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Project Information Document/ Integrated Safeguards Data Sheet (PID/ISDS)

Concept Stage | Date Prepared/Updated: 18-May-2017 | Report No: PIDISDSC20805

BASIC INFORMATION

A. Basic Project Data

Country	Project ID	Parent Project ID (if any)	Project Name
China	P162299		China Distributed Renewable Energy Scale Up Project (P162299)
Region	**Estimated Appraisal Date**	**Estimated Board Date**	**Practice Area (Lead)**
EAST ASIA AND PACIFIC	Sep 07, 2017	Nov 30, 2017	Energy & Extractives
Financing Instrument	**Borrower(s)**	**Implementing Agency**	**GEF Focal Area**
Investment Project Financing	People's Republic of China	National Energy Administration	Climate change

Proposed Development Objective(s)

This project aims to support the scale-up of distributed renewable energy in China, thereby reducing greenhouse gas emissions.

Financing (in USD Million)

Financing Source	Amount
Global Environment Facility (GEF)	7.28
Total Project Cost	**7.28**

Environmental Assessment Category	Concept Review Decision
C-Not Required	Track I-The review did authorize the preparation to continue

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Other Decision (as needed)

B. Introduction and Context

Country Context

1. During the period 2005-2015, China's total primary energy consumption increased by 68 percent, putting China as the largest energy consumer in the world by a wide margin. King coal continues to dominate the energy mix in China, accounting for 64 percent of primary energy consumption in 2015. However, coal consumption in China has dropped for three years in a row since 2014, and non-fossil fuel energy (renewable energy and nuclear) accounts for more than half of the newly added power capacity for the first time since 2013. Looking forward, China's energy sector is facing twin challenges-environmental sustainability and energy security. China has many of the world's most polluted cities, and is the largest emitter of greenhouse gases (GHGs) in the world. China is also facing growing energy security concerns because of the increasing dependence on oil and gas imports.

Sectoral and Institutional Context

2. **Government's commitment to renewable energy development**: Concerned with the adverse health and environmental consequences associated with coal combustion, energy security risks, and resource scarcity challenges, the Government of China (GoC) is making continued efforts to increase renewable energy (RE) contribution to meet its energy needs. The GoC set an ambitious target to increase the share of non-fossil fuel (RE and nuclear) in primary energy supply from 13.3 percent in 2016 to 15 percent by 2020 and 20 percent by 2030. As part of the Nationally Determined Commitment (NDC) under the Paris Agreement, the GoC is committed to reducing carbon intensity (carbon emissions per unit of GDP) by 40–45 percent from 2005 to 2020 and by 60–65 percent from 2005 to 2030, and has announced that it expects China's carbon emissions to peak by 2030. Renewable energy is expected to contribute significantly to these carbon targets.

3. **RE achievements during the 11th and 12th Five-Year Plan:** The 2005 Renewable Energy Law, one of the first in the developing world, set a solid foundation for developing RE to meet increasing demand for electricity. The GoC adopted feed-in tariffs for wind, solar PV, and biomass power, and compensates RE generators for the incremental costs between RE and fossil fuels from surcharges on power tariff for all consumers. As a result, RE has experienced an unprecedented growth over the past decade during the 11th Five Year Plan (FYP, 2006-10) and the 12th FYP (2011-15) periods. China has currently the world's largest renewable energy capacity, with the wind and solar PV installed capacity of 130 GW and 43 GW respectively at the end of 2015, both ranking No. 1 in the world. Finally, China now has more than half of the global solar water heaters, and the world's leading solar and wind manufacturers.

4. **RE Priorities for the 13th Five-Year Plan and the importance of distributed RE**: China's 13th FYP for 2016-2020 has even more ambitious targets for renewable energy, including reaching 210 GW of wind and 110 GW of solar PV by 2020. Of the solar PV target, 60 GW would be distributed solar PV by 2020, a big jump from only 3 GW by the end of 2015. Currently, about 15-20 percent of wind power is curtailed without integration to the grids. Energy demands in the urban areas will continue to grow fast due to the rapid urbanization. The Chinese government puts distributed renewable energy close to the load centers as a high priority for the 13th FYP, partly to address the curtailment bottleneck of large-scale grid-connected RE far from the load centers, and partly to meet the growing urban energy needs. In a consultation meeting on the 13th FYP energy development planning in November 2016, Premier Li emphasized the need for policy and institutional

arrangements that will scale up and accelerate distributed energy development, especially in terms of pricing and grid access and connection, as well as the need for smart technology integration that combines distributed renewable energy with smart-grid technologies. China's 13th FYP also emphasizes these technology-integration, targeting distributed energy for combined heat-and-power applications, as well as flexible-grid controls, flexible distributed storage, electric vehicle (EV) charging, and pilots that promote multiple-technology combinations and optimization at the distribution level.

5. **Power Sector Reform**: President Xi called for an "energy revolution" that encompasses radical changes in energy consumption, energy supply, institutions, and technology, as well as strengthening international cooperation. The GoC laid out key principles for power sector reform that "the market should play a decisive role" and "energy should be commodities". Under this context, the issuance by the State Council Decree No 9 in 2015 is a clear sign that the GoC intends to revive the power sector reform. Decree No. 9 specified to introduce competition at the generation and retail sides, "gradually" phase out coal power generation quota, allow direct contracting between generators and large users, and develop transmission and distribution (T&D) pricing. Power market restructuring decisions and market design and rules can have significant impacts on RE development and operation. International experience demonstrates that the design of the power sector reform needs to consider integration of variable RE into the power system and market.

6. **Barriers to distributed renewable energy**: By the end of 2015, distributed solar PV is only 3 GW of capacity, short of its 12th FYP target of 8 GW, and only a fraction of the 43 GW of total solar PV capacity. A variety of policy, institutional, and financing barriers, as shown below, have been attributed to the limited distributed RE:

- ***Limited conducive policies for distributed RE***: To date, RE policy development has mostly focused on tariffs and subsidies for distributed solar PV, which enjoys a fixed subsidy premium of 0.42 Yuan/kWh (or 6.3 cent/kWh) on top of end-user tariff when self-use and on top of on-grid coal power wholesale price when exporting excess power to the grids. While the feed-in tariffs have led to the scale-up of large-scale and centralized renewables development, it has not been sufficient for the distributed renewable energy segment of the market. The government has begun to address a number of relevant policies such as grid access, wheeling charges, and technical standards for distributed RE and micro-grids. But the level of policy development and implementation is still far from what is needed, and further policies for distributed RE under the context of power sector reform are also required. There continues to be a lack of national, provincial, and even local enabling policies for distributed electricity generators, including grid access under direct contracting between generators and users, wheeling charges at distribution level, who will pay for the distribution grid upgrade to accommodate high penetration of distributed RE, micro-grids pricing when exporting excess power to the grids, building safety standards, and incorporation of distributed RE into urban planning.

- ***Limited scalable business models and difficulties in access to rooftop space***: There are limited viable and scalable business, institutional, and ownership models for distributed renewable energy. Most distributed energy development has occurred using just a few standard models where the third party developers own, install, and maintain solar PV on roof-tops of the buildings in industrial parks, or a cluster of buildings with the same ownership. The single most difficult challenge is that the developers have trouble to secure roof-top spaces from the building owners. The developers need to obtain consent and willingness from multiple owners in most commercial buildings, who are not interested in roof-top

solar PV, since energy costs are a small share of operating costs and tenants typically pay for the energy bills anyway. Decision makers in government buildings are concerned about potential safety issues of roof-top solar PV. Chinese cities have mostly skyscrapers, where solar PV on the roof and even the side of the building can only meet a small fraction of the building energy needs, in contract to single houses or low-level warehouses with large roof-top spaces in developed countries. There are also other barriers related to technology application that hinder certain business models, for example, short time-scale of rooftop leasing, ownership or access consent, relative to typical solar PV project lifetime. However, there are many more potential business models and RE technologies, including innovations in ownership, stakeholders, service types, and power consumers, such as ground-mount distributed RE and micro-grids, which if proven and adopted could greatly accelerate distributed renewables.

- ***A lack of access to financing***: Most RE DG developers are local small and medium sized enterprises (SMEs). SMEs face unique barriers in access to financing regardless of the sector, because of their inherent low creditworthiness resulting from limited collateral. Most local banks usually rely on balance sheet financing, which requires that borrowers either have good credit ratings or high levels of collateral, which, in turn, favors large-scale borrowers. The end result is that the customers most in need of financing are typically not creditworthy. There is a lack of proven and scalable financing models that could demonstrate viability and instill confidence in a much larger cohort of project developers, banks, landholders, energy services businesses, consumers, and a broad array of other stakeholders. To date, a very limited and narrow set of financing models have been used in developing distributed energy projects in China. These existing models are either limited in scale-up potential, or require only specific types of actors and stakeholders, precluding other models with a wider range of stakeholder opportunities and scale-up potentials.

7. **Complementarity with the China Renewable Energy Scale-Up Project**: This project complements the China Renewable Energy Scale-Up (CRESP) Phase II project under implementation. The CRESP is a long-term strategic partnership between the GoC and the World Bank/GEF. The First Phase of the CRESP Program has made significant contributions to the scale-up of RE in China and played an essential role in the rapid growth and quality improvement of the domestic wind manufacturing industry during the 11th Five-Year Plan. CRESP Phase II aims to support the ambitious renewable energy scale-up program in China with a focus on efficiency improvement and reduction of incremental costs. The CRESP Phase II project has played an important role in the development of the RE 13th FYP; and focuses its support on RE grid integration through policies and technical solutions and pilots, efficiency improvement for existing wind and solar PV farms, and technology improvement for off-shore wind and concentrated solar power. This proposed project differs in several respects from CRESP Phase II. CRESP Phase II is mostly focused on the energy-supply-side – generation from large-scale grid-connected renewable generators, whereas this proposed project is focused on energy consumption on the demand side – how distributed generation from renewables can provide energy services to end-users in urban areas, and how distributed generation can be configured and implemented consistent with the new priorities of the 13th FYP, including integration with other technologies like storage, demand flexibility, smart inverters, and energy management technologies. This proposed project can also build on the recent power sector reform, including potential new opportunities for direct contracting between generators and end users with a wheeling charge and micro-grids from distributed generation.

Relationship to CPF

8. The proposed project is fully consistent with the Country Partnership Strategy (CPS) FY2013–2016 for China priority of "supporting greener growth, in particular, shifting to a sustainable energy path". The Project also contributes to China's efforts to expand use of renewable energy and address climate change during the 13th FYP. It is consistent with the NDC by the Government of China. In addition, the proposed project would support the World Bank Group's corporate commitment to increasing renewable energy lending, and addressing climate change. The proposed project will also contribute to the Bank's twin goals of energy poverty alleviation and shared prosperity, and is consistent with the Bank's energy strategy.

C. Proposed Development Objective(s)

Note to Task Teams: The PDO has been pre-populated from the datasheet for the first time for your convenience. Please keep it up to date whenever it is changed in the datasheet.

9. This project aims to support the scale-up of distributed renewable energy in China, thereby reducing greenhouse gas emissions.

Key Results (From PCN)

10. This project intends to contribute to the government's ambitious distributed RE targets for the 13th FYP. The project development objective (PDO) level indicators are:

- Capacity of distributed RE and micro-grids in pilots
- GHG emissions reductions

11. The project-level intermediate output indicators are:

- Distributed RE pricing and wheeling charge policies adopted
- Number of cities/townships developed distributed RE targets and plans
- Innovative and viable business strategies identified and piloted
- Innovative financing mechanisms designed and piloted
- Amount of investments in distributed RE for the pilots

D. Concept Description

12. This project addresses the removal of the key barriers that are hindering the development of distributed renewable energy as a key pillar of China's 13th FYP and long-term energy and climate strategies.

13. Distributed renewable energy can be developed at several different implementation levels: at the building level, at a micro-grid level, and at the level of districts or zones (see Table 1). Building-level distributed renewables have been the most common, especially for rooftop solar PV. Some building-level projects in China involve clusters of buildings that may be common to a single owner or investor but geographically spread over multiple cities. Distributed renewables at the micro-grid level, potentially including heating networks, energy storage, and demand management, has become a priority for China as well. Micro-grids can be placed within urban areas, and within industrial-park settings. Districts or zones within an urban

setting can include, for example, multiple micro-grids and/or multiple buildings developed under the auspices of a district/zone plan by the district and city government, or an integrated investment strategy.

14. At each of these three levels, an array of technology characteristics and combinations are possible, and a number of policy requirements, business models, and financing mechanisms may be necessary or desirable to overcome barriers. The project calls each specific combination a "use case." Each use case describes a specific implementation level, a specific set of technology characteristics, a specific set of policy requirements, a specific business model, and a specific financing mechanism. And each use case will bring with it a unique set of relevant stakeholders that must be involved.

15. The project will develop a "proof of concept" for a number of specific use cases that are identified as having the greatest potential to be profitable and replicable approaches to distributed renewable energy in China. This collection of use cases will then be piloted, using private or public funds for actual investments, and GEF funds for business model development, capacity building, and technical assistance. Finally, the "proofs of concept" and the pilot results will be used to replicate investments in distributed renewable energy within the targeted cities. Ultimate replication will occur from targeted cities to other cities, although that is beyond the scope of this project.

16. Technology characteristics include whether the distributed energy system is only for electricity or only for heat or both; whether it includes energy storage; whether it contains rooftop solar PV or ground-mount PV or other non-rooftop structures; whether it includes flexible demand (demand response) as an element, whether it employs distributed solar, wind, geothermal or biomass, alone or in combination with other renewable sources, etc.

17. It is anticipated that the use-cases selected for project pilots should include technology characteristics that show great potential. For example, much attention has been put into roof-top solar PV in recent years, but due to the rooftop-limitation barriers discussed in the previous sub-section, other forms of distributed solar PV should be piloted, such as solar PV on ancillary landscaping, parking and roadway structures, and dedicated land areas near to buildings. As a second example, micro-grids that include both electricity and heat in hybrid systems have become a priority for the Chinese government, especially including geothermal heating sources or heat storage, according to the National Energy Administration (NEA), so use-cases under the project should target these technology characteristics.

18. These pilots will of necessity involve new types of stakeholders, possibly new policy requirements, and new business models. But if successful, such pilots have the potential to break the "log-jam" of viable use-cases that is so far stifling the development of distributed renewable energy in China.

Table 1: Typology of "Proof of Concept"

Implementation Level	Technology Characteristics (forms of renewable energy, electricity vs. heat, rooftop vs. non-rooftop, storage,	Policy Requirements (national, provincial, local, pricing, interconnection, grid access, codes,	Business Models (including revenue model, tariffs, services, ownership, customers, operator, and	Financing Models (i.e., government funds, banks, leasing companies, etc.)

	etc.)	standards, etc.)	control schemes)	
1. Building-Level (one building or clusters of individual and independent buildings, may include energy management and heating)				
2. Micro-grid Level (integrated energy system serving multiple buildings and consumers with one connection to grid; may also including heating)				
3. Urban Zone or District Level (including zones with multiple micro-grids and building-level distributed generators with multiple connections to grid)				

19. The project will consist of two components:

20. **Component 1 Supporting Policies** (indicative cost estimate: US$3 million GEF grant). This project will support developing and implementing distributed RE policies, with a focus on pricing, grid access and connection, standards, and urban planning. The policy studies will be jointly determined by NEA, Project Management Office (PMO), and the World Bank, involving policy institutions and world class consultants.

21. The policy support will focus on the following areas: (a) access to the grids under direct contracting between the generators and end users; (b) wheeling charges at the distribution level; (c) who will pay for the grid upgrade to accommodate high penetration of distributed RE; (d) tariff for distributed RE and micro-grids when exporting excess power to the grids, particularly under the power sector reform context, for example, net metering policies, the impacts of reducing cross-subsidies to industrial users on distributed RE tariffs, etc.; (e) building codes for utilizing rooftop infrastructure for distributed solar PV; (f) incorporating distributed RE in urban planning at the city and township levels; and (g) monitoring and evaluation distributed RE and New Energy City. This component will also look into the value of distributed renewable energy. For example,

international experience to accelerate distributed RE adopts pricing schemes to capture the full value of distributed renewable energy, including peak demand charges for consumers with distributed generation; avoided transmission and distribution charges; integration capacity (ability of a distribution system to absorb distributed renewables); and locational value (which shows the true economic value of avoided future investments in the distribution system at different locations).

22. **Component 2 Piloting scalable business and financing models and applications in selected cities** (indicative cost estimate: US$5.046 million GEF grant). The pilot cities and districts/industrial parks will be selected according to developed criteria, for example, as government's commitment, having the greatest chance of being able to enact the appropriate local policies, being able to scale-up the pilots beyond the project scope, and different climate zones for heating applications. This component will support the selected pilot cities and district/industrial parks to (a) develop local policies and/or pilot policies developed under Component #1; (b) pilot the scalable proof of concept and use-cases that can be accelerated through project activities. These use cases will then be selected and proof-of-concepts developed, including technology characteristics selection, identifying and involving necessary and appropriate stakeholders, identifying and elaborating business models, and identifying and developing financing models. Then this component will support the design and implementation of the proof-of-concepts pilots. An RFP to be competitively-bid will be developed separately for each unique pilot. Project developers will be identified, solicited and selected to implement the pilots. Financing sources, both public and private, will be identified, solicited, and confirmed on the basis of the financing model and business model for the proof of concept. Each proof of concept will include conditions and recommendations for replication elsewhere; (c) establish municipal distributed RE funds or financing schemes; (d) build capacity; (e) provide technical assistance, advisory services, stakeholder analysis and coordination; and (g) monitoring, evaluation, and dissemination.

23. The proposed project is a stand-alone GEF project. The Project is part of the government's broader investment program aimed at meeting its 13th Five-Year Plan distributed renewable energy targets. The Project cost is US$8.046 million, to be financed out of the GEF grant, plus a US$804,000 agency fee. Also, US$80 million from the national and local governments, renewable energy developers, and investors will be provided towards the pilot activities.

24. **Safeguard:** The proposed project primarily consists of policy studies, technical assistance, and capacity building related to distributed RE development. These activities are environmentally friendly measures and have little or no adverse environmental impacts. The project does not include any physical construction or installation of RE facilities, and there is no land acquisition, resettlement, physical cultural resources or indigenous people involved in the project, thereby, there is no social safeguards policy triggered. Therefore, the project is classified as Category C according to OP4.01.

25. Gender: The project will benefit women and men equally. During consultation and assessment with beneficiaries, surveys and interviews will be designed with gender sensitivity to ensure that women are given equal opportunities

2. Overall Risk and Explanation

26. The various risks related to the proposed project were preliminarily assessed through the Systematic Operations Risk-Rating Tool (SORT). The overall project risk is rated as substantial. In particular, the risks of

sector strategy and policies and stakeholders are identified as "Substantial", while the technical design of the project is assessed as "Moderate". Key risks and pertinent mitigation actions to achieving the results are described below.

27. ***Sector strategy and policy risk is substantial.*** Necessary policies will not be adopted widely or timely enough to affect project pilots and scale-up. This includes resistance by vested interests to the broader power sector reform agenda, as well as the complexity of price reform and policies for grid access and transparent dispatch protocols. The issuance of State Council Decree No. 9 is a clear sign that the GoC is fully committed to power sector reform, which is under way. This project will build on the ongoing engagement and dialogues the Bank team has with NEA and NDRC on power sector and pricing reform. The project will select proof of concepts that are more resilient and viable even without the more stringent policy reform, for example, micro-grid use cases that can be profitable in most circumstances independently of grid access – use cases that will only become stronger once such reforms are undertaken.

28. ***Stakeholder risk is substantial.*** Distributed renewable energy development is not solely an "energy sector" issue, and thus cannot be fully controlled by the NEA as project Implementing Agency. Rather, a wide range of stakeholders, many not in the energy sector, must be involved and closely coordinated, and willing to participate in project activities. This includes local city/zone administrations, construction and transport authorities (i.e., rooftop and non-rooftop spaces), and industrial authorities (i.e., in the case of micro-grids for industrial parks or clusters), etc. To mitigate this risk, the project will coordinate with other relevant authorities and sectors through a number of explicitly designed mechanisms, including a multi-stakeholder project steering committee and formal consultations at specific project intervals.

29. ***Technical design of the project risk is moderate***. The project proposes to pilot innovative "proof-of-concept" and technology characteristics that go beyond the traditional roof-top model in China, to include non-rooftop applications of distributed RE, as well as new micro-grid configurations. The viability of innovative business models and applications have been demonstrated in other countries. The project will also provide intensive capacity building and technical assistance to support the pilots.

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SAFEGUARDS

A. Project location and salient physical characteristics relevant to the safeguard analysis (if known)

The policy research studies are general studies for application throughout China. Selected cities for business model piloting will be determined during project implementation, based upon results of various research studies.

B. Borrower's Institutional Capacity for Safeguard Policies

The project will be implemented by the Renewable Energy Department of National Energy Agency, which is in charge of renewable energy policy in China. The PMO under the NEA has been implementing the previous Bank-funded CRESP

Project Phases II since 2013, so is very familiar with the Bank's procurement, financial management, environment and social safeguards, and project management procedures and requirements.

C. Environmental and Social Safeguards Specialists on the Team

D. Policies that might apply

Safeguard Policies	Triggered?	Explanation (Optional)
Environmental Assessment OP/BP 4.01	Yes	This proposed project is a stand-alone GEF project. It primarily consists of policy studies, technical assistance, and capacity building related to distributed RE development. These activities are environmentally friendly measures and little or no adverse environmental impacts are envisaged. The project does not include any physical construction or installation of RE facilities, and there is no land acquisition, resettlement, physical cultural resources or indigenous people involved in the project. Therefore, the project is classified as Category C according to OP4.01.
Natural Habitats OP/BP 4.04	No	The project will not involve physical construction of RE facilities, and no natural habitats are envisaged to be involved.
Forests OP/BP 4.36	No	This project will not involve forest land or forestry activity.
Pest Management OP 4.09	No	This project will not involve any activity related to pest management.
Physical Cultural Resources OP/BP 4.11	No	The project is primarily a technical assistance activity and will not involve physical construction of RE facilities, and no physical cultural resources are envisaged to be involved.
Indigenous Peoples OP/BP 4.10	No	The project is primarily a technical assistance activity for RE. It will not involve any specific physical investment activities with specific locations, and no ethnic minority communities will be affected. The policy of indigenous people (OP4.10) will be triggered for the project.
Involuntary Resettlement OP/BP 4.12	No	The project is primarily a technical assistance activity and will not involve physical construction of RE facilities. As a result, no land acquisition or resettlement will be involved for the project.
Safety of Dams OP/BP 4.37	No	The project will not involve any dam construction or existing dam.

Projects on International Waterways OP/BP 7.50	No	The project will not involve any international waterways.
Projects in Disputed Areas OP/BP 7.60	No	The project will not involve any disputed areas.

E. Safeguard Preparation Plan

Tentative target date for preparing the Appraisal Stage PID/ISDS

Sep 07, 2017

Time frame for launching and completing the safeguard-related studies that may be needed. The specific studies and their timing should be specified in the Appraisal Stage PID/ISDS

During the project implementation stage, environmental and social considerations will be included in the terms of reference (TOR) and scope of work of the project-supported technical assistance activities to ensure that potential environmental and social impacts are duly considered in the project activities.

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