3.1.3. Completed assessment of market-based financing scheme options

The review of existing market-based financing schemes for EC&EE and LC technologies in public buildings has been finalized and a list of potential schemes to be promoted by the PSBEE project has been drafted. As part of this work, the project completed the following products:

- Report on "Evaluation of the effectiveness and impact of economic incentive policies or systems in public buildings"; and,
- Policy brief on "Guidelines on investment and financing of green insurance credit enhancement model for public buildings".[63]

Output 3.1.4. Designed market-based financing of new EC&EE and LC technology (system and product) applications

The start of activities under this output was planned for the second quarter of 2021.[64] As shown in Figure 2 (page 46 of this report), output 3.1.4. has a long chain of dependent outputs, including the establishment of a market-based financing scheme (output 3.1.4.), the implementation of demonstration projects financed by the scheme (output 3.2.1.), and the reporting of the results from these demonstration projects (output 3.2.4.). The late start of the design of the market-based financing scheme had an impact on the project strategy, since the demonstration projects were ultimately selected before the financing scheme had been designed and implemented, thus preventing the original project objective of testing and documenting a financing scheme for energy efficiency in public buildings. This was a material change to the project design that was not adequately approved and documented.

Draft guidelines on insurance products for energy efficient buildings have been produced.[65]

Output 3.1.5. Selected EC&EE and LC projects (total of 20) in public buildings in selected public sub-sectors

The PSBEE project was expected to identify and implement 20 projects for the demonstration of EC&EE/LC technology applications in public buildings.[66] The number of demonstration projects was later reduced to 10 during a workshop on 22 – 24 January 2019.[67] GEF-resources had been originally requested to complete pre-feasibility assessments of potential demonstration projects[68], prepare feasibility assessments and the engineering design of these projects[69], and for the implementation, monitoring and evaluation of the demonstration projects.[70] The budget allocated for this group of interventions was

[63] APR for 2020, section B, pp.7.
[64] APR for 2020, section B, pp.22.
[65] "Public building energy efficiency insurance. Investment and financing guidelines". No date.
[66] ProDoc, pp. 29 – 38.
[67] Minutes for "Project Log Framework Retrofitting Workshop – Energy Efficiency Improvement in the Public Sector in China (PSBEE) project", 2019.
[68] ProDoc, p. 34.
[69] ProDoc, p. 35.
[70] ProDoc, p. 36 - 37.

substantive, including USD 2 million for equipment (hardware required for the implementation of demonstration projects), and additional resources for professional consulting services for the pre-feasibility, feasibility, design, and promotion of the demonstration projects.[71] During the inception workshop in June 2019, the total budget to identify, assess, implement, monitor, evaluate, and promote the demonstration project was increased to USD 3,8 million (incl. activities to design the market-based incentive mechanism under outputs 3.1.3. and 3.1.4.). The revision to the project budget allocated these resources under a category for contractual services by companies (ATLAS budget account 72100), with a view to securing contracts with companies that would provide professional services and procure the equipment required by the selected demonstration projects. However, the budgets of individual demonstration projects in the sample reviewed by this evaluation reveals that resources are allocated to consulting services, with no investment in equipment. As exemplified by the discussion of the demonstration project number seven, below, and in the presentation of the results under output 3.2.2, it seems quite impractical to appropriately commit and invest these large sums on professional services within the scope and timeframe of the PSBEE project.

Demonstration projects were selected during project implementation based on the criteria shown in Box 1 and various versions of the ToRs shown in Annex K. The criteria for the selection of these demonstration projects are based on standard evaluation criteria for conventional procurement processes, without further elaboration on important characteristics that were expected from demonstration projects, including the proposals´ capacities to improve the energy efficiency of underlying baseline projects and to deliver incremental GHG emissions reductions in a cost-efficient manner. It is noteworthy that, despite the minimum-cost criterion, all proposals selected under output 3.2.2. were priced at USD 66,000 except for two, priced at USD 64,000 and USD 65,826. Likewise, seven demonstration projects selected under output 3.2.3. were priced between USD 198,000 and USD 200,000. The fact that the prices of proposals with vast differences in scope were the same suggests that the design of the calls for proposals and the evaluation and selection process did not strive for cost-effectiveness.

[71] ProDoc section X, pp. 71 – 77. The total budget for professional consulting services in the ProDoc was USD 391,000, including resources for activities other than the demonstration of EC&EE/LC technology applications in public buildings.

Box 1. Selection criteria for demonstration projects under component 3.1.

Item	Full Mark	Criteria
Quotation （30 points）	30	Take the lowest budget as the baseline for full mark, i.e. 30 points. The points of others = (budget/baseline) x 30.
Capability, past achievement, personnel （20 points）	10	Accomplished at least 8 projects on designing, consulting or implementing energy efficient buildings or green buildings development in the past 5 years, 10 points; 5-7 projects, 7 points; 2-4 projects, 4 points;
	10	5 team members with senior profession title, 10 points; 3-4 team members, 6 points; 2 or less, 2 points.
Proposal （50 Points）	10	Good understanding of requirement, 8-10 points; Feasible, 4-7 points; Basically satisfying, 0-3 points.
	15	An excellent implementation plan is drafted, 11-15 points; Feasible, 4-7 points; Basically satisfying,0-3 points
	10	An excellent progress plan is drafted, 8-10 points; Feasible, 4-7 points; Basically satisfying,0-3 points
	15	Excellent results is estimated, 11-15 points; Feasible, 7-10 points; Basically satisfying, 0-6 points
Total	100	

Source: Communications with PMO.

The selected demonstration projects are different from those proposed in the ProDoc (Annex K). The demonstration projects selected during project design could not be pursued due to the change in IP before project start. Notably, among the 20 demonstration projects selected during implementation, there are eight projects in private buildings, as opposed to public buildings, which were the original target of the PSBEE project. The selected demonstration projects under output 3.1.5. are listed in Table 8.

According to the information made available to the MTR, the demonstration projects selected by the PSBEE project are in fact deploying EC&EE/LC technology applications in public *and private* buildings, and these technology applications have indeed the potential to reduce GHG emission. However, based on the information available for a sample of nine projects reviewed for the MTR, it can be concluded that the terms of the agreements between the PSBEE project and the proponents of demonstration projects do not require proponents to use the GEF grants to improve the energy performance of demonstration projects. Instead, the obligations of project proponents seem limited to reporting on the implementation of demonstration projects, including on the energy performance. Based on the information provided by the PMO for the MTR, some or all the projects selected by the PSBEE project do not seem to meet the characteristics defined in the ProDoc and may need to be redesigned or replaced by more suitable demonstration projects. The main characteristics sought in demonstration projects include adherence to the incremental-cost reasoning laid down in the ProDoc, direct contributions to energy performance improvements and to global environmental benefits, and cost-efficiency considerations to ensure that the GEF grants are used appropriately and efficiently. This is the main drawback from the implementation of the PSBEE project,

and one that requires immediate corrective actions by the PMO, with support from UNDP (see section on 5.2. on recommendations).

The following example illustrates the issues related to the selection of the demonstration projects under output 3.1.5. and the unsatisfactory terms of the agreements with project proponents:

Demonstration project 7. The project sought to improve the energy performance of the refrigeration and HVAC systems and improved the energy management system in a private shopping mall and hotel complex. Improvements to the energy performance of the building were undertaken under the terms of an energy performance contract (EPC) signed in June 2019, seemingly before the project itself was selected by the PSBEE project. The works were completed in 2020. The PSBEE project awarded the proponents a grant for USD 69,400 for the elaboration of three deliverables: (i) an energy-savings plan (USD 14,840), (ii) a report on energy performance (USD 41,340), and (iii) uploading information to EMIS (USD 8,720). The estimated effort for the preparation of the deliverables is 540 working days. While it is most probable that the project may indeed improve the energy performance of the building, that improvement is attributable to the EPC entered into by the project proponents, and not the GEF grant. Also, the estimated effort and cost for the elaboration of the three agreed deliverables seem excessive, not the least because, under the terms of the signed EPC, the energy-savings plan and the monitoring of energy performance would have been completed regardless of the input by the PSBEE project. Uploading information to EMIS may not have been part of the obligations under the EPC, but the price-tag of more than USD 8,000 does not seem to be justified.

Table 8. Demonstration projects selected

No.	Building	Public/ Private	Location	Technologies	GEF-resources allocated [USD]	Status
1	Culture center	Public	Haimen city, Jiangsu Province	Passive design, high-performance building envelope, high-efficiency HVAC system, natural lighting, solar thermal and photovoltaic energy generation, energy management system.	USD 240,000	Commissioned
2	University hospital	Public	Qingdao city, Shandong Province	Solar photovoltaic energy generation, high efficiency ventilation, heat pumps, waste heat utilization, fan and water pump frequency conversion, energy management system and intelligent logistics management platform.	USD 300,000	Commissioned
3	Office building	Private	Shenzhen city, Guangdong Province	Natural lighting and ventilation, photovoltaic energy generation, energy storage, low-voltage DC distribution system, demand-side management.	USD 200,000	Commissioned
4	University campus	Public	Beijing	High-performance building envelope, high efficiency lighting and heating, solar thermal and photovoltaic energy generation, heat pump, energy management system.	USD 200,000	Commissioned
5	Elementary and middle school	Public	Beijing	High-efficiency lighting with advanced control systems, solar thermal energy generation, heat pump, swimming pool temperature control, air-quality monitoring system, rainwater harvesting, energy metering, energy management system.	USD 200,000	Commissioned
6	Hospital	Public	Shanghai	High-efficiency HVAC system, high-efficiency lighting, chillers and water heating systems, solar photovoltaic energy generation, energy metering, energy management system.	USD 200,000	Commissioned
7	Commercial building	Private	Beijing	Building information modelling, chiller and HVAC advanced control systems, fan frequency conversion, energy management system.	USD 69,400	Commissioned
8	Airport terminal	Public	Beijing	Building information modelling, high-efficiency HVAC system, solar photovoltaic energy generation, natural lighting and ventilation with advanced control systems, ice thermal energy storage system, heat pump, heat recovery.	USD 200,000	Commissioned
9	District heating and cooling	Private	Chongqing	Natural gas combined heat and power (CHP), heat pump, energy metering, high-efficiency water chillers, energy management system.	USD 198,000	Under implementation
10	Various	Private	Qingdao city, Shandong Province	Building information modelling, solar thermal and photovoltaic energy generation, wind power generation, high-efficiency lighting and water chillers, heat pump, boiler upgrades, heat recovery, advanced control systems, energy management system.	USD 198,750	Commissioned

Source: PSBEE. Fact sheets on demonstration projects. Communications with PMO.

Output 3.1.6. Completed feasibility analyses and design of 20 EC&EE and LC technology application demonstrations

The demonstration projects (see Table 8. Demonstration projects) selected by the PSBEE project were in advanced stages of design and construction, making the feasibility analysis proposed in the ProDoc unnecessary. In some case, experts facilitated by the PSBEE project provided comments to project implementation.[72]

Component 3.1. Implementation of EC&EE and LC technologies application demonstrations

Outcome 3.2. Increased application of EC&EE technologies in public sector buildings and facilities

Achievements

Output 3.2.1. Established scheme for market-based financing of new EC&EE and LC technology (system and product) applications

Activities under output 3.2.1. are scheduled to start during the third quarter of 2021. The late start of activities under output 3.1.4. on the design of the market-based financing scheme had an impact on output 3.2.1. and on the overall project strategy (see discussion under output 3.1.4.).

Output 3.2.2. Implemented 10 EC&EE and LC projects financed through market-based financing scheme in public buildings in selected public sub-sectors

As discussed above, the design of the PSBEE project required the design of a market-based financing scheme (output 3.1.4.), to be piloted in ten demonstration projects under output 3.2.2. Even though the financing scheme had not been designed, the project still selected ten demonstration projects and allocated close to USD 660,000 of GEF resources to support their implementation. Instead of piloting a financial scheme developed by the PSBEE project, the selected demonstration projects were chosen to showcase existing financing mechanisms available in the Chinese market. GEF resources were not granted to demonstration projects based on their specific needs, but instead all received essentially the same amount (USD 66,000). Stakeholders from financial institutions interviewed by the evaluation team reported that they had not received support from the PBSEE project and were not aware of the project´s activities on the development of financial products for investments in energy efficiency in public buildings. This shift in strategy is a material change to the original project design that was not adequately approved and documented. The effect on removing financial barriers from the approach adopted by the project is unclear and may not be effective.

Demonstration projects under output 3.2.2. were selected based on the same criteria used for projects under output 3.1.5. (see Box 1) and also used versions of the ToRs shown in Annex K. These ToRs and criteria had the shortcomings discussed in the earlier presentation on output 3.1.5., and the projects selected under output 3.2.2. share the same weaknesses with those under output 3.1.5. That is, energy performance improvements cannot be attributed to the PSBEE project, activities do not adhere to the incremental cost reasoning laid down in the ProDoc, and no cost-efficiency criteria was used in the selection and negotiation of agreements with project proponents. The demonstration projects selected to showcase financial mechanisms for energy efficiency in public buildings are presented in Table 9, together with the mechanism chosen in each case. The following example illustrates the shortcomings of demonstration projects under output 3.2.2.:

[72] Sample of reports of demonstration projects reviewed by the MTR team. Interviews with members of the PMO.

Demonstration project 8. The project's objective was to improve the energy performance in a data center belonging to a telecommunication's company. Activities to improve the performance of the HVAC and energy management systems were implemented under an EPC. The project was started and completed in December 2020. The project received a grant from the PBSEE project for USD 66,000 and the agreed deliverables are: (i) an energy-efficiency plan (USD 19,850), (ii) a report on energy performance (USD 44,650), and (iii) uploading information to EMIS (USD 1,500). The estimated effort for the preparation of the deliverables is 58 person·months, including 50 person·months charged to the GEF grant. These cost estimates seem excessive given the apparent duration of the project and the fact that an energy efficiency plan and the monitoring of energy performance are tasks that would have been completed under the EPC, even if the absence of a GEF grant.

Table 9. Projects demonstrating financial mechanisms for energy efficiency

No.	Building	Public/ Private	Location	Technologies	Financing mechanism	GEF-resources allocated [USD]	Status
1	Middle school	Public	Beijing	High-performance building envelope, high-efficiency boiler, HVAC and lighting with advanced control systems, solar thermal and photovoltaic energy generation, energy management system.	Benefit sharing	66,000	Commissioned
2	Hospital	Public	Leshan city, Sichuan Province	High-efficiency HVAC, lighting and elevator systems, boiler upgrades energy efficient cooking appliances, high-efficiency water pumps and chiller motors.	Energy savings performance contracting	66,000	Commissioned
3	Commercia l building	Private	Ningbo city, Zhejiang Province	Solar photovoltaic energy generation, advanced HVAC control system, high-efficiency water chillers, high-efficiency lighting with advanced control systems, high-efficiency fans, demand side management, energy management system.	Demand side management	66,000	Commissioned
4	Office building	Public	Beijing	Energy efficient building envelope, high-efficiency HVAC and lighting with advanced control systems, energy management system.	Insurance	66,000	Under implementation
5	Various	Private	Shanghai	Demand-side management, energy management system.	Demand side management	66,000	Commissioned
6	Office building	Private	Guilin city, Guangxi Autonomous region	Advanced HVAC control system, high-efficiency lighting, energy management system.	Leasing	65,826	Commissioned
7	University campus, hotel	Public	Tianjin	Advanced HVAC control system, high-efficiency lighting, high-efficiency boiler.	Carbon finance	66,000	Commissioned
8	Data center	Private	Guangzhou city, Guangdong province	High-efficiency HVAC with advanced control system, indoor air-quality monitoring, energy management system.	Green loans	66,000	Commissioned
9	Commercia l building	Private	Qingdao city, Shandong Province	Building information modelling, high-efficiency HVAC, lighting, and ventilation systems, ice thermal energy storage system, heat recovery, water pump frequency conversion.	Green bonds	64,000	Commissioned
10	Hospital	Public	Shanghai	High-efficiency HVAC, chillers, water pumping and lighting systems, advanced control systems, energy management system.	Insurance, green loans	66,000	Commissioned

Source: PSBEE. Fact sheets on demonstration projects. Communications with PMO.

Output 3.2.3. Implemented 10 EC&EE and LC technology application demonstrations in public buildings

The status of implementation of the ten demonstration projects showcasing the application of EC&EE and LC technologies and practices is shown in Table 9. Nine of the ten projects have been commissioned, and another is currently under implementations. However, as discussed under output 3.1.5., some or all the projects selected by the PSBEE project do not meet the characteristics defined in the ProDoc and may need to be redesigned or replaced by more suitable demonstration projects.

Output 3.2.4. Published reports on the impacts of the EC&EE and LC project financing and demonstration program

The performance of 18 commissioned demonstration projects is being monitored but a report has not been completed and published.

An initial workshop was held in July 2021 and a second event is planned for November 2021.

Output 3.2.5. Developed sustainable follow-up plans for the replication of the demonstrated applicable and feasible EC&EE and LC technologies in the public sector buildings in 5 other provinces

Activities under output 3.2.5. have not started.

Component 4. Public sector EC&EE capacity and awareness enhancement program

Outcome 4. Enhanced awareness and knowledge of public sector authorities and personnel and the citizenry on the cost-effective application of EC&EE technologies

Achievements

Output 4.1.1. Completed project promotional campaigns and workshops in target segments of the public sector

The project team has organized four conferences with a combined attendance of 600 participants. A promotional campaign was deployed in July 2021, and another is expected to take place in November 2021.

Output 4.1.2. Completed trainings for MOHURD and DOHURD authorities and technical staff on the implementation of the various EC&EE and LC programs

An online training course was prepared and offered to participants from government institutions, architecture, design, building materials and construction companies. In addition to the online training course, training centers in Beijing and Chongqing have held training workshops. Additional training centers in Guangzhou, Suzhou, and Tianjin are planned. Altogether, the project team reports that more than 3,000 people (40% female participants) have received training.

Output 4.1.3. Completed and post-evaluated EC&EE and LC capacity development programs for the public buildings sector

An assessment of the trainings and online course has been completed.

Output 4.2.1. Established information network for the promotion and dissemination of knowledge on public sector EC&EE and LC technology applications

Activities under output 4.2.1. are scheduled to start during the third quarter of 2021.

Output 4.2.2. Established public sector EC&EE and LC management cum education training centers in the different climate regions

The project has supported the establishment of training centers in Beijing and Chongqing. Additional training centers in Guangzhou, Suzhou, and Tianjin are planned. The project has adopted a standard and an operation plan to support the organization of these training centers.

Output 4.2.3. Established platform for information sharing on low-carbon technology, standard & policy applied public buildings among main cities along the silk & belt route.[73]

Preliminary results from the work undertaken under output 4.2.3. recommend the adoption of an international standard for energy efficiency in buildings in localities with hot climates.

Activities under output 4.2.3 have produced the following reports:

- Comparative study on European policies and standards for energy efficiency in buildings;
- Comparative study on the technical standards for green, low-carbon and energy-efficient buildings in Southeast Asia and Southern China; and,
- Comparison of green, low-carbon, energy-efficient building standards and related policy systems in Southeast Asian countries.

4.2.2. Remaining barriers to achieving the project objective

The planned project closing date of November 2022 is only 11 months away from the time of writing of this report. While the project has made significant progress under most outcomes, the work still ahead is significant and raises doubts about the possibility of concluding all the tasks withing the original project timespan. The conclusion of this evaluation is that a no-cost extension to the project's implementation period is needed given the complex project design, the problems encountered during the selection of demonstration projects, and the inevitable delays due to the COVID-19 pandemic.

The project's work on policy and regulatory development at the national level has been effective and the project results have contributed to removing the policy and regulatory barriers identified at that level during project design (barrier 1). The project team, together with partners and stakeholders, should build on that success to focus on the work to replicate/demonstrate the application of these policies and regulations at the provincial level (outputs 1.4. and 1.5.).

The project results have also contributed to address the lack of an evaluation system for energy management in public buildings (barrier 2). Activities under outcome two have successfully delivered an EMIS and ESMVS, and the work on an PBEMIS database is expected to conclude in 2021. Two key milestones remain to be achieved for the project to be effective at addressing this barrier: (i) make the information on energy performance and EC&EE and LC technologies and practices publicly accessible (outputs 2.2.2., 3.1.1., and 3.1.2.), and (ii) finalize and implement the energy audit system for public buildings (outputs 2.1.2. and 2.2.1.).

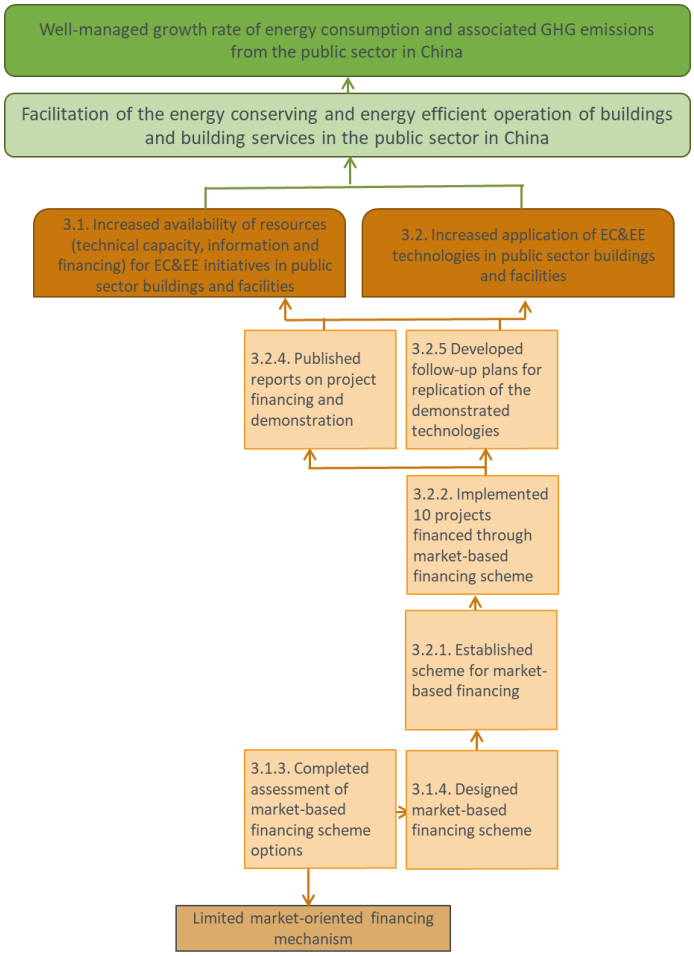
The elimination of financing-related barriers is perhaps the area where the project's contribution is less straightforward. The project design had defined a clear sequence of activities for the implementation of a market-based financial mechanism to be demonstrated by the project. This sequence of activities constitutes an important and distinct impact pathway in the reconstructed ToC that is shown in Figure 2 (overleaf). The

[73] Output added during the inception workshop in 2019.

impact pathway required the project to (i) assess existing financial mechanisms (output 3.1.3), (ii) design a financial incentive mechanism (output 3.1.4.), (iii) deploy that mechanism in collaboration with partner financial institutions (output 3.2.1.), (iv) implement demonstration projects benefiting from the incentive scheme (output 3.2.2.), and (v) evaluate the demonstration projects benefiting from the incentive scheme and disseminate the results. Undoubtedly, the plan in the ProDoc to implement this sequence of activities was going to be a challenge given the time available. However, this plan was abandoned early during project implementation and has not been substituted with an explicit and clear alternative that ensures that the project contributes to removing financial barriers to the adoption of EC&EE and LC technologies and practices in public buildings. The current approach of showcasing existing financing options through demonstration projects will possibly improve the understanding of the existing alternatives and limitations for financing energy efficiency measures in public buildings but it will fail short of providing an incentive scheme to public buildings in China and removing financial barriers. Interviews with stakeholders confirm that the financial barriers remain in place and that there are no adequate financial mechanisms and incentives to enable the adoption of EC&EE and LC technologies and practices in public buildings.

Trough the establishment of provincial training centers, the project is establishing a valid model for the development of capacities of staff in public buildings. Provided that the model continues to expand to additional provinces and that training activities in existing centers continue in the future, over time, the barrier related to low capacities and awareness in the public buildings sector will be eased.

Figure 2. Impact pathway on financial barriers



4.3. Project implementation and adaptive management

4.3.1. Management Arrangements

The PSBEE project is implemented under UNDP's NIM modality with MOHURD acting as IP. The project management structure, as defined in the ProDoc, consists of a PSC, a PMO, and a TAC (see also section 3.4.). During project design, the National Government Offices Administration (NGOA) had been selected as IP for project implementation. This decision was revised before the signature of the ProDoc, when implementation responsibilities were assigned to MOHURD.

Project steering committee. The PSC has met twice since project start: 15 September 2020 and 26 April 2021. At the meetings, the PMO provides updates on project progress and submits annual work plans for the consideration of the PSC. The PSC has also provided strategic guidance, recommending work on: (i) renewable energy, (ii) financial mechanisms, (iii) innovative technologies (i.e. artificial intelligence, energy storage, etc.), (iv) cooperation with countries along the Belt and Road Initiative [74], (v) project demonstrations of carbon-neutral buildings, (vi). expanding the work to disseminate the project results, including case studies, publications, etc., (vii) improving the understanding of GHG emissions from buildings, including linkages to the energy, transport and industry sectors, and (viii) focusing on green finance standards to support energy efficient, low-carbon buildings. [75] The PSC has also discussed approaches to a possible second phase of the project, that could be implemented during the eighth replenishment of the GEF Trust Fund.[76]

Project Management Office. According to the design in the ProDoc, the staffing of the PMO included a Project Manager, a Chief Technical Advisor (CTA), three component coordinators, and administrative staff. However, during implementation the composition was revised to include:

- A national program director (MOHURD);
- A deputy national program director (MOHURD);
- A director for operational management (Center of Science and Technology Industrialization Development, (CSTID));
- A deputy director for operational management (CSTID);
- A technical assistant;
- An administrative assistant;
- A finance assistant; and,
- A procurement assistant.

The team has been proactive in seeking, establishing, and maintaining partnerships with key organizations and stakeholders. Except for the process to award grants to demonstration projects, procurement processes were well understood by the project team, and there were no major issues implementing procurement processes.

Certain project management functions need to be improved. These include, inter alia, managing project scope, monitoring and reporting, accounting for cofinancing contributions, etc. This MTR found that significant changes to the project scope are not being adequately approved and documented, including for example the process for the selection and award of grants to demonstration projects, the extension of the

[74] Minutes of the first PSC meeting, September 2020.

[75] Minutes of the first PSC meeting, April 2021.

[76] Minutes of the first PSC meeting, September 2020, April 2021.

project scope to private buildings, and the deviation from the plan for removing financial barriers. Routine monitoring and reporting functions, including the calculation of GHG emissions reductions and the accounting of co-financing contributions, have large gaps that should be addressed before project end. To address these gaps and in accordance with the provisions in the ProDoc, the MTR team recommends recruiting an international CTA to support project management. The international CTA should have experience managing GEF-financed project (including the application of incremental reasoning and the calculation of GHG emissions reductions) and expertise in energy efficiency in buildings.

Technical Advisory Committee. The TAC includes representatives from various organizations, including public entities, business groups, and research and academic organizations. Since project start, the PMO and PSC have identified and appointed new members to the TAC (see section 3.4. for a list of members). Members of the TAC attend PSC meetings and have provided recommendations to the committee and project team. However, TAC members do not hold regular meetings and do not produce minutes or reports for consideration by the PSC and PMO. Some of the recommendations produced by the TAC include: (i) identifying relevant project experiences that could be replicated in developing countries, (ii) expanding work on the renovation of existing buildings to improve energy performance, (iii) exploring opportunities to improve energy efficiency beyond individual buildings, (iv) seeking opportunities linked to major international events (e.g. Winter Olympics), (v) focusing building renovation efforts at the sector level in key sector such as health and hotels, (vi) exploring opportunities on demand-side management in cities, (vii) emphasizing the work on removing financial barriers, and (viii) continue focusing on energy efficient operation and management of public buildings, including by introducing the ISO 50001 international standards on energy management systems.[77]

UNDP. UNDP´s support during project preparation, appraisal and approval was relatively adequate, with no significant delays to project-cycle milestones. The project team valued the support received from UNDP and considered that support in part responsible for the project successes. However, the project's shortcomings in key areas, including the selection and award of grants to demonstration projects, point to weaknesses in UNDP's oversight role. These shortcomings include ineffective and inadequate communications between UNDP staff at the country office and the Regional Hub in Bangkok. Most notably, project-related information is not transmitted by the country office to the Regional Hub on time to support their technical backstopping role, therefore limiting opportunities to identify and resolve emerging issues.

Moving forward, UNDP could provide additional support and guidance to the PMO to improve their understanding and adherence to GEF-specific requirements, including the calculation and reporting of GHG emissions reductions, the attribution of project results, and the accounting of co-financing contributions. The effectiveness of that support would benefit from a more proactive and critical oversight by UNDP that identifies emerging problems early on, and by a more active communication of problems and doubts by the PMO to UNDP.

Risk management

In the ProDoc, the project risk log had registered seven risks related to: (i) political support to project implementation, (ii) poor communication and coordination between different government levels, (iii) materialization of cofinancing commitments, (iv) level of technical capacities in public buildings sector, (v) low participation from managers and staff from public buildings, (vi) failure to implement proposed policies and regulations, and (vii) sustainability of project outcomes. The project risk log was updated to include a COVID-19 related risk that has delayed the implementation of project activities. The risks in the project´s risk log were monitored and reported periodically in QPRs, APRs and the 2020 PIR. No other

[77] Minutes of the first PSC meeting, September 2020.

new risks were identified, and the existing risks have not been revised during project implementation. No risks related to safeguards have been identified and recorded in the project's risk log. The signature of the ProDoc delayed project start and the restrictions due to COVID-19 related measures have had an impact on project implementation. Insufficient support from local governments (risk 1 in the ProDoc's risk log) caused some delays in project implementation, triggering a response from the PMO reaching out to these stakeholders and improving communication and coordination.[78] Similarly, low interest in training activities resulted in a slow delivery of initial training activities, a situation that was also addressed by the project team by engaging these stakeholders.

The project has adopted a grievance redress mechanism following MOHURD requirements. No complaints have been recorded since project start.

4.3.2. Work planning

The project team has produced AWPs for 2019-2020, 2020-2021, and 2021-2022. AWPs follow the structure of components, outcomes, outputs, and activities as defined in the ProDoc and revised by the PSC. The AWP for 2019-2020 had a problem of misidentification of budget categories that was corrected in subsequent AWPs. AWPs were discussed and approved during the 2020 and 2021 meetings of the PSC.

During the inception workshop, participants approved additional project activities and outputs and changes to the targets in the PRF (see section 4.2.). The updated outputs were used on AWPs for 2019-2020, and 2020-2021. The next AWP, for 2021-2022, includes seven additional outputs (2.2.4., 2.2.5., 3.1.7., 3.1.8., 4.3., 4.4., 4.5.), but there is no documented record of the approval of these outputs in the minutes of the PSC or in any other document. Changes to project outputs were not accompanied by a description of the required changes to the project budget. Changes to the project design, including to the PRF, have not been incorporated in an updated version of the ProDoc.

As indicated in section 4.2., the project has included pilot demonstration in commercial and other type of private buildings. Given that the scope of the project had been limited to public sector buildings, this is considered a significant change to project design, but the formal approval to this change was not recorded in minutes of the PSC or other similar document.[79] Changes to the project's strategy and sequence of activities to address financial barriers were also significant and were not adequately approved and documented.

This evaluation recommends that UNDP, the PSC and PMO agree and adopt a formal procedure for proposing, assessing, approving, and documenting changes to the project design. The procedure should maintain consistency in the PRF, targets, risk assessments, project budget and schedule, document changes, and timely inform all relevant stakeholders, including members of the PSC, UNDP country office, and UNDP Regional Hub in Bangkok.

4.3.3. Finance and co-finance

The project received a grant from GEF for USD 8,932,420 and committed to mobilize USD 70,100,000 in co-financing resources. As of December 2020, a total of USD 3,686,805.54 of the GEF grant had been disbursed (42%). The rate of grant disbursement by the PSBEE project are deemed satisfactory. The budget

[78] APR 2020, p. 44.

[79] During a workshop to review the PRF, the definition of the buildings included in the project's scope were revised to "buildings that are accessible for use and occupancy by the public". While this definition is vague and impractical, the minutes of the workshop report that participants reaffirmed the intention to keep the scope of the project focused on the energy performance of the public sector. PSBEE. Minutes of the workshop on "Project log-frame retrofitting". January 2019.

execution, as compared to planned budgets in AWP, had been good, reporting execution ratios ranging from 89 to 93%. At the component level, the fractions of planned budgets that were spent in a given period have been within a range from 72% (component 3 in 2019) to 143% (component 4 in 2019).

Table 10 provides an overview of the GEF grant expenditures from January 2019 to December 2020. Information in Table 10 reflects the financial details reported in the project's combined delivery reports (CDRs), corrected for discrepancies between the CDRs and the financial information reported by the project.

Table 10. GEF project budget and grant expenditures

	2019	2020	2021	2022	Subtotal	Remaining budget	Fraction remaining
Component 1. Public sector EC&EE policy and regulatory frameworks							
Annual budget (ProDoc)	438,950.00	457,650.00	62,300.00	3,200.00	962,100.00	394,932.02	41%
Planned expenditures (AWP)	438,950.00	255,900.00	284,200.00				
Actual expenditures (CDR)	372,968.26	194,199.72			567,167.98		
Fraction spent (actual/planned)	85%	76%					
Component 2. Energy performance monitoring and evaluation system for public sector buildings							
Annual budget (ProDoc)	504,800.00	807,950.00	270,400.00	99,800.00	1,682,950.00	904,498.40	54%
Planned expenditures (AWP)	504,800.00	312,590.00	547,660.00				
Actual expenditures (CDR)	529,604.32	248,847.28			778,451.60		
Fraction spent (actual/planned)	105%	80%					
Component 3, EC&EE improvement promotion and demo programs for public sector buildings							
Annual budget (ProDoc)	617,100.00	675,000.00	2,119,000.00	534,000.00	3,945,100.00	2,551,043.52	65%
Planned expenditures (AWP)	617,100.00	959,400.00	1,516,156.64				
Actual expenditures (CDR)	444,000.00	950,056.48			1,394,056.48		
Fraction spent (actual/planned)	72%	99%					
Component 4. Public sector EC&EE capacity and awareness enhancement program							
Annual budget (ProDoc)	229,500.00	797,650.00	697,800.00	192,000.00	1,916,950.00	1,076,000.91	56%
Planned expenditures (AWP)	229,500.00	587,700.00	607,378.00				
Actual expenditures (CDR)	327,553.62	513,395.47			840,949.09		
Fraction spent (actual/planned)	143%	87%					
Project management							
Annual budget (ProDoc)	44,800.00	104,800.00	153,448.00	122,272.00	425,320.00	290,269.59	68%
Planned expenditures (AWP)	44,800.00	116,216.00	117,598.00				
Actual expenditures (CDR)	37,579.46	97,470.95			135,050.41		
Fraction spent (actual/planned)	84%	84%					
Unrealized gain/loss	(10,697.39)	(18,172.63)					
Total							
Annual budget (ProDoc)	1,835,150.00	2,843,050.00	3,302,948.00	951,272.00	8,932,420.00	5,195,300.06	58%
Planned expenditures (AWP)	1,835,150.00	2,231,806.00	3,072,992.64				
Actual expenditures (CDR)	1,751,322.67	1,985,797.27			3,737,119.94		
Fraction spent (actual/planned)	95%	89%					

The project team reported USD 69.5 million in mobilized co-financing resources from the national government, municipal governments, and the private sector. The MTR could review documentary evidence for only USD 3.4 million in contributed co-financing by the private sector since, according to the project team, most private companies keep financial and accounting information confidential. While confidentiality considerations can be valid in certain cases, they should not preclude the project team from requesting and obtaining adequate documentation of co-financing contributions from project partners. The co-financing pledged by provincial governments and UNDP had not materialized by the time of this evaluation.

Table 11. Project co-financing

Sources of co-financing	Name of co-financer	Type	Amount confirmed at CEO endorsement [USD]	Actual amount contributed at MTR [USD]	Fraction expected amount
National government	MOHURD	Cash	25,810,000.00	12,029,200	47%
		In-kind	5,000,000.00	0	0%
Local governments	Jilin Provincial Government	Cash	11,700,000.00	0	0%
	Jiangxi Provincial Government		5,700,000.00	0	0%
	Gansu Provincial Government		5,790,000.00	0	0%
	Qingdao Financial Bureau, Qingdao Municipality		None	975,200	N.A.
	Guilin Municipal Government Offices, Guilin Municipality		None	232,200	N.A.
Private sector	Total private sector	Cash	16,000,000	56,278,600	352%(1)
	Qingdao Guoxin Haitian Center Engineering	Cash		37,925,100	(2)
	Beijing Investment Group			4,489,000	(2)
	Huashan Hospital			3,297,200	(3)
	Tianjin various buildings			2,481,400	(4)
	I-mec Technology			1,861,200	(2)
	Ningbo various buildings			1,040,000	(2)
	Shanghai Linxiang Environmental Protection			932,800	(5)
	Nanjing Tianshuo Auto-control Mechanics			883,300	(6)
	Beijing Bayi High School			804,900	(2)
	Hangtiancheng School			743,000	(2)
	Capital University of Physical Education and Sports			534,000	(2)
	Beijing Daxing International Airport			387,000	(2)
	China Institute of Building Standard Design & Research			323,800	(7)
	Chongqing CECEP Yuelai Energy Management Co., Ltd			273,700	(8)
	Shenzhen Institute of Building Research Co., Ltd.			226,300	(9)
	Jiangsu Nantong Third Engineering Group Co., Ltd.			75,900	(2)
GEF agency	UNDP	Cash	100,000	0	0%
Total			70,100,000.00	69,515,200.00	99%

(1) While the total co-financing from the private sector is reported as more than USD 56 million, the project team could only provide documentary evidence of USD 4.44 million, or 8% of the total reported amount.
(2) No documentary evidence of the contribution.
(3) Documentary evidence of a contribution of USD 0.32 million.
(4) Documentary evidence of a contribution of USD 1.32 million.
(5) Documentary evidence of a contribution of USD 1.03 million.

(6) Documentary evidence of a contribution of USD 0.89 million.
(7) Documentary evidence of a contribution of USD 0.33 million.
(8) Documentary evidence of a contribution of USD 0.27 million.
(9) Documentary evidence of a contribution of USD 0.28 million.

A spot check covering the first nine months of 2020 was completed in December 2020. The report found inconsistencies in the financial management internal control systems. The report states that the spot check "found that some consulting service contracts attached with the vouchers are only sealed by Party A and Party B, without signature and date". The spot check recommends that contracts should not only be sealed by both Parties, but also signed and dated. The inconsistency should be rectified by the PMO. No other findings were reported in the report; no other spot check or audit reports were provided to the MTR team.

4.3.4. Project-level monitoring and evaluation systems

Overall, the M&E framework proposed in the ProDoc is sound and provides a solid starting point for tracking project progress. The total cost for M&E activities to be financed by the GEF grant was estimated at USD 236,000 or 2.6% of the total GEF grant. An additional USD 260,000 of co-financing resources were budgeted for these activities.[80] At the inception stage, the project team was expected to prepare a 4-year monitoring and evaluation (M&E) plan.[81] This plan, however, had not been produced by the time of this evaluation. The MTR team recommends that the project team completes and implements a monitoring and evaluation plan to support project implementation and accountability. When preparing the plan, the project team may consider addressing the following aspects:

- Elaborate the approach and methodology for the calculation of GHG emissions and emissions reductions attributable to the demonstration projects. The information on GHG emissions reductions provided by the project team was inconsistent and did not comply with the provision in the ProDoc for the calculation of *incremental* emissions reductions from the implementation of each demonstration project.
- Define an appropriate baseline and calculation method for the estimation of fuel savings to be reported under the first indicator of the project´s objective: "Cumulative fossil fuel savings due to project intervention".
- Prepare and allocate resources to the buildings sector and sociological surveys necessary to collect data for second indicator of the project´s objective: "No. of new jobs created with the application of EC&EE technologies and techniques in the public buildings sector in China". According to the M&E plan included in Annex B of the ProDoc, these two surveys should be conducted after completing the second and fourth PIR.

The M&E budget, as defined in the ProDoc, had allocated resources for the update of the GEF tracking tool. However, the tool had not been updated by the start of this MTR. A similar budget allocation had been made in the ProDoc to update the GEF tracking tool before the start of the terminal evaluation of the project. The MTR team recommends that this budget allocation is used to update the tracking before the terminal evaluation team is appointed.

[80] ProDoc, section VII, p. 60

[81] ProDoc, section VIII, p. 64

4.3.5. Stakeholder engagement

The ProDoc listed the main stakeholders of the project as: (i) MOHURD, (ii) DOHURD provincial units, (iii) Ministry of Education, (iv) Ministry of Health, (v) National Energy Conservation Center, (vi) Standardization Administration of China, (vii) building managers of demonstration projects, (viii) certification and verification entities, and (ix) ESCOs. Several of these stakeholders have not been involved during project implementation (e.g. Ministry of Education, Ministry of Health, National Energy Conservation Center, and Standardization Administration of China) and the participation of others has been limited (e.g. DOHURD provincial units).[82] The engagement with these stakeholders, especially government organizations at the national (e.g. line Ministries) and subnational levels (e.g. provincial and municipal governments), is critically important to the mainstreaming of concepts of energy efficiency in public buildings that the PSBEE project seeks to promote. Mainstreaming these concepts in public planning and investment processes is a key factor in ensuring the sustainability and long-term impact of the project results. The lack of engagement of the project with the Standardization Administration of China could represent a missing opportunity given the wide and important role of technical standards to facilitate the adoption EC&EE and LC technologies and practices in public buildings.

On the other hand, the project has successfully engaged a variety of stakeholders, especially through their involvement in demonstration projects, in the activities of the TAC, and as suppliers for different training and technical assistance activities. Members of the TAC include representatives from universities, financial institutions, research organizations, design institutes, private sector companies and business groups, among others. In most cases, partnerships with stakeholders are based on contractual arrangements for the delivery of specific products commissioned by the project. Other types of collaboration are less frequent and could be explored further, especially for outreach and dissemination purposes.

With a few notable exceptions (e.g. Qingdao Municipality), the project´s outreach to provincial and municipal governments has been limited. As the project moves towards the replication of proposed approaches at the subnational level (for example under outputs 1.4. and 1.5), building partnership with this governments will become increasingly important.

4.3.6. Reporting

During implementation, the project team prepared AWPs for 2019-2020, 2020-2021, and 2021-2022; QPRs for the third quarter of 2019 and 2020; APRs for 2019 and 2020; and a PIR in 2020. The quality of progress reports (i.e. QPRs, APRs, and PIRs) is moderately satisfactory. Reports discuss progress and challenges and refer directly to the outcomes, outputs and activities as defined in the ProDoc, thus supporting effective management and oversight of the project. However, reports do not account for changes in the project design and do not provide adequate context for project activities and results.

Significant changes to project design, strategy and implementation have not been properly documented and reported. Examples of changes that should have been better documented and reported include: (i) changes to the demonstration projects initially pre-selected during project preparation, (ii) changes in project scope to include demonstrations in private-sector buildings, (iii) changes in the strategy for the development and implementation of a market-based financial mechanism, etc.

[82] Interviews with project stakeholders.

4.3.7. Communications

As reported by stakeholders interviewed during the MTR, internal communications within the project team, and between the team and the PSC, TAC, and UNDP's country office in China are effective and contribute to effective project management. Communications outside the direct members of these bodies is less effective, including the sharing of information with the public and other stakeholders.

The project has not created a website, newsletter, or alternative means to reach out to a broader audience in the construction and building management sectors. Instead, the project team has relied mainly on workshops to disseminate the project results. Considering the vast audiences in the building management and construction sectors (in China and abroad) who could potentially benefit from the project's results and knowledge, it is recommended that the project team explores additional communication channels, including internet and social media, to reach out to larger audiences more efficiently.

4.4. Sustainability

Sustainability refers to the likelihood that the project´s positive effects will be maintained after the project has closed, and external funding and assistance has ended. Sustainability is evaluated in terms of the identifiable risks that could affect the continuation of such positive effects. The risks to sustainability are assessed in four areas: (i) financial, (ii) socio-political, (iii) institutional frameworks and governance, and (iv) environmental.

Financial risks. A potential second phase of the project had been discussed at the first meeting of the PSC, where members discussed the possibility of using resources from the current GEF-supported project for the preparation of such second phase.[83] As discussed, this follow-up project could include some of the following elements: (i) expanding to scope to include all types of buildings, not only public sector buildings, (ii) focusing on the promotion of carbon-neutral buildings, (iii) researching and developing a standard for carbon-neutral buildings, (iv) researching options on carbon finance for the buildings' sector, (v) expanding the work on the renovation of existing buildings, including project demonstrations, and (vi) focusing on energy efficiency in buildings in warm and cold climates in China.[84]

An important factor to reduce the financial risks to sustainability is the creation of an enabling environment for financial institutions to provide adequate financing to construction projects (either new construction or renovation) adopting EC&EE and LC technologies and practices. The strategy defined in the ProDoc to contribute to this enabling environment was modified during project implementation. The new project strategy to promote these enabling conditions has not been clearly formulated and presented to the PSC for approval. It is recommended that the project team formulates that strategy and obtains approval by the PSC and UNDP.

During interviews with financial institutions, stakeholders demonstrated a high level of awareness of the role of energy efficiency in buildings and a commercial interest in financing investments to deploy EC&EE and LC technologies and practices in buildings. However, some also demonstrated little awareness of the activities of the PSBEE project and did not report having received support or assistance by the project.

Socio-economic risks. Based on interviews with stakeholders, there seems to be strong support from government authorities, financial institutions, and the buildings management and construction sector to the objectives of the project. The economic, environmental and health benefits from the adoption of EC&EE and LC technologies and practices in buildings seem to be well understood and aligned to the stakeholders'

[83] Minutes of the first PSC meeting, September 2020.
[84] Minutes of the first PSC meeting, April 2021.

own objectives and principles. The public´s awareness and attitudes towards energy efficiency measures in buildings have not been assessed by the project or the evaluation team, but there is no evidence that they could be against them.

An important action to further reduce the socio-economic risks to sustainability is to capture, analyze and disseminate the experiences and lessons learned from project implementation. In this context, the critical evaluation, reporting and wide dissemination of the experience and performance of the demonstration projects (output 3.2.4.) should be a focus of the project team during the next months.

Institutional frameworks and governance risks. The Government of China has participated actively in the formulation and implementation of the project. As indicated in section 3.1, concepts on energy efficiency in buildings have been mainstreamed in key policies and development plans, including China's 13th Five-Year Plan (2016 – 2020) and the 13th Five-Year Plan for Energy Efficiency and Green Energy in Buildings. By themselves, these actions do not guarantee sustainability, but they signal a keen interest in furthering the adoption of EC&EE and LC technologies and practices in public buildings. Interviewees considered that the inclusion of these concepts in the five-year plans will have a meaningful impact on the future of the energy efficiency performance of this sector.

The development *and* enforcement of technical standards on energy efficiency in public buildings are an effective mechanism to reduce the risks to the sustainability of the project results. To remain an effective mechanism to improve energy efficiency and encourage innovation, standards should be updated periodically to review performance benchmarks and requirements. As part of the exit strategy of the project, stakeholders should aim at adopting a procedure for the periodic and systemic review and update of the standards on energy efficiency in buildings that are in effect in China.

The development of capacities related to EC&EE and LC technologies and practices in public buildings could be a daunting task simply by the enormous number of individuals involved in the planning, design, approval, construction, management, and occupation of these buildings. As such, the task must be understood as a continuous, long-term activity, to be implemented in partnership with various stakeholders including universities, technical education institutes, and others. The project´s approach to establish training centers is valid and plans should be made to facilitate the expansion of the model to additional localities/provinces in China.

Environmental risks. The adoption of EE&EC and LC technologies and practices in buildings has environmental benefits in terms of energy savings, air quality, water savings, waste management and others. No significant, negative environmental impacts from the adoption EE&EC and LC technologies and practices promoted by the PSBEE project have been identified.

The overall likelihood of sustainability is ranked on a four-point scale from unlikely (U), to likely (L). Based on the assessment of individual areas, the rating to sustainability is **moderately likely (ML)**. An explanation of the ratings scale is provided in Annex C.

5. Conclusions and recommendations

5.1. Conclusions

The PSBEE project was conceived to improve the energy management and promote the adoption of EC&EE and LC technologies and practices in public buildings. The project was designed following a conventional strategy on barriers removal to be implemented along four causal pathways: (i) development and enforcement of a policy and regulatory framework for energy management in public buildings (component 1), (ii) adoption of an evaluation system of energy performance of public buildings (component 2), (iii) improving access to financing for energy efficiency investments in public buildings (component 3), and (iv) raising awareness, building technical capacities and improving access to information on EC&CC and LC technologies and practices in public buildings (components 3 and 4).

This MTR concluded that the project strategy and design were adequate and found evidence of progress towards achieving some of the project's intended objectives. The PSBEE project has made progress towards the objectives related to policy and regulatory development (outcome 1), and to the adoption of an energy performance management system for public buildings (outcome 2). The project has also made relevant progress setting up a model for developing the capacities of staff with responsibilities over the management of public buildings. This model, based on the establishment of provincial training centers, if expanded and maintained over time, could become an important driver for innovation and change in the public buildings sector.

On the other hand, the process to select demonstration projects and award grants under component 3 diverted from the approach defined in the ProDoc and has demonstrated major shortcomings. The role of the demonstration projects -and the substantial GEF-resources allocated to them- supporting the project´s strategy on barriers removal is unclear and their contribution to the project´s objectives is uncertain. The contribution of the PSBEE to the projects demonstrating EC&EE and LC technologies under component three seem minor, as those projects were already in advanced stages of implementation when they were selected and awarded GEF-resources. The projects selected under outputs 3.2.2. did not demonstrate a financial incentives scheme developed by the PSBEE project, since no such scheme was developed before resources were committed to these projects. Resources allocated to these demonstration projects (approx. USD 2.6 million) do not comply with the incremental cost reasoning laid down in the ProDoc. To address these shortcomings, it is recommended that the PMO, supported by UNDP, undertakes an urgent review of the scope of each demonstration project selected under outputs 3.1.5. and 3.2.2. with the view to ensuring that each demonstration project invests GEF resources in a cost-efficient manner to deliver energy savings and GHG emissions reductions that are *incremental* (additional) to those that would have been achieved by the baseline projects, and that contribute to the barrier-removal strategy sought by the PSBEE project.

Other factors have also affected project implementation, including a delay in signing the ProDoc, adjustments to implementation arrangements, changes to the lineup of demonstration projects agreed during project preparation, and the restrictions from the COVID-19 pandemic. These factors have contributed to a delay in the implementation of project activities that, unless corrected, will have an impact on the project's results and the long-term sustainability of these results.

Critically important to the project's strategy is to complete the implementation of demonstration projects that contribute to the removal of barriers, and to allocate the necessary time and resources to document, evaluate and disseminate the results from these projects (output 3.2.4.). In turn, such evaluations are an input to the plans for the replication of the demonstration projects (output 3.2.5.), and a major project contribution to improving the knowledge and understanding of EC&CC and LC technologies and practices

in public buildings. Due to the underlying problems with the selected demonstration projects, their evaluation and replication could be at risk.

Likewise, the replication at provincial and local levels of the policy and regulatory developments supported by the project is an important element of the project's strategy and a key factor to ensure the sustainability of project results. While the project has made progress in the formulation of revised policies and regulations (outputs 1.3. and 1.6.), the work on the replication of these instruments at subnational levels has not started and seems unlikely to be completed within the original project's timeline.

In conclusion, the project is on track to produce relevant contributions to removing the barriers for the adoption EC&CC and LC technologies and practices in public buildings. However, delays in project start and shortcoming in its implementation could limit its true potential. In light of the analysis by this MTR, the evaluation team considers that an extension to the project implementation period is warranted.

The PMO has demonstrated to be able to manage multiple activities and stakeholders simultaneously. Interviews with project stakeholders indicated that the project team was skilled and effective at implementing the project activities and resolving emerging issues. However, the PMO would benefit from the expertise of external consultants with knowledge and experience on the implementation of GEF-financed projects, especially on issues related to monitoring and reporting, incremental-cost reasoning, and the estimation of GHG emissions reductions. A detailed monitoring plan has not been adopted and there are unresolved issues regarding the definitions, sources of information, calculation methods, and reporting of key performance indicators in the PRF (e.g. fuel savings, jobs crated, GHG emissions reductions). Most notably, the project needs to develop a sound approach for the estimation of GHG emissions reductions that adheres to the basis for the calculation adopted in the ProDoc. Also related to the observed gaps in monitoring and reporting, the evaluation concluded that the project has not adopted an adequate approach for documenting and reporting cofinancing contributions by project partners. Lastly, the project lacks an adequate process for proposing, assessing, approving, and documenting changes to the project scope, strategies, and activities.

The sustainability of the project outcomes was deemed as moderately likely by this evaluation. The evaluation found evidence, including through interviews with various stakeholders, that there is a good understanding of concepts on energy efficiency in public buildings and a shared recognition of the relevance of these concepts for the economic, social, and environmental wellbeing and development of citizens in China. The project is developing partnerships with different stakeholders that, if pursued and strengthened, will contribute to reducing the risks to the sustainability of project results.

5.2. Recommendations

Based on the findings and conclusions from this evaluation, the following recommendations are put forward to the project team, UNDP, and stakeholders:

Recommendation 1. Request UNDP and the GEF secretariat a 12-month extension to ensure that (i) plans for the replication of policies and regulations at subnational levels are adopted, (ii) demonstration projects are fully implemented and evaluated, and the results are disseminated, and (iii) plans for the replication of demonstration projects are adopted.

Responsible parties: PMO, PSC, and UNDP.

Recommendation 2. Complete an urgent and comprehensive review of the scope, budget and monitoring procedures of each demonstration project selected under outputs 3.1.5. and 3.2.2. to ensure that each project invests GEF resources in a cost-efficient manner to deliver energy savings and GHG emissions reductions

that are *incremental* (i.e. additional) to those that would have been achieved by the baseline project, and that contribute to the barrier-removal strategy sought by the PSBEE project. Recruiting an independent expert on energy efficiency in buildings, with expertise and international experience on the application of incremental-cost reasoning to GEF-supported investments, would contribute to an efficient and meaningful review of the demonstration projects.

Responsible parties: PMO, UNDP.

Recommendation 3. Formulate an updated project strategy to remove financial barriers for the adoption of EC&CC and LC technologies and practices in public buildings and present it to the PSC for formal approval. As discussed in section 4.1.2, the causal pathway defined in the ProDoc to remove financial barriers had been modified during project implementation. The strategy replacing that pathway has not been documented and adequately validated. For the remaining project duration and based on the updated and approved strategy, the project team should increase its focus on activities that contribute effectively to the removal of these barriers. The strategy may take into consideration the findings and recommendations from the PSBEE report on "Roadmap for energy efficiency of Chinese public buildings" that includes a recommendation for the adoption of a mandatory insurance system for energy efficient buildings.[85]

As part of discussion of the updated strategy, the PMO, PSC and UNDP may agree on a revised definition for the first indicator under outcome 3.2.: "No. of EC&EE/LC projects financed through the market-based financing scheme for public buildings" According to the ProDoc, the projects that contribute to the target of this indicator are defined as "… projects that were implemented by public buildings and funded by the banks/FIs that are implementing the market-based financing schemes developed by the PSBEE Project".[86] As such, the ten projects showcasing various financial mechanisms under outcome 3.2. do not contribute to the target of this indicator. Depending on the characteristics of the updated strategy to be agreed by the PMO, PSC and UNPD, the definition of the indicator could be revised to include (some of) the projects showcasing financial mechanisms.

Responsible party: PMO, PSC and UNDP.

Recommendation 4. Prepare a detailed monitoring plan, as required and stipulated in the ProDoc, and submit it to UNDP for comments/advice, and to the PSC for endorsement. The detailed monitoring plan should include provisions and allocate resources for data collection and verification. The plan should include, among others:

- An approach and methodology for the calculation of *incremental* GHG emissions and emissions reductions attributable to the demonstration projects and to their replication effects;
- An appropriate baseline and calculation method for the estimation of fuel savings to be reported under the first indicator of the project´s objective: "Cumulative fossil fuel savings due to project intervention". Accomplishing this goal would require that the PBEMIS captures the relevant information from reporting public buildings;
- The monitoring and reporting of baseline and co-financed activities that are subsumed into the PSBEE project and are an integral part of it, including as part of the results in the PRF. These activities are to be reported apart from the GEF-funded activities.

[85] Tsinghua University, Taihor Technology. Roadmap for energy efficiency of Chinese public buildings. no date. Chapter 6, section II. ii.
[86] ProDoc, Annex B on Monitoring Plan, p. 88.

- The design and provisions to collect data for second indicator of the project´s objective: "No. of new jobs created with the application of EC&EE technologies and techniques in the public buildings sector in China"; and,
- Updating the GEF tracking tool before the start of the terminal evaluation.

Responsible parties: PMO, PSC, and UNDP.

Recommendation 5. Improve the process for requesting, assessing, approving, and documenting changes in project scope and activities. The process should be presented to the PSC and UNDP for approval. In addition to the plan, document all material changes to project scope that have been implemented since project approval. These changes include, but are not limited to:

- Expansion of the project scope from public buildings to "buildings that are accessible for use and occupancy by the public";
- Modification of indicators and targets in the PRF;
- Lineup of demonstration projects, as presented in the ProDoc;
- Changes to the project budget;
- Impact pathway to remove financial barriers; and,
- Composition of the PMO.

Responsible parties: PMO, PSC, and UNDP.

Recommendation 6. Improve the process for documenting and accounting for co-financing contributions from project partners, especially from private sector stakeholders. Properly documenting co-financing contributions not only is a GEF requirement, but also supports project management and is evidence of the project's results engaging with stakeholders and building effective partnerships. While confidentiality considerations should be protected, these should not be an obstacle for the transparent and accurate representation of co-financing contributions. In that context, the PMO should be able to maintain, as part of the project records, formal communications from project partners stating the status (including the destination and use) of contributions of co-financing resources without disclosing confidential or proprietary information,

Responsible party: PMO.

Recommendation 7. Prepare and adopt an exit strategy that contributes to reducing risks to the sustainability of project results. The PSC has already started discussions on a potential follow-up project to build on and expand the PSBEE project results. Such exit strategy should facilitate the adoption of institutional and financial mechanisms to secure the continuity of critical project initiatives such as the EMIS and provincial training centers, and devise processes to continue the replication of policy and regulatory developments at the subnational level. The exit strategy may include a follow-up project with resources from international climate finance (e.g. GEF, Green Climate Fund (GCF), etc.).

Responsible party: PMO.

Recommendation 8. Recruit a part-time international CTA to provide strategic guidance and support to the PMO and key stakeholders. A CTA can be appointed on a short-term basis and be assigned tasks when required. The international CTA would support project management (especially on monitoring and reporting activities), provide strategic guidance to project implementation, and contribute to the definition

of the project's exit strategy (including a potential follow-up project involving international climate finance resources).

Responsible party: UNDP.

Recommendation 9. Strengthen the oversight function of UNDP and their role supporting the project team monitoring and reporting project progress. The evaluation team suggests that, as part of the proposed review, UNDP discuss procedures to improve, inter alia, (i) the communication of project-related information between the country office and Regional Hub to facilitate their technical backstopping role and allow for a timely identification of potential issues and solutions; (ii) the validation of monitoring and evaluation frameworks, including baselines; (iii) the appropriate approval and recording of changes to project activities, indicators, targets, etc. (iv) the periodic monitoring and reporting of the contribution of cofinancing resources, including the recording of appropriate evidence; (v) the preparation and communication of high-quality quarterly and annual progress reports that effectively support project management and oversight.

Responsible party: UNDP.

Recommendation 10. Improve public access to project information and expand the scope and reach of activities to disseminate project products and information. The project has produced valuable research products, especially on topics related to energy efficiency policies and standards. While some of these products have been presented in workshops, most remain inaccessible to stakeholders in the public buildings sector and to the public in general. In fact, stakeholders interviewed by the evaluation team indicated that they have little access to the knowledge and results produced by project. When the evaluations of demonstration projects are completed, the results will have to be disseminated extensively to ensure that the project activities to support them have a wider impact on the building management and construction sectors.

Responsible party: PMO.

Recommendation 11. Enhance partnerships with provincial, county, and municipal governments, Subnational governments are key project partners for the replication of the policy and regulatory approaches developed by the project (outputs 1.4. and 1.5), the replication of demonstration projects (output 3.2.5), the expansion of training centers to additional provinces, and for expanding the number of buildings reporting to the information systems and databases developed by the project. Subnational governments may also become key partners in an eventual follow-up project developed as part of the exit strategy of the PSBEE project. Lastly, provincial government had committed co-financing resources for the PSBEE project that have yet to be contributed and accounted for.

Responsible party: PMO, PSC.

Recommendation 12. Renew efforts to build partnership with line ministries and bureaus, especially the education and health authorities at the national and subnational levels. As originally intended in the ProDoc, these authorities were going to have a role mainstreaming concepts of energy management in the operation of health and education facilities. However, during project implementation, the role of these institutions has been limited. Partnerships with line ministries would contribute to the mainstreaming of concepts on energy efficiency in public buildings in public planning and investment processes, thus contributing with a key factor to ensuring the sustainability and long-term impact of the project results. The project should renew efforts to build partnerships with these authorities with a view to further reducing institutional and governance risks to sustainability.

Responsible party: PMO, PSC.

Recommendation 13. Energy standards are an effective tool for improving energy performance as long as the requirements in the standards are periodically updated to reflect technology and behavioral changes. To maintain the relevance of the standards developed with support from the PSBEE project and to reduce the risks to the sustainability of the project results, the project should ensure that adequate mechanisms (including institutional and financial arrangements) are in place to ensure that these standards will continue to be updated periodically, even in the absence of external funding from, e.g., the GEF.

Responsible party: PMO

Recommendation 14. The experiences by the PSBEE project have a remarkable potential for replication within China and abroad. The framework for the promotion of EC&CC and LC technologies and practices in public buildings under development by the project could be readily upscaled with support from national governments, national or multilateral development banks, and sources of international climate finance. To contribute to the achievement of this potential, the project team could prepare a comprehensive and well-written project completion report. The report would provide a critical review of the project experiences, emphasizing on lessons learned, and opportunities for improvement by subsequent replication initiatives. The completion report should be professionally translated and be widely disseminated, with support from UNDP.

Responsible party: PMO, UNDP.

Annex A. Mid-term review terms of reference

1. INTRODUCTION

This is the Terms of Reference (ToR) for -the Midterm Review (MTR) of the full -sized UNDP-supported GEF-financed project titled Energy Efficiency Improvement in Public Sector Buildings in China (PSBEE) (PIMS 5395) implemented through the Ministry of Housing and Urban-Rural Development. The project started on the *20th November 2018* and is in its third year of implementation. 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 Mid-Term Review of UNDP-supported GEF-financed Projects').

2. PROJECT BACKGROUND INFORMATION

The public sector in China is comprised of national and local government-owned and operated institutions and facilities that provide service to the general public. These include buildings of government (central and local) ministries/departments, quasi-government organizations and associations whose operating budget comes from the Chinese government. The table below shows the historical energy consumption and corresponding CO2 emissions in the buildings that comprise the public sector in China. Bulk of the energy consumption is accounted for by coal (50.7%), followed by electricity (40.2), petroleum fuels (7.1%), and natural gas (2.0%). In 2012, the public sector in China consumed about 157 million tce (Mtce) of energy and the corresponding amount of CO2 emissions is about 462 million tons (Mtons). During the period 2005-2012, the average annual energy consumption of the public sector was about 147.8 Mtce, which translates to an average annual CO2 emission of about 434.3 MtonsTo facilitate the widespread practice and application of energy conservation and energy efficiency (EC&EE) in the public sector, the Ministry of Housing and Urban-Rural Development (MOHURD) established its Department of Building Energy and Science & Technology, making it responsible for advancing, guiding, coordinating and supervising the implementation of EC&EE initiatives in the public sector in China. It has issued a number of administrative actions on EC&EE in the public sector during the 12th Five-Year Plan (12th FYP) period and has so far realized modest achievements. Nevertheless, even though the public sector in China has realized some achievements in EC&EE and in the application of low carbon technologies, the demand for energy in the sector is still expected to increase in the coming years. The expected increase is due to: (1) new building floor area; (2) application of energy-using equipment; and number of building occupants. With the expected increase in the: (1) level of work activities; (2) expansion of the scope and coverage of public services; and (3) overall socio-economic development, there will also be commensurate increase in the demand for energy in public sector buildings. With the current level of technical capacity, understanding on the application and implementation of EC&EE as well as low carbon technologies, and the general attitude of the public sector towards energy conservation, further improvement in the energy utilization efficiency and reduction in specific energy consumption in the public sector will be very difficult to realize in the coming FYP periods.

The abovementioned situation is further exacerbated by the existence of certain persistent barriers, which are as follows:

(1) Inadequate policy and regulatory frameworks that promote and support EC&EE improvement initiatives in the public sector - Currently, there are existing general policies and frameworks on EC&EE but there are no specific ones for the public sector, and the implementation and enforcement of these general policies and regulations are inadequate and ineffective. While there are stated (in the 12th FYP) energy targets and the measures that will be taken to realize the target. the implementation plan for the measures to be done to realize the targets is not adequate; EC&EE projects in the public

sector are often not sufficiently funded; do not get enough and optimum funding from social funds, and consequently fall short of achieving target energy and energy cost savings. The lax and rather weak implementation of EC&EE policies in the national and local governments further contributes to this major barrier.

(2) Absence of an overall evaluation system for reviewing and analyzing the existing energy management procedures and practices in public sector entities and their facilities - The administrators and managers of the different public sector buildings in the country are not motivated, and in fact not required/obligated to carry out EC&EE and low carbon technology/technique implementation because their operations costs are uniformly financed from government budgets. Those rather few public sector buildings that have already started doing energy management activities are without the benefit of an effective evaluation system to assist in keeping track of their performance and progress and provide appropriate recommendations for improving individual EC&EE and energy management efforts. Furthermore, there are also industry associations, the public sector in China does not benefit from an established technology evaluation system, which is currently non-existent.

(3) Limited market-oriented financing mechanism for funding EC&EE technologies/products in the public sector - The public sector in China is also a big energy consuming segment of the national economy but the application of EC&EE technologies in this sector has been limited. Apart from the low level of knowledge and confidence to apply building-related EC&EE (and low carbon) technologies in the public sector, there is also the problem of lack of funding from other sources such as the financial sector (i.e., private banks and financial institutions) and from energy service companies and entities that provide energy supply outsource services, to supplement limited government and social funds. In regard to engineering, procurement, and construction (EPC) in the public sector, China's public buildings represent less than 1% of the country's current EPCs

(4) Low level of capacity and awareness of public sector technical and management personnel on the application of EC&EE and low carbon technologies - In general, this is true especially in the public sector in provinces and small to medium cities/towns in the country, where generally there are no capacity development programs designed and catered to the public sector on EC&EE and low carbon technologies and techniques/practices applications. Public sector personnel (e.g., government authorities, policy and decision-makers, public sector administrators, buildings, and facilities managers, etc.) and the citizenry have low level of awareness about the various EC&EE and low carbon options and opportunities that can be applicable in public buildings and facilities, let alone the socio-economic and environmental benefits that can be derived from these.

In many developed countries, Energy Service Companies (ESCOs) play a key role in the design, financing, and implementation of EC&EE projects in buildings (commercial and government). In China, local ESCOs are active in such kind of projects in private commercial buildings. ESCOs have not been successful enough in doing business in government buildings. The barriers that prevent ESCOs from engaging in public sector EC&EE projects such as those in national and local government buildings and facilities are mainly linked to the abovementioned 4 main barriers. The non-involvement of the ESCOs (and private sector financing institutions) in public sector EC&EE activities are by and large effects of 3 of the 4 main barriers and contributes to the barrier of limited market-oriented and/or performance-based financing mechanism for funding EC&EE technologies/products in the public sector. The ESCO industry just like any other profit-oriented industry would definitely be interested in investing resources (expertise, time, and money) in profitable EC&EE projects. The lax and rather weak implementation of policies on EC&EE in the national and local government agencies and facilities mainly prevent private sector ESCOs interest and investment in the public sector EC&EE projects. The main barriers for ESCOs entering public building segment are on the demand side: (a) there are no rules and best practices identified to support the use of engineering, procurement, and construction (EPC) contracts in public procurement; and, (b) energy budgets are decreased when energy efficiency is achieved (since budgets are determined by the previous years' actual expenses). This reduces the interest of both ESCOs and public building managers in pursuing EPC since the payment allowance reduces public institutions' ability to pay for the services. The project has a potential

and ambitions to leverage significant amount of private sector co-financing from Chinese ESCOs by removing the underlying, demand-side barriers, to foster investment in the public buildings sector.

There a number of services that the private sector can provide in the area of EE/RE applications in the public sector buildings. Currently, the services of private engineering firms are being engaged by some public sector buildings that are keen in doing EC&EE. In the past 5 years, the MOHURD has contracted private consulting firms to carry out energy auditing and energy management services in some of the major public buildings in the major cities. The ESCO scheme is something that the public sector buildings are keen to carry out, but the ESCO-related barriers are hindering the MOHURD in doing this. There is also the possibility of engaging the services of the private sector (once the current barriers are removed, and some of the financing schemes will be adopted) to carry out outsourced energy services for the public buildings, including the implementation build-operate-transfer or build-operate-own projects, or variations of these.

a) The main strategy that is employed to achieve the project objective is barrier removal. The enabling conditions that will be created through the barrier removal activities of the proposed GEF project will facilitate the achievement of the required outcomes that will contribute in the achievement of the project objective. Specific interventions that will remove barriers to EC&EE and LC initiatives that bring about reduction of CO2 emissions from the operation of energy consuming equipment/appliances and service facilities in public sector buildings will be carried out. Involving the private sector, particularly banks/financial institutions, as well as entities that are willing to finance EC&EE and LC technology applications through ESCO and PPP modalities, forms part of the strategy for the proposed project. The strategy to attract private sector partners and investment is essentially based on 3 core elements: Knowing and understanding of the current energy utilization – This involves laying the foundation for better and more efficient energy management in the public sector through the establishment of a system that generates up to date and accurate information of energy use that can be monitored on-line using modern ICT technology.
b) Creation of the necessary demand for better energy management and increased energy efficiency - This can be done e.g., by introducing mandatory EE targets for the public sector (at the different levels) and mandating public procurement standards incorporating EE, combined with the right incentives (budget process reform, by allowing the public entities to retain all or part of their energy savings).
c) Stimulation of supply of energy management services and EE measures from the market (i.e., the private sector) by promoting EPC contracting between public entities and private ESCOs (assist the public sector with tendering out the EPC contracts) and establish the required appropriate financial mechanism(s) (guarantees of various sorts, or other credit enhancement measures like concessional lending (from public sources); or some sort of combination) allowing the ESCOs to get access to capital on the right terms to finance EE projects in public buildings.

Lastly, the strategy to continuously facilitate the effectiveness of the established enabling conditions through their institutionalization will be applied. Towards the end of the project, as part of the project activities, a suitable follow-up action plan that comprise of the appropriate actions that will ensure sustainability of whatever policies, regulations, and institutional frameworks that will be established and enforced and implemented in the public sector buildings in China will be developed

Project Summary

The public sector in China include the national and local government-owned and operated institutions and facilities that provide service to the general public. These include buildings of government (central and local) ministries/departments, quasi-government organizations and associations whose operating budget comes from the Chinese government. To facilitate the widespread practice and application of energy conservation and energy efficiency (EC&EE) in the public sector, the Ministry of Housing and Urban-Rural

Development (MOHURD) established its Department of Building Energy and Science & Technology, making it responsible for advancing, guiding, coordinating, and supervising the implementation of EC&EE initiatives in the public sector in China. It has issued a number of administrative actions on EC&EE in the public sector during the 12th Five-Year Plan (12th FYP) period and has so far realized modest achievements. Even though the public sector in China has realized some achievements in EC&EE and in the application of low carbon technologies, energy utilization efficiency and reduction in specific energy consumption in the public sector can be further improved in the coming 13th FYP periods. This existing situation can be greatly improved through improving barriers, including: integrating policy and regulatory frameworks, evaluations systems, market-oriented financing mechanism, and improved outreach and professional capacity building.

The PSBEE project is designed to include the following innovative features:

a) Introduction of ICT solutions and "smart" technologies for building energy management to monitor building energy use, spot immediate and most cost-effective opportunities and effectively monitor performance and improvement. Without a good EMIS it is impossible to move on with any market-based instruments because savings should be objectively monitored to be "monetized".
b) Establishment of EE targets/obligations (in particular in the public sector) to boost demand and uptake of EE measures in public sector buildings. This is in line with the fact that if there are no targets/obligations, there is no market solution, because the public sector tends to be very inert (as in most, if not all countries). But the target system will only work and generate private interest and investment if there is a robust MRV system (i.e., energy savings verification system (ESVS) underpinning it. Hence, the need for a world class EMIS.
c) Promotion of EPC contracting. EPC contracting has proven to be effective to bring the private sector on board. But it is still new in China and is still very rarely applied in the public sector (even in developed counties) because of the many barriers and inertia typically in place.

The EMIS is in line with what are considered as emerging global "state of the art" in the building sector, including public buildings, is the proliferation of ICT solutions and "smart" technologies for building energy management to monitor building energy use, spot immediate and most cost-effective opportunities and effectively monitor performance/improvement. UNDP has an excellent track record of piloting EMIS, which received nationwide replication in Croatia and is now being rolled out in other countries. The Croatian EMIS has been listed as international best practice for ICT solutions in buildings. These innovative features are also fully consistent with recommendations from Berkeley Lab/Pacific Northwest Lab on promoting EPCs in China (April 2015).

Expected outcomes:

Goal: Well-managed growth rate of energy consumption and associated GHG emissions from the public sector in China.

Objective: Facilitation of the energy conserving and energy efficient operation of buildings and building services in the public sector in China

1. Public Sector EC&EE Policy and Regulatory Frameworks

This component comprises activities that collectively address the barriers related to the inadequate policies and regulations that help promote and support EC&EE applications and practices in public sector buildings in China. With the delivery of the expected outputs from these activities, a strict enforcement of approved enhanced policies and rules and regulations on energy efficiency and low carbon operation and maintenance of public sector buildings is the expected outcome.

2. **Energy Performance Monitoring and Evaluation System for Public Sector Buildings**

This component of the project will enable the comprehensive tracking and control of the energy performance of the buildings in the public sector in China. This consists of activities that will deliver outputs that will contribute to better control and enhanced management of the energy performance of public sector buildings. The following major activities will deliver the expected outputs that will help bring about such expected outcome: (1) Review and verification, including the provision of supplemental baseline energy information in the various major segments of the public sector; (2) Design, establishment and operationalization of a public sector building energy audit system; (3) Conduct of energy audits of public sector buildings in at least four buildings per building type, in two public sector sub-sectors; (4) Design, establishment and operationalization of a public sector buildings energy (supply and consumption) management information system (EMIS); (5) Design, establishment and operationalization of a supplementary system of the EMIS for the measurement & verification of reported energy savings in EMIS energy report submissions; and, (6) Design and operationalization of a Public Buildings EMIS database. The EMIS will cover all levels of government and that there should also be a hierarchy of targets from national to local with a clear system for their enforcement.

1. EC&EE Improvement Promotion and Demo Programs for Public Sector Buildings

This major component of the project is meant to address the low level of knowledge and experience in the application and benefits of EC&EE (as well as low carbon) technologies, as well as the financing of these initiatives in public sector buildings. There are two sets of activities within this component. The first set addresses the inadequate resources for implementing EC&EE interventions, and the other set will focus on facilitating the implementation of these technologies. The first set of activities are intended to deliver outputs that collectively contribute to the increased availability of resources (technical capacity, information and financing) for EC&EE initiatives in public sector buildings and facilities. The proposed activities include: (1) Establishment and operationalization of a system for providing information about the features, technical specifications and costs of new EC&EE low carbon technologies (including products) for the public sector; (2) Publication of a directory of recommended applicable and cost-effective new EC&EE and low carbon (LC) technologies (systems and products) for public sector building administrators/managers; (3) Conduct of a comprehensive assessment of market-based financing scheme options and design of appropriate market-based financing of new EC&EE/LC technology (system and product) applications; and, (4) Identification and selection of 5 EC&EE/LC projects that will be financed through market-based financing scheme in public buildings in selected public sub-sectors in three to five cities or regions; (5) Conduct of feasibility analyses and design of EC&EE/LC technology application demonstrations.

2. Public Sector EC&EE Capacity and Awareness Enhancement Program

The achievement of enhanced awareness and knowledge of public sector authorities and personnel and the citizenry on the cost-effective application of EC&EE technologies is the expected outcome from the outputs that will be delivered under this project component. This project component is intended to remove the low level of technical capacity and awareness within the public sector in the application and practice of EC&EE and low carbon technologies/techniques. The Intended activities for delivering the expected outputs are the following: (1) Organization and conduct of project promotional campaigns and workshops in target segments of the public sector; (2) Design and conduct of trainings for MOHURD and DOHURD authorities and technical staff on the implementation of the various EC&EE programs: *(a) energy audit; (b) EMIS; (c) ESMS; and, (d) EC&EE/LC demonstration; (e) energy management and technology*; (3) Establishment and operationalization of an information network for the promotion and dissemination of knowledge on public sector EC&EE/LC technology applications; (4) Design, establishment and operationalization of public sector EC&EE/LC management and education training centers in the different climate regions; and, (5) Design, conduct and post-evaluation of EC&EE/LC capacity development programs for the public sector

Funding: Total Budget (USD): 79,032,420, including USD 8,932,420from GEF

Implementation Period: 2018-2022

3. MTR PURPOSE

The objectives of this Mid-Term Review (MTR) seek to fulfill the following overarching objectives of the monitoring and evaluation of GEF projects:

The objective of the MTR is to gain an independent analysis of the progress of the project so far. The MTR will identify potential project design problems, assess progress towards the achievement of the project objective, identify and document lessons learned (including lessons that might improve design and implementation of other UNDP-GEF projects), and make recommendations regarding specific actions that should be taken to improve the project. The MTR will assess early signs of project success or failure and identify the necessary changes to be made. The project performance will be measured based on the indicators of the project's logical framework (see Annex 1) and various Tracking Tools.

The MTR must provide evidence-based information that is credible, reliable, and useful. The review team is expected to follow a participatory and consultative approach ensuring close engagement with government counterparts, in particular the GEF operational focal point, UNDP Country Office, project team, UNDP GEF Technical Adviser based in the region and key stakeholders. Interviews will be held with the following organizations and individuals at a minimum:

1. UNDP staff who have project responsibilities;
2. Executing agencies (including but not limited to senior officials and task team/ component leaders: key experts and consultants in the demonstration areas, PSC members;
3. The Chair of Project Steering Committee
4. Project stakeholders, to be determined at the MTR inception meeting; including academia, local government.

The team will review all relevant sources of information, such as the project document, project reports – including Annual APR/PIR, project budget revisions, progress reports, GEF focal area tracking tools, project files, national strategic and legal documents, and any other materials that the team considers useful for this evidence-based review.

4. MTR APPROACH & METHODOLOGY

The MTR report 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 Social and Environmental Screening Procedure/SESP), the Project Document, project reports including annual PIRs, project budget revisions, 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 Core Indicators/Tracking Tools submitted to the GEF at CEO endorsement, and the midterm GEF focal area Core Indicators/Tracking Tools that must be completed before the MTR field mission begins.

The MTR team is expected to follow a collaborative and participatory approach[87] ensuring close engagement with the Project Team, government counterparts (the GEF Operational Focal Point), the UNDP Country Office(s), the Nature, Climate and Energy (NCE) Regional Technical Advisor, direct beneficiaries, and other key stakeholders.

Engagement of stakeholders is vital to a successful MTR. Stakeholder involvement should include interviews with stakeholders who have project responsibilities, including but not limited to 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.

The specific design and methodology for the MTR should emerge from consultations between the MTR team and the above-mentioned parties regarding what is appropriate and feasible for meeting the MTR purpose and objectives and answering the evaluation questions, given limitations of budget, time and data. The MTR team must use gender-responsive methodologies and tools and ensure that gender equality and women's empowerment, as well as other cross-cutting issues and SDGs are incorporated into the MTR report.

The final methodological approach including interview schedule, field visits and data to be used in the MTR must be clearly outlined in the Inception Report and be fully discussed and agreed between UNDP, stakeholders, and the MTR team.

The final MTR report must 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.

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.

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

- Were relevant gender issues (e.g. the impact of the project on gender equality in the programme country, involvement of women's groups, engaging women in project activities) raised in the Project Document?

- 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[88]	Baseline Level[89]	Level in 1st PIR (self-reported)	Midterm Target[90]	End-of-project Target	Midterm Level & Assessment[91]	Achievement Rating[92]	Justification for Rating
Objective:	Indicator (if applicable):							
Outcome 1:	Indicator 1:							
	Indicator 2:							
Outcome 2:	Indicator 3:							
	Indicator 4:							
	Etc.							
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/Core Indicators 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.

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

- 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.
- Do the Executing Agency/Implementing Partner and/or UNDP and other partners have the capacity to deliver benefits to or involve women? If yes, how?
- What is the gender balance of project staff? What steps have been taken to ensure gender balance in project staff?
- What is the gender balance of the Project Board? What steps have been taken to ensure gender balance in the Project Board?

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?
- Informed by the co-financing monitoring table to be filled out by the Commissioning Unit and project team, 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?

Sources of Co-financing	**Name of Co-financer**	**Type of Co-financing**	**Co-financing amount confirmed at CEO Endorsement (US$)**	**Actual Amount Contributed at stage of Midterm Review (US$)**	**Actual % of Expected Amount**
		TOTAL			

- Include the separate GEF Co-Financing template (filled out by the Commissioning Unit and project team) which categorizes each co-financing amount as 'investment mobilized' or 'recurrent expenditures'. (This template will be annexed as a separate file.)

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?
- Review the extent to which relevant gender issues were incorporated in monitoring systems. See Annex 9 of *Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects* for further guidelines.

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?
- How does the project engage women and girls? Is the project likely to have the same positive and/or negative effects on women and men, girls, and boys? Identify, if possible, legal, cultural, or religious constraints on women's participation in the project. What can the project do to enhance its gender benefits?

Social and Environmental Standards (Safeguards)

- Validate the risks identified in the project's most current SESP, and those risks' ratings; are any revisions needed?
- Summarize and assess the revisions made since CEO Endorsement/Approval (if any) to:
    - The project's overall safeguards risk categorization.
    - The identified types of risks[93] (in the SESP).
    - The individual risk ratings (in the SESP) .
- Describe and assess progress made in the implementation of the project's social and environmental management measures as outlined in the SESP submitted at CEO Endorsement/Approval (and prepared during implementation, if any), including any revisions to those measures. Such management measures might include Environmental and Social Management Plans (ESMPs) or other management plans, though can also include aspects of a project's design; refer to Question 6 in the SESP template for a summary of the identified management measures.

A given project should be assessed against the version of UNDP's safeguards policy that was in effect at the time of the project's approval.

[93] Risks are to be labelled with both the UNDP SES Principles and Standards, and the GEF's "types of risks and potential impacts": Climate Change and Disaster; Disadvantaged or Vulnerable Individuals or Groups; Disability Inclusion; Adverse Gender-Related impact, including Gender-based Violence and Sexual Exploitation; Biodiversity Conservation and the Sustainable Management of Living Natural Resources; Restrictions on Land Use and Involuntary Resettlement; Indigenous Peoples; Cultural Heritage; Resource Efficiency and Pollution Prevention; Labour and Working Conditions; Community Health, Safety and Security.

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 & Knowledge Management:

- 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.
- List knowledge activities/products developed (based on knowledge management approach approved at CEO Endorsement/Approval).

iv. Sustainability

- Validate whether the risks identified in the Project Document, Annual Project Review/PIRs and the ATLAS Risk Register 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 in the MTR report for evidence-based conclusions, in light of the findings.

Additionally, the MTR consultant/team is expected to make recommendations to the Project Team. 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 (*Project Title*)

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)	

6. TIMEFRAME

The total duration of the MTR will be approximately *20* working days, and shall not exceed five months from when the consultant(s) are hired. The tentative MTR timeframe is as follows:

ACTIVITY	NUMBER OF WORKING DAYS	COMPLETION DATE
Document review and preparing MTR Inception Report (MTR Inception Report due no later than 2 weeks before the MTR mission)	*5 days*	*(date)*
Presentation of initial findings- last day of the MTR mission	*1 day*	*(date)*

Preparing draft report (due within 3 weeks of the MTR mission)	*10 days*	*(date)*
Finalization of MTR report/ Incorporating audit trail from feedback on draft report (due within 1 week of receiving UNDP comments on the draft)	*4 days*	*(date)*

Options for site visits should be provided in the Inception Report.

7. MIDTERM REVIEW DELIVERABLES

#	Deliverable	Description	Timing	Responsibilities
1	**MTR Inception Report**	MTR team clarifies objectives and methods of Midterm Review	No later than 2 weeks before the MTR start	MTR team submits to the UNDP and project management
2	**Presentation**	Initial Findings	End of MTR interview	MTR Team presents to project management and the Commissioning Unit
3	**Draft MTR Report**	Full draft report (using guidelines on content outlined in Annex B) with annexes	Within 3 weeks of the MTR interview	Sent to the Commissioning Unit, reviewed by RTA, Project Coordinating Unit, GEF OFP
4	**Final Report***	Revised report with audit trail detailing how all received comments have (and have not) been addressed in the final MTR report	Within 1 week of receiving UNDP comments on draft	Sent to UNDP

*The final MTR report must be in English. If applicable, the Commissioning Unit may choose to arrange for a translation of the report into a language more widely shared by national stakeholders.

8. MTR ARRANGEMENTS

The UNDP China will contract the consultants and ensure the timely provision of per diems and travel arrangements within China for the MTR team and will provide an updated stakeholder list with contact details (phone and email). The Project Team will be responsible for liaising with the MTR team to provide all relevant documents, set up stakeholder interviews, and arrange field visits.

9. TEAM COMPOSITION

A. International Lead Consultant （one person）

Budget：Consultant fee

Numbers of working days: 20 days

Profile

- Minimum of ten years accumulated and recognized experience in the Energy Efficiency and climate change area

- Minimum of five years experience of project evaluation and/or implementation experience in the result-based management framework
- Familiarity with China
- Experience with multilateral and bilateral supported project environments
- Comprehensive knowledge of international project best practices
- Very good report writing skills in English

Responsibilities

- Define the evaluation methodology and schedule, and report to the PMO
- Documentation of the review
- Leading the MTR Team in planning, conducting and reporting on the evaluation
- Deciding on division of labor within the team and ensuring timeliness of reports
- Use of best practice evaluation methodologies in conducting the evaluation
- Leading presentation of the draft evaluation findings and recommendations in-country
- Conducting the debriefing for the UNDP China Office and the TNC PMO
- Leading the drafting and finalization of the MTR report

10.ETHICS

The MTR team will be held to the highest ethical standards and is required to sign a code of conduct upon acceptance of the assignment. This MTR will be conducted in accordance with the principles outlined in the UNEG 'Ethical Guidelines for Evaluation'. The MTR team must safeguard the rights and confidentiality of information providers, interviewees and stakeholders through measures to ensure compliance with legal and other relevant codes governing collection of data and reporting on data. The MTR team must also ensure security of collected information before and after the MTR and protocols to ensure anonymity and confidentiality of sources of information where that is expected. The information, knowledge and data gathered in the MTR process must also be solely used for the MTR and not for other uses without the express authorization of UNDP and partners.

11.PAYMENT SCHEDULE

100% payment upon satisfactory delivery of the final MTR report and approval by UNDP and RTA (via signatures on the TE Report Clearance Form) and delivery of completed TE Audit Trail

12.APPLICATION PROCESS[94]

Recommended Presentation of Proposal:

a) **Letter of Confirmation of Interest and Availability** using the template[95] provided by UNDP;
b) **CV** and a **Personal History Form** (P11 form[96]);
c) **Brief description of approach to work/technical proposal** of why the individual considers him/herself as the most suitable for the assignment, and a proposed methodology on how they will approach and complete the assignment; (max 1 page)

[94] Engagement of the consultants should be done in line with guidelines for hiring consultants in the POPP: https://popp.undp.org/SitePages/POPPRoot.aspx

[95] https://intranet.undp.org/unit/bom/pso/Support%20documents%20on%20IC%20Guidelines/Template%20for%20Confirmation%20of%20Interest%20and%20Submission%20of%20Financial%20Proposal.docx

[96] http://www.undp.org/content/dam/undp/library/corporate/Careers/P11_Personal_history_form.doc

d) **Financial Proposal** that indicates the all-inclusive fixed total contract price and all other travel related costs (such as flight ticket, per diem, etc), supported by a breakdown of costs, as per template attached to the Letter of Confirmation of Interest template. If an applicant is employed by an organization/company/institution, and he/she expects his/her employer to charge a management fee in the process of releasing him/her to UNDP under Reimbursable Loan Agreement (RLA), the applicant must indicate at this point, and ensure that all such costs are duly incorporated in the financial proposal submitted to UNDP.

All application materials should be submitted to the address (fill address) in a sealed envelope indicating the following reference "Consultant for (*project title*) Midterm Review" or by email at the following address ONLY: (fill email) by ***(time and date)*.** Incomplete applications will be excluded from further consideration.

Criteria for Evaluation of Proposal: Only those applications which are responsive and compliant will be evaluated. Offers will be evaluated according to the Combined Scoring method – where the educational background and experience on similar assignments will be weighted at 70% and the price proposal will weigh as 30% of the total scoring. The applicant receiving the Highest Combined Score that has also accepted UNDP's General Terms and Conditions will be awarded the contract.

Annex B. Evaluation criteria matrix

Since the MTR ToRs did not include an evaluation matrix and key evaluation questions, the MTR team prepared the evaluation criteria matrix (Table B.1.), proposing the criteria and questions to be addressed during the MTR. The evaluation matrix was finalized during the review and approval of the MTR inception report.

Table B.1. Evaluation criteria matrix

Evaluative Criteria Questions	Indicators	Sources	Methodology
Project strategy			
Project design			
Relevance: Are the underlying problems and project assumptions relevant?	Validity of problem analysis, barrier analysis, and assumptions in the ProDoc	ProDoc	Desk review ToC Interviews with project team and stakeholders
Lessons from other projects: Did the project design incorporate lessons from other, similar projects?	Evidence of lessons from other projects in project design	ProDoc	Desk review
Project logic and strategy: Were project objectives clear and feasible? Were project outcomes and outputs internally coherent and consistent with the definition of the project objective?	Coherence and consistency between outputs, outcomes, and objective	ProDoc	Desk review ToC
Gender responsiveness: How were gender considerations incorporated in project design?	Evidence of planned activities with considerations on gender issues Evidence of gender-disaggregated indicators	ProDoc	Desk review
Stakeholder participation: Was there participation from stakeholders in the project design process?	Level of participation of stakeholders in project design	ProDoc	Desk review Interviews with project team and stakeholders
Project results framework			
Project results framework: Does the project results framework present a logical structure to support the evaluation of relevant project outcomes?	Level of coherence between project results framework and project strategy (i.e. objective, outcomes, outputs, and activities) Ability of the project results framework to measure progress	ProDoc	Desk review ToC Interviews with project team and stakeholders

Evaluative Criteria Questions	Indicators	Sources	Methodology
SMART indicators: Are the indicators in the project results framework specific, measurable, achievable, relevant and time-bound (SMART)?	Quality of indicators and baselines, adequacy of targets	ProDoc	Desk review Interviews with project team
Development impacts: Does the project results framework include adequate indicators to measure broader development effects (e.g. gender equality, improved livelihood, better governance)?	Ability of the project results framework to measure development impacts	ProDoc	Desk review Interviews with project team
Progress towards results			
Progress towards targets: What progress has been made towards planned project outcomes and targets?	PRF indicators Indicators in GEF tracking tool	ProDoc APRs, PIRs Press releases GEF tracking tool	Desk review Interviews with project team and stakeholders
Policy development: What progress has been made in the adoption of new or revised policies to promote energy efficiency in public buildings?	Publication of adopted policies	ProDoc Official bulletins and websites Press releases	Desk review Interviews with project team and stakeholders
Implementation of demonstration projects: Are the demonstration projects being implemented as planned? Were the barriers removal actions by the project effective enablers for these demonstration projects?	Consistency between proposed demonstration projects and actual project activities Degree to which barriers to the implementation of these projects were removed by the project	ProDoc APRs, PIRs Representatives from demonstration projects and participating banks	Desk review Interviews with project team and stakeholders, including representatives from demonstration projects and participating banks
Capacity development: What progress has been made in training public sector officials?	Number and quality of training products Number and affiliation of individuals who have completed training	ProDoc APRs, PIRs Training materials Training reports and certificates of completion	Desk review Interviews with project team and stakeholders
Changes to practices and behaviours: Did building designers, developers, and managers	Reported changes to building design, construction and/or management practices to	ProDoc APRs, PIRs Interviews with representatives	Desk review Interviews with project team and stakeholders

Evaluative Criteria Questions	Indicators	Sources	Methodology
change practices in accordance with the project´s intended objectives? Was the support provided by the project to building designers, developers, and managers effective?	adopt EE&EC and LC technologies and practices	from demonstration projects and participating banks	
Project successes: What have been the main achievements of the project and how can the project build on those successes?	Results above targets Unexpected results or benefits	ProDoc APRs, PIRs Interviews with project team and stakeholders Press releases	Desk review Interviews with project team and stakeholders
Project shortcomings: What are the main shortcomings of the projects and what could be done to address them?	Results below targets Activities behind schedule Budget execution behind schedule	ProDoc APRs, PIRs Interviews with project team and stakeholders	Desk review Interviews with project team and stakeholders
Progress implementation and adaptive management			
Project management			
Focus of results: Has the IP focused on results and timeliness?	Evidence that problems were identified and analysed on time Evidence that solutions were identified and implemented effectively to respond to emerging problems Evidence that plans were adjusted and updated to respond to problems and agreed courses of action	ProDoc APRs, PIRs Minutes of PSC	Desk review Interviews with project team and stakeholders
Scope management: Have changes to the project scope and activities been documented and approved?	Evidence that changes to the project scope, activities, targets, and budget have been documented and approved	ProDoc APRs, PIRs Minutes of PSC	Desk review Interviews with project team and stakeholders
Roles and responsibilities: Has there been clarity regarding responsibilities over project execution?	Evidence that plans adequately identified responsibilities and timelines Evidence that activities were implemented as planned Evidence that plans were adjusted and updated to	ProDoc APRs, PIRs Minutes of PSC	Desk review Interviews with project team and stakeholders

Evaluative Criteria Questions	Indicators	Sources	Methodology
	respond to problems and agreed courses of action		
Risk management: Is the IP identifying and managing risks effectively?	Risk log was kept up to date Evidence that problems were identified and analysed on time Evidence that solutions were identified and implemented effectively to respond to emerging problems Evidence that plans were adjusted and updated to respond to problems and agreed courses of action	ProDoc APRs, PIRs	Desk review Interviews with project team and stakeholders
Procurement: Are procurement processes appropriate?	Evidence that contracts were awarded in accordance with procurement plans	AWP, procurement plans, lists of awarded contracts	Desk review Interviews with project team
UNDP role: Was the support provided by UNDP timely and effective?	Field visits were conducted as planned Evidence that responses to emerging issues were clear and timely	APRs, PIRs Field missions' reports	Desk review Interviews with UNDP and project team
Monitoring and evaluation (M&E)			
Monitoring plan: Is the monitoring plan being implemented as intended? Are resources allocated for M&E being expended as planned?	Project reports submitted in accordance with provisions in the monitoring plan Project budgets and expenditures conform to provisions in monitoring plan	ProDoc APRs, PIRs	Desk review Interviews with project team
Project finance and cofinancing			
Financial control: Are there appropriate financial controls and mechanisms in place to allow effective project management?	Adequacy of financial control mechanisms Findings from auditors	Audit reports APRs, PIRs	Desk review Interviews with project team
Cofinancing: Have planned cofinancing contributions materialized? Were external resources well integrated into project strategy?	Levels of cofinancing reported	ProDoc Audit reports APRs, PIRs Press releases	Desk review Interviews with project team

Evaluative Criteria Questions	Indicators	Sources	Methodology
Stakeholder engagement			
Project partnerships: Has the project developed effective partnerships? Do these partnerships contribute to project results?	Evidence of resources committed by partners to project activities Evidence of commitment by partners to take over project activities after project end	ProDoc APRs, PIRs Press releases	Desk review Interviews with project team and stakeholders
Government support: Do national and local government support the objectives of the project and actively contribute to results?	Evidence of government engagement with project activities Adoption of policy recommendations produced with support from the project	ProDoc APRs, PIRs Press releases	Desk review Interviews with project team and stakeholders
Sustainability			
Financial risks to sustainability: Are there arrangements and mechanisms in place to ensure the financial sustainability of project results?	Evidence of commitment/interest by public or private institutions to provide financial resources to sustain or build on project results	ProDoc APRs, PIRs Press releases	Desk review Interviews with project team and stakeholders
Institutional risks to sustainability: Are there institutional arrangements in place to ensure the continuation of relevant activities? Are the capacities of relevant institutions in place to support the continuation of relevant products and services developed by the project?	Evidence of commitment/interest by public or private institutions to maintain services or products developed by the project	ProDoc APRs, PIRs Press releases	Desk review Interviews with project team and stakeholders
Socio-economic risks to sustainability: Are there social risks (e.g. acceptance of proposed solutions), economic or political risk that may hamper the sustainability of project results?	Evidence of ownership by stakeholders of the project's strategy and results Evidence of private sector aligning resources to the project's strategy	ProDoc APRs, PIRs Press releases Grievance redress mechanism	Desk review Interviews with project team and stakeholders
Environmental risks to sustainability: Are the environmental factors that could threaten	Evidence of natural hazards, including climate change-related hazards Evidence of issues arising from the implementation	ProDoc APRs, PIRs Press releases	Desk review Interviews with project team and stakeholders

Evaluative Criteria Questions	Indicators	Sources	Methodology
the project's strategy or the results achieved?	of environmental and social safeguard policies and procedures	Grievance redress mechanism	
Gender equality and women's empowerment: How did the project contribute to gender equality and women's empowerment?			
How did the project contribute to gender equality and women's empowerment?	Levels of participation of women in project implementation Incorporation of gender considerations in the planning and execution of project activities	ProDoc AWPs, APRs, PIRs	Desk review Semi-structured interviews Interviews with project team

Annex C. MTR rating scales

Table C.1. Ratings for progress towards results

Rating	Description
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 (MU)	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.

Table C.2. Ratings for project implementation & adaptive management

Rating	Description
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.

Table C.3. Ratings for sustainability

Rating	Description
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)	There are significant risks to sustainability.
1 = Unlikely (U)	There are severe risks to sustainability.

Annex D. List of persons interviewed

The following table lists the individuals interviewed for this MTR.

Table D.1. List of persons interviewed

Name	Affiliation
Project Management Unit	
Li Chunyan	Administrative Assistant, PMO
Li Mingyang	Technical Assistant, PMO
Meng Guang	Director, MoHURD
Peng Mengyue	Executive Director, PMO
Project Steering Committee	
Lei Yao	Institute of Finance, People's Bank of China
Liang Junqiang	Center of Science and Technology and Industrialization Development, MOHURD
Liu Jingying	World Bank Evaluation Center, International Finance Cooperation Department, MOF
Ni Jiangbo	Department of Standards and Norms, MOHURD
Wang Xiaolong	Department of Social Development Science and Technology, MOST
Technical Advisory Committee	
Liu Junyue	Shenzhen Institute of Architectural Sciences
Zhu Neng	Tianjin University
Zhou Ning	Beijing General Housing Technology Development Center
UNDP	
Shijun Liu	Programme director climate change, UNDP China
Manuel Soriano	Regional Technical Advisor, UNDP NCE, Bangkok Regional Hub
Project stakeholders	
Chen Xiaodong	Chief Engineer, Qingdao Energy and Kaiyuan Thermal Power Co., LTD
Hu Nan	Merchants Bank Co., LTD.
Huang Jin	Senior Engineer, Qingdao Municipal Bureau of Housing and Urban-Rural Development
Sheng Xiaoyan	Senior Engineer, Gongxin Testing (Shandong) Co.
Sun Pengcheng	General Manager, China Construction Engineering Design Group Co. Ltd. (CSCEC)
Wu Yongtao	President, Health Industry Finance Division, Bank of Qingdao (BQD)
Yin Yonggao	Southeast University

Annex E. List of documents reviewed

The following table lists the documents reviewed/consulted for this MTR.

Table E.1. List of documents reviewed

Documents reviewed for the terminal evaluation
Project document and related information
• GEF Project Identification Form (PIF) • GEF review sheet (at PIF stage) • Responses to GEF Council Members • UNDP project document (ProDoc) • GEF CEO endorsement request
Project outputs/deliverables
• China Academy of Building Standards and Design, Co. Public Building Technology (Shopping Mall Hotel Category). Demonstration sub-project work outline and proposal. March 2021 • China Construction Design Group Limited. Demonstration sub-project on market mechanisms for energy efficiency improvement in public buildings (Green Fund or Green Bond category). Intermediate results. August 2021 • China Institute of Building Standards, Design and Research Co. Ltd. Xidan Joy City Mall Energy Efficiency Retrofit Project. Financial programmes. December 2020 • MOHURD. Opinions on the opening of the demonstration sub-project "Xidan Joy City Shopping Mall". March 2021 • China Institute of Building Standards, Design and Research Co. Ltd. Public building technology (shopping malls and hotels). Demonstration sub-project work outline and proposal. March 2021 • China Institute of Building Standards, Design and Research Co. Ltd. Xidan Joy City Shopping Mall Energy-saving Renovation Project. Research report. October 2020 • China Institute of Building Standards, Design and Research Co. Ltd. Xidan Joy City Shopping Mall Energy-saving Renovation Project. Energy analysis report. November 2020 • Fact sheets on demonstration projects • Guangzhou Yuanzheng Intelligent Technology Co. Market mechanisms for energy efficiency improvement in public buildings (Financial leasing category). Model subproject opening report. March 2021 • Guangzhou Yuanzheng Intelligent Technology Co., Ltd.; China Mobile Group Guangdong Co., Ltd. Guangzhou Branch. Market mechanism for energy improvement in public buildings (Green Credit Category). Model subproject opening report. March 2021 • MOHURD. Proposals for the Demonstration Sub-project "Smart Power Consumption". March 2021 • Qingdao Lixinda Energy Service Co., Ltd. Demonstration Project of West Coast Campus of Qingdao University Affiliated Hospital. Mid-term results. January 2021 • Qingdao Lixinda Energy Service Co., Ltd. Demonstration Project of West Coast Campus of Qingdao University Affiliated Hospital. Proposal results. October 2021 • Tsinghua University, Taihor Technology. Roadmap for energy efficiency of Chinese public buildings. Promotion Road of Chinese Public Buildings Energy Efficiency. no date. • Terms of Reference for the selection of demonstration projects • Shanghai Tengtian Energy Saving Technology Co., Ltd., Shanghai Huangpu District Development and Reform Commission. Public building energy efficiency improvement

market mechanism demonstration subproject (intelligent electricity use). Opening report. December 2020
- Tianjin Jianneng Energy Saving Technology Co.; Ltd.Tianjin Huanke Environmental Consulting Co.; Ltd.; Tianjin Jianke Building Energy-saving Environmental Testing Co., Ltd. Demonstration Project of Public Building Market Mechanism (Other types such as carbon emission trading or public-private partnerships). Proposal Outcome. Opening report. March 2021
- No author. No title. No date. Report on the demonstration project on the Beijing Daxing Airport (1)
- No author. No title. No date. Report on the demonstration project on the Beijing Daxing Airport (2)

Project steering committee

- Minutes meeting 15 September 2020
- Minutes meeting 26 April 2021

Stakeholders' engagement

- List of project staff and key stakeholders

Monitoring and evaluation

Project implementation review (PIR) reports
- PIR for 2019
- PIR for 2020

Annual progress reports (APR)
- APR for 2019
- APR for 2020

Minutes of the workshop on "Project log-frame retrofitting". January 2019

Inception report, including minutes of the inception workshop. June 2019

GEF Tracking Tool at CEO endorsement and mid-term

Financials

Combined delivery reports (CDRs)
- CDR for 2019
- CDR for 2020

Annual work plans (AWPs)
- AWP for 2019 – 2020
- AWP for 2020 – 2021
- AWP for 2021 – 2022

Spot checks
- Jan – Sep 2020 (report dated 10 December 2020

Co-financing
- Qingdao Guoxinhaitian Center Engineering Co., Ltd
- Beijing Investment Group Co., Ltd
- Huashan Hospital, Affiliated to Fudan University
- Tianjin Jinze Hotel, Tianjin Tianchengliyun Hotel, Tianjin Vocational Institute, Tianjin Central Hospital of Gynecology Obstetrics
- I-mec Technology Co., Ltd
- Ningbo Municipal Meishan Management Committee, Ningbo Modern Mall, Ningbo Modern Porcelain Mall, Yinzhou District Power Supply Company
- Shanghai Linxiang Environmental Protection Co., Ltd
- Nanjing Tianshuo Auto-control Mechanics Co., Ltd

- Beijing Bayi High School
- Hangtiancheng School, Affiliated to Renmin University of China
- Capital University of Physical Education and Sports
- Beijing Daxing International Airport
- China Institute of Building Standard Design & Research
- Chongqing CECEP Yuelai Energy Management Co., Ltd
- Shenzhen Institute of Building Research Co., Ltd.
- Jiangsu Nantong Third Engineering Group Co., Ltd.

Procurement

List of contracts awarded for more than USD 5,000

Others

- UNDP. Changing the World. UNDP Strategic Plan: 2014 – 2017. No date.
- UNDP. Country Programme Document (CPD) for China (2016 – 2020). 2016.
- UNDP. Guidance for Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects. 2014.

Annex F. Signed UNEG Code of Conduct form

UNEG Code of Conduct for Evaluators

Independence entails the ability to evaluate without undue influence or pressure by any party (including the hiring unit) and providing evaluators with free access to information on the evaluation subject. Independence

Evaluators/Consultants:

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.
8. Must ensure that independence of judgement is maintained, and that evaluation findings and recommendations are independently presented.
9. Must confirm that they have not been involved in designing, executing, or advising on the project being evaluated and did not carry out the project's Mid-Term Review.

Evaluation Consultant Agreement Form

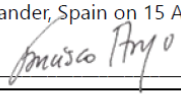
Agreement to abide by the Code of Conduct for Evaluation in the UN System:

Name of Evaluator: Francisco Arango

Name of Consultancy Organization (where relevant): N.A.

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

Signed at Santander, Spain on 15 August, 2021

Signature: 

An independent evaluation reduces the potential for conflicts of interest which might arise with self-reported ratings by those involved in the management of the project being evaluated. Independence is one of ten general principles for evaluations (together with internationally agreed principles, goals, and targets: utility, credibility, impartiality, ethics, transparency, human rights and gender equality, national evaluation capacities, and professionalism).

Annex G. Signed MTR report clearance form

ANNEX : MTR Report Clearance Form

(to be completed by the Commissioning Unit and RTA and included in the final document

Midterm Review Report Reviewed and Cleared By:

Name: ____Liu Shijun_____

Signature: _____ _____ Date: _____

Regional Technical Advisor (Nature, Climate and Energy)

Name: Manuel Soriano

Signature: DocuSigned by: Manuel Soriano B01FE800169D418... Date: 13-Feb-2022

Annex H. MTR audit trail (in separate file)

Annex I. GEF CCM Tracking Tool (in separate file)

Annex J. Project components, outcomes, outputs, and activities

Table K.1. Project components, outcomes, outputs, and activities

Project outcomes, outputs, and activities	
Component 1. Public sector EC&EE policy and regulatory frameworks. Outcome 1. Strict enforcement of approved enhanced policies and rules and regulations on energy efficiency and low-carbon operation and maintenance of public sector buildings.	
Outputs	**Activities**
Output 1.1. Completed comprehensive assessment of applicable foreign and domestic EC&EE and LC policies and regulations for public sector buildings.	1.1.1. Gathering of information about EC&EE and LC policies and regulations for public sector buildings from developed and developing countries that have the same circumstances as China.
	1.1.2. Evaluation of public sector buildings EC&EE and LC policies and regulations from selected countries.
	1.1.3. Inventory of information on local EC&EE and LC policies and regulations for public sector buildings in China.
	1.1.4. Comparative analysis of local and foreign EC&EE and LC policies and regulations for public sector buildings.
	1.1.5. Presentation and discussions on the results of the comparative analysis and recommended local and foreign EC&EE and LC policies and regulations for public sector buildings.
	1.1.6. Documentation of the results of the proposed applicable local and foreign EC&EE and LC policies and regulations for adoption in the public sector buildings in China.
Output 1.2. Formulated and promoted EC&EE improvement roadmaps.	1.2.1. Evaluation of the current EC&EE activities in the public sector buildings in China.
	1.2.2. Defining the desired pathway for the EC&EE applications in the public sector buildings.
	1.2.3. Development of the EC&EE improvement roadmaps.
	1.2.4. Publication of the EC&EE improvement roadmaps and preparation for their launching and implementation.
	1.2.5. Implementation of the EC&EE improvement roadmaps.
Output 1.3. Formulated and enforced policies including the associated guidance and implementing rules and regulations (IRRs) on energy monitoring and reporting, energy savings verification, and energy conservation in public buildings.	1.3.1. Formulation, approval, and enforcement of policies and implementing rules and regulations (IRRs) on energy management information system (EMIS) for public sector buildings and measurement, reporting and verification (MRV) of EC&EE projects in public sector buildings. 1.3.1.1. Review of current policy and implemented system for energy monitoring and reporting of public buildings. 1.3.1.2. Formulation of new policies and regulations on EMIS for public buildings. 1.3.1.3. Presentation and promotion of the recommended policies on EMIS. 1.3.1.4: Formulation of the supporting IRRs for the EMIS.
	1.3.2. Formulation, approval and enforcement of supplementary policies and IRRs to the EMIS for the establishment and operationalization of an Energy Savings Measurement & Verification System (ESMVS). 1.3.2.1. Formulation of supporting policies and regulations on the evaluation of the energy performance, and verification of reported energy savings (in EMIS), of public buildings. 1.3.2.2. Conduct of advocacy and promotional work to secure approval of the ESMVS for public buildings.

	1.3.3. Formulation, approval, and enforcement of improved and revised regulations on energy conservation in the public sector including associated new set of guidance and institutional frameworks. 1.3.3.1.a. Review of the existing energy conservation policies and regulations as applied to the implementation of EC&EE measures in buildings. 1.3.3.1.b. Review of the existing, and potential improvements to, institutional and financial policies regarding the use of savings/revenues generated by public buildings. 1.3.3.2. Formulation of supporting policies and regulations on energy conservation in the public sector. 1.3.3.3. Formulation and finalization of the public sector energy conservation policy measures and associated IRRs. 1.3.3.4. Evaluation of the results and impacts of public sector energy conservation policies.
Output 1.4. Completed demonstrations on the application of EC&EE policies and systems in 3 to 5 provincial Department of Housing and Urban-Rural Development (DOHURD) regions.	1.4.1. Solicitation and vetting of ideas for novel policies for discussion among experts and local policy makers.
	1.4.2. Implementation of agreed upon local-level policy pilots.
	1.4.3. Design and implementation of plan to monitor results of the two or more local-level policy pilots.
	1.4.4. Design and conduct of survey of cities on the development of local public building EC&EE policies and regulations.
Output 1.5. Developed and approved follow-up plan for the replication of piloted EC&EE improvement policies in public buildings in other provinces.	1.5.1. Design of the follow-up plan to promote and implement the replication of the successful applications of the piloted EC&EE and LC policies to other DOHURD regions in the country.
	1.5.2. Promotion of the successful applications of the piloted EC&EE and LC policies to other major Chinese provinces and cities.
Output 1.6. Developed improved and updated public sector building energy standards.	1.6.1. Assessment of best practices on energy efficiency in public sector building design and operation.
	1.6.2. Assessment and setting of improved public sector building energy efficiency codes.
	1.6.3. Enforcement of public sector building energy codes and standards.
Output 1.7. Developed life energy efficiency management and evaluation regulation for large public buildings.[97]	1.7.1. Investigate the current situation of energy-saving management and evaluation of the whole life of energy-saving design, construction, and operation of large public buildings.
	1.7.2. Research and establishment of whole process energy conservation assessment system of large public buildings.
	1.7.3. Research and establishment of whole process energy conservation management system of large public buildings.
	1.7.4. Implementing and promoting energy conservation management and assessment system in the whole process of large public buildings.
Output 1.8. Methodology research on regional energy planning & operation management for public buildings, and demonstration.[98]	1.8.1. Investigation and research on case information of regional energy system operation management projects of public buildings at home and abroad.
	1.8.2. Investigation on regional energy policies, institutions, and implementation guidelines for public buildings.
	1.8.3. Research on regional energy planning method based on internet concept.
	1.8.4. Research on regional energy operation and management model of public buildings.
Component 2. Energy performance monitoring and evaluation system for public sector buildings Outcome 2. Better control and enhanced management of the energy performance of public sector buildings	
Outputs	**Activities**
	2.1.1.1. Conduct of research on active EMIS for buildings in other countries.

[97] Output added during the inception workshop in 2019.
[98] Output added during the inception workshop in 2019.

Output 2.1.1. Reviewed and verified supplemental baseline energy information in the various major types of buildings within the public sector.	2.1.1.2. Conduct of a comprehensive review of the current and planned EC&EE activities in various types of public buildings.
	2.1.1.3. Organization and conduct of a workshop on EC&EE in public buildings.
Output 2.1.2. Established public sector building energy audit system.	2.1.2.1. Review of building energy audit practices and needs.
	2.1.2.2. Development of a public sector Building Energy Audit System (BEAS).
	2.1.2.3. BEAS evaluation
Output 2.1.3. Established public sector buildings EMIS.	2.1.3.1. Design of the EMIS for public buildings.
	2.1.3.2. Finalization of the EMIS framework and mechanisms based on the approved policies and IRRs
	2.1.3.3. Implementation of the EMIS, including provision of technical assistance to public buildings requesting assistance in the reporting process.
	2.1.3.4. Preparation of annual reports on the status and trends in the energy supply, demand, and consumption in the public buildings sector in China.
	2.1.3.5. Evaluation of the results and impacts of the EMIS.
Output 2.1.4. Established ESMVS in public buildings sector	2.1.4.1. Design of the ESMVS for public buildings.
	2.1.4.2. Formulation and finalization of the ESMVS mechanisms and supporting IRRs based on the approved policies
	2.1.4.3. Implementation of the ESMVS, including evaluation of its results and impacts.
	2.1.4.4. Publication and dissemination of results of the ESMVS.
Output 2.1.5: Established green finance indicator system which supports the building energy efficiency improvement[99]	2.1.5.1. Sorting out the development mode of green finance supporting energy efficiency of public buildings at home and abroad.
	2.1.5.2. Design the Green Finance Index System of Energy Efficiency Improvement of Public Buildings Supported.
	2.1.5.3. Develop implementation Plans and Improving Implementation Rules.
Output 2.2.1. Completed energy audits of public sector buildings	2.2.1.1. Development and implementation of public building energy audit program.
	2.2.1.2. Conduct scheduled energy audits.
	2.2.1.3. Publication and dissemination of results of the energy audit program.
	2.2.1.4. Enhancement of the public building energy audit program
Output 2.2.2. Established public buildings EMIS (PBEMIS) database	2.2.2.1. Conduct of research/study on the requirements and procedures for processing, verification, and encoding, as well as data updating.
	2.2.2.2. Design and development of the public buildings EMIS database.
	2.2.2.3. Capacity development in the use of the PBEMIS database.
Output 2.2.3. Investigation on energy consumption of different types of public buildings[100]	2.2.3.1 Investigation on energy consumption statistic and reporting regulation of public buildings in north China.
	2.2.3.2 Investigation on energy consumption statistic and reporting regulation of public buildings in hot-summer cold-winter climate zone of China.
	2.2.3.3 Investigation on energy consumption statistic and reporting regulation of public buildings in hot-summer warm-winter climate zone of China.
Component 3. EC&EE improvement promotion and demonstration programs for public sector buildings **Component 3.1. Facilitation of EC&EE and LC technologies application demonstrations** Outcome 3.1. Increased availability of resources (technical capacity, information, and financing) for EC&EE initiatives in public sector buildings and facilities	
Outputs	**Activities**
	3.1.1.1. Conduct of analyses of data/information in the PBEMIS database.

[99] Output added during the inception workshop in 2019.

[100] Output added during the inception workshop in 2019.

Output 3.1.1. Established scheme for providing information about the features, technical specifications, and costs of new EC&EE and LC technologies (including products) for the public sector	3.1.1.2. Conduct of a workshop on the sharing of EC&EE and LC technologies as applied to public buildings.
	3.1.1.3. Design and establishment of a scheme for the sourcing of EC&EE and LC technology-related information for the PBEMIS database.
Output 3.1.2. Published directory of recommended applicable and cost-effective new EC&EE and LC technologies (systems and products) for public sector building administrators/managers.	3.1.2.1. Conduct of analyses of EC&EE and LC technologies that are feasible and applicable in public buildings in China.
	3.1.2.2. Development of a compendium/directory of EC&EE and LC technology suppliers
	3.1.2.3. Conduct of a commercial exhibition and conference on EC&EE and LC technologies included in the directory.
	3.1.2.4. Review and updating of the EC&EE and LC technologies directory.
Output 3.1.3. Completed assessment of market-based financing scheme options.	3.1.3.1. Review of existing operational financing schemes for EC&EE and LC projects in China.
	3.1.3.2. Review of potential market-based financing schemes for EC&EE and LC projects in the public buildings sector.
	3.1.3.3. Promotion of potential schemes for EC&EE and LC project financing in public buildings.
Output 3.1.4. Designed market-based financing of new EC&EE and LC technology (system and product) applications.	3.1.4.1. Selection of market-based financing scheme options.
	3.1.4.2. Design of selected market-based financing scheme(s) for EC&EE and LC projects in the public buildings sector.
	3.1.4.3. Design of an EC&EE and LC incentive scheme for public buildings.
Output 3.1.5. Selected EC&EE and LC projects (total of 20) in public buildings in selected public sub-sectors.	3.1.5.1. Review of the potential demo/pilot projects.
	3.1.5.2. Pre-feasibility assessments of the potential projects.
	3.1.5.3. Conduct of preliminary discussions for financing of demo projects.
	3.1.5.4. Finalization of the line-up of confirmed EC&EE demos/pilots.
Output 3.1.6. Completed feasibility analyses and design of 20 EC&EE and LC technology application demonstrations.	3.1.6.1. Review of pre-feasibility analyses of identified demo/pilot projects.
	3.1.6.2. Conduct of comprehensive feasibility analyses.
	3.1.6.3. Design of the EC&EE and LC demonstrations.
	3.1.6.4. Promotion of the demonstrations.
	3.1.6.5. Finalization of the design of demo/pilot projects.
Component 3. EC&EE improvement promotion and demonstration programs for public sector buildings **Component 3.2. Implementation of EC&EE and LC technologies application demonstrations** Outcome 3.2. Increased application of EC&EE technologies in public sector buildings and facilities	
Outputs	**Activities**
Output 3.2.1. Established scheme for market-based financing of new EC&EE and LC technology (system and product) applications.	3.2.1.1. Establishment and operationalization of the selected financing scheme(s).
	3.2.1.2. Conduct promotional campaigns for the financing/incentive schemes.
	3.2.1.3. Capacity development for public buildings.
Output 3.2.2. Implemented 10 EC&EE and LC projects financed through market-based financing scheme in public buildings in selected public sub-sectors.	3.2.2.1. Implementation of the demo EC&EE and LC projects that are financed through market-based financial schemes.
	3.2.2.2. Preparation of the demo project profiles (as case studies).
	3.2.2.3. Conduct of an overall performance evaluation of the demo projects.
Output 3.2.3. Implemented 10 EC&EE and LC technology application demonstrations in public buildings.	3.2.3.1. Implementation of the EC&EE and LC demonstrations.
	3.2.3.2. Preparation of the demo project profiles (as case studies).
	3.2.3.3. Conduct of an overall performance evaluation of the demo/pilot projects.
Output 3.2.4. Published reports on the impacts of the EC&EE	3.2.4.1. Organization and conduct of a seminar-workshop on the results of the demonstrations.

and LC project financing and demonstration program.	3.2.4.2. Documentation, publication, and dissemination of the seminar-workshop proceedings
Output 3.2.5. Developed sustainable follow-up plans for the replication of the demonstrated applicable and feasible EC&EE and LC technologies in the public sector buildings in 5 other provinces.	3.2.5.1. Evaluation of additional capacity development needs on EC&EE and LC technologies.
	3.2.5.2. Design of sustainable follow-up plans.
	3.2.5.3. Promotion of the sustainable follow-up program.
Component 4. Public sector EC&EE capacity and awareness enhancement program Outcome 4. Enhanced awareness and knowledge of public sector authorities and personnel and the citizenry on the cost-effective application of EC&EE technologies	
Outputs	**Activities**
Output 4.1.1. Completed project promotional campaigns and workshops in target segments of the public sector.	4.1.1.1. Conduct capacity needs assessment.
	4.1.1.2. Design and conduct of promotional campaigns.
	4.1.1.3. Evaluation of the implemented promotional campaigns.
Output 4.1.2. Completed trainings for MOHURD and DOHURD authorities and technical staff on the implementation of the various EC&EE and LC programs.	4.1.2.1. Design of capacity development program for MOHURD and DOHURD.
	4.1.2.2. Conduct of the planned training courses.
	4.1.2.3. Post-evaluation of the capacity development program.
Output 4.1.3. Completed and post-evaluated EC&EE and LC capacity development programs for the public buildings sector.	4.1.3.1. Design of EC&EE and LC capacity development program for the public buildings sector.
	4.1.3.2. Conduct of the programmed EC&EE and LC training courses.
	4.1.3.3. Post-evaluation of the EC&EE and LC capacity development program.
Output 4.2.1. Established information network for the promotion and dissemination of knowledge on public sector EC&EE and LC technology applications.	4.2.1.1. Conduct of capacity and information needs assessments of the public buildings sector.
	4.2.1.2. Development, establishment, and operationalization of a buildings energy technology information exchange (BETIX) service.
	4.2.1.3. Sustaining and strengthening the BETIX service.
Output 4.2.2. Established public sector EC&EE and LC management cum education training centers in the different climate regions.	4.2.2.1. Assessment of current capabilities and resources for regional capacity development.
	4.2.2.2. Selection of DOHURDs where EC&EE and LC management cum education training centers will be established
	4.2.2.3: Establishment and operationalization of EC&EE and LC management cum education training centers.
	4.2.2.4: Performance evaluation of the EC&EE and LC management cum education training centers.
Output 4.2.3. Established platform for information sharing on low-carbon technology, standard & policy applied public buildings among main cities along the silk & belt route.[101]	4.2.3.1: Study on Green Low Carbon Energy-saving Building Standards and Related Policies and Institutions in Southern China and Comparative Study with Southeast Asian Countries and Regions.
	4.2.3.2: Comparative study of building energy efficiency standards in China and Europe.
	4.2.3.3: Identify key cities.
	4.2.3.4: Develop information sharing mechanism on technology, standard and policy.
	4.2.3.5: Establish comparison platform.

Source: Adapted from UNDP Project Document pp. 11 – 42

[101] Output added during the inception workshop in 2019.

Annex K. Example of ToR for the selection of demonstration projects

The following is an example of ToR used for the selection of demonstration projects under component three of the PSBEE project. There were 20 versions of these ToRs, one each for the different types of buildings and financial mechanisms showcased by the project.

Terms of Reference (TOR)

Sub-contract: Demonstration Projects of Energy Efficiency Improvement Technologies in Public Buildings (shopping mall, hotel)

Implementation Term: August 2020 - September 2021

I. Project Background

In recent years, with the rapid development of China's economy and deepening industrialization and urbanization, people's living standards have greatly improved. At the same time, energy consumption has increased, especially in various types of buildings. Public buildings are large energy consumers. The average energy consumption per unit area is 2 to 3 times that of other buildings, which is higher in economically developed areas. In 2018, the national total construction area reached 60.1 billion square meters. The public building area was about 12.8 billion square meters, accounting for around 21%. The total energy consumption of buildings was 857 million tce, of which public buildings consumed 341 million tce, accounting for about 40%. Public buildings, as an important part of building energy efficiency improvement, feature high energy consumption per unit area and huge energy-saving potential.

Since 2007, under the guidance of the Department of Standard Quota of the Ministry of Housing and Urban-Rural Development (formerly the Department of Building Energy Efficiency and Technology), efforts have been gradually made in improving energy efficiency in public buildings, including the establishment of statistical and auditing mechanisms, the management and control of intelligent systems such as online monitoring, and the implementation of high-performance energy efficiency retrofits. The policy system has been improved and work in all aspects has progressed smoothly, achieving outstanding results in the sector. With the advancement of energy efficiency improvement projects in public buildings, several energy-saving retrofit technologies with low costs and good results have emerged in such areas as energy diagnostics, heating, ventilation and domestic hot water system, lighting system, and exterior envelope structure. As people's demand for green living has increased, technologies

such as green roofs and energy efficiency improvement technologies that have ultra-low consumption and net-zero emissions are becoming available in the market. However, energy-efficient technologies in public buildings in some parts of China are relatively homogeneous and lagging behind. The lack of new technology application results in poorly designed technology solutions and high retrofit costs, which have restricted the advancement of energy efficiency improvements in public buildings. This project intends to select a series of shopping malls and hotels (such as chain shopping malls or hotels, etc.) to demonstrate the application of energy-efficient technologies for public buildings, and to promote it through the Internet and promotional events, so as to enhance energy efficiency in public buildings throughout China.

II. Demonstration Items

1. The demonstration buildings are limited to shopping malls and hotels, such as chain shopping malls or chain hotels, etc.

2. The demonstration can be a single building, or a building block that belongs to the same owner.

3. Applied technologies shall be outstanding and scalable in terms of energy conservation, green, ultra-low energy consumption and renewable energy application.

4. No less than 2 technology types shall be adopted for application in an individual building, and no less than 5 technologies of 3 types shall be adopted for application in a building block.

5. The demonstration area of new buildings shall be no less than 20,000 square meters and shall meet at least two-star level of the 2019 Green Building Standard. The overall energy efficiency of the applied retrofit of existing buildings shall not be less than 20%. The annual carbon dioxide emission reduction after completion of the project shall not be less than 1,500 tons.

6. The demonstration projects shall collect, analyze and evaluate data on energy consumption, technology and costs of public buildings, and upload such information to the public building energy management system designated by the Project Management Office as per their request (hereinafter referred to as the "PMO").

7. Conducting case studies on the results of demonstration projects and comprehensively assessing operations of the projects; preparing a list of project deliverables (such as the content of retrofits, operational performance of retrofitted systems and economic performance);

publishing results, conclusions and recommendations; promoting demonstration projects in cities when conditions permit in support of the PMO.

8. The main applicant can be building owner, energy service company + building owner, technical support unit + building owner. The building owner must be included for the application.

III. Expected Deliverables

1. Energy efficiency design and implementation plan of demonstration projects (including investment and financing options and pre-evaluation of energy conservation);

2. A report on the operational assessment of energy consumption and analysis of benefits after implementation of the demonstration projects;

3. Reports to be uploaded to the public building energy information management platform.

IV. Eligibility Requirements

1. Independent legal entity in China.

2. The applied demonstration project is about energy efficiency retrofits of public buildings or new public buildings, and has demonstration significance. The procedures for project initiation and approval, land, planning, etc. have been completed; the requirements of relevant national policies and regulations are met; the project has a reliable source of funds.

3. Candidate who has experience in the implementation of energy efficiency retrofits of public buildings is preferred.

4. Having excellent data collection and analysis capabilities

5. The project leader has excellent project organization and coordination skills, and has extensive cooperation with local government authorities, relevant research institutions, companies, associations and industry experts.