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The World Bank

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Report No: ICR00005084

IMPLEMENTATION COMPLETION AND RESULTS REPORT

TF-014522

ON A

GRANT

IN THE AMOUNT OF US$12.00 MILLION

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR THE

URBAN SCALE BUILDING ENERGY EFFICIENCY AND RENEWABLE ENERGY PROJECT

December 2, 2020

Energy and Extractives Global Practice
East Asia and Pacific Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective December 31, 2019)

Currency Unit =	Chinese Yuan (CNY)
CNY 1.00 =	US$0.14
US$1.00 =	CNY 7.02

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

BDRC	Beijing Development and Reform Commission
BHURDC	Beijing Housing and Urban-rural Development Commission
BJSPVP	Beijing Distributed Solar PV Scale-Up Project
BMG	Beijing Municipal Government
CPF	Country Partnership Framework
CSTC	Center of Science and Technology for Construction
CUSBEERE	China Urban Scale Building Energy Efficiency and Renewable Energy
DA	Designated Account
DPV	Distributed Photovoltaics
EPB&D	Energy Performance Benchmarking and Disclosure
FIRR	Financial Internal Rate of Return
FM	Financial Management
FYP	Five-year Plan
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEO	Global Environment Objective
GHG	Greenhouse Gas
GOC	Government of China
ICR	Implementation Completion and Results Report
IR	Intermediate Results
IRR	Internal Rate of Return
ISR	Implementation Status and Results Report
LOCAL	Low-carbon, Adaptive, and Livable
M&E	Monitoring and Evaluation
MOF	Ministry of Finance
MOHURD	Ministry of Housing and Urban-Rural Development
NDRC	National Development and Reform Commission
NHURDC	Ningbo Housing and Urban-Rural Development Committee
NMG	Ningbo Municipal Government
PAD	Project Appraisal Document

PDO	Project Development Objective
PMO	Project Management Office
PSC	Project Steering Committee
PV	Photovoltaic
RESCO	Renewable Energy Service Company
SCD	Systematic Country Diagnostic
TA	Technical Assistance
TOR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change

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DATA SHEET

BASIC INFORMATION

Product Information

Project ID	Project Name
P130786	Urban Scale Building Energy Efficiency and Renewable Energy
Country	**Financing Instrument**
China	Investment Project Financing
Original EA Category	**Revised EA Category**
Partial Assessment (B)	Partial Assessment (B)

Organizations

Borrower	Implementing Agency
Ministry of Finance	Ministry of Housing and Urban-Rural Development, Beijing Housing and Urban-Rural Development Commission, Beijing Development and Reform Commission, Ningbo Housing and Urban-Rural Development Commission, Center of Science and Technology for Construction (CSTC)

Project Development Objective (PDO)

Original PDO

The proposed project development objective is to improve selected national and city-level policies for (1) the promotion of low-carbon, adaptive and livable urban forms; (2) an increase in energy efficiency in public and commercial buildings; and, (3) the scale-up of commercially viable rooftop solar PV deployment.

The global environment objective of the proposed project is to reduce carbon dioxide emissions from buildings in selected Chinese cities by supporting improved policy making and implementation in promoting low-carbon, adaptive and livable urban forms, increasing energy efficiency in public and commercial buildings, and scaling up commercially viable rooftop solar PV deployment.

FINANCING

	Original Amount (US$)	Revised Amount (US$)	Actual Disbursed (US$)
World Bank Financing			
TF-14522	12,000,000	11,825,642	11,825,642
Total	**12,000,000**	**11,825,642**	**11,825,642**
Non-World Bank Financing			
Borrower/Recipient	18,590,000	18,590,000	61,741,666
Total	**18,590,000**	**18,590,000**	**61,741,666**
Total Project Cost	**30,590,000**	**30,415,642**	**73,567,308**

KEY DATES

Approval	Effectiveness	MTR Review	Original Closing	Actual Closing
26-Apr-2013	26-Aug-2013	31-Oct-2016	31-Dec-2018	31-Dec-2019

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US$M)	Key Revisions
31-Mar-2018	6.37	Change in Disbursements Arrangements Change in Institutional Arrangements
18-Dec-2018	7.53	Change in Results Framework Change in Loan Closing Date(s) Change in Implementation Schedule

KEY RATINGS

Outcome	Bank Performance	M&E Quality
Satisfactory	Satisfactory	Modest

RATINGS OF PROJECT PERFORMANCE IN ISRs

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US$M)
01	24-Oct-2013	Satisfactory	Satisfactory	0
02	14-Jun-2014	Satisfactory	Satisfactory	.80
03	25-Oct-2014	Satisfactory	Satisfactory	.80
04	11-Mar-2015	Satisfactory	Satisfactory	1.48
05	18-Oct-2015	Satisfactory	Satisfactory	2.09
06	02-Jun-2016	Satisfactory	Satisfactory	3.35
07	18-Dec-2016	Satisfactory	Moderately Satisfactory	4.36
08	27-Jun-2017	Satisfactory	Moderately Satisfactory	4.60
09	15-Jan-2018	Satisfactory	Moderately Satisfactory	6.15
10	29-Jun-2018	Satisfactory	Moderately Satisfactory	6.71
11	19-Oct-2018	Satisfactory	Moderately Satisfactory	6.53
12	18-Apr-2019	Satisfactory	Satisfactory	8.68
13	18-Oct-2019	Moderately Satisfactory	Satisfactory	9.52

SECTORS AND THEMES

Sectors

Major Sector/Sector	(%)
Public Administration	**19**
Sub-National Government	19

Energy and Extractives	**78**
Renewable Energy Biomass	4
Renewable Energy Geothermal	4
Renewable Energy Solar	4
Renewable Energy Wind	4
Other Energy and Extractives	62
Transportation	**3**
Urban Transport	3

Themes

Major Theme/ Theme (Level 2)/ Theme (Level 3)	(%)
Finance	**17**
Finance for Development	17
Housing Finance	17
Urban and Rural Development	**22**
Urban Development	22
Urban Infrastructure and Service Delivery	5
Urban Planning	17
Environment and Natural Resource Management	**62**
Climate change	62
Mitigation	62

ADM STAFF

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I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

Context

1. At the time of appraisal in early 2013, China was rapidly urbanizing.[1] Alongside multi-decade, double-digit gross domestic product (GDP) growth, China's rural residents flocked to cities to seek a better life. Between 1990 and 2010, the number of city residents more than doubled and the amount of urban building stock more than tripled. In 2019, according to World Bank statistics, the share of China's population living in cities exceeded 60 percent. By 2030, 70 percent of Chinese, or more than 1 billion people, were projected to reside in metropolitan areas.

2. **New, rising cities pursued a carbon-intensive development path.** Modern China's urban design found its roots in Soviet legacies recommended by advisers: wide boulevards, cavernous buildings, and road networks devoid of multimodal horizontal integration. During the 1990s and 2000s, new urban areas exacerbated these challenges by emphasizing car-based transport, segregated residential high-rise buildings, and commercial districts linked by major roads. China's new urban form not only constrained optimal energy use at the building, block, and neighborhood level but also locked cities into a lifestyle dependent on motorized transport.

3. **China's 12th Five-year Plan (FYP) for National Socio-Economic Development (12th FYP 2011–2015**) **and related pledges sought to balance economic expansion with environmental sustainability.** Binding targets included cutting energy consumption per unit of GDP and CO_2 emissions per unit of GDP by 16 percent and 17 percent, respectively, over the 12th FYP period and increasing the share of non-fossil energy in primary energy use from 8 percent in 2010 to 11.4 percent by 2015. In related pledges, the Government aimed to increase rooftop solar photovoltaic (PV) capacity from under 1 GW in 2010 to 3 GW by 2015. Energy intensity and non-fossil energy use were expected to further improve by 2020. Key actions were identified for the building sector in the 12th FYP period, including comprehensive promotion of building energy efficiency through planning, regulations, standards, technologies, and designs; development and implementation of a green building action plan; strengthening of the energy monitoring and management system for public and commercial buildings; improvement in energy audit and energy disclosure to support building energy retrofit and operational management; and promotion of renewable energy and building integration. Recognizing the benefits of low-carbon, adaptive, and livable (LOCAL) urban forms, the Government specifically called for carrying out low-carbon community pilots to integrate community planning and design, transportation, energy and other infrastructure systems, green buildings, and lifestyle.

4. **Cities were tapped to occupy a central role in China's green growth and climate action plans.** Cities accounted for about 80 percent of the GDP and 75 percent of the energy consumption in China. They were key to meeting China's energy intensity and carbon reduction targets. Alarming environmental degradation paired with increasingly frequent extreme weather highlighted the need for resilient urban forms that fostered low-carbon living and scaled up energy efficiency and renewable energy deployment.

[1] The China Urban Scale Building Energy Efficiency and Renewable Energy (CUSBEERE) Project Appraisal Document (PAD) is dated March 28, 2013. In Chinese, the project is called 城市建筑节能与可再生能源应用项目.

The National Development and Reform Commission (NDRC) launched its Low-carbon Pilot Cities and Provinces Program in 2010, which focused on more sustainable industrial development. The Ministry of Housing and Urban-rural Development (MOHURD) had promoted low-carbon eco-cities since 2007 through more than a dozen green growth demonstration projects. Some 200 Chinese cities included low-carbon growth in their development objectives, including Beijing and Ningbo.

5. **Beijing and Ningbo were examples of innovative economic and environmental management in the early 2010s that others could look to.** Beijing achieved a 26.5 percent reduction in energy intensity per unit of GDP during the 11th FYP period, which exceeded the national target of 20 percent, due to an economic shift from manufacturing to services. For the 12th FYP, Beijing committed to reduce its GDP energy intensity and carbon intensity by 17 percent and 18 percent, respectively, requiring greater energy conservation in buildings, improved energy efficiency in transportation, and use of green infrastructure such as rooftop PV. Ningbo was one of the first pilot cities for integrating renewable energy into buildings. Under the 12th FYP, Ningbo committed to reduce its GDP energy intensity and its carbon intensity by 18 percent and 19 percent, respectively. The city's municipal government also pledged to scale up green buildings and innovative urban spatial planning to achieve its low-carbon objectives. The project preparation team believed that Ningbo's experience with sustainable urbanization and Beijing's leading example as the national capital could serve as role models for other Chinese cities.

6. **Significant barriers confronted Beijing's and Ningbo's transition toward greener municipalities.**

(a) **Prevailing urban spatial planning standards and regulations were not conducive to LOCAL urban form development and offered few levers to catalyze energy efficiency and renewable energy deployment.** Existing national urban planning laws, in fact, impeded the efficient use of urban land and the smooth flow of urban mobility. Previous government attempts to promote energy efficiency and renewable energy in cities focused on individual buildings, which failed to address issues at scale through statutory urban planning.

(b) **Information asymmetry was another challenge.** In 2013, energy performance data was rarely measured and never disclosed for existing public and commercial building stock. This dampened incentives for energy-efficient retrofits and energy management optimization. Motivated parties, moreover, faced significant difficulties in securing financing partly due to the lack of data. Well-known barriers (for example, split incentives and high transaction costs) notwithstanding, the lack of basic energy performance data for buildings and the absence of market valuation of energy-efficient real estate hindered both private action and public policy.

(c) **Ineffective policy prevented green buildings from going mainstream**. Scarce empirical evidence on benefits (for example, lower lifetime maintenance, higher tenant retention, lower utility bills, and greater employee productivity) coupled with misguided design practices (for example, showcasing technologies instead of tailoring architectural design to local climatic conditions and customs) further impaired market development.

(d) **Distributed photovoltaics (DPV), also known as rooftop solar, suffered from lack of experience; companies and buildings lacked a blueprint for integrating distributed power into the local grids, demonstrating a need for viable business models.** Regulatory incentives

at the city level in tandem with bolstered capacity to create markets were also important, despite dramatic drops in PV system costs.

(e) **Friction from utilities was another barrier.** Local grid companies were unable to handle small, intermittent, and distributed power. Still, Beijing was attempting to scale DPV capacity at the time of appraisal. If profitable, other commercial and industrial solar development firms would form in other cities and replicate success.

7. **The Global Environment Facility (GEF, which provided the grant funding) and the World Bank partnered with MOHURD and Beijing and Ningbo Municipalities to address the above constraints.** The proposed activities were to establish links between city-level efforts and those of MOHURD, forming the basis of a national dissemination platform that would promote replication of good practices and policies, accelerating adoption of both energy efficiency and renewable energy in urban areas. This project was among several innovative World Bank operations and analytical and advisory services promoting sustainable approaches to the development of low-carbon cities in China, complementing and building synergies with several other World Bank/GEF operations that generally focused on energy efficiency-specific or renewable energy-specific challenges and solutions. In this case, the project is directly complementing the Beijing Distributed Solar Photovoltaic Scale-Up Project (BJSPVP) (described in further detail in the following paragraphs). Another example of a project link is the Shanghai Green Energy Schemes for Low-carbon City Project, which was approved before the present project and provided empirical information to support the design and replication of energy performance benchmarking and disclosure (EPB&D).

Theory of Change (Results Chain)

8. **This technical assistance (TA)-focused project was designed to improve national- and city-level policy making and implementation in three areas, with the environmental objective of reducing greenhouse gas (GHG) emissions.** Those three areas are (a) promoting LOCAL urban forms, (b) increasing energy efficiency in public and commercial buildings, and (c) supporting the scale-up of commercially viable DPV deployment in Beijing. These outcomes were to be supported by grant-financed TA activities under three corresponding components (Components 1, 2, and 3, described in further detail in the following paragraphs).

9. **The project would involve grants for research projects to analyze policy approaches, pilot programs to demonstrate those approaches, and build capacity to improve both policy formation and implementation toward the expected development outcomes.** Under Component 1, grant financed TA would produce studies and analyses of urban development policies having a direct impact on LOCAL urban forms and recommended improvements to statutory urban planning standards and regulations based on three LOCAL pilot schemes. Together with capacity building for local officials from across China, these efforts were intended to enhance understanding of LOCAL development options and issues, improve national consensus on best LOCAL options, and recommend specific policy changes for implementation at the national level and replication at the municipal level. Under Component 2, grant financed TA were provided for studies and pilots to develop methodologies and guidelines for EPB&D, and improve municipal policies and implementation capacity around energy efficiency in public and commercial buildings. EPB&D pilots would be conducted in four cities, including mandatory EPB&D programs, revised guidelines, green building demonstrations, local stakeholder training, and development of a green

certification program and an online green building registry. The aim was to inform national EPB&D guidelines and policy replication in Chinese municipalities.

10. **The project was linked at inception to the Beijing Rooftop Solar Photovoltaic Scale-Up (Sunshine Schools) Project, later renamed the Beijing Distributed Solar Photovoltaic Scale-Up Project (BJSPVP).**[2] This was structured as a deliberate program of two parallel programs with concurrent implementation periods. The present project (China Urban Scale Building Energy Efficiency and Renewable Energy [CUSBEERE])[3] supports the BJSPVP to scale up DPV deployment in Beijing, initially with 100 MW of DPV in Beijing's education sector (later expanded to sectors beyond schools). Such support is provided as TA through Component 3, including the completion of a two-way metering pilot and a solar information portal, as well as monitoring and evaluation (M&E) services, capacity-building study tours, and the development of operational guidelines and internal standards for the management of solar DPV power projects. Such TA support improves policy by strengthening the management capacity of the utility company and providing essential information for the Beijing Municipal Government (BMG) to monitor the valuation and deployment of local green energy. As a result of this project link, the success of some CUSBEERE activities related to Component 3 are reflected in the successful outcomes of the BJSPVP, which implemented the recommendations provided by this financing.

11. **The power to affect better policy, and replication of good policy models, lies at the heart of this Theory of Change.** Successful pilot demonstration of policies for LOCAL urban developments, green buildings, and DPV deployment was intended to inspire sustainable development policy and outcomes in municipalities across China. Proof of concept, therefore, is concentrated in two model metropolises: the country's capital, Beijing, and the sub-provincial coastal city of Ningbo.

12. **The project's results chain is based on the following assumptions:**

(a) Studies and pilots that demonstrate the efficacy of LOCAL design, showcase policy innovation, and provide models for replication as well as training and capacity building will yield improved policy making in major cities and at the national level.

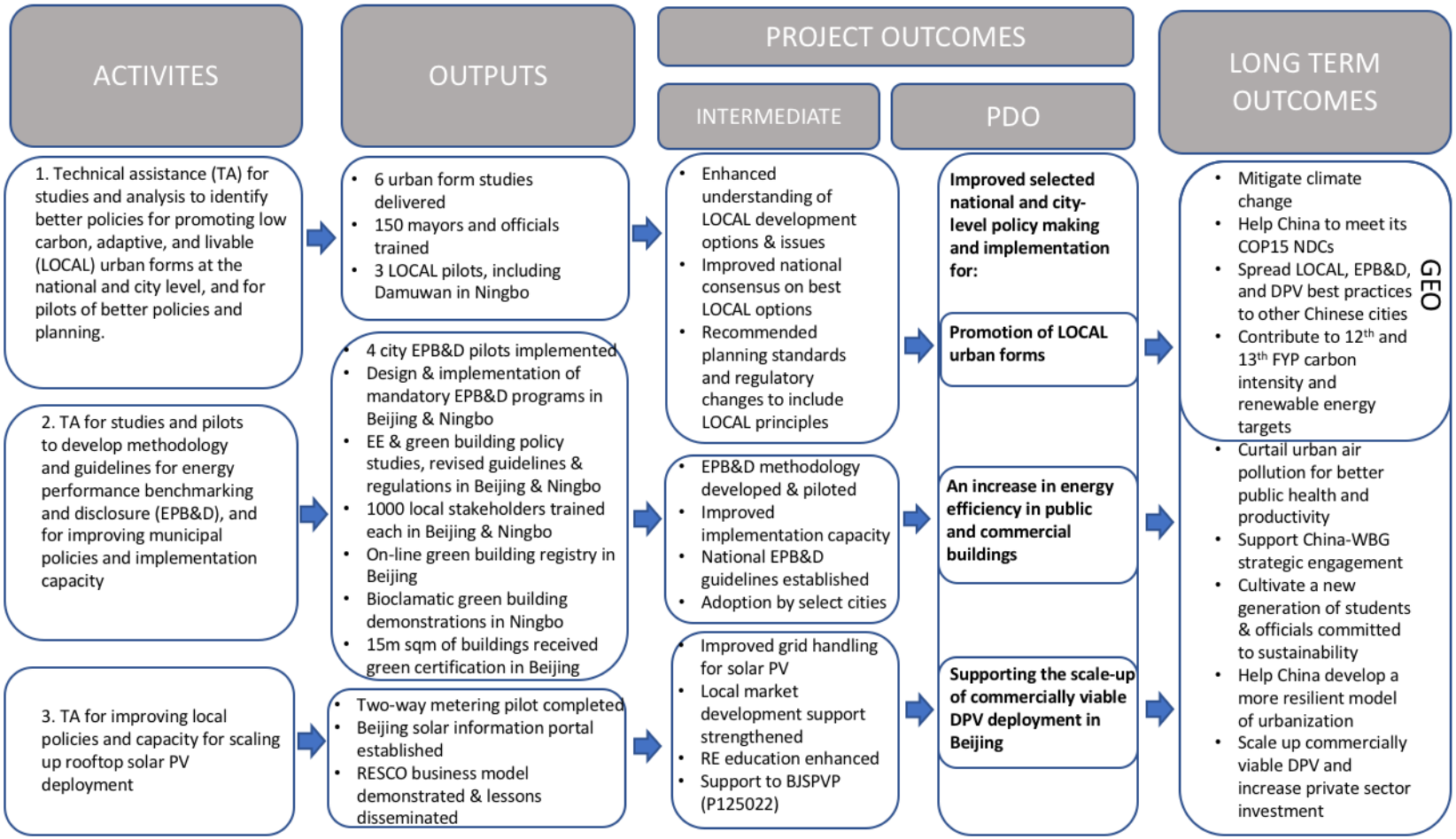
(b) EPB&D guidelines, studies, demonstrations, policy innovation, and trainings will improve policy making and implementation, and help green the urban building stock, in part by facilitating bankable green building retrofits.

(c) Coordination between this project and the BJSPVP will ensure TA activities to effectively support scale-up of DPV under the renewable energy service company (RESCO) business model in Beijing.

(d) By promoting LOCAL urban forms, increasing energy efficiency in public and commercial buildings, and supporting DPV scale-up, improved policies will lead to reduced carbon emissions from buildings.

[2] This project will subsequently be referred to as the BJSPVP. The project number is P125022.
[3] The present project will subsequently be referred to as CUSBEERE. The project number is P130786.

Figure 1. Results Chain for CUSBEERE



Project Development Objectives (PDOs)

13. According to the Grant Agreement (page 6), "the objective of the Project is to improve selected national and city-level policies for: (i) the promotion of low-carbon, adaptive, and livable urban forms; (ii) an increase in energy efficiency in public and commercial buildings; and (iii) the scale-up of commercially viable rooftop solar photovoltaic deployment."

14. **The PAD (page 4) stated the same PDO as the Grant Agreement, with an additional Global Environment Objective (GEO):** "to reduce carbon dioxide (CO_2) emissions from buildings in selected Chinese cities by supporting improved policy making and implementation in promoting low-carbon, adaptive and livable urban forms, increasing energy efficiency in public and commercial buildings, and scaling up commercially viable rooftop solar PV deployment."

15. **The GEO is assessed but not rated in this Implementation Completion and Results Report (ICR).** Achieving emissions reductions is a long-term outcome implicit in the project design, distinct from the PDO defined in the Grant Agreement.

16. **Whereas the PDO refers to 'improved policies', this is understood to mean 'improved policy making and implementation' consistent with the Grant Agreement's (pages 6–7) detailed description of activities (see component section) and the GEO (PAD, page 4), which refers explicitly to 'improved policy making and implementation'.** On this basis, 'improved policies' refers to new or upgraded statutory, legal, or regulatory imperatives, as well as enhanced knowledge, capacity, experience, and tools to develop them and ensure their quality execution. Policies which have been adopted, approved, issued, or promulgated by the relevant authority are considered to have been implemented.

Key Expected Outcomes and Outcome Indicators

17. Assessment of outcomes is organized on the basis of the PDO (sub-objective 'A', 'B', and 'C'), as stated in the Grant Agreement and described in the Theory of Change. Table 1 lays out the key indicators from the PAD Results Framework deemed relevant for assessing the three key expected outcomes. This includes some indicators classified as intermediate results (IR) indicators in the PAD Results Framework but which nevertheless measure as PDO-level outcomes.

18. The key expected outcomes for PDO sub-objective 'A' and sub-objective 'B' include improved policy making and implementation both at the national level and at the municipal level for two select cities, Beijing and Ningbo, including through city pilots.

(a) The key expected outcomes for sub-objective 'A' are best reflected in PDO Indicator 1 (LOCAL urban planning and design principles recommended for inclusion in statutory urban planning standards and regulations) and IR Indicator 1.3 (City pilots of LOCAL urban planning and design completed).

(b) The key expected outcomes for sub-objective 'B' are best reflected in PDO Indicator 2 (Energy performance benchmarking and disclosure (EPB&D) program for large public and commercial buildings developed at the national level and adopted by select cities), IR Indicator 2.1 (National and city EPB&D pilot programs implemented), IR Indicator 2.2 (Beijing

building EE and green building policies improved and new policies informed), and IR Indicator 2.6 (Ningbo green building policies improved and new policies informed).

19. **The project documents make it clear that the key expected outcome of sub-objective 'C' (that is, improved policies as achieved through Component 3) is supporting the scale-up of commercially viable DPV under the RESCO business model in Beijing.**

(a) The key expected outcome for sub-objective 'C' is accomplished through Component 3, whose main objective is 'to assist Beijing in its effort to increase the deployment of grid-connected rooftop solar PV systems through the renewable energy service company (RESCO) business model'[4] and to 'develop local capacity for scaling up of commercially viable solar energy deployment'[5] including through provision of engineering and technical support to improve policy (as defined earlier). This support is best reflected through IR indicators that indicate the completion of two-way metering (which improved grid management capacity) and the establishment of an information portal (which provided essential information to improve the local policy system).

(b) The final outcome is best reflected in the first part of the IR stated in the PAD Results Framework as 'RESCO business model for large-scale rooftop solar PV deployment in public buildings demonstrated and lessons and experiences disseminated'. This IR is best reflected in PDO Indicator 3 and IR Indicator 3.1, which are accomplished by the BJSPVP itself.

(c) Thus, it should be noted that while PDO Indicator 3 (as the main indicator for sub-objective 'C') does not directly correspond to the objective of 'improved policies', and is in fact achieved by another project, it denotes the successful provision of support such that the expected outcome was achieved.

Table 1. Key Expected Outcomes and Outcome Indicators

Outcomes	Relevant Outcome Indicators from the Results Framework	Target Value[a]	Remarks
A: Improved selected national and city-level policy making and implementation for promotion of LOCAL urban forms	• PDO Indicator 1: LOCAL urban planning and design principles recommended for inclusion in statutory urban planning standards and regulations.	• Recommendations for urban planning standards by Year 3 • Draft national LOCAL guidelines by Year 5	Indicators are relevant and attributable. PDO Indicator 1 would be more fully achieved if standards and regulations were actually changed.
	• IR Indicator 1.3: City pilots of LOCAL urban planning and design completed.	• Damuwan and 2 other pilots completed	
B: Improved selected national and city-level policy making and implementation	• PDO Indicator 2: Energy performance benchmarking and disclosure (EPB&D) program for large public and commercial buildings developed at the	• Official national EPB&D guidelines issued, and mandatory EPB&D ordinance issued by Beijing, Ningbo, +2 cities	Indicators are relevant, sufficient, and attributable.

[4] As stated in the PAD.
[5] As stated in the Grant Agreement.

Outcomes	Relevant Outcome Indicators from the Results Framework	Target Value[a]	Remarks
for increase in EE in public and commercial buildings	national level and adopted by select cities.		
	• IR Indicator 2.1: National and city EPB&D pilot programs implemented.	• Beijing, Ningbo, +2 city pilots • National EPB&D guidelines drafted	
	• IR Indicator 2.2: Beijing building EE and green building policies improved and new policies informed.	Identified studies completed Specified energy efficiency standards, codes, and regulations revised Online green building certification registry established	
	• IR Indicator 2.6: Ningbo green building policies improved and new policies informed.	Green building design guidelines and scale-up roadmap drafted	
C: Improved selected national and city-level policy making and implementation for supporting the scale-up of commercially viable DPV deployment in Beijing	• IR Indicator 3.2: Improved knowledge of local grid company about handling grid-connected rooftop PV systems.	Two-way metering pilot completed.	Two IR Indicators are taken as indicating policies that were improved.
	• IR Indicator 3.3: 'establishment of Beijing solar energy information portal.'	Operational portal with a website for public information access.	
	• PDO Indicator 3: Number of renewable energy service contracts signed	400	Support to the BJSPVP is indicated by outcomes successfully delivered by the two parallel projects.
	• IR Indicator 3.1: Installed rooftop solar PV capacity under the Beijing Rooftop Solar PV Scale-up Project	100 MW	

Note: a. Baseline values are 'zero'.

20. **The GEO is reflected in PDO Indicator 4, measuring CO_2 emissions reduction associated with GEF assistance.**

Components

21. **The project consists of the following components, as described in Schedule 1 of the Grant Agreement.**

Component 1: Promoting development of Low-Carbon, Adaptive, and Livable (LOCAL) urban forms (cost at appraisal: US$8.76 million [of which US$4.25 million is GEF financing] and cost at completion: US$8.7 million [of which US$3.77 is GEF])

22. **1A: National support for development of low-carbon, adaptive, and livable urban forms.** Improvement of statutory urban planning standards and regulations, national consensus-building, and support to city pilots, including carrying out of empirical studies and analyses and a review of urban development policies having a direct impact on urban forms, outreach to and capacity building of concerned national government agencies and the public, and provision of technical support to pilots for the development of LOCAL urban forms in selected cities

23. **1B: Beijing Municipality studies and analyses.** Carrying out of empirical studies and analyses in Beijing Municipality for improvement of statutory urban planning standards and regulations.

24. **1C: Ningbo Municipality studies and pilot:**

(a) Carrying out of empirical studies and analyses in Ningbo Municipality for improvement of statutory urban planning standards and regulations

(b) Implementation of a pilot for improvements in master and construction-control planning demonstrating the impact of LOCAL urban planning and design in Damuwan, including revision of the development master plan for a selected centrally located area, development of associated construction-control plans, and carrying out of a comprehensive transport planning exercise for Damuwan.

Component 2: **Improving energy efficiency in public and commercial buildings** (cost at appraisal: US$18.53 million [of which US$5.25 million is GEF financing] and cost at close: US$60.67 million [of which US$5.64 is GEF])

25. **2A: National support for energy performance benchmarking and disclosure for large public and commercial buildings:**

(a) Development of a model methodology and national guidelines for EPB&D based on the pilot programs in this regard carried out in Beijing and Ningbo Municipalities under Parts 2 (b) and 2 (c) of the project, respectively

(b) Design and implementation of a national program for replication of EPB&D in additional cities.

26. **2B: Improvement of policies and implementation capacity in Beijing Municipality:**

(a) Design and implementation of a mandatory EPB&D program for large public and commercial buildings, including a pilot program for selected building types, and development of procedures for the introduction of a local mandate for EPB&D

(b) Improvement of key policy instruments and mechanisms in light of international best practice, including carrying out of related studies and analyses and development of policies for the promotion of building energy efficiency and green buildings, and establishment of an online registry of and certification platform for green buildings

(c) Outreach and training of local construction trades to meet new or revised policy and regulatory requirements.

27. **2C: Improvement of policies and implementation capacity in Ningbo Municipality:**

(a) Design and implementation of a mandatory EPB&D program for large public and commercial buildings and establishment of an online energy monitoring program for such buildings

(b) Carrying out of green building sub-projects demonstrating bioclimatic and cost-optimal designs for new green buildings and green building retrofitting incorporating international best practice at Ningbo University, including financing of part of the cost of low-carbon technologies incremental to that incurred to fulfill municipal building code requirements

(c) Carrying out of related policy studies and capacity building of local stakeholders and construction trades for purposes of fulfillment of new or revised policy and regulatory requirements.

28. **Component 3: Scaling up commercially viable rooftop solar photovoltaic deployment** (cost at appraisal: US$2 million [of which US$2 million is GEF financing] and cost at close: US$3.3 million [of which US$1.94 is GEF] [6])

(a) 3A: Demonstration of the renewable energy service company business model for large-scale grid-connected rooftop solar PV deployment in Beijing Municipality, provision of engineering and technical support in relation to PV systems to Beijing Yuanshen Energy-Saving Technology Company Limited, and independent M&E of implementation and results of the RESCO business model

(b) 3B: Demonstration of two-way metering in Beijing Municipality

(c) 3C: Establishment of an online monitoring system for rooftop photovoltaic systems and a solar-energy information portal in Beijing Municipality

(d) 3D: Improvement of renewable-energy education in schools and other educational institutions in Beijing Municipality.

29. **Component 4: Project management, including implementation and monitoring and evaluation (M&E)** (Cost at appraisal: US$1.5 million [of which US$0.500 million is GEF financing], cost at close: US$0.89 million [of which US$0.48 is GEF])

B. SIGNIFICANT CHANGES DURING IMPLEMENTATION (IF APPLICABLE)

30. **Revised PDOs and outcome targets.** The PDOs remained unchanged during the implementation. However, the outcome targets were revised during the October 2018 restructuring.

[6] Financing for Component 3 of the project complemented parallel financing under Component 2 of the BJSPVP (estimated cost: US$4.0 million from BMG counterpart funding and potential parallel GEF-financed project; actual cost: US$2.0 million from GEF).

31. **Revised PDO indicators.** The PDO Indicators 3 and 4 end targets were revised down during the October 2018 restructuring. The number of renewable energy service contracts was reduced from 800to 400, and the end target for CO_2 emissions reduction was reduced from 85,120 tons per year to 70,000 tons per year.

32. **Revised components.** The components remained unchanged during implementation other than adjustments to subcomponent activities as described in the following paragraphs.

33. **Other changes:**

(a) A March 2018 restructuring changed the Project Management Office (PMO) from MOHURD to an affiliated but legally independent entity, the Center of Science and Technology for Construction (CSTC). In addition, at the request of the Ministry of Finance (MOF), the Designated Account (DA) was relocated from the MOF to the CSTC.

(b) At the October 2018 restructuring, a one-year extension was granted for the CUSBEERE Project.

(c) Under Component 1, an activity was cancelled (regulatory planning for the development of Bulaodao area.

(d) Under Component 2, one of the two green building demonstration projects planned for Ningbo University was cancelled due to the inability to obtain the necessary fire and safety certificates from the municipal government. A replacement green building demonstration project at the university (the Ningbo Kitchen Waste Treatment Plant) was identified and included in the project restructuring. The resulting cost increases were accommodated by the local counterpart (as detailed in paragraph 73a).

Rationale for Changes and their Implications on the Original Theory of Change

34. **The March 2018 change to the designated PMO was due to institutional reorganizations inside the Government of China (GOC).** During 2017, the MOF began the process of relocating DA management from the MOF to project execution agencies. Around the same time, national-level PMOs, led by the NDRC, began relocating foreign capital and project management functions to subsidiary institutions. The CUSBEERE DA was therefore relocated in line with these changes.

35. **Under Component 3, CUSBEERE provided support to the BJSPVP.** During BJSPVP restructuring, its indicators were modified (specifically, two new PDO indicators related to CUSBEERE were added to the Results Framework). Because of these changes and to continue support, the closure date of CUSBEERE needed to be extended by one year to be aligned with the closure date of the BJSPVP, which was December 31, 2019. In addition, the two CUSBEERE PDO indicators which are associated with Component 3 and actually carried out by the BJSPVP (CUSBEERE PDO Indicators 3 and 4) were revised to align with changes to BJSPVP.

36. **While the extension of the closing date was primarily justified by extension of the BJSPVP (according to the October 2018 Restructuring Paper), additional implementation period was also useful to "accommodate unforeseen delays in project implementation for several components and allow**

completion of specific CUSBEERE activities." [7] These delays were associated with developing the theoretical groundwork for new demonstration projects under Components 1 and 2. Such delays had prompted the cancellation of regulatory planning for the development of the Bulaodao area under Component 1. Under Component 2, the replacement green building demonstration project planned for Ningbo University was completed by the new closing date. While the low-carbon urban form studies from four cities (Beijing, Ningbo, Qingdao, and Taiyuan) would be completed by late 2018, the new closing date also provided the needed time to draw policy recommendations and disseminate findings.

37. The changes did not have implications for the original Theory of Change.

II. OUTCOME

A. RELEVANCE OF PDO

Assessment of Relevance of PDO and Rating
Rating: High

38. **The PDO is and has remained relevant to priorities and goals of the GOC at all relevant levels, the World Bank Group, and the GEF.** Improving LOCAL urban forms, improving energy efficiency of buildings, and scaling up DPV contribute to high-level priorities such as air pollution reduction, climate change mitigation, and energy security. These priorities continue to be relevant under the 13th FYP for 2016 to 2020, which sets targets to reduce energy intensity and carbon intensity at national, municipal, and district levels. Under China's 13th FYP program for energy efficiency and emissions reduction, key targets for the building sector include, for example, increasing the implementation rate of new green building standards by 30 percent and reducing the per capita energy consumption of public institutions by 11 percent by 2020 compared to 2015 levels. LOCAL urban forms and improved building efficiency policies, and their replication at the municipal level and beyond, would contribute to meeting these targets. Carbon intensity reduction is consistent with China's 2013 National Communication to the United Nations Framework Convention on Climate Change (UNFCCC) and its later nationally determined contribution to the UNFCCC Paris Agreement made in 2015, as well as the United Nations Sustainable Development Goal 7 to ensure access to affordable, reliable, sustainable, and modern energy for all, also adopted in 2015.

39. **China's most recent Systematic Country Diagnostic (SCD, *Report No. 113092-CN*, February 2018) identifies five umbrella goals:** CUSBEERE contributes to three of those goals as explained in table 2.

Table 2. CUSBEERE Link to China's Latest SCD (2018)

SCD Goal	Specific SCD Sub-goal	CUSBEERE Relevance and Contribution
Sustainable Development	• Catalyzing markets • Sustainable urbanization	• Proof of concept and commercial viability of RESCO distributed solar business model • Pilots demonstrating LOCAL design best practices in major cities
Improved Policy	• Enhanced transparency • Tailored regulations	• Improve national and city LOCAL policies with evidence-based recommendations and drafts.

[7] As reported by the PMO ICR (MOHURD).

		• Improve national and city EPB&D guidelines and ordinances with evidence-based policy.
Green Growth	• Pollution abatement • Climate mitigation • Renewable energy	• Improve policies to result in lower emissions and local pollution through better LOCAL design, buildings energy efficiency, and solar PV scale-up.

40. **The PDO is fully consistent with the World Bank Group's Country Partnership Framework (CPF) for China (Report 117875-CN) (FY2020–2025), discussed by the Board of Executive Directors on December 6, 2019.** The CPF sets three engagement areas of which the second is 'Promoting greening growth' including 'by facilitating the transition to a lower-carbon energy path' and 'promoting low-carbon cities'. The project's contribution to this engagement area is recognized in the CPF Result Matrix under Objective 2.1 'Facilitating the Transition to a Lower-Carbon Energy Path' and with the following supplementary progress indicator which highlights the project's support to the BJSPVP: 'Demonstrate and scale-up the Renewable Energy Service Company (RESCO) model for market-based roof-top solar PV systems. Target: 400 RESCO contracts signed by 2021 (Beijing Rooftop Solar Photovoltaic Scale-Up Project)'.

41. The operation provided clear evidence of the alignment of the PDO and the GEO with the current CPF and GOC strategy objectives, as well as with the SCD goals, both at appraisal and at closing to substantiate High relevance.

B. ACHIEVEMENT OF PDO (EFFICACY)

Rating: Substantial

Assessment of Achievement of Each Objective/Outcome

PDO sub-objective 'A': **Improved selected national and city-level policy making and implementation for promotion of LOCAL urban forms** (Rating: High)

42. This sub-objective was fully met as demonstrated by a complete list of results supporting full achievement of corresponding indicators presented in Table 1 and detailed evidence in Annex 1.B to measure the success. Some indicators refer to phased implementation, with outputs by specific years of the project. Assessment has considered timing of specific outputs, while prioritizing completion of outputs by the end of the project.

43. The project produced a series of recommendations and improvements for at least 28 regulations and standards at the national level (MOHURD) and municipal level (Beijing and Ningbo) and were reflected in the planning of five new urban zones, as reported in the December 2019 Aide Memoire.

44. At the national level, MOHURD provided draft national LOCAL guidelines and recommendations on revisions of national statutory urban planning regulations and standards, as informed by the various studies that it carried out. At least three sets of standards were implemented: 'Standards for Planning and Design of Urban Residential Areas GB50180-2018', 'Urban Drainage Planning Standard GB50318-2017', and 'Standards for Planning of Urban Integrated Transportation System GB/T51328-2018'. An additional set 'Standards for Planning and Design of Walking and Bicycle Systems' was drafted for approval.

45. The Beijing Housing and Urban-Rural Development Commission (BHURDC) reported that GEF funding has contributed to the formation or revision of 11 policies and 11 standards in the capital, as reflected in the October 2019 Implementation Status and Results Report (ISR). Outcomes of the studies conducted, that is, LOCAL planning and design principles, were reflected in the plans for the city's sub-center, Tongzhou, and fully represented in the new edition of Beijing's master plan, according to the BHURDC ICR.

46. In Ningbo, NHUDRC implemented recommendations on the improvement of urban planning laws and regulations, specifically to incorporate LOCAL principles into administrative laws and statutory planning, and to incorporate low-carbon construction requirements into the planning and management of construction land uses.

47. In addition, success in meeting this sub-objective is strongly supported by achievement of the IRs referring to enhanced understanding of the issues and options in development of LOCAL urban form; informed decision-making on improvements of statutory urban planning standards and regulations; and improved national consensus on necessary actions. This was carried out with urban form studies, capacity building trainings, and LOCAL pilots. Specifically:

(a) **IR Indicator 1.1: Urban form studies completed.** The target figure for this indicator was 4 studies completed; however, 20 studies were completed. These studies directly contributed to the issuance of a series of new standards mentioned earlier, which provide concrete evidence of policy improvement. For example, the outcomes have been benefitting the Ningbo Municipal Government (NMG), Planning Bureau, NBHURD, and other departments, having provided them with theoretical bases and empirical information to carry out extended studies and improve the policies and regulations concerned. The outcomes also benefit MOHURD with suggestions for revising, adjusting, and improving key standards for low-carbon urban and rural development and informed the State Council's 'Some Opinions on Further Strengthening the Management of Urban Planning and Construction'. These studies also provided reference documents for the policy formation of urban renewal management in China.

(b) **IR Indicator 1.2: Mayors and city planning officials trained**. The target was 30 per year for a total of 150 officials trained. MOHURD completed trainings for 51 officials, and NBHURD completed trainings for 244 people, for a total of 295 people. According to the PMOs, the trainings "improved the corresponding capabilities of national policy makers, city managers and planners in low-carbon livable cities" (MOHURD ICR page 62) and "raised the green and low-carbon development concept of government officials and employees of the sector, and enhanced their understanding and abilities of implementing relevant policies" (NBHURD ICR page 43).

(c) **IR Indicator 1.3: City pilots of LOCAL urban planning and design completed.** The target was to complete the Damuwan pilot by Year 3, plus two additional pilots for a total of three city pilots completed.

- At Damuwan, NBHURD reports that Damuwan transportation planning based on LOCAL principles was completed and study outcomes will be applied to long-term development of Damuwan New Town and Xiangshan Urban Area.

- An 'application demonstration' was carried out at the Western Technological Innovation Harbor in Shaanxi Province (Shaanxi Xixian New Area) where planning was informed. The 'Low Carbon, Livable and Adaptive City Form Study in the New Campus Town of Xi'an Jiaotong University of Shaanxi Fengxi New Town' is an outcome of the project. 'Several Opinions on Further Strengthening the Urban Planning, Development and Management Work', issued in 2016 by the State Council, highlighted open blocks and narrow roads in dense networks as important concepts, implying a positive demonstration effect of the project.

- Another application was carried out with detailed planning in Taiyun City for the core area of Jinzhong Starting District, comprising a third city pilot.

- According to the PMO, "through technical assistance to support the pilot work of urban planning in Beijing, Ningbo and other cities, [assisted] the competent administrative departments in providing relevant policy suggestions and capacity-building" (MOHURD ICR, page 13).

PDO sub-objective 'B': Improved selected national and city-level policy making and implementation for increase in EE in public and commercial buildings (Rating: High)

48. This sub-objective was fully met as demonstrated by a complete list of results supporting full achievement of corresponding indicators presented in Table 1 and detailed evidence in Annex 1.B to measure the success.

49. At the national level, official national guidelines on EPB&D for large public and commercial buildings were approved by MOHURD.

(a) An annex was specifically introduced in the Technical Standard for Ultra-low Energy Building of Public Institutions (T/CECS 713-2020), adding a methodological requirement for evaluating and monitoring building performance and operation. The document has been promulgated and will take effect in December 2020.

(b) The Evaluation Standard on EPB&D includes specifically defined technical methods for data screening and modelling. Launched in 2018, the document has since been approved.

(c) In 2015, the Ministry of Housing and Construction promulgated the Intelligent Building Design Standards. In December 2016, the State Council promulgated the 13th FYP for energy conservation and emission reduction, proposed the development plan of the green building industrial chain; promoted green construction methods, and promoted energy-saving green building materials and fabricated steel structure buildings. On March 1, 2017, MOHURD issued the 13th FYP for building energy conservation and green building development, which aims to build a low-carbon, green, ecological, and efficient building energy system, and promote supply-side structural reforms in the field of urban and rural housing construction. In April 2017, MOHURD issued the 13th FYP for the development of the construction industry, officially including intelligent building practices and upgrading them to the national level.

50. At the municipal level, pilot programs were completed in Beijing and Ningbo, with additional pilot projects in Qingdao and Chongqing.

51. NBHURD completed two green building demonstration sub-projects (New Sci-Tech Service Building of Ningbo University and Ningbo Kitchen Waste Treatment Plant). The project also provided methodological and technical support for energy-efficient benchmarking and information disclosure of large-scale public and commercial buildings in Ningbo, and a Ningbo energy consumption monitoring platform was established connecting 333 buildings to real-time monitoring. MOHURD developed application demonstrations of publicity systems of benchmarking methods in Qingdao and an information disclosure system in Chongqing.

52. Selected building energy efficiency and green building policies in Beijing were improved and new policies were informed with a series of building energy efficiency studies and revised regulations and guidelines.

(a) Investigation of the effects of the Beijing Building Energy Conservation Regulations has provided a basis for local city-level legislation on building energy efficiency, and the regulations were officially promulgated and implemented in 2015.

(b) Based on the investigation and research of the relevant sub-projects supported by the project on the necessity and revision of the Beijing Building Energy Conservation Regulations, the BHURDC and Legal Affairs Office of the BMG and other relevant departments went through legal procedures and submitted to the municipal government, the Beijing Civil Buildings Energy Saving Management Regulation (Municipal Government Order No. 256), which was promulgated. The clear regulations established in the field of building operation included energy-saving operation responsibilities of building owners, energy-saving operation technologies and energy management systems, public building energy consumption limit management systems led by construction administrative departments, and administrative penalties for violations of energy-saving operation management regulations.

(c) Evaluation Standard for Green Building for Beijing DB11/T 825 has been amended. Compared with the old standard, the new standard puts greater emphasis on local characteristics, and the evaluation requirement became more scientific. Evaluation methods and content were more closely aligned to new national requirements for green building development.

(d) Beijing Energy Efficient Design Standard for Public and Commercial Buildings [8] and Acceptance Standard of Green Building Construction in Beijing have been formulated and issued. Acceptance Standard of Green Building Construction in Beijing has improved Beijing's green building management system and also greatly helped to improve policy making and

[8] Since implementation of the revised Energy Efficient Design Standard for Public and Commercial Buildings in Beijing, improvement of the thermal performance of building envelope, the energy efficiency of the cold and heat source equipment and lighting equipment, led to 30 percent of reduction in energy consumption from heating, ventilation, air conditioning, and lighting throughout the year.

ensure effect of implementation of green buildings. The regulation will effectively solve the issue of loss of control over standard compliance in engineering and construction.

53. **BHURDC also established an online portal**[9] for green building labeling and evaluation. The portal also includes an online application system for green building financial subsidies, technique catalog, and map system. The implementation of this system assisted the Green Building Management Department of BHURDC with developing green buildings, standardizing the application process, and improving work efficiency.

54. **Green building policies in Ningbo improved and new policies informed.** The target for this indicator is to draft the Ningbo green building design guidelines and scale-up roadmap study. NBHURD conducted top-level design for the large-scale promotion of green building development in Ningbo; released a series of policy systems and technical standards, supporting industry development documents; provided scientific technical support; and established a training system. The scale-up roadmap study requirement is superseded by the special planning for Ningbo and implementation guidelines.

55. **Implementation capacity was strengthened with outreach and training of local construction trades.** Training and education for 4,423 stakeholders in Beijing (with 18 training and dissemination activities related to green building, prefabricated buildings, and domestic study tours), and 2,810 stakeholders in Ningbo (with workshops and events related to three-dimensional greening, solid waste management, and scaling up green building). These activities also contributed to institutional strengthening described in Table 4.

PDO sub-objective 'C': Improved selected national and city-level policy making and implementation for supporting the scale-up of commercially viable DPV deployment in Beijing (Rating: Substantial)

56. This sub-objective was mostly met as demonstrated by a list of results supporting almost full achievement of corresponding indicators presented in Table 1 and detailed evidence in Annex 1.B to measure the success. Assessment of this sub-objective is more complicated because it refers to activities and indicators that are intertwined with the BJSPVP project. Although it is considered as one sub-objective, the ICR use two sets of evidence and corresponding indicators to measure the success.

57. The project launched and completed a two-way metering project, which improved the knowledge of the local grid company about handling grid-connected DPV systems. Beijing Grid Company (State Grid) hired technical experts to complete a report and demonstration pilot on the viability of two-way metering. Two-way metering research and stakeholder socialization has been completed, enabling acceptance by initially reluctant state-owned grid monopolies. It should be noted that the two-way metering-related activities delivered essential support to the Yuanshen Company, contributing to the improvement of its internal capacity and providing a critical element that allowed it to complete demonstration of the RESCO model. It should also be noted that Yuanshen actively participated in the policy evolution process, which was made possible owing to the experience gained in the project, for example, around two-way metering. See annex 6 for specific reports as to the accomplishment and impact of the work on two-way metering.

[9] http://zjw.beijing.gov.cn/bjjs/xxgk/ztzl/lsjz/index.shtml

58. **The project established the Beijing Solar Energy Information Portal.** The online renewable energy monitoring system is hosted by the Beijing Energy Conservation and Environment Protection Center. It is fully functional and publicly accessible (http://www.re-bj.com), disclosing real-time data for more than 260 solar rooftop installations as of December 2019.

59. **Improvement of renewable energy education in schools and educational institutions in Beijing** was completed with the construction of a new energy and renewable energy education platform, curriculum development for sustainable development education, the construction of 20 demonstration classrooms, and exchanges to learn more about sustainable energy education in the US and Canada. This contributed to institutional capacity building described in Table 4.

60. **As a part of PDO sub-objective 'C', the support provided by CUSBEERE to the BJSPVP is reflected in the latter's successful scale-up of DPV and demonstration of the RESCO business model.** This includes IR Indicator 3.1 (installed rooftop solar PV capacity under the Beijing Rooftop Solar PV Scale-up Project) and PDO Indicator 3 (number of renewable energy service contracts signed.).

(a) The annual generation of the project is on track to reach 111,510 MWh in 2020 on the basis of the trend during the first half of the year.[10] About 102 MW of distributed PV system was completed with high attribution to the project, slightly exceeding the target of 100 MW. This is a substantial achievement as the total installed capacity of the project represented 20 percent of the 510 MW total PV capacity in Beijing[11] by the end of 2019.

(b) Successful demonstration of the RESCO business model is measured by (i) the number of sectors in which Yuanshen signed RESCO contracts and (ii) the aggregated financial internal rate of return (FIRR) across all sub-projects exceeding a threshold value[12] of 6 percent (including tax). At project completion, the 102 MW PV capacity covered five main sectors. The installation capacity by sector is as follows: industry (40 MW), schools (30 MW), commerce and infrastructure (18.4 MW), logistics (10 MW), and agriculture (3.6 MW). The project FIRR aggregated across all sub-projects is estimated to be 6.5 percent (including tax), exceeding the target value of 6 percent and demonstrating the financial viability of the RESCO model. The FIRRs tend to be higher in industry with high electricity tariff and high energy consumption and lower in sectors such as agriculture with much less electricity consumption and discounted electricity tariff.

61. This outcome is assessed using IR Indicators 3.2 and 3.3 and qualitatively against the PDO sub-objective itself. The question is thus whether national- and city-level policies, policy making, and/or implementation were improved.

(a) In particular, the Beijing Development and Reform Commission (BDRC) PMO notes that the first-hand practical experience and basic data accumulated by the online monitoring

[10] This estimate is derived from the observed average capacity factor (12–13 percent) in 2019 and is validated by observed generation of all systems in the first half year of 2020.
[11] The PV capacity in Beijing was 140 MW in 2013 (at project commencement) and 240 MW at end-2016 (during restructuring).
[12] Based on the World Bank team's calculation during restructuring. This benchmark value was the weighted average of estimated individual FIRRs across various facilities, including educational facilities, major event buildings, metro, metro maintenance center, parking lots and office buildings, sewage treatment, large storage facilities, agriculture, and energy-intensive industry.

platform supported by this project have provided valuable support, reference, and verification for the BMG to improve the relevant policy system. The government subsidy policy is gradually 'declining' and marketization is becoming more and more popular, forming a benign external environment for duplication and expansion of this project.

(b) Specific national policies related to DPV scale-up do not appear to have been directly affected per se; however, the BDRC PMO has stated that "through the implementation of specific investing projects, the industrial workflow is more clear and standardized; the work scope is more comprehensive in photovoltaic residual power grid sector. This will also provide support to the releasing of new national regulation in the renewable energy sector."

(c) The achievement of this outcome is 'Substantial'.

Table 3. Achievement of Each Objective and Outcome

Outcome	Relevant Outcome Indicator	Target Value	Actual Value at Completion
A: Improved selected national and city-level policy making and implementation for promotion of low-carbon, adaptive, and livable (LOCAL) urban forms	• PDO Indicator 1: LOCAL urban planning and design principles recommended for inclusion in statutory urban planning standards and regulations.	Urban planning recommendations by Year 3; draft national guidelines by Year 5	Exceeded as validated by the PMO. 20 urban form studies completed over 4 studies targets. High attribution to the project.
	• IR Indicator 1.3: City pilots of LOCAL urban planning and design completed.	Damuwan and 2 other pilots completed.	Fully achieved. Three successful pilots implemented in Damuwan, Shaanxi, and Taiyuan City. Validated by the PMO. High attribution to the project.
B: Improved selected national and city-level policy making and implementation for an increase in energy efficiency in public and commercial buildings	• PDO Indicator 2: Energy performance benchmarking and disclosure (EPB&D) program for large public and commercial buildings developed at the national level and adopted by select cities.	Official national EPB&D guidelines issued, and mandatory EPB&D ordinance issued by Beijing, Ningbo, +2 cities.	Technical and evaluation standards completed at national level; municipal ordinance issues by Beijing, Ningbo, Qingdao, and Chongqing. Validated by the PMO. High attribution to the project
	• IR Indicator 2.1: National and city EPB&D pilot programs implemented.	Beijing, Ningbo, +2 city pilots; national EPB&D guidelines approved.	Pilots completed in Beijing, Ningbo, Qingdao, and Chongqing. Validated by the PMO. High attribution to the project.
	• IR Indicator 2.2: Beijing building EE and green building policies improved and new policies informed.	Improved regulations promulgated; online green building certification registry	Energy conservation regulations and design and evaluation standards promulgated in Beijing; online registry/portal completed. Relevant, and validated by the PMO. High attribution to the project.
	• IR Indicator 2.6: Ningbo green building policies improved and new policies informed.	Green building design guidelines and scale-up roadmap drafted; online consumption monitoring platform introduced.	Guidelines and online monitoring platform completed. Relevant, and validated by the PMO. High attribution to the project.
C: Improved selected national and city-level policy making and implementation for supporting the scale-up of commercially viable	• IR Indicator 3.2: Improved knowledge of local grid company about handling grid-connected rooftop PV systems.	Two-way metering pilot completed by Year 4	Two-way metering completed. Relevant and validated by the PMO. High attribution to the project
	• IR Indicator 3.3: Establishment of Beijing solar energy information portal.	Completed by Year 5	Solar energy information portal completed. Relevant and validated by PMO. High attribution to the project

distributed photovoltaic (DPV) deployment in Beijing	• PDO Indicator 3: Number of renewable energy service contracts signed	400[a]	324
	• IR Indicator 3.1: 'Installed rooftop solar PV capacity under the Beijing Rooftop Solar PV Scale-up Project'	100 MW	102.2 MW

Note: a. This revised target value was overestimated because the scale of a single solar PV system is larger than that anticipated at restructuring.

62. **The GEO was exceeded for the end target value of direct emissions, and in addition, there were significant indirect emissions reductions.** The original target was 85,120 tons per year less CO_2 from buildings in selected Chinese cities and was revised in the restructuring to 70,000 tons per year. According to the PMO, the final achieved figure for direct emissions reductions was 82,040 tons per year. The figure for indirect emissions reductions was much higher (see discussion of emissions reductions in annex 7). For emissions reported by MOHURD, this calculation was partly based on an emission factor of 741 g CO_2e per kWh (North China Grid for 2016, assuming a linear annual decrease interpolated from factors for 2012 and 2015), transmission and distribution losses of 6.5 percent, and supply to grid of 9 percent as a share of total solar PV electricity generated.

63. In addition to this direct CO_2 emission reduction target, the incremental cost analysis (annex 6) of the PAD provides an estimate of the broader impact of the project resulting from the support of the project activities to the 12th FYP, which can be considered as indirect emissions (see annex 7).

64. Of the barriers described in the Context at Appraisal section which hindered the transition of Beijing and Ningbo to greener municipalities, the project addressed each materially.

(a) Prevailing urban spatial planning standards and regulations are now more conducive to LOCAL urban form development and offer more levers to catalyze energy efficiency and renewable energy deployment.

(b) Information asymmetry has been addressed, particularly for building energy efficiency with the development of an online monitoring and information platform, increasing incentives for energy efficiency retrofits and energy management optimization. The provision of such data helps motivated parties to secure financing.

(c) Empirical evidence on the benefits of green buildings has been produced through studies and pilots to improve market development.

(d) Experience with scaling up DPV has been gained, offering companies and buildings a blueprint for integrating distributed power into the local grids, and showing the viability of the RESCO business model.

(e) Local grid companies (starting with Yuanshen) are now better able to handle small, intermittent, and distributed power.

Justification of Overall Efficacy Rating
Overall rating: Substantial

65. The efficacy of PDO sub-objective ‘A’ is rated High and PDO sub-objective ‘B’ is rated High. The efficacy of PDO sub-objective ‘C’ was Substantial. The overall efficacy rating for the achievement of the PDO is rated Substantial.

C. EFFICIENCY

Assessment of Efficiency and Rating
Overall Rating: Substantial

66. **At appraisal, an incremental cost analysis was carried out (PAD annex 6).** The total lifetime avoided CO_2 emissions of the baseline project were estimated at about 20 million metric tons. The proposed GEF activities, as described in the main text and in Annex 2, are envisioned to complement and augment ongoing national and local government programs by focusing support on policy areas, technical aspects, and market segments where the impact will be large and crosscutting, the results will be highly replicable, and government commitment and private sector interest are strong.

67. **Delays were partly exogenous, resulting from changes to an associated project.** Therefore, the delay by itself should not be held against the efficiency of the CUSBEERE Project. However, it is apparent that this delay was also useful to accommodate delays in the CUSBEERE Project itself "due to the fact that the field of building low-carbon energy conservation is just starting in China and the industry foundation is weak."[13]

68. **Cost-benefit analysis of TA.** In the case of this project, activities focused on policy research, TA, and recommendations for changed policies at the city level and nationally. The PAD did not include a method for calculating the discrete benefits of TA or policy improvements as such. Other projects that measure the efficiency of policy formation TA have concluded that it should be "judged by quality of analysis, conclusions, and recommendations."[14] In the case of CUSBEERE, analysis and conclusions were based on extensive research analysis (as listed in Annex 1) that was assessed to be rigorous and of high quality. The resulting policy recommendations that were presented by the project to the municipal governments or national authorities were mostly quickly integrated into national guidelines and informed pilot projects that encouraged replication. While some took longer to develop because of the need for theoretical research necessary to underpin them, eventually the uptake from authorities was generally high. As for capacity building, PMOs describe a positive reaction from officials trained and a positive impact on their performance, and institutional capacity building among the PMOs, the grid operator (Yuanshen), and municipal authorities was substantial, as described in the relevant section in the following paragraphs. TA activities were also performed within budget, implying a positive cost-benefit relationship.

69. **The broad economic justification of the proposed project is based on incremental cost reasoning required by the GEF.** The GEO helps meet the economic and financial justifications of the GEF—namely, to yield an incremental global environmental benefit and thus satisfy the incremental cost reasoning. Regarding CO_2 emissions reductions which resulted from the project, one can distinguish between direct emission reductions, which result from the construction of green buildings supported by Component 2 and DPV supported by Component 3, and indirect emissions reductions, which result from improvement of energy efficiency and renewable energy polices supported by Components 1, 2, and 3. The original target for the PDO-level Indicator 4 was 85,120 tons per year less CO_2 from buildings in selected Chinese cities and was revised in the restructuring to 70,000 tons per year. This indicator monitored the direct emissions reductions of the project. Actual value achieved at completion was 81,563.51 tons per year in direct emissions reduction for Beijing and 476.17 tons per year for Ningbo, thus exceeding the revised target.

70. The undiscounted unit cost of the additional avoided CO_2 emissions to GEF (for the total grant of US$12 million) was therefore estimated at appraisal to be about US$0.8 per ton CO_2. At project conclusion, the total amount disbursed was US$11,825,642, and final calculations on avoided CO_2 emissions were

[13] As per MOHURD ICR.
[14] ICR for PNG Energy Sector Development Project (P101578).

requested to be included in the PMO ICRs (during the ICR workshop, it was also agreed to reduce the conversion coefficient from 0.997 kg per kWh to 0.6 kg per kWh).

71. According to the PMO, the final achieved figure (including both direct and indirect emissions reductions) was 81,563.51 tons per year for Beijing; 89,590 tons per year from MOHURD; and 1,141,963 tons per year for Ningbo, for a total of 1,313,116.51 tons per year.[15] In the case of MOHURD, this calculation was based on an emissions factor of 0.741 kg per kWh (North China Grid for 2016, assuming a linear annual decrease interpolated from factors for 2012 and 2015), transmission and distribution losses of 6.5 percent, and supply to grid of 9 percent as a share of total solar PV electricity generated. While other emissions factors were not specified, they are assumed here to be the same. At the new coefficient of 0.6 kg per kWh, that implies an achieved figure of 1,063,252.23 tons per year. Over the 15-year period referenced in the PAD, this implies 15.94 million tons of incremental reduction of CO_2 and an undiscounted unit cost of US$0.75 per ton CO_2. In this regard, project efficiency was higher than expected.

72. **Final cost versus anticipated cost at appraisal.** The project was approved to be financed by a GEF grant in the amount of US$12 million, that is, the estimated cost of the project at appraisal. Effective cost management by the PMOs kept costs within budget limits. For example, in Ningbo a competitive bidding process for consulting contracts kept costs at 9.46 percent below estimates, allowing for additional funds to be redirected when required to accommodate changes to the green building demonstration project (paragraph 73a, below). In Beijing, by the end of the project, the BHURDC had spent US$2.4827 million of its US$2.5 million budget. At the close of the project, total amount disbursed was US$11,825,642. The project was completed under budget as dispersed by the GEF grant, positively affecting efficiency.

73. **'Hard cost' overruns were experienced by the counterparts with regard to tasks informed by the project, and covered by their own funding**.

a. The cancellation and replacement of a green building demonstration project at Ningbo University (described in paragraph 33d) increased costs. No additional funding was required for activities covered by the grant, since surplus grant money saved from Ningbo bidding was redirected for additional evaluation studies. However, additional funds were still required for construction cost increases from US$15.59 million to US$57.8 million. These costs were covered by the local counterpart, which increased funding from US$12.09 million to US$54.3 million.

b. The function of Beijing Renewable Energy Online Monitoring System was expanded after project approval, from only monitoring solar PV to monitoring renewable energy as a whole. The project cost was consequently raised by US$1.3 million. The increased cost was covered by the Beijing Municipal Government.

c. In both cases of project cost overrun, these relate to 'hard costs' for infrastructure construction provided by the counterpart in the original project costing, rather than activities funded by the GEF grant *per se*. Project costs by component are detailed in Annex 3.

[15] The figure for Ningbo provided by the PMO represents indirect emissions, which are an order above direct emissions. Based on available data, the Ningbo project is likely to have achieved what was expected for direct emissions.

D. JUSTIFICATION OF OVERALL OUTCOME RATING

Overall rating: Satisfactory

74. The Satisfactory rating is justified based on high relevance, substantial efficacy, and substantial efficiency.

E. OTHER OUTCOMES AND IMPACTS (IF ANY)

Gender

75. The proposed project improved energy efficiency and renewable energy policies and facilitated deployment, contributing to the improvement of local air quality and the global environment, thus benefitting the general population equally. Most proposed activities, such as promoting LOCAL urban forms, energy efficiency in public and commercial buildings, and scaling up commercially viable DPV systems, were either upstream studies or pilot demonstrations informing policy improvements and increasing implementation capacity, with equal benefits for men and women.

76. The PMOs do not seem to have explicitly considered gender in the participation of personnel in project activities such as training, awarding of sub-grants, and the staffing of PMOs.

Institutional Strengthening

77. The project provided TA and capacity-building support on policies, business models for DPV deployment, policy implementation, grid management, and local stakeholders and trades skills.

Table 4. Institutional Strengthening

Institution	Institutional Strengthening Achieved
MOHURD	MOHURD organized a series of international training and inspections, strengthened international exchanges and cooperation, and improved international cooperation. Going forward, MOHURD expressed its commitment to strengthening its relationship with international organizations and with countries benefitting from Belt-and-Road Initiative programs and to exploring ways to implement the internationalization of engineering construction standards.
	The project established a national-level communication platform through the organization of the Urban Development and Planning Conference, the Local Urban Form Development Sub-forum, and the International Green Building Conference. It also established a national-level communication platform, developed training courses, and organized related personnel to go to Germany for training and to other countries. The inspection improved the corresponding capabilities of national policy makers, city managers, and planners in low-carbon livable cities, building energy efficiency and energy efficiency improvement.
State Grid	The local grid company improved its knowledge about handling grid-connected rooftop PV systems. State Grid, which controls 82% of China's power transmission and distribution capacity, completed a demonstration pilot on the viability of two-way metering. As a result, State Grid now believes that intermittent renewable energy penetration can reach 30–35% without destabilizing its electricity network.
Yuanshen	Yuanshen Company's solar PV business models were enhanced through the provision of capacity-building consulting services based on RESCO promotion of DPV systems to public institutions and third-party M&E consulting services. As a result, company procedures have improved in terms of organizational structure, management systems, project operation mode, human resources, and technical capacity.

Municipal authorities (Beijing, Chongqing, Ningbo, Qingdao)	EPB&D methodologies, guidelines, and systems for public and commercial buildings have been developed and piloted in public hospitals in three major cities (Beijing, Chongqing, and Ningbo) and a variety of public buildings in Qingdao (Shandong Province). Project activities have also enabled the development and revision of policies, regulations, standards, guidelines, and action plans related to the energy performance and greening of buildings in Beijing, Ningbo, and Zhejiang Province, with a demonstration effect for other cities and provinces. The pilot projects carried out in Qingdao and Chongqing with the support of the project have improved the governance capabilities of the two cities in the field of energy conservation and emission reduction through system construction of energy efficiency benchmarking and data management.
	Capacity-building efforts also trained hundreds of mayors and municipal urban planning officials, as well as almost 4,000 local stakeholders. The Ningbo Housing and Urban-Rural Development Committee (NHURDC) reports that the NMG, the Ningbo Municipal Planning Bureau, NHURDC itself, and other relevant government departments in Ningbo have improved their abilities to formulate and implement policies.
	The PMOs improved their capacity in project management. For example, to ensure effective use of the GEF grant to support smooth implementation of the CUSBEERE Project, the BHURDC PMO formulated project management regulations and documents incorporating procurement, contract management, approval procedures, and financial management (FM). To enhance supervision and management to ensure effective and efficient project implementation, the BHURDC also formulated a set of approval sheets for contract signing and payments.

Mobilizing Private Sector Financing

78. **While this operation did not include an explicit financial vehicle to mobilize private financing, it contributed to demonstrating successful business models.** This GEF grant facilitated studies that successfully improved local policies, funded demonstrations of the RESCO business model for DPV, and trained both public and private sector representatives on the use of renewables. The long-term outcomes of this operation would include a successful DPV sector in the major cities that would contribute to the growth of the renewable market in the country.

Poverty Reduction and Shared Prosperity

79. **The improved policies for LOCAL urban forms, building efficiency, and greater DPV capacity do not directly generate income opportunities for the poor.** However, energy efficiency gains in buildings and use of distributed solar power lead to reduced GHG emissions, thereby contributing to mitigating climate change and related damages and economic losses and/or adaptation costs, which disproportionately affect low-income populations globally. Air pollution, which is reduced by the development of LOCAL urban forms, energy efficiency in buildings, and increased use of solar roof tops, has relatively higher impact on the poor because they have fewer options to protect themselves (that is, less access to air filtering and to health care to mitigate air pollution-related disease). Moreover, reduced pollution and carbon emissions, as well as more efficient uses of energy and associated cost savings, can contribute to shared prosperity by reducing loss of activity due to pollution and associated measures. Improved LOCAL urban forms can also positively affect the design and use of public space, reducing transport time, improving productivity of urban services, reducing fossil-fuel based energy consumption and associated air pollution, and thus also contributing to shared prosperity.

Other Unintended Outcomes and Impacts

80. **The project completed the 'General Principles for Operation, Management and Maintenance of Distributed Solar PV Power Generation Systems**' with the intention of supporting Yuanshen Company. This document has been approved by the China Energy Conservation Association in late November 2019 and officially published on January 1, 2020. The principles will provide guidance for all DPV system operators by standardizing the procedures and requirements on system operation and maintenance to enhance the system efficiency and safety and bring more social and environmental, local, and global benefit to the society.

III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

81. **The project preparation team prepared the project design with sound background analysis and in alignment with the Government's objectives.** The World Bank team closely coordinated with other ongoing and planned low-carbon initiatives and building energy efficiency programs, both at the national and municipal levels in China. The project design was built on lessons drawn from international and Chinese experience of LOCAL urban forms, building energy efficiency, and renewable energy programs.

82. **The project was prepared simultaneously with the BJSPVP and with intertwined objectives related to Component 3.** That caused some imperfect alignment between the PDO and the indicators. PDO Indicator 3, 'Number of renewable service contracts', may therefore be relevant to achieving PDO sub-objective 'C' in that it expresses a final outcome achieved by the BJSPVP. However, it is only tangentially relevant to achieving the PDO of CUSBEERE, which refers to improved selected national- and city-level policy making and implementation for supporting the scale-up of commercially viable DPV deployment in Beijing. Rather, it measures the final deployment itself. For the purposes of this assessment, those indicators remain relevant for achieving the overall intertwined objective of the two projects and the GEO, but the indicators could have been better aligned to the separate goals of the respective projects at preparation.

B. KEY FACTORS DURING IMPLEMENTATION

83. **The project was implemented by MOHURD, BHURDC, BDRC, and NHURDC, each accountable for a defined set of activities that collectively contribute to the achievement of the PDO**. In addition, each of those PMOs eventually partially relied on more specialized institutions to execute specific activities (that is, the Beijing Education Science Institute for activities to improve renewable energy education in Beijing's schools under Subcomponent 3.d).

84. **Overall implementation by the PMOs (MOHURD, BHURDC, BDRC, and NHURDC) was generally highly rated due to their effective coordination**. That is despite risks identified at project appraisal with regard to implementation (particularly around lack of reference experience among the PMOs, policy coordination risks around promoting LOCAL forms, and sensitivity of energy consumption data disclosure and complexity of benchmarking). Project delays resulting from policy coordination (for example, difficulties in receiving municipal certification in the case of the Ningbo green building pilot) or from lack of experience and the need to develop a theoretical framework (for example, lengthened research times

for LOCAL urban form studies to draw conclusions) were reflected in the restructuring document and ultimately accommodated by the project extension deriving from the restructuring of the BJSPVP.

85. **The project Monitoring and Implementation System** employed by the PMOs for projects monitored by GEF has been in operation since 2015. It proved to be an effective tool for standardizing project procurement procedures, standardizing funds withdrawal and payments procedures, managing personnel change, standardizing document filing, and providing project data.

86. **Component 3 was delayed largely due to its close relationship to the BJSPVP, which was stalled for over a year in 2015–16 due to changes in China's subsidy system for PV.** That delay justified the restructuring of CUSBEERE to postpone the project closure; however, the postponement also accommodated delays in CUSBEERE itself.

87. **Capacity building and institutional strengthening were key enabling factors both for implementation of the project and for replication.** For example, at appraisal, Component 1 was recognized as the most innovative activity supported by the project, requiring extensive efforts to analyze critical issues, consult with key national and local stakeholders, and reach consensus on policy directions and specific improvements of urban statutory planning standards and regulations. The national conference on LOCAL urban forms helped increase the knowledge base for national decision-making and encouraged replication by other cities. However, the PMO (MOHURD) expressed concern that replication may be hindered by different levels of city development across the country, limiting shared lessons. Anecdotal evidence during site visits (for example, in October 2019 to the Ningbo green building demonstrations) showed that authorities in other cities were keen to replicate these pilots.

88. **Coordination among various implementing agencies was generally successful and achieved with the formation of a Project Steering Committee (PSC).** The PSC, under MOHURD with overall coordination responsibilities among the PMOs, was responsible for responding to major issues of the project; setting up a project office; and providing professional procurement, financial, and other management personnel. The project office of the PSC actively focused on communicating with various units, collecting feedback from the implementing agents, and identifying and resolving problems on time. Training and TA were provided to ensure awareness about World Bank policies, procedures, and differences with domestic projects. This included training of new project personnel on procurement and FM policies, work experience exchanges among project units, and audit training. The project office also implemented a dedicated project management platform (MIS) to support contract management, FM, collection of rules and regulations documents, publicizing of achievements, management of activities, and other functional modules.

89. **Where some specific grant implementation activities were slowed in the early years due to coordination difficulties, they were adequately addressed by the project teams with flexible adaptation.** For example, when the Damuwan pilot faced difficulties in transforming the urban master plan to incorporate low-carbon elements, funding was diverted to other urban form activities while the PMO worked to resolve the issues with Damuwan City officials (in particular, preparation of the regulatory planning for the development of Bulaodao Island was progressing very slowly and could not be completed within the project term; after discussion with the World Bank, this task was cancelled.) Similarly, the cancellation and replacement of one of the green building demonstration projects at Ningbo University (described in paragraph 33d) was completed. Overall, for the pilot programs, MOHURD assessed the need to continuously track project risks, collect primary data, and provide scientific support.

90. **MOHURD raised the issue of the impact of exchange rates.** While GEF project costs are expressed in US dollars, project implementation is denominated in Chinese yuan. Fluctuations in the exchange rate between the two hindered accurate calculations of the actual project expenditures by the PMO and relevant departments and complicated their ongoing progress reviews based on financial statements.

IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION (M&E)

M&E Design

91. **Designing M&E for TA projects targeting policy improvement through such a wide range of activities is not an easy exercise, having generally to rely on proxies that indirectly or only partially reflect progress and impact.** The design of the M&E for this complex project, which involves so many institutions and activities, was no exception. While the Theory of Change is clear, several of the indicators identified are proxies that are quite distant from the expected project outcome and thus not always adequate to monitor progress toward the overall PDO as strictly interpreted, that is, improving relevant policies. Moreover, the addition of a GEO, as well the intertwined nature of the BJSPVP, contributed to a degree of perceived misalignment between certain indicators and the PDO. Therefore, a mix of PDO and intermediary level indicators were used to capture achievement of all parts of the PDO.

M&E Implementation

92. **M&E data were collected and analyzed in a consistent and methodologically sound manner.** Over the course of the project, the World Bank completed 13 ISRs and 9 Aide Memoires. During the project implementation stage, electronic version of all project documents recorded in the MIS project management system helped ensure the accuracy of the information provided to the project evaluation teams and the World Bank's annual monitoring and supervision mission teams.

93. **M&E was intensified as necessary.** For example, in the critical stage of project implementation of Component 3, the World Bank task team leader communicated with the Project Implementation Units weekly to get updates on the progress of the project implementation, and the team regularly visited the site for inspections. In October 2019, the World Bank organized GEF Project Implementation Units to carry out exchanges and discussions. Each unit introduced its research outcomes and exchanged management experience. This process was highlighted by the relevant PMOs as a useful exercise in helping achieve project completion.

M&E Utilization

94. **M&E data collected over the course of the project and reflected in the ISRs were used to inform project management and decision-making.** Several reports, including annual and semiannual progress reports, were used to monitor the project's outcome and results indicators. The proactive management approach of PMO staff allowed decisions to be made as needed through informal consultations without relying on the formal interagency committees. The M&E reports were prepared mostly on time to keep track of project status at a given time.

95. **Project decisions, particularly with regard to restructuring, were informed by M&E.**

Justification of Overall Rating of Quality of M&E
Overall rating: Substantial

96. **The overall quality of M&E is rated Substantial.** The design, implementation, and use of M&E were adequate to assess achievement of PDO 'A' and PDO 'B', though it somewhat more difficult to assess achievement of PDO 'C' and test the links in the results chain. The PDO indicators do not completely correspond to each objective but rather reflect certain impacts expected to result from achieving the objectives. In particular, the PDO indicators describe outcomes that appear as IR under the Results Framework. While the indicators did monitor well the IR deriving from activities under Component 3, these activities cannot be easily related to policy improvement; as a consequence, M&E could not monitor improvement of policies for scaling up DPV under PDO 'C'.

97. **It should be noted that this issue may be attributable less to the quality of M&E, which monitored well the progress and results of activities, and more to the formulation of the PDO.** It is possible that the PDO should have limited the use of the term 'policy' only to PDO 'A' and PDO 'B' and referred more directly to specific outputs for PDO 'C'. Project activities and design were discussed, reviewed, negotiated, and approved by the technical teams and quality control team of both the client and the World Bank, as well as the management, the Country Management Unit, the local authorities, and the World Bank Board. The issue could have been better solved by revising the PDO, rather than the indicators; reassessment or revision of the PDO was not undertaken at the time of restructuring.

B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE

98. **Overall safeguards implementation performance is considered Satisfactory.** The project had limited social impacts. An Environmental and Social Management Framework was prepared as specific investments were to be identified only during implementation. The PMOs screened environmental impacts, prepared sub-project technical and environmental documents, and supervised implementation as required.

99. **Environmental safeguards.** The project was classified as Category B in view of its insignificant and site-specific adverse environmental impacts limited to the physical activities of green building demonstration projects in Ningbo. In accordance with the World Bank's OP 4.01 (Environmental Assessment), the EMPs have been well developed and implemented for these physical activities during project preparation and implementation to avoid and minimize environmental impacts and risks. No environmental noncompliance was reported throughout project implementation.

100. **Social safeguards.** This project is intended to improve selected national- and city-level policies for (a) the promotion of LOCAL urban forms and () an increase in energy efficiency in public and commercial buildings. For the solar PV component, no land acquisition was required because all solar PV facilities are being installed in existing public and commercial buildings. The promotion of more efficient and clean energy by the project is expected to provide net benefits to society. No adverse social effects were reported during project implementation.

101. **Land acquisition and resettlement** were limited to the implementation of the Ningbo Kitchen Waste Treatment Plant green building demonstration at Ningbo University, where the resettlement was

carried out in strict accordance with the requirements of the resettlement plan and the World Bank[16]. The Annual Internal Monitoring Report on Resettlement was prepared as required, and Hohai University was entrusted to prepare an independent External Monitoring Report on Resettlement. A total of 47 households were affected by NKWTP. The residential building for the resettled residents was completed in 2019.

102. **Fiduciary compliance.** The project complied with all fiduciary covenants. Internal control arrangements were put in place and adequate FM, procurement, and disbursement systems were maintained.

103. **FM.** The World Bank's supervision mission and annual project audits did not note any significant problems or internal control weaknesses. The PMO staff became familiar with the World Bank's requirements, and FM activities improved further during implementation. FM manuals were prepared and adopted by the four PMOs and provided to all relevant financial staff before project start. The project's financial staff were trained before and during project implementation. The internal controls of the project worked as intended. In addition, it is required by China's national laws that audit institutions perform audit supervision duties on foreign loan and grant financed projects. The Ningbo and Beijing Municipal Audit Offices conducted annual financial audits and expressed their opinions on the project; evaluated the financial system, accounting system, and project implementation; and put forward suggestions on implementation. The project passed such local audits without major concerns raised, and audit reports submitted on time and unqualified.

104. **Procurement.** The GEF grant-funded activities were implemented by the PMOs which followed the World Bank's procurement policies and procedures. Overall, procurement was managed by the project office with adherence to the Project Grant Agreement and project-related management documents and in accordance to the approved plan. Almost all contracts under the project are subject to procurement post review. The World Bank mission carried out post review on sampling basis every year. No substantial deviations from the World Bank procurement policies and requirements were identified. The overall procurement management was found satisfactory. The procurement adequately met the World Bank's requirements to ensure that funds were used for the intended purposes.

C. BANK PERFORMANCE

Quality at Entry

105. At appraisal, the team considered adequacy of project design and all major relevant aspects such as technical, financial, economic, institutional, and procurement. Major risk factors and lessons learned from earlier projects were also considered and incorporated into the design. The project was well grounded in the realities of China and its problems in the energy sector and was focused on designing novel and efficient ways to achieve China's carbon intensity reduction targets. An experienced and committed task team was constituted to provide technical support for preparation. This was critically important, given that implementation of climate change mitigation interventions in any country is

[16] Implementation in accordance with WBG requirements was affirmed under the WBG-financed Ningbo Urban Domestic Waste Collection and Recycling Demonstration Project.

complex and challenging. However, shortcomings associated with the M&E framework (and/or the formulation of the PDO), as previously described, constitute a shortcoming of quality at entry.

Quality of Supervision

106. **The World Bank team included the task team leader; technical experts; environmental, social, FM, and procurement specialists; and consultants.** Approximately every six months, the project was subject to implementation supervision missions that monitored progress and provided extensive support. Missions included review of safeguard documentation and field visits. The team consistently and closely engaged the PMOs, both for providing expertise and guidance on the reporting of activities' progress and results. The task team collected relevant data on a regular basis and updated current progress against the baseline. The progress was recorded in 13 ISRs and 9 Aide Memoires which were generally very detailed. ISRs were candid and targeted to outline important events and highlighted issues for World Bank management attention. The task team responded appropriately and on time to all the Government's requests. The World Bank team's support resulted in timely adjustments including project restructuring and funds reallocation. The task team also provided extensive sector expertise.

107. **According to the PMOs, World Bank task teams provided significant value.** The teams were praised for their management experience and professional knowledge and for undertaking regular annual visits to evaluate the progress of the project. Their suggestions on many terms of reference (TOR) and feedback on draft and intermediary outputs of activities were assessed to have greatly improved project implementation and its efficiency, and they were judged to have carried out their responsibilities rigorously, methodically, and meticulously. PMO staff claim to have benefitted from expertise and advanced management methods and appreciate the good relationship and rapport that World Bank teams maintained with the PMO, contributing to smooth communication and effective consensus building.

108. Supervision of the BJSPVP and CUSBEERE projects was very closely coordinated due to their related nature. Although the opportunity for deeper restructuring of CUSBEERE was missed (specifically, to align Component 3 outcomes and indicators in a similar manner to, and consistent with, the BJSPVP restructuring), close supervision was instrumental to achieving the successful outcomes of both projects.

Justification of Overall Rating of Bank Performance
Overall rating: Satisfactory

109. The World Bank performance is considered Satisfactory.

D. RISK TO DEVELOPMENT OUTCOME

110. **The risk to development outcome is rated Low.** To the degree that project recommendations have been incorporated into national- and city-level statutory regulations and policies, especially where they have been included in the 13th FYP strategies, it is unlikely that those policies will be reversed in the near future. As a project that is focused on policy improvement and augmenting institutional capacity, outcomes from CUSBEERE are likely to persist through better processes and statutory requirements.

111. **The PMOs express broad confidence that the outputs of the project will be ongoing.** MOHURD claims that "with the support of the policy recommendations proposed by the research, with the

continuous improvement of the policy system, the continuous strengthening of the low-carbon livable concept, and renewable energy application technologies, the continuous maturity of China will inevitably accelerate the improvement of energy efficiency and renewable energy applications in the construction sector." Moreover, urban forms and building efficiency guidance both inform long life cycle building projects, implying that their effects will be long-lasting and difficult to reverse.

112. **The project has been well designed and is suitable to its operating environment.** Economic crisis and volatility as a result of COVID-19, for example, are unlikely to cause reversals because greater energy efficiency is an effective response to energy price fluctuations and a useful catalyst for postcrisis sustainable growth.

113. **The building efficiency and LOCAL urban form pilots have already demonstrated value.** They will provide value in future as long as their implementation continues and associated lessons and knowledge are disseminated for replication or to inform alternative approaches. There are questions regarding the potential for replication and the degree to which demonstrated municipal policy improvements (for example, through pilots with regard to LOCAL forms and building efficiency) will spread to additional Chinese cities. MOHURD expressed this concern with regard to energy-saving benchmarking and disclosure in its final ICR (Due to the different development stages and economic levels of different cities, there is a big challenge of scale replication.).

V. LESSONS AND RECOMMENDATIONS

114. The project offers key lessons and recommendations applicable for similar projects within and beyond China, as discussed in the following paragraphs.

115. **Separate and distinct PDOs and indicators should be identified for each project.** Supporting or intertwined projects, such as was the case between Component 3 of CUSBEERE and the BJSPVP, should be prepared with separate and distinct PDOs and indicators**.** In this case, the results included some misalignments between the PDO and the indicators, and the need to assess achievement of the objective using indicators that were ultimately fulfilled by another project.

116. **Where complex policy projects are implemented in the absence of significant reference experience, it is important to establish the theoretical framework through policy research and to develop institutional capacity to carry it out.** In this case, the completion of studies to examine policies for LOCAL urban forms and building energy efficiency provided an important basis for institutions with little experience in these policy areas. The research identified the influencing factors of urban spatial form which affected the energy consumption from transportation and buildings, put forward requirements of urban spatial form in line with low-carbon development, and further made proposals on preparation and management of urban planning. Through such studies, the PMOs could study the morphology elements of low-carbon urban spatial form relevant to energy consumption from buildings and transportation, clarify the influencing factors of urban spatial morphology that affect the energy consumption from transportation and buildings, put forward the urban spatial form requirements in line with low-carbon development, and make informed proposals on preparation and management of urban planning, including producing a series of standards to implement concretely the finding of the studies. Furthermore, pilot projects instituted by major metropolitan areas such as Beijing and Ningbo, together with TA to train

and inform the relevant stakeholders, provided lessons for implementation in the Chinese context that could then inform national policy and be replicated by other municipalities.

117. **Effective urban and rural planning standards are key tools for improving LOCAL urban forms.** Improving those standards benefits from data from a low-carbon livable city morphology and indicator systems to guide the optimization of land and space structure, promotion of resource conservation, and increase in the strength of natural ecosystems and environmental protection. Effective standards emphasize building a green ecosystem, including green transportation systems, ecological infrastructure, sponge city construction, and comprehensive pipe corridor construction and innovatively integrating concepts such as open blocks, underground comprehensive pipe corridors, and narrow roads and dense networks.

118. **Primary data collection and sharing around building energy efficiency is key to further efficiency improvements.** Introducing mandatory building EPB&D catalyzed market development for building retrofits by introducing a transparent and consistent system of data recording, evaluation, and sharing, which was critical to market participation and valuation of energy efficiency improvements. The availability of systematic building energy benchmarking data also informs long-term planning to enable more effective control of the overall carbon footprint of the built environment. Through comparison and disclosure of data, the PMO can determine which buildings in China are being refurbished and rebuilt and which refurbishments are most cost-effective, and it helps determine the design, construction, equipment, and operational characteristics that will enable the building to achieve optimal energy efficiency. Through data analysis, the PMO can better understand the key factors affecting the energy efficiency of Chinese buildings, help understand the most realistic market data, and formulate national energy conservation goals and standards.

119. **Evidence-based policy proposals that are tested in municipal pilot schemes can and should inform positive statutory and regulatory changes and convince other local authorities to replicate successful policy schemes.** Policies that are grounded in a thoroughly developed theoretical framework formed by methodical research and tested in pilot settings are more likely to prove effective in convincing national policy makers and other municipal authorities of their value and thus more likely to encourage replication. In this case, pilot schemes were carried out for EPB&D programs at Beijing, Ningbo, Qingdao, and Chongqing; for LOCAL urban planning and design at Ningbo (Damuwan), Beijing (Tongzhou), Shaanxi Xixian New Area (Western Technological Innovation Harbor), Taiyuan, and Inner Mongolia; and for green building demonstrations in Ningbo (Ningbo University Sci-tech Service Building and the Ningbo Kitchen Waste Treatment Plant). Particularly in Beijing and Ningbo, these pilots usually represented policies that were implemented, city planning that was directly affected, or physical buildings that were constructed. In these cases, where real-world outcomes were observable, replication by other cities was very likely. Other activities referred to as ‘pilots’ outside of the two principal cities were sometimes draft guidelines or research studies, which provided valuable input to policy making but were less clearly tested and therefore presented a lower likelihood of replication. Overall, the PMOs expressed a high level of satisfaction with the policy results at both the national and municipal level, demonstrating the value of a research-pilot-adopt-replicate model for policy development.

ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS INDICATORS

A.1 PDO Indicators

Objective/Outcome: Promotion of low-carbon, adaptive and livable urban forms

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
LOCAL urban planning and design principles recommended for inclusion in statutory urban planning standards and regulations	Yes/No	N 01-May-2013	Y 31-Dec-2018		Y 31-Dec-2019

Comments (achievements against targets):
"Standards for Planning and Design of Urban Residential Areas" GB50180-2018 "Urban Drainage Planning Stan dard" GB50318-2017, "Urban Waterlogging Planning Standard" (formulation) "Standards for Planning and D esign of Walking and Bicycle Systems" (draft for approval) "Standards for Planning of Urban Integrated Tran sportation System" GB/T51328-2018

Objective/Outcome: Increase in energy efficiency in public and commercial buildings

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion

Energy performance benchmarking and disclosure (EPB&D) program for large public and commercial buildings developed at the national level and mandatory adoption by select cities.	Yes/No	N 01-May-2013	Y 31-Dec-2018		Y 31-Dec-2019

Comments (achievements against targets):

- Develop methodology and draft guidelines on energy performance benchmarking for public and commercial buildings (2-A-CS-001) (MOHURD\Beijing\Ningbo)
- Energy Performance Information Disclosure in Large Public and Commercial Buildings in Qingdao (2-A-CS-005)
- Research on Implementation of the Information Disclosure System on Energy Consumption and Energy Efficiency of Public Buildings in Chongqing (2-A-CS-006)

Objective/Outcome: Scale-up of commercially viable rooftop solar PV deployment

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of renewable energy service contracts signed	Number	0.00 01-May-2013	765.00 31-Dec-2018	400.00 31-Dec-2019	324.00 31-Dec-2019

Comments (achievements against targets):

After the mid-term restructuring of the project, the installed capacity of one single sub-project under the scale-up part was much larger than that of the Sunshine School sub-projects, so the final actual value is lower than the end target.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
CO2 emissions reduction associated with GEF assistance	Tones/year	0.00 01-May-2013	85120.00 31-Dec-2018	70000.00 31-Dec-2019	1313116.51 31-Dec-2019

Comments (achievements against targets):
According to the PMO, the final achieved figure (including both direct and indirect emissions reductions) was 81,563.51 tons per year for Beijing; 89,590 tons per year from MOHURD; and 1,141,963 tons per year for Ningbo, for a total of 1,313,116.51 tons per year. In the case of MOHURD, this calculation was based on an emissions factor of 0.741 kg per kWh (North China Grid for 2016, assuming a linear annual decrease interpolated from factors for 2012 and 2015), transmission and distribution losses of 6.5 percent, and supply to grid of 9 percent as a share of total solar PV electricity generated. While other emissions factors were not specified, they are assumed here to be the same. At the new coefficient of 0.6 kg per kWh, that implies an achieved figure of 1,063,252.23 tons per year. Over the 15-year period referenced in the PAD, this implies 15.94 million tons of incremental reduction of CO2 and an undiscounted unit cost of US$0.75 per ton CO2. In this regard, project efficiency was higher than expected.

A.2 Intermediate Results Indicators

Component: 1. Promoting the Development of Low-Carbon, Adaptive and Livable Urban Forms

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Urban form studies completed	Number	0.00 01-May-2013	4.00 31-Dec-2018		20.00 14-Oct-2019

Comments (achievements against targets):
20 studies were completed: MOHURD conducted 8 research activities from 6 areas under Component 1A(a); BHURDC conducted 4 technical research studies in the Beijing municipality context under Component 1B; NHURD conducted 8 technical studies in the Ningbo municipality context under Component 1C. These studies directly contributed to the issuance of a series of new standards, which provide concrete evidence of policy improvement. For example, the outcomes have been benefitting the Ningbo Municipal Government, Planning Bureau, NBHURD and other departments, having provided them with theoretical bases and empirical information to carry out extended studies and improve the policies and regulations concerned. The outcomes also benefit MOHURD with suggestions for revising, adjusting and improving key standards for low-carbon urban and rural development, and informed the State Council's *Some Opinions on Further Strengthening the Management of Urban Planning and Construction.* These studies also provided reference documents for the policy formation of urban renewal management in China.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Mayors and city planning officials trained	Number	0.00 01-May-2013	150.00 31-Dec-2018		295.00 31-Dec-2019

Comments (achievements against targets):
Beijing and Ningbo.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
City pilots of Local urban planning and design completed	Number	0.00 01-May-2013	3.00 31-Dec-2018		3.00 15-Oct-2019

Comments (achievements against targets):

- Xixian New Area: The Outline of Regulatory Detailed Planning on China's Western Technological Innovation Harbor (1-A-CS-019）
- Taiyuan City: Research and compilation on Low-Carbon oriented Regulatory Detailed Planning for Core Area of Jinzhong Starting District of Shanxi Transformation and Comprehensive Reform Demonstration Zone (1-A-CS-018）
- Ningbo Damuwan

Component: 2. Improving Energy Efficiency in Public and Commercial Buildings

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
National and city BEP&D pilot programs implemented	Number	0.00 01-May-2013	2.00 31-Dec-2018		4.00 14-Oct-2019

Comments (achievements against targets):

- Beijing EPB&D pilot
- Ningbo EPB&D pilot
- Study on implementation of the information disclosure system on energy consumption and energy efficiency of public buildings in Chongqing (2-A-CS-006)
- Research on Publicity Systems of Comprehensive Energy Efficiency Benchmarking Methods in Public Buildings and Renewable-energy Demonstration Projects in Qingdao (2-A-CS-005)

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion

Selected building EE and green building policies in Beijing improved and new policies informed	Yes/No	N 01-May-2013	Y 31-Dec-2018		Y 15-Oct-2019

Comments (achievements against targets):
Energy conservation regulations, and design and evaluation standards promulgated in Beijing, online registry/portal completed. Relevant, and validated by the PMO. High attribution to the project.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Outreach to local stakeholders and training of local trades in Beijing (number of people trained)	Number	0.00 01-May-2013	1000.00 31-Dec-2018		4423.00 31-Dec-2019

Comments (achievements against targets):
Implementation capacity was strengthened with outreach and training of local construction trades.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Floor area of green buildings in Beijing received	Square Meter(m2)	3000000.00	15000000.00		47175800.00

certificates		01-Jan-2013	31-Dec-2018		31-Dec-2019

Comments (achievements against targets):
Certified green buildings floor area in Beijing (m2): 47.1758 million (target: 15 million)

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Bioclimatic and cost-optimal green building designs demonstrated in Ningbo	Yes/No	N 01-May-2013	Y 31-Dec-2018		Y 11-Oct-2019

Comments (achievements against targets):
NBHURD completed two green building demonstration sub-projects (New Sci-Tech Service Building of Ningbo University and Ningbo Kitchen Waste Treatment Plant). The project also provided methodological and technical support for energy-efficient benchmarking and information disclosure of large-scale public and commercial buildings in Ningbo, and a Ningbo energy consumption monitoring platform was established connecting 333 buildings to real-time monitoring. MOHURD developed application demonstrations of publicity systems of benchmarking methods in Qingdao and an information disclosure system in Chongqing.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Green building policies in Ningbo improved and new policies informed	Yes/No	N 01-May-2013	Y 31-Dec-2018		Y 15-Oct-2019

Comments (achievements against targets):
NBHURD conducted top-level design for the large-scale promotion of green building development in Ningbo; released a series of policy systems and technical standards, supporting industry development documents; provided scientific technical support; and established a training system. The scale-up roadmap study requirement is superseded by the special planning for Ningbo and implementation guidelines.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Outreach to local stakeholders and training of local trades in Ningbo (number of people trained)	Number	0.00 01-May-2013	800.00 31-Dec-2018		2000.00 31-Dec-2019

Comments (achievements against targets):
With workshops and events related to three-dimensional greening, solid waste management, and scaling up green building.

Component: 3. Scaling up Commercially Viable Rooftop Solar PV Deployment

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Installed rooftop solar PV capacity under the Beijing Rooftop Solar PV Scale-up Project	Megawatt	0.00 01-Jan-2013	100.00 31-Dec-2018		102.20 31-Dec-2019

Comments (achievements against targets):
Actual achieved at completion: 102.2 MW.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Improved knowledge of local grid company about handling grid-connected rooftop PV systems	Yes/No	N 01-May-2013	Y 31-Dec-2018		Y 14-Oct-2019

Comments (achievements against targets):
The project launched and completed a two-way metering project, which improved the knowledge of the local grid company about handling grid-connected DPV systems.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Establishment of Beijing solar energy information portal	Yes/No	N 01-May-2013	Y 31-Dec-2018		Y 14-Oct-2019

Comments (achievements against targets):
The Beijing solar energy portal can be found at http://www.re-bj.com.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Renewable energy education delivery in public schools enhanced (number of demonstration laboratories established)	Number	0.00 01-May-2013	20.00 31-Dec-2018		20.00 31-Dec-2019

Comments (achievements against targets):
Improvement of renewable energy education in schools and educational institutions in Beijing was completed with the construction of a new energy and renewable energy education platform, curriculum development for sustainable development education, the construction of 20 demonstration classrooms, and exchanges to learn more about sustainable energy education in the US and Canada.

B. KEY OUTPUTS BY COMPONENT

The project includes 98 activities with corresponding outputs, 4 PDO indicators, and 14 intermediate indicators. Those activities and metrics are organized below by component.

PDO (1): Improved selected national and city-level policies for the promotion of low-carbon, adaptive, and livable (LOCAL) urban forms	
Outcome/PDO Results Indicators	1. LOCAL urban planning and design principles recommended for inclusion in statutory urban planning standards and regulations: YES
Intermediate Results Indicators	1. Urban form studies completed: 20 (target: 4) 2. Mayors and city planning officials trained: 542 (target: 150) 3. City pilots of LOCAL urban planning and design completed: 3 (target: 3) 4. Selected EE and green building policies in Beijing and new policies informed: YES
Key Outputs by Component (linked to the achievement of the Objective / Outcome 1)	Component 1 (39 outputs) **1A:** 1. Urban form study and LOCAL urban planning pilot cities through TA grants • GIS[17] Data Collection Report and Sample Selection Report • Urban Morphology Analysis Report • Traffic Energy Analysis Report • Energy Consumption Analysis Report of Building Operation in Different Communities and Neighborhood Types • Comparative Study Report of Case City Research Results and International Best Practice Cities 2. Suggestions on revisions of national statutory urban planning regulations and standards • Sub-report 1: Research Report on Low-Carbon Development and Technical Standards for Urban Transportation Planning • Sub-report 2: Research Report on Technical Standards for Ecological Environmental Protection and Municipal Engineering Planning • Sub-report 3: Research Report on Foreign Urban and Rural Planning Standards

[17] GIS = Geographic information system.

- Sub-report 4: Research Report on Typical Cases and Key Control Contents and Indicators at Home and Abroad
- General report: General Report on Research on Technical Standards for Urban and Rural Planning under the Concept of Low-Carbon Ecology

3. Research on LOCAL city assessment indicators and tools
   - Research Report on China's Urban Ecological Development Evaluation System
   - Research Report on Instrumentalization of Urban Ecological Development in China
   - Urban Ecological Development, Evaluation Research and Practice Seminar, symposium
   - Media salons and presentations
4. Research of Methods and Implementation Strategies of Green Community Development
   - Sub-report 1 ： Research on Related Standards and Practices of Green Construction and Renewal of Chinese Urban Communities
   - Sub-report 2 ： Research on Methods and Practices of Green Construction and Renewal of Urban Communities in Foreign Countries
   - General Report: Research on Updated Methods and Implementation Paths
5. Research on Urban Design Method and Implementation under Low-carbon Development Background
   - Research on the Mechanism of Low-carbon Ecological City Design Concept
   - Study on the Design System of Low-carbon Ecological City Based on the Current Planning System
   - Exploring the Implementation Path of Low-carbon Ecological City Design from the Perspective of Management
6. Research on Method and Implementation of Green Urban Renewal
   - Sub-report 1: Summary and Analysis of Successful Experiences of Chinese and Foreign Urban Renewal
   - Sub-report 2: Urban Renewal Planning System and Its Green and Low-Carbon Technologies and Methods
   - Sub-report 3: Research on the Design and Implementation Strategies of Urban Renewal Institutional Framework
   - General Report: Research on Methods and Implementation Paths of Green Urban Renewal
7. Low-carbon, Livable and Adaptive City Form Study in New Campus Town of Xian Jiaotong University of Shanxi Fengxi New Town
   - Controlled Detailed Plan for Science and Technology Innovation Port in Western China
8. Research and Compilation on Low-carbon-oriented Regulatory Detailed Planning for Core Area of Jinzhong Starting District of Shanxi Transformation and Comprehensive Reform Demonstration Zone

- Outcome 1: Research Report on Low-carbon Index System of Jinzhong City
- Outcome 2: Regulatory Detailed Planning for the Core Area of the Jinzhong Starting Area in the Demonstration Area
- Outcome 3: Research Report on Low-carbon Planning

1B:

1. A series of research activities were carried out.
   - Low-carbon Urban Spatial Form Related Research Review Report (2015)
   - Beijing Urban Spatial Form Research Report (2016)
   - Analysis Report on Energy Consumption from Buildings and Transportation (2016)
   - General Report of Low Carbon Urban Form Study in Beijing (2018)
2. The low-carbon planning concepts and strategies proposed by the project are already included in the city's urban planning schemes, as well as that of the city's sub-center, Tongzhou.
3. The concept of project output has been fully represented in the new edition of Beijing's master plan.
4. The research outcome of the project is highly consistent with the new edition of Beijing's urban planning.
5. The advanced ideas put forward by the project have been reflected in the master plan and detailed construction plan of the city's sub-center, Tongzhou.

1C:

1. Ningbo Urban Form Studies (1-C-CS001) were carried out
   - GIS Data Collection Report
   - Sample Selection Report
   - Urban Form Analysis Report
   - Community Traffic Energy Use Analysis Report
   - Building Embodied Energy Analysis Report of the Block and Building Samples
   - Operational Energy Use Analysis Report
   - Report of Comparing the Study Outcomes of Ningbo Urban Form Energy Use and the International Best Practices
   - Report of Recommendations on Improving Urban Planning Standards and Regulations
2. Damuwan Transport System Planning and Concept Design (1-C-CS003)
3. Studies on Design and Evaluation System of Technical Indicators of Ningbo Green Residential Areas (1-C-CS004)
   - Report on Green Technology Indicators for Blocks of Residential Area

	• Guidelines for Design and Planning of Green Blocks • Technical Guidelines for EE Assessment of Green Blocks • Master report Component 2 (None) Component 3 (None)
PDO (2): Improved selected national and city-level policies for an increase in energy efficiency in public and commercial buildings	
Outcome/PDO Results Indicators	1. Energy performance benchmarking and disclosure (EPB&D) program for large public and commercial buildings developed at the national level and adopted by select cities: YES
Intermediate Results Indicators	1. National and city EPB&D pilot programs implemented: 2 (target: 4) 2. Selected EE and green building policies in Beijing and new policies informed: YES 3. Outreach to local stakeholders and training of local trades in Beijing: 4,423 (target: 1,000) 4. Certified green buildings floor area in Beijing (m^2): 47.1758 million (target: 15 million) 5. Bioclimatic and cost-optimal green building designs demonstrated in Ningbo: YES 6. Green building policies improved, and new policies informed in Ningbo: YES 7. Outreach to local stakeholders and training of local trades in Ningbo: 2,810 (target: 1,000)
Key Outputs by Component (linked to the achievement of the Objective / Outcome 2)	Component 1 (None) Component 2 (40 outputs) **2A:** 1. Research for comprehensive energy planning path focused on demand side • Handbook for Benchmarking Energy Demand for Urban Buildings • Research Report on Energy Demand Forecast Model • An Analysis of the Relationship between Community Form and Energy Consumption Characteristics • Guide for Setting Energy-saving Index in the Detailed Planning of City Control in China • Energy Bus System Design Guide • Demand-side Energy Planning Policy Study • Model Project Report • Guidelines for Energy Planning on the Demand Side of Cities • Research Report on Energy System Reform Strategy in Old City Transformation and Urban Renewal

2. The Urban Existing Building Energy Efficiency and Green Building-oriented Renovation and Demonstration
3. Research for Popularization of Distributed Photovoltaic Construction Model in Hinggan League of Inner Mongolia
   - Investigation Report on Construction Resources and Conditions of Xing'an League's Urban-scale Distributed Photovoltaic Power Stations
   - The Government Recommends Distributed Photovoltaics as the Operating Mode of Public Construction projects (recommended draft)
   - National Policy Recommendations for Distributed Photovoltaic as a Government Public Utility Construction (recommended draft)
   - Report on the Feasibility of Implementing 'Household Photovoltaic Electricity Thermal Storage Heating' to Replace the Winter Coal-fired Coal Heating in Xing'an League of Inner Mongolia and the Effect of Controlling Winter Haze in Northern China
4. Technical Roadmap and Policy Research of the Clean Heating Supply in Urban and Rural Areas in China
   - Research Report on Winter Clean Heating Technology Paths and Policies in Northern China
5. Promotion of Building Energy Efficiency and Green Building Development Via Legislation
   - Research Report on the Evaluation of the Implementation of the Regulations on Energy Conservation of Civil Buildings and the Suggestions for Revision
   - Regulations on Building Energy Efficiency and Green Building Management
6. Distributed Energy Application in Zhuzhou Yunlong Vocational School City
   - Feasibility Study Report of Multi-energy Fusion System in Vocational Education City
   - Vocational City Multi-energy Fusion Supply System Solution Report
   - Outcome 3: Report on Financing and Construction Modes and Policy Suggestions for a Multi-energy Fusion Supply System in Vocational Education City
7. Distributed Energy Application in Shanxi Taiyuan Science and Technology Innovation City
   - Analysis of Core Differentiated Energy Demand and Available Resources
   - Research Report on Applicability of Distributed Energy in Core Area
   - Guidelines or Guidelines for Special Planning of Distributed Energy Construction
8. Distributed Energy Application in Shaanxi Fengxi Information Innovation City
   - Technical Report on New Energy Comprehensive Energy Supply System of Phase II of Headquarters Economic Park in Xixian New Area
   - Technical Guide for Phase II Demonstration Project of Headquarters Economic Park in Xixian New Area

- Analysis and policy suggestions on financing and construction mode of new energy comprehensive energy supply system in phase II of headquarters economic park of Xixian New Area

9. Methodology and Draft Guidelines on Energy Performance Benchmarking for Public and Commercial Buildings
10. Mechanism on Building Energy Efficiency Service Market
    - Research Report on China's Building Energy Saving Service System
    - Research Report on Construction and Implementation Strategy of Building Energy Saving Service System
    - Guidance Document on Regulating Building Energy Saving Service Activities
    - Evaluation Report on Building Energy Saving Service Enterprises
11. Study of Disclosure Mechanism on Energy Performance for Large Public and Commercial Buildings
12. Analysis of Energy Consumption and Efficiency of Hospital Buildings (Beijing, Chongqing, and Nanjing)
13. Research on Methods and Paths for Controlling Total Carbon Emissions and Intensity of Buildings in Urban China
14. Research on Publicity for Comprehensive Energy Efficiency Benchmarking Methods in Public Buildings and Renewable-energy Demonstration Projects in Qingdao
15. Research on Implementation of the Information Disclosure System on Energy Consumption and Energy Efficiency of Public Buildings in Chongqing
16. The Urban Existing Building Energy Efficiency and Green Building-oriented Renovation and Demonstration
    - Research Report on the Current Situation of Comprehensive Improvement and Transformation of Green Existing Residential Buildings at Home and Abroad
    - Research Report on the Technical System of Comprehensive Improvement and Transformation of Green Urban Existing Residential Buildings
    - Research Report on Policies and Measures for Comprehensive Promotion and Transformation of Green Urban Existing Residential Buildings
    - Report on the Completion of the Demonstration Project of the Comprehensive Improvement and Transformation of the Green Urban Existing Residential Buildings
    - General Report
17. Series of high-level meetings and exchange visits organized (Total 1,260 participants)
    - National Annual Seminar on Local Urban Form (9th and 10th Urban Development and Planning Conference): 530 trainees
    - Professional sub forums organized at the 11th and 12th International Green Building Conferences (1,000 participants)

- The 12th International Green Building Conference
- Urban Renewal Policy and Technology Workshop
- International Symposium on Regional Energy Planning Methods and Implementation Paths
- Organized expert teams to the United States and Canada to carry out building energy benchmarking and information disclosure research
- 2 training trips to Germany
- 2017 Urban Demand-side Energy Planning and Method Seminar

2B:

1. Studies on EPB&D for Large Public and Commercial Buildings
   - Studies on Ultra-Low Energy Consumption Buildings' Insulation Materials and External Thermal Insulation System Related Techniques
   - Studies on Indoor Building $PM_{2.5}$ Pollution Control Techniques
     - Report on the Source and Spread Mechanism of $PM_{2.5}$ Pollution in Buildings
     - Technical Guidelines for Design and Operation of $PM_{2.5}$ Pollution Control in Buildings
2. Improvement on Municipal Level Building Energy Efficiency Policy Framework
   - Amendment of Beijing's Energy Efficient Design Standard for Public and Commercial Buildings
   - Amendment of the Beijing Building Energy Conservation Regulations
   - Amendment of the Energy Efficient Design Standard for Public and Commercial Buildings in Beijing (DB11/687-2009)
3. Improvements in Green Building Development
   - Amendment of the Beijing Green Building Evaluation Standard (DB11/T 825-2011)
   - Development and Dissemination of the Beijing Green Building Applicable Technologies Catalogue (2016)
   - Development of Management and Information System on Green Building Labeling and Certification
   - Research and Formulation of Beijing Code for Acceptance of Green Building Construction
   - Road Map and Policy-Support Mechanism Research on Development of Green Building and Building Energy-Conservation in Beijing by 2030
   - Green and Energy Efficiency Renovation and Pilot Projects in the Old City
4. Improvements in Prefabricated Construction
   - Research on Technological Application of Prefabricated Construction to the green renovation of Existing Buildings

- Research and Pilot on Application of Ultra Low Energy Efficient Prefabricated Building Technology in Cold Regions
- Formulation of the Technology Catalogue of Prefabricated Buildings
- Contributed to formulation of Evaluation Standards for Prefabricated Buildings (amendment of the Quality Acceptance Inspection for Precast Concrete Components and Specification for Construction and Quality Acceptance of Precast Concrete)

5. Online green building certification registry established - Establishment of Green Building Evaluation and Certification Platform and Provision of Related Training

2C:

1. System for EE benchmarking and information disclosure (EBP&D) of large-scale public and commercial buildings in Ningbo
   - Studies conducted and recommendations proposed on the Disclosure Policy of Energy Consumption Information of Public Buildings in Ningbo
   - 'Primitive' energy consumption benchmarking tools for public buildings and commercial buildings
   - Training seminar held on the energy efficiency benchmarking and information disclosure system of large public and commercial buildings in Ningbo
   - Ningbo energy consumption monitoring platform established
   - Ningbo energy consumption comparison tool
   - Ningbo Energy Consumption Disclosure Policy Report
   - Information Disclosure Management Measures for Energy Consumption by Public Buildings in Ningbo
   - Training conducted on the use of the energy consumption monitoring platform and the energy consumption evaluation and comparison platform
2. Green building policy documents produced
   - Implementation Plan for Green Buildings in Ningbo Municipality
   - Opinions offered on the development of green buildings in Ningbo Municipality
   - Notice on Adjusting the Pre-sale Conditions of Green-building Commercial Housing
   - Detailed Rules for the Implementation of EE Evaluation Techniques and Management Review of Civil Buildings in Ningbo Municipality
   - Detailed Rules for the Implementation of Green Building Evaluation in Ningbo Municipality
   - Atlas of Building Structures of Sintered Thermal Insulation Bricks

	• Assisted establishment of Ningbo Green Building Management Framework and Expert Committee, Green Building Online Applying System Platform and Ningbo Green Building Training and Publicity Cooperation Mechanism 3. Studies on Implementation of the Energy Efficiency Improvement Project for Public Buildings in Ningbo • Ningbo Public Building EE Evaluation Report • List of Suitable Projects (9 buildings) • Implementation Plan of Ningbo Public Building EE Improvement Pilot Project 4. Green Building Demonstrations • The New Sci-tech Service Building of Ningbo University is designed and implemented in accordance with the national three-star green building standard. • Ningbo kitchen waste treatment plant is designed and implemented in accordance with the national industrial three-star green building standard. 5. Equipment procured for the computer room of the building energy consumption monitoring data center, and online monitoring platform created for Ningbo public buildings. Component 3 (None)
PDO (3) Improved selected national and city-level policies for (iii) the scale-up of commercially viable rooftop solar photovoltaic deployment	
Outcome Indicators	1. Renewable energy service contracts signed: 324 (target: 400)
Intermediate Results Indicators	1. Installed rooftop solar PV capacity under the Beijing Rooftop Solar PV Scale-up Project: 102.2 MW (target: 100 MW) 2. Improved knowledge of local grid company about handling grid-connected rooftop PV systems: YES (two-way metering pilot) 3. Establishment of Beijing solar energy information portal: YES 4. Renewable energy education delivery in public schools enhanced (number of demonstration laboratories established): 20 (target: 20)

Key Outputs by Component (linked to the achievement of the Objective / Outcome 3)	Component 1: None Component 2: None Component 3: **3A:** 1. Engineering and technical support relevant to PV system has been provided to Yuanshen Company, which is the implementation units of the World Bank loan project and independent M&E has been conducted to support relevant publicity and dissemination work. • 'Sunshine Campus Project' Case Study • Operational Guidelines for the Whole-process Project Management of PV Power Projects in Public Institutions • Market Evaluation Report on the Promotion of Rooftop Solar PV in Other Public Institutions Using RESCO Mode • Training of distributed PV finance and operation/maintenance for relevant staff of Yuanshen • Carried out a standardized institutional construction project for the operation, management, and maintenance of distributed solar PV system • Compiled the 'General Rules for Distributed Solar PV System's Operation, Management and Maintenance' to be used as internal standards (approved by China Energy Conservation Association in November 2019) • Provision of third-party M&E consulting services by Chinese Academy of Sciences, including the compilation of the following: ○ Guidelines for Comprehensive Performance Evaluation of 'Sunshine Campus Project' Rooftop Solar PV Power Stations ○ 'Sunshine Campus Project' Annual Monitoring Report ○ 'Sunshine Campus Project' Interim Report ○ 'Sunshine Campus' Publicity Science Program ○ General Evaluation Report of Beijing Solar PV Power Generation Scale-up Project 2. PV communication collector purchased and installed 3. 3 study tours implemented by Beijing Academy of Educational Sciences and Yuanshen Company to USA and Canada, and 1 study tour to Europe by the PMO. 4. Case Study of Beijing 'Sunshine Schools Golden Sun' Project **3B:**

	1. Two-way metering pilot executed by Beijing Energy Saving Company (State Grid), with TOR designed by an independent expert. **3C:** 1. Solar energy information portal website completed **3D:** 1. 20 demonstration classrooms established, as well as a renewable energy education module and teacher training

ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

A. TASK TEAM MEMBERS

Name	Role
Preparation	
Feng Liu	Task Team Leader(s)
Yabei Zhang	Task Team Leader(s)
Xiaowei Guo	Procurement Specialist(s)
Fang Zhang	Financial Management Specialist
Youxuan Zhu	Social Specialist
Peishen Wang	Environmental Specialist
Dan Xie	Team Member
Xuege Lu	Team Member
Supervision/ICR	
Christophe de Gouvello	Task Team Leader(s)
Jianjun Guo	Procurement Specialist(s)
Fang Zhang	Financial Management Specialist
Songling Yao	Social Specialist
Yan Zhang	Procurement Team
Yanqin Song	Team Member
Shanshan Ye	Team Member
Xiaodan Huang	Environmental Specialist
Na Han	Team Member
Phillip Edouard Cornell	ICR Author
Jeffrey Alexander Gibson	Team Member

B. STAFF TIME AND COST

Stage of Project Cycle	Staff Time and Cost	
	No. of staff weeks	US$ (including travel and consultant costs)
Preparation		
FY12	5.325	53,780.85
FY13	10.888	156,248.65
Total	**16.21**	**210,029.50**
Supervision/ICR		
FY14	6.550	55,395.81
FY15	6.565	66,717.85
FY16	7.382	74,874.29
FY17	2.225	36,005.63
FY18	10.200	147,496.62
FY19	2.063	20,219.81
FY20	1.087	8,581.78
Total	**36.07**	**409,291.79**

ANNEX 3. PROJECT COST BY COMPONENT

Components	Amount at Approval (US$, millions)	Actual at Project Closing (US$, millions)	Percentage of Approval
1. Promoting the Development of Low-Carbon, Adaptive and Livable Urban Forms	8.76	8.7	99
2. Improving Energy Efficiency in Public and Commercial Buildings[18]	18.53	60.67	327
3. Scaling up Commercially Viable Rooftop Solar PV Deployment[19]	2	3.3	165
4. Project Management	1.5	0.89	59.3
Total	**30.79**	**73.56**	**238.91**

[18] The activity changed from building renovation to a solid waste treatment facility construction, which resulted in a significant cost increase. For details please refer to paragraph 33 (d).
[19] The function of Beijing Renewable Energy Online Monitoring System has expanded after project approval (from monitoring solar PV only to renewable energy as a whole); therefore, project cost has increased accordingly. The increased part of the cost was covered by the Beijing Municipal Government. For details please refer to paragraph 73.

ANNEX 4. EFFICIENCY ANALYSIS

The broad economic justification of the proposed project is based on incremental cost reasoning required by the GEF. At appraisal, an incremental cost analysis was carried out (PAD annex 6**).** The total lifetime avoided CO_2 emissions of the baseline project were estimated at about 20 million metric tons. The undiscounted unit cost per ton of avoided CO_2 was used to determine efficiency.

The proposed GEF activities are envisioned to complement and augment ongoing national and local government programs by focusing support on policy areas, technical aspects, and market segments where the impact will be large and crosscutting, the results will be highly replicable, and government commitment and private sector interest are strong.

Cost-benefit analysis of TA was completed in line with similar WBG projects where a specific method for calculating the discrete benefits of TA is not explicit in the PAD, specifically that it should be "judged by quality of analysis, conclusions, and recommendations."[20]

[20] ICR for PNG Energy Sector Development Project (P101578)

ANNEX 5. BORROWER, CO-FINANCIER, AND OTHER PARTNER/STAKEHOLDER COMMENTS

ICR was shared with counterparts, who did not have further comments to contribute.

ANNEX 6. SUPPORTING DOCUMENTS

The following are the supporting documents[21]:

- BHURDC CUSBEERE Implementation Completion and Results Report (Final Version)
- CUSBEERE MOHURD Implementation Completion Report (December 2019)
- CUSBEERE Project Completion Report BDRC (June 2020)
- CUSBEERE Recipient's Implementation Completion Report Ningbo (December 2019)
- Beijing Solar PV Power Generation Scale Project General Evaluation Report
- Task 1–7 Reports on Two-Way Metering

[21] All supporting documents were filed into World Bank's filing system (WBDocs).

ANNEX 7: ACCOUNTING OF INDIRECT CO_2 EMISSIONS

According to the estimates at appraisal reflected in annex 6 of the PAD, the additional global environment benefit leveraged by the project was about 15 $MtCO_2$ (GEF project 35 $MtCO_2$ of emission reduction versus baseline 20 $MtCO_2$ emission reductions). While the M&E of the project could not monitor such indirect impact precisely, it was discussed during the ICR workshop (see the agenda for this workshop in annex 5). One of the PMOs, the NHURDC, provided an estimate of the indirect emissions reduction that resulted from the activities it implemented, which amounted to 1.1 $MtCO_2$. A similar approach to PAD annex 6 was used to revise the estimate at appraisal stage, using ex post 12th FYP data. As detailed in tables 4.1 and 4.2, emissions reductions achieved through energy efficiency in buildings and additional PV solar rooftop during the 12th FYP period amounted to 312.2 $MtCO_2$.

Table 4.1. Installed PV Rooftop Capacity

	PAD Assumptions for the 12th FYP	Estimates Real Achievements under the 12th FYP	Estimates Real Achievements 2016–2019
Installed rooftop capacity	1 GW	3.848 GW	42.112 GW
Number of hours of insulation per day	11 hours per day	11 hours per day	11 hours per day
Total energy generated per day	11 GWh per day	42.328 GWh per day	463.232 GWh per day
Total energy generated per year	4,015 GWh per year	15,449.72 GWh per year	169,079.68 GWh per year
Lifetime of PV rooftops	20 years	20 years	20 years
Totally energy generated over lifetime	80,300 GWh	308,994.4 GWh	3,381,593.6 GWh
GHG reduction per MWh (national grid average emission factor)	1.003 tCO_2 per MWh	0.8275 tCO_2 per MWh	0.8275 tCO_2 per MWh
	1003 tCO_2 per GWh	827.5 tCO_2 per GWh	827.5 tCO_2 per GWh
Total GHG reduction over installed PV rooftop lifetime	80,540,900 tCO_2	255,692,866 tCO_2	2,798,268,704 tCO_2
	80.54 $MtCO_2$	255.69 $MtCO_2$	2,798.27 $MtCO_2$

Table 4.2. Energy Efficiency in Retrofit of 1996–2006 Buildings

	PAD Assumptions for 12th FYP	Estimates Real Achievements under the 12th FYP	Estimates Real Achievements 2016–2019
Potential savings per square meter	9 kge per m^2 per year	8 kge per m^2 per year	7 kge per m^2 per year
Emission factor coal combustion	2.77 tCO_2 per tce	2.77 tCO_2 per tce	2.77 tCO_2 per tce
Potential annual GHG reduction per square meter	0.02493 tCO_2 per m^2 per year	0.02216 tCO_2 per m^2 per year	0.01939 tCO_2 per m^2 per year
Total 1996–2006 park area	3,400,000,000 m^2	3,400,000,000 m^2	3,400,000,000 m^2
Hypothesis retrofit during the 12th FYP	1% (34,000,000 m^2)	5% (170,000,000 m^2)	4% (130,000,000 m^2)
Potential annual GHG reductions	847,620 tCO_2 per m^2 per year	3,767,200 tCO_2 per m^2 per year	2,520,700 tCO_2 per m^2 per year

	PAD Assumptions for 12th FYP	Estimates Real Achievements under the 12th FYP	Estimates Real Achievements 2016–2019
EE measure lifetime	15 years	15 years	15 years
Total GHG reductions resulting from retrofit during the 12th FYP over 15 years EE lifetime	12,714,300 tCO_2	56,508,000 tCO_2	37,810,500 tCO_2
	12.71 $MtCO_2$	56.51 $MtCO_2$	37.81 $MtCO_2$

ANNEX 8: ICR TRAINING AND PREPARATION WORKSHOP AGENDA

Ningbo: October 14–15, 2019

Start Time	First Day
8:30 a.m.	Registration
9:00 a.m.	Welcome addresses
	First session: Presentation of most important activities and outcomes Detailed presentations on 2–3 most important activities for each PMO
9:10 a.m.	MOHURD PMO: 2–3 presentations of most important activities and outcomes
9:55 a.m.	NINGBO PMO: 2–3 presentations of most important activities and outcomes
10:40 a.m.	**Coffee break**
10:50 a.m.	BHURDC PMO: 2–3 presentations of most important activities and outcomes
11:35 a.m.	BDRC PMO: 2–3 presentations of most important activities and outcomes
12:20 p.m.	**End of session**
	Lunch
	Second session: Direct and indirect contributions of PMOs to all Indicators of the CUSBEERE PAD for preparation of the ICR
1:30 p.m.	MOHURD PMO: Contribution of activities to indicators, including indirect contribution to PAD indicators not monitored by MOHURD; concrete impacts in terms of national policies, standards, and other concrete measures related to the PAD indicators; and other impacts of the project not captured by the PAD indicators framework
1:50 p.m.	NINGBO PMO: Contribution of activities to PAD indicators, including indirect contribution to PAD indicators not monitored by NINGBO PMO; concrete impacts in terms of national policies, standards, and other concrete measures related to the PAD indicators; and other impacts of the project not captured by the PAD indicators framework
2:10 p.m.	BHURDC PMO: Contribution of activities to PAD indicators, including indirect contribution to PAD indicators not monitored by BHURDC PMO; concrete impacts in terms of national policies, standards, and other concrete measures related to the PAD indicators; and other impacts of the project not captured by the PAD indicators framework
2:30 p.m.	BDRC PMO: Contribution of activities to PAD indicators, including indirect contribution to PAD indicators not monitored by BDRC PMO; concrete impacts in terms of national policies, standards, and other concrete measures related to the PAD indicators; and other impacts of the project not captured by the PAD indicators framework
2:50 p.m.	General discussion and synthesis of recommendations for finalizing the PMO ICR regarding PAD indicators framework
3:10 p.m.	**End of session**
After 3:30 p.m.	**Field visit Ningbo**

Start Time	Second Day
8:30 a.m.	**Third session: Greenhouse gas reduction estimates for ICR**
8:30 a.m.	MOHURD PMO: Estimates of direct and indirect emissions, by the end of the project and in the future (lifetime of equipment or 10 years after project end)
8:55 a.m.	NINGBO PMO: Estimates of direct and indirect emissions, by the end of the project and in the future (lifetime of equipment or 10 years after project end)
9:20 a.m.	BHURDC PMO: Estimates of direct and indirect emissions, by the end of the project and in the future (lifetime of equipment or 10 years after project end)
9:45 a.m.	BDRC PMO: Estimates of direct and indirect emissions, by the end of the project and in the future (lifetime of equipment or 10 years after project end)
10:10 a.m.	Consolidation of GHG reduction estimates for the CUSBEERE Project as a whole Synthesis of recommendations for finalizing GHG reductions estimates in PMO ICRs
10:40 a.m.	**Coffee break**
	Fourth session: Economic Analysis for ICR
10:50 a.m.	MOHURD PMO: Estimates of costs and benefits and internal rate of return (IRR) of PMOs activities by the end of the project and in the future (lifetime of equipment or 10 years after project end)
11:10 a.m.	NINGBO PMO: Estimates of costs and benefits and IRR of PMOs activities by the end of the project and in the future (lifetime of equipment or 10 years after project
11:30 a.m.	BHURDC PMO: Estimates of costs and benefits and IRR of PMOs activities by the end of the project and in the future (lifetime of equipment or 10 years after project
11:50 a.m.	BDRC PMO: Estimates of costs and benefits and IRR of PMOs activities by the end of the project and in the future (lifetime of equipment or 10 years after project
12:10 p.m.	Consolidation of estimates of costs and benefits for the CUSBEERE Project as a whole Synthesis of recommendations for finalizing economic analysis in PMO ICRs
12:00 p.m.	**End of session**
	Lunch
	Fifth session: Lessons learned for the ICR
1:30 p.m.	MOHURD PMO: Reasons of success for successful and impactful activities; difficulties encountered and solutions adopted to overcome difficulties; and recommendations for future similar projects to ensure success of activities and maximize concrete impacts
1:50 p.m.	NINGBO PMO: Reasons of success for successful and impactful activities; difficulties encountered and solutions adopted to overcome difficulties; and recommendations for future similar projects to ensure success of activities and maximize concrete impacts
2:10 p.m.	BHURDC PMO: Reasons of success for successful and impactful activities; difficulties encountered and solutions adopted to overcome difficulties; and recommendations for future similar projects to ensure success of activities and maximize concrete impacts
2:30 p.m.	BDRC PMO: Reasons of success for successful and impactful activities; difficulties encountered and solutions adopted to overcome difficulties; and recommendations

Start Time	Second Day
	for future similar projects to ensure success of activities and maximize concrete impacts
2:50 p.m.	General discussion on lessons of the CUSBEERE Project as a whole and synthesis of recommendations for finalizing PMO ICR regarding lessons learned
	Final session: Other topics related to finalization of PMO ICR and elaboration of World Bank ICR
3:20 p.m.	Open discussion for PMOs to raise other topics
3:50 p.m.	Final considerations and closure
4:00 p.m.	**End of workshop**