Meeting of the Board
30 September –2 October 2017
Cairo, Arab Republic of Egypt
Provisional agenda item 14(g)

GCF/B.18/04/Add.01

11 September 2017

Consideration of funding proposals – Addendum I

Funding proposal package for FP046

Summary

This addendum contains the following three parts:

a) A funding proposal summary titled "Renewable Energy Program #1 - Solar" submitted by XacBank LLC;
b) No-objection letter issued by the national designated authority(ies) or focal point(s); and
c) Environmental and social report(s) disclosure;

These documents are presented as submitted by the accredited entity and the national designated authority(ies) or focal point(s), respectively. Pursuant to the Comprehensive Information Disclosure Policy of the Fund, the funding proposal titled "Renewable Energy Program #1 - Solar" submitted by XacBank LLC is being circulated on a limited distribution basis only to Board Members and Alternate Board Members to ensure confidentiality of certain proprietary, legally privileged or commercially sensitive information of the entity.

Table of Contents

Funding proposal summary submitted by the accredited entity 1

No-objection letter issued by the national designated authorities or focal points 73

Environmental and social report(s) disclosure 74

GREEN CLIMATE FUND

Funding Proposal

Version 1.1

The Green Climate Fund (GCF) is seeking high-quality funding proposals.

Accredited entities are expected to develop their funding proposals, in close consultation with the relevant national designated authority, with due consideration of the GCF's Investment Framework and Results Management Framework. The funding proposals should demonstrate how the proposed projects or programmes will perform against the investment criteria and achieve part or all of the strategic impact results.

Project/Programme Title:	Renewable Energy Program #1 - Solar
Country/Region:	Mongolia
Accredited Entity:	XacBank LLC
Date of Submission:	March 15th, 2017

Contents

Section A	**PROJECT / PROGRAMME SUMMARY**
Section B	**FINANCING / COST INFORMATION**
Section C	**DETAILED PROJECT / PROGRAMME DESCRIPTION**
Section D	**RATIONALE FOR GCF INVOLVEMENT**
Section E	**EXPECTED PERFORMANCE AGAINST INVESTMENT CRITERIA**
Section F	**APPRAISAL SUMMARY**
Section G	**RISK ASSESSMENT AND MANAGEMENT**
Section H	**RESULTS MONITORING AND REPORTING**
Section I	**ANNEXES**

Note to accredited entities on the use of the funding proposal template
• Sections **A, B, D, E** and **H** of the funding proposal require detailed inputs from the accredited entity. For all other sections, including the Appraisal Summary in section F, accredited entities have discretion in how they wish to present the information. Accredited entities can either directly incorporate information into this proposal, or provide summary information in the proposal with cross-reference to other project documents such as project appraisal document. • The total number of pages for the funding proposal (excluding annexes) is expected not to exceed 50.

Please submit the completed form to:

fundingproposal@gcfund.org

Please use the following name convention for the file name:
"[FP]-[Agency Short Name]-[Date]-[Serial Number]"

Abbreviations

AE	Accredited Entity
ASG	Asia Super Grid
AuES	Altai-Uliastai Energy System
BOM	Bank of Mongolia
CAGR	Compound Annual Growth Rate
CAPEX	Capital Expenditure
CBD	Corporate Banking Department
CES	Central Energy System
CHP	Combined Heat and Power
CRMP	Credit Risk Management Policy
CSO	Civil Society Organization
CSP	Concentrated Solar Power
CVI	Climate Vulnerability Index
DES	Dalanzadgad Energy System
DSCR	Debt Service Cost Ratio
DD	Due Diligence
EBD	Eco Banking Department
EBRD	European Bank for Reconstruction and Development
EE	Energy Efficiency
EES	Eastern Energy System
EPC	Engineering, Procurement, Construction
ERC	Energy Regulatory Committee
ESIA	Environmental and Social Impact Assessment
ESM	Environmental and Social Management
ESMS	Environmental and Social Management System
FDI	Foreign Direct Investment
FiT	Feed-in-Tariff
FMO	The Netherlands Development Finance Company
FX	Foreign Exchange
GAP	Gender Action Plan
GHG	Green House Gas
GL	General Ledger
GoM	Government of Mongolia
HPP	Hydropower plant
INDC	Intended Nationally Determined Contributions
IPCC	Intergovernmental Panel on Climate Change
IRENA	International Renewable Energy Agency
JCM	Joint Crediting Mechanism
JICA	Japan International Cooperation Agency

KEPCO	Korea Electric Power Corporation
LCOE	Levelised Cost of Electricity
LLC	Limited Liability Company
LULUCF	Land-use, Land-use change, and Forestry
M&E	Monitoring and Evaluation
MARCC	Mongolia's Second Assessment Report on Climate Change
MRV	Monitoring, Reporting and Verification
MSME	Micro, Small and Medium Enterprises
NAMA	Nationally Appropriate Mitigation Actions
NAPCC	National Action Program on Climate Change
NDA	National Designated Authority
NDC	National Dispatch Center
NOx	Nitrogen oxides
NPL	Non-Performing Loan
NREL	National Renewable Energy Laboratory
O&M	Operation and Maintenance
PM	Particulate Matter
PP	Power Plant
PPA	Power Purchase Agreement
PV	Photovoltaic
RE	Renewable Energy
REP	Renewable Energy Program
Sox	Sulphur oxides
SPP	Solar Power Plant
SREP	Scaling Up Renewable Energy Plan
STCM	Science and Technology Committee Meeting
TNA	Technology Need Assessment
UNEP	United Nations Environment Program
VAT	Value Added Tax
WES	Western Energy System

A.1. Brief Project / Programme Information			
A.1.1. Project / programme title		Renewable Energy Program #1 - Solar	
A.1.2. Project or programme		programme	
A.1.3. Country (ies) / region		**Mongolia, central region**	
A.1.4. National designated authority (ies)		**Batjargal Zamba, Ministry of Environment**	
A.1.5. Accredited entity		**XacBank LLC**	
A.1.5.a. Access modality		☒ Direct ☐ International	
A.1.6. Executing entity / beneficiary		Executing Entity: XacBank, project developer Beneficiary: Citizens of Mongolia;	
A.1.7. Project size category (Total investment, million USD)		☐ Micro (≤10) ☐ Medium (50<x≤250)	☒ Small (10<x≤50) ☐ Large (>250)
A.1.8. Mitigation / adaptation focus		☒ Mitigation ☐ Adaptation ☐ Cross-cutting	
A.1.9. Date of submission		July 21st, 2017	
A.1.10. Project contact details	Contact person, position	Tuul Galzagd	
	Organization	XacBank LLC	
	Email address	tuul.g@xacbank.mn	
	Telephone number	+976-7577-1888 ext. 701	
	Mailing address	XacBank HQ Bldg, Ulaanbaatar-14200, Post Branch 20A, PO Box-72, MONGOLIA	

A.1.11. Results areas *(mark all that apply)*

Reduced emissions from:

- ☒ Energy access and power generation
  (E.g. on-grid, micro-grid or off-grid solar, wind, geothermal, etc.)
- ☐ Low emission transport
  (E.g. high-speed rail, rapid bus system, etc.)
- ☐ Buildings, cities and industries and appliances
  (E.g. new and retrofitted energy-efficient buildings, energy-efficient equipment for companies and supply chain management, etc.)
- ☐ Forestry and land use
  (E.g. forest conservation and management, agroforestry, agricultural irrigation, water treatment and management, etc.)

Increased resilience of:

- ☐ Most vulnerable people and communities
  (E.g. mitigation of operational risk associated with climate change – diversification of supply sources and supply chain management, relocation of manufacturing facilities and warehouses, etc.)
- ☐ Health and well-being, and food and water security
  (E.g. climate-resilient crops, efficient irrigation systems, etc.)
- ☐ Infrastructure and built environment
  (E.g. sea walls, resilient road networks, etc.)
- ☐ Ecosystem and ecosystem services
  (E.g. ecosystem conservation and management, ecotourism, etc.)

A.2. Project / Programme Executive Summary (max 300 words)

This program includes the financing of a 10MW plant in Sumber soum of Govisumber province (southern Mongolia). As part of Mongolia's Intended Nationally Determined Contributions (INDC), the country aims to supply 20% of the country's energy through renewable energy by 2020, and 30% by 2030. Though Mongolia's historical contribution to the current level of GHG emissions is small, the annual per capita emission of GHG of 14.5 tons of CO2 (as of 2013) per Mongolian is relatively high compared to other countries, and is almost three times the world average (4.996 tons per capita as of 2013).

10 MW SPP: reduce greenhouse gas emissions by 12,270 tons annually; net electricity supply of 15,395 MWh of electricity annually. Project lifetime is 25 years.

For the project developer, a pre-assessment was conducted by the Corporate Banking Division (CBD). Currently, a full due diligence is being conducted by the CBD and the Risk Management Department (RMD).

The pre-assessment entails analysis of the feasibility studies, client projections, and project assumptions given by the project developers, with special attention paid to confirming the project assumptions to ensure accuracy of the project. A full DD includes a more in-depth analysis of the above factors, as well as further review of all related contracts and legal documents among others, to make sure that they are active and binding. Additionally, there are further in depth stress tests on the financial model.

A.3. Project/Programme Milestone	
Expected approval from accredited entity's Board (if applicable)	The Bank does not need its Board approval for this program. The projects will be submitted to the Bank's Credit Committee to be evaluated for approval.
Expected financial close (if applicable)	September, 2017
Estimated implementation start and end date	Start: Nov, 2017 End: Nov, 2027
Project/programme lifespan	10 years

B.1. Description of Financial Elements of the Project / Programme

The financial elements of the program can be seen from the table in Section B.2 below, however, the following is a simplified table outlining the elements:

in US$	SPP
SPP Project Cost	17,556,920
GCF Loan	8,650,050
GCF Grant	877,846
GCF Total	9,527,896
Total Financing Amount	18,434,766

A detailed explanation of the necessity for each component can be found in Section B.2 as well as throughout this document. Currently, market interest rates in Mongolia are prohibitively high and tenors are prohibitively short for investments in renewable energy. Mongolia's central bank's (Bank of Mongolia, BOM) policy rate is 14%, which leads to extremely attractive deposit savings rates (about 15-16% for local currency), which in turn leads to very expensive loan rates that also come with very short terms (maximum of 5 years, usually less than 3 years). BOM keeps its policy interest rate at 14% to further support macroeconomic external balance (i.e. balance of payments). Monetary policy stance is still extremely tight, having 11.5 percent positive real interest rate as of end-March 2017. Mongolia's government domestic bond rate is currently at 18%. Government of Mongolia's (GOM) MNT denominated bills' and bonds' yields have been on the declining trend, reaching 2012 coupon levels. The yields are defined based on primary dealers' (banks) auction results of government securities. According to approved budget for 2017, GOM plans to repurchase over 1 trillion MNT securities from domestic banks and restrict new issuances to maintain debt sustainability, reduce burden on government budget and avoid costly borrowings from domestic market.

BOM is fully committed to flexible exchange rate regime with occasional foreign exchange (FX) intervention if necessary. Intervention is limited by smoothing excessive market volatility and is still conducted by FX auctioning mechanism twice a week. There is no change in FX policy, auctioning or intervention mechanisms. FX official reserves stood at US$1048 million as of end February, covering 4 months of imports. Last year, overall balance of payments had US$-18 million deficit, however, this year's balance of payments is going to have surplus of over US $350 million, supported by increased capital inflows and soft loans under IMF package. This means that FX reserves are expected to increase to over $1.6 billion at the end of 2017. Between February to March 2017, BOM purchased around $200 million /net/ from domestic banks through auctioning whilst MNT/USD reference rate appreciated by over 80 MNT (3.2%). This is a clear signal that FX market has fully been stabilized and calmed down due to stabilization of market expectation and sentiment. BOM's long and short-term FX swap facilities with domestic banks are still available and effective to hedge or reduce FX-related risks in foreign funds. There is no dramatic change in regulation expected.

These conditions illustrate the shortcomings of financing options in Mongolia as well as a lack of access to adequate funds for not only large scale projects, but for the entire country itself. As XacBank is a commercial bank and not a development bank, and despite its efforts to lessen the burden of loans on its customers by attracting sources of funding from international partners, the Bank is still not able to offer sufficient low cost, long term financing. Without the GCF's support, XacBank's ability to finance renewable energy projects such as the one included in this proposal would be extremely limited.

The GCF provides access to funding at competitive rates, as such, GCF involvement will allow XacBank to provide beneficial financial terms to sustainable development project implementers who have been interested in implementing such projects but discouraged by high loan interest rates and short loan tenors available in Mongolia. With the GCF's ability to provide concessionary loan support (competitive rates and longer tenures), XacBank will be able to offer loans that allow the project to go forward and not over-burden the developers with debt during the course of the payback period. Without such concessionary financing, the

project would not be able to go forward. The Bank will closely monitor loan proceed usage based on supplier contracts, first hand purchase receipts, etc., which is customary for the Bank to do with regards to unfinished (but on-going) construction projects. Furthermore, the Bank will manage the project's cash flow, as customary in project financing situations.

Cost Structure

The largest cost component for the project is concentrated mainly in the equipment and materials areas, with the PV panels themselves being the single largest source of costs, followed by other inputs such as inverters, panel conditioners, cables, installation, and mounting frames, etc. Based on the successful construction and operationalization of the recent Darkhan 10 MW solar power plant (SPP), this can be accepted as reasonable for Mongolia. Once the SPP becomes operational, the operating expense is not significant.

Financial Model

A detailed financial model for the subproject under the program is attached in the annexes of this funding proposal. The financial model consists of a projection covering the period from financial closing through final maturity of the proposed GCF financing with detailed assumptions and reasoning, as well as sensitivity analyses of critical elements of each subproject. Furthermore, the model includes the breakdown of cost estimates for total project costs and GCF financing by sub-component in USD, as the project will be financed by and generating revenues in USD.

Although financial models and related calculations and data were obtained from the project developer, XacBank's Corporate Banking Division analysis team built their own financial model from scratch, using above mentioned data while inputting the necessary risk assumptions to generate various possible scenarios for the subproject.

In the below table, the straight-line amortization schedule for the project over the senior debt tenure can be seen. The SPP will be issued 10 year tenure. The sub-borrower will be granted a one year grace period from interest payments, whereby the interest will be capitalized until the second year after disbursement. At the end of the grace period, the capitalized interest payments will be made by the subproject owner to XacBank. Moreover, the sub-borrower will be given 18 months' grace period from principle loan payments. The loan repayment schedule can be seen in Table B.1.1. below.

The grace period will apply to the payments made by the client to XacBank; however, during this period XacBank will be making interest payments to the GCF. The grace period is necessary because after the 6 months construction period, the Bank expects another 6 month period for the SPP's operations to become stabilized.

Table B.1.1: Straight-line Amortization Schedule

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
SPP	0.00%	5.26%	10.53%	10.53%	10.53%	10.53%	10.53%	10.53%	10.53%	10.53%	10.53%

The subproject under this program will be able to service its debt with different degrees of amplitude depending on various assumptions made in the model's sensitivity analysis. The following tables show the debt service coverage ratios (DSCR) for each project for the lifetime of the senior loan provided to each subproject:

Table B.1.2: DSCR Schedule for the SPP

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Base Case	2.37	1.62	1.67	1.72	1.78	1.84	1.9	1.98	2.06	2.15
Low Case	1.76	1.2	1.22	1.24	1.27	1.3	1.33	1.37	1.4	1.45
High Case	2.64	1.82	1.88	1.94	2.01	2.09	2.18	2.27	2.38	2.49

For further details for the subproject, please refer to the attached financial model in the annexes.

B.2. Project Financing Information

	Financial Instrument	Amount	Currency	Tenor	Pricing
(a) Total project financing	**(a) = (b) + (c)**	18,434,766	million USD ($)		
(b) GCF financing to recipient	(i) Senior Loans	8,650,050	million USD ($)	As outlined in the Term Sheet	As outlined in the Term Sheet
	(ii) Grant	877,846	million USD ($)		
	** Please provide economic and financial justification in section F.1 for the concessionality that GCF is expected to provide, particularly in the case of grants. Please specify difference in tenor and price between GCF financing and that of accredited entities. Please note that the level of concessionality should correspond to the level of the project/programme's expected performance against the investment criteria indicated in section E.*				
	Total requested (i+ii+iii+iv+v+vi)	9,527,896	million USD ($)		

	Financial Instrument	Amount	Currency	Name of Institution	Tenor	(c) Co-financing to recipient	Financial Instrument
(c) Co-financing to recipient	Equity Options Options	8,906,870 …… ……	million USD ($) Options Options	…… …… …… ……	10 years	N/A	Equity
	Lead financing institution: Project developers						
	** Please provide a confirmation letter or a letter of commitment in section I issued by the co-financing institution.*						
(d) Financial terms between GCF and AE (if applicable)							

B.3. Financial Markets Overview (if applicable)

In December of 2016, Mongolia's very first utility scale solar power plant became operational, after beginning construction in July 2016. The Darkhan solar power plant, which also has a 10MW capacity, was completed through the cooperation of domestic Solar Power International with two Japanese partners.

The reason that current Mongolian renewable energy projects are unable to scale up to more than 50MW is mainly due to the financing constraints that many such projects face. Renewable energy financing typically requires long term financing with high quality materials and expertise, which means that the projects are more expensive than short-term solutions or traditional coal-fired power plants. Current financing options in Mongolia are extremely high cost (typically in the 18.00% to 25% interest rate range for domestic currency financing, and 8.00% to 12.00% in USD financing) with relatively short terms (maximum of 5 to 8 years), and other mitigating factors such as grace periods, guarantees and equity investments are not adequately available, especially for large-scale projects like these.

All this adds up to the fact that it is difficult to implement large scale solar power plants in Mongolia at the moment, which makes it challenging to provide a review of comparable transactions due to the fact that this is a brand new field of business in Mongolia. However, through the GCF's concessional funding and support in addition to the SPP project's international and domestic co-financing possibilities, it is becoming feasible to construct the plant.

C.1. Strategic Context

Global

As global political trends have demonstrated, the initiative of governments on climate change and investment in renewable energy infrastructure is unreliable and subject to the changing views of new administrations. Now more than ever, it is clear that the push to create a green economy must come from the consistent hand of the private sector. Mongolia is naturally endowed with bountiful opportunities to create bankable green projects. Supported by the national and subnational contexts outlined below, private sector institutions in Mongolia are also bolstered by the global acknowledgement of their crucial role in the mainstreaming of renewable energy projects. The Paris Agreement (COP 21) establishes, and the recent Marrakech agreements (COP 22) reaffirmed the private sector's participation in achieving INDCs. The here proposed projects are prime examples of the Mongolian private sector bringing its expertise to bear in achieving publically-set mitigation goals.

National

Regulatory

In order to achieve the Mongolian government's stated goal of a 14% reduction in total national GHG emissions, the INDC outlined a number of policies across the energy, industrial, agricultural, and waste sectors. The proposed projects falls under the following INDC goal: "increase the share of renewable electricity capacity of total electricity generation from 7.62% in 2014 to 30% by 2030." The State Policy on the Energy Sector, approved by parliament and published in 2015, determined short- and mid-term development scenarios and set an ambitious goal of increasing the contribution of renewable energy to the country's total installed power-generation capacity to 20% in 2023 and 30% in 2030. According to IRENA (2016) report, "In parallel, Mongolia has stepped up efforts to improve the conditions for domestic development and deployment of renewables. The Renewable Energy Law, passed in 2007, has provided a fundamental legal basis to regulate the generation and supply of renewable power. Amid changing circumstances, parliament amended the law in June 2015. The improved legislation should strengthen public-private partnerships and create a market oriented framework for the energy sector."

The Government of Mongolia (GoM) has been working to strengthen renewable energy (RE) regulations to create an enabling environment for private led renewable energy development and to facilitate policy evolution to mobilize investment in RE projects across Mongolia. For a full summary of key renewable energy regulations and initiatives by GoM, please see annex I.

Economic

Following the annual economic growth rate of 17.5% in 2011 and 12.3% in 2012, driven by commodities super-upward cycle, FDI influx and expansionary policies, Mongolian economy has been hard-hit by both terms of trade and FDI shocks since 2013 as well as by overly expansionary fiscal policies for the last 6 years. Countercyclical policies toward stabilizing the economy in 2013-2015 have enabled to maintain low and stable inflation, rebalance current account, and ensure financial sector stability. However, collapsed but unrecovered yet FDI, continuously low external demand, repressed domestic demand, elevated debt metrics and widened fiscal gap have jointly resulted a slowdown of economic growth from 11.6% in 2013 to 1.0% in 2016. Current economic difficulty faced to Mongolia is definitely not a solvency issue, affirmed by the international community and private investors.

Apparently low GDP growth environment in Mongolia is expected to continue in a short-run due to economic stabilization. However, this is a completely new environment and a new opportunity, which requires new economic equilibrium after commodity boom-bust cycles and resource-driven exuberances over the past 10 years.

Parliament has already ratified the economic recovery program, which has a financing support from international financial institutions and donors. Government and IMF have reached a mutual agreement on implementing Extended Fund Facility program of USD 3.4 billion package for 2017-2019, which improves certainty and crystalizes consistent policy package towards full economic stabilization, gradual recovery and diversification for prosperity. Under the program, fiscal and institutional reforms are expected to ensure fiscal stability and public debt sustainability, foreign exchange reserves shall sufficiently been increased, and these positive macro developments are expected to enable medium-term sustainable economic growth. In addition, Bank of Mongolia and People's Bank of China have reached a mutual agreement on extending bilateral currency swap facility of RMB 15 billion until August 2020, positive to bilateral trade and investment relations.

FDI is expected to recover thanks to bottoming-up commodity cycles and implementation of major projects especially in mining, energy and infrastructure sectors. Economic partnership agreement, signed with Japan shall definitely bring new private investments, especially in non-mineral sectors.

These developments and expected positive outlook shall support the country's macroeconomic external and internal balances, which strengthen key fundamentals and cornerstones of a more sustainable long-term expansion of the economy, so they are positive for the proposed project in renewable energy sector development.

Political

In mid-2016, Mongolia held national elections and the incumbent Mongolian Democratic Party was overwhelming replaced by the Mongolian Peoples' Party. The incoming government has pledged to introduce more consistent and favorable policies to encourage foreign investment. They have also re-affirmed the prior government's commitment on environmental issues and have acted with increasing urgency to confront the public health risk posed by air pollution in the capital city of Ulaanbaatar. It can be concluded that the material political difference is net neutral, if not slightly favorable, to the contents of this proposal.

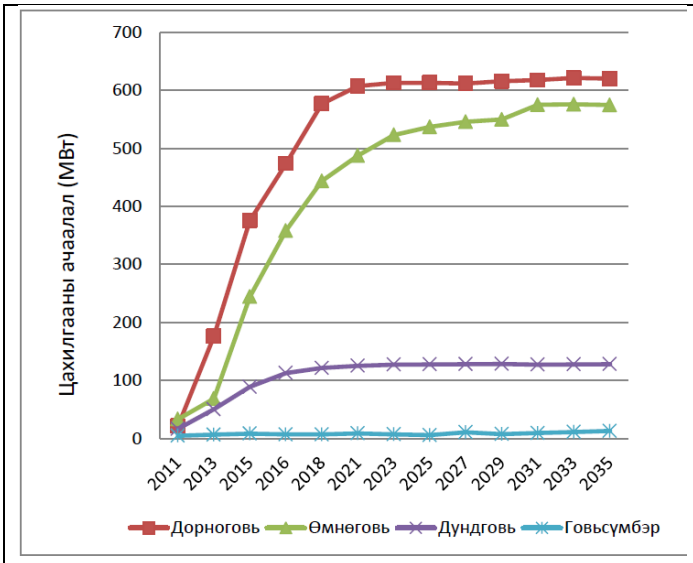
Subnational/Municipal

Central Energy System

The Central Energy System is the largest of the five independent energy systems, covering consumers in 14 of the 21 first-level administrative subdivisions known as aimags in the Khangai, Central and South regions. The Central Energy System represents annual electric energy demand of over 900 MW and annual electricity consumption of 4 300 GWh, supplied largely by seven power plants. The Central Energy System is connected to the Russian power grid system through a 220 kilovolt (kV) overhead transmission line.[1]

A feasibility study conducted by the National Renewable Energy Center in 2011 estimated that electrical consumption and loading of provinces of southern region of Mongolia such as Dornogovi, Dundgovi, Umnugovi and Govisumber between 2011 and 2036 will grow significantly. This is shown in the consumption curve below.

[1] IRENA (2016) Mongolia Renewables Readiness Assessment



Building solar power plant in Sumber soum of Govisumber province is significant to implement “Program to develop infrastructure of southern region” which was adopted by the Government of Mongolia, “National Program for Renewable Energy” and “The Integrated Power System”. It is also important to serving the growing demand largely driven by mining projects in the southern region.

Energy Sector

Feed in Tariff (FiT)

Feed in Tariffs are a crucial mechanism initiated by the Renewable Energy Law. According to the IRENA (2016) report, “FiTs were introduced to create an enabling environment for the private sector to actively engage itself with the development of renewable energy markets. They were also intended to attract investments in renewable energy project development under seven special licenses issued, for a total installed generating capacity of 534.2 MW. A Power Purchasing Agreement (PPA) was also developed and used as a legally binding document between the state-owned National Dispatch Center and any private renewable energy developers or electricity producers, to make sure the electricity generated from renewable sources is sold at favourable prices.” The renewables FiT acts as a subsidy to encourage the production of renewables. However, it is important to note that the Mongolian government also heavily subsidized coal-generated power to lessen the burden on consumers. Thus, the FiT for renewables acts to somewhat even the playing field between brown and green energy sources. The tariff amounts can be seen in the table below. The proposed projects take advantage of these incentives.

Table 6. Ranges of FiTs for renewable energy power sources in Mongolia (USD/kWh)

	Hydropower			Wind	Solar
	Up to 500 kW	500 – 2 000 kW	2 000 – 5 000 kW		
Grid-connected	0.045-0.06	0.045-0.07	0.045-0.08	0.08-0.095	0.15-0.18
Off-grid	0.08-0.10	0.05-0.06	0.045-0.08	0.10-0.15	0.20-0.30

Source: Renewable Energy Law of Mongolia, 2007

XacBank

Although XacBank began as a microfinancing institution in 2001, the Bank has become a fully integrated financial services provider since early in its inception stages. As a result, the Bank’s lending portfolio evenly covers the corporate, SME, and retail segments of the banking services market, with each segment representing about one-third of the Bank’s portfolio. In this regard, corporate banking activities represent 32% of the Bank’s portfolio as of December 2016. Moreover, XacBank has been the only Bank with a dedicated Eco Banking Department in Mongolia since 2009. Since its inception, the Department has had

experience in implementing projects and programs, as well as working with international institutions to finance sustainable energy projects. In the past, the Department has financed projects in all segments of the market, from micro- to corporate-scale, including both energy efficiency and renewable energy solutions. Since becoming an accredited entity of the GCF in October 2016, the Department has become more focused on supporting larger-scale renewable energy projects, which led to the formation of this funding proposal.

C.2. Project / Programme Objective against Baseline

Baseline Scenario: Electricity and Fuel Mix

There are five types of energy sources used for the national electricity generation in Mongolia: coal (lignite), diesel, hydro, wind, solar and imported electricity. The share of the overall electricity generated from 2010 to 2016 by the type of fuel used is shown below in Table C.2.1. Majority of the total electricity supply is provided from lignite accounting for 95.7% in 2016. The amount of electricity generation from renewable energy sources accounted only for **4.2%** as of 2016 of which 2.7% came from wind, 1.4% from hydro, 0.11% from diesel and 0.01% from solar.

Table C.2.1. Electricity production by sources in Mongolia (million kWh)

Sources	million kWh							%
	2010	2011	2012	2013	2014	2015	2016	2016
Lignite (CHPs)	4256	4450	4775.5	5014	5191.3	5415,6	5551.6	95.7
Diesel	21.4	20.2	28.7	5.4	8.2	6.4	6.1	0.11
Hydro	35.3	52.6	52.1	59.9	66.3	59.3	84.7	1.46
Wind	0	0	0	52.9	125.4	152.5	157.5	2.72
Solar	0	0	0	0	0.6	0.6	0.6	0.010
Total production	4312.7	4522.8	4856.3	5132.2	5391.8	5634.4	5800.5	100
Share of renewables								**4.2**

Source: Ministry of Energy (March 2017)

Renewable Energy Sources

There are 15 renewable energy sources operating in Mongolia (shown in Table C.2.2). Seven of them are hydro, and another seven are solar. Out of the 7 solar power plants, only one is utility scale at 10 MW which became operational in Darkhan city in 2016, and started supplying electricity to the Central Grid from 1 Jan 2017. Other solar PVs are small scale. The first and only wind farm became operational in 2014 at capacity of 50 MW at Tuv province and supplies electricity to the Central Grid. Out of 7 hydro power plants (HPPs), 5 are small scale. The two big ones are Durgun HPP and Taishir HPP.

Table. C.2.2. Installed Capacity of Renewable Energy Sources in Mongolia

	Name	Installed Capacity MW
1	Tosontsengel HPP	0.375
2	Taishir HPP	11
3	Guulin HPP	0.2
4	Hun HPP	0.11
5	Galuutai HPP	0.15
6	Bogd river HPP	2
7	Durgun HPP	12
	hydro	**25.835**
8	Salkhit wind farm	50
	wind	**50**
9	Bugat solar power plant	0.14
10	Urgamal solar PP	0.15

11	Buyantooroi solar PP	0.1
12	Altai solar PP	0.3
13	Mandakh solar/wind	0.2
14	New airport solar PP	0.44
15	Darkhan solar PV (Solar Power Int')	10
	solar	**11.33**
	Total	**87.17**

Source: Ministry of Energy (March 2017)

Power Capacity

The total installed capacity of Mongolia 1158 MW of which 989 MW or 85% is available for operation (table C.2.3). Share of total installed capacity of renewable energy sources reached 87.17 MW. However, due to operational status of these renewables, 74-78 MW out of 87.17 MW is available for operation. Therefore share of operational renewable sources make about **7.4%** from 989 MW.

Electricity Import

Total electricity import of Mongolia was 19.9% of the total consumption in 2016. Electricity import of the Central Energy System was 3.2% in 2015 and 4.3% in 2016.

Electric Power Network

The electric power network of Mongolia comprises from five main energy systems shown below in Figure C.2.1. The Central Energy System (CES) is the largest and includes the Dalanzadgad Energy System (DES) in the South Gobi. The smaller energy systems are the Western Energy System (WES), the neighboring Altai-Uliastai Energy System (AuES), and the Eastern Energy System (EES). The WES and CES are interconnected with Russia and are dependent on imported energy. There are small capacity cross-border inter-connections with China at the border areas of Hovd and Omnogobi (South Gobi) provinces.

The CES is supplied by five Combined Heat and Power (CHP) plants, covering the main cities of UB, Darkhan, Erdenet and 13 provinces. The nominal electric capacity in the CES is 1072.5 MW, however, the power plants are aged and unreliable and the available capacity is only 918 MW.

The national grid imports electricity from Russia and China (19.9% of all electricity supplied in 2016). Electricity from China is also supplied to the Oyu Tolgoi area in the southern region and areas in the southern, western and eastern region. However, these areas are not connected to the Southern Energy System, Western Energy System, or Eastern Energy System. Therefore, these areas and their electricity imports from China are excluded from the calculation of the national grid emission factor.

Calculation of Emission Factor

Calculation of emission factor of SPP is based on the latest approved methodologies of the JCM. JCM methodologies are based on UNFCCC's Clean Development Mechanism (CDM), and therefore equitable to IPCC's standards. Furthermore, JCM methodologies of emission factor calculation are more conservative than CDM.

The latest calculations of Mongolia's grid emission factor has been calculated and made publicly available on 9 Feb 2017 on Joint Crediting Mechanism (JCM) website[2]. Original calculation of national grid emission factor for solar PVs have been calculated in Sep 2016 by the Institute of Global Environmental Strategies (IGES) as part of developing solar PV projects for JCM, a bilateral mechanism initiated by Japan to offset its carbon emissions[3]. The summary of the calculation is shown below:

[2] https://www.jcm.go.jp/mn-jp
[3] IGES (Sep 2016) Calculation of Conservative Emission Factor of Mongolia

Name of the methodology used: approved JCM methodology **MN_AM003 "Installation of Solar PV Systems"**

Emission factor of the national grid: **0.797 tCO2/MWh** which applies the lowest emission factor of coal-fired power plant supplying electricity to the national grid. This value is lower than the grid emission factor for CES, which is 1.154 tCO2/MWh (combined margin, 2012) published by Mongolian government and it ensures net emission reductions.

Application: 0.797 tCO2/MWh will be applied in case the PV system in a proposed project activity is connected to the Mongolian national grid (supplied by the Central Energy System (CES), Western Energy System (WES), Altai-Uliastai Energy System (AUES), Eastern Energy System (EES), and/or Southern Energy Systems (SES)) including internal grid which is not connected to a captive power generator.

Calculation: The calculation of each coal-fired CHP plant emission factors was conducted using the specific fuel consumption of each power plant from the national authority and default values (Table 2) determined by the national authority and IPCC guidelines. Detailed calculation of emission factor of coal-fired power plants in Mongolian national grid can be seen from this IGES (2016) calculation.

Table. C.2.7. Constants for calculation of emission factor

Item	Values	Reference[4]
CO_2 emission factor for lignite coal	90,900 $kgCO_2/TJ$	IPCC guideline for National Greenhouse Gas Inventories 2006, Chapter 2, stationary combustion
Net calorific value for lignite coal	29.33 TJ/Gg	Mongolian national standard

* Since the auxiliary power consumption is unknown, the plant efficiency of gross electricity generation is applied. This ensures the calculation of a conservative emission factor.

Source: IGES (2016) Calculation of Conservative Emission Factor of Mongolia

Climate vulnerability baseline

Mongolia's Second Assessment Report on Climate Change (MARCC) conducted in 2014 summarized current observed climate change, future estimation, and impact of climate change on nature, socio-economic sectors, vulnerability, and risk assessment in Mongolia. According to this study, Mongolia is one of the most vulnerable countries to the impacts of climate change due to its geographical and climate conditions as well as the structure and development level of the economic sectors, and the lifestyle of the people.

Climate change impacts are visible in Mongolia through the intensification of soil and pasture degradation, drying up of rivers, lakes and springs in the Gobi and steppe regions, and loss of biodiversity (MARCC 2009). Mean air temperature of Mongolia increased by 2.070C between 1940 and 2013 (MARCC 2014) according to records from 48 meteorological stations that are evenly distributed across the country.

In the MARCC (2014) climate change risk assessment was conducted on water resources, biodiversity, ecosystem services, forest, agriculture/animal husbandry, arable farming, social health and infrastructure and an integrated assessment of all sectors using multi-criteria analysis.

INDC Report (2015) summarized climate change impacts, vulnerability and risk assessment analyzing changes in climate and risk factors, affected areas/sectors, current, past and future impacts in related areas/sectors with their vulnerability and risk assessment as well as actions required to mitigate them. It also describes the adaptation goals and targets.

XacBank's Renewable Energy Program (REP) of Solar PVs targets a province that stands on the second level of most vulnerable provinces to water resources. This includes Govisumber province where one of the solar PVs will be established which stands as one of the most vulnerable provinces. Therefore, developing

renewable energy sources like solar which do not use water resources are critical to mitigate the vulnerability risk.

National Action Program on Climate Change (NAPCC, 2011), endorsed by the Parliament of Mongolia, defined 5 strategic objectives in two phases during 2011-2021. Action plan for the first phase for 2011-2016 was approved by the Government Resolution No. 317. Within second strategic objective of the NAPCC, 13 actions have been reflected to improve adaptation capacity, ensure environmental sustainability and reduce vulnerability and risks of socio-economic sectors.

Emissions Baseline: Sources of GHG Emissions

The **energy** sector is the most significant source of CO2 emissions in Mongolia. The contribution of different sectors to solid fuel mainly includes energy, manufacturing, transport, agricultural and other industries. The following table illustrates energy and carbon intensity in Mongolia.

Table C.2.8. Energy and carbon intensity of Mongolia

Gross Domestic Product (GDP) (billion 2005 USD)	Total Primary Energy Supply (million toe)	Emissions from fuel combustion (million tCO2)	Energy Intensity (TPES/GDP)	Carbon Intensity (CO2/GDP
5.1	5.2	18.7	1.0	3.6

Source: International Energy Agency 2015

When comparing GHG emission to other countries, Mongolia's total GHG emission level is low. But GHG production is high per capita when compared to other developing countries. This can be attributed to Mongolia's extremely cold climate, the widespread use of fossil fuels for energy, and low efficiency of fuel and energy use.

Energy Sector

In terms of emissions, the energy sector accounted for 51.9% of all GHG emissions, and the second largest GHG emission is the agricultural sector, accounting for 36.6% in 2012. The contribution of emission from each sector is illustrated in the following table.

Table C.2.9. CO2 emissions from solid fuel

Year	Sector						
	Energy Industries	Manufacturing Industries	Transport	Commercial	Residential	Agriculture	Other
2012	6,751.67	624.90	47.11	12.34	702.17	4.15	629.15

Projections of GHG emission between 2006 and 2030 have been estimated in Mongolia's Second National Communication in 2010 in the following table.

Table C.2.10.

Sector	GHG emissions on Gg Co2-eq.						Average annual growth rate %			
	2006	2010	2015	2025	2025	2030	2006 - 2015	2015 - 2020	2020 - 2030	2006 -2030

Energy	10,220	14,033	20,233	25,930	32,796	41,815	10.89	5.63	6.13	12.88
Industry	891	1,354	1,602	1,836	2,065	2,318	8.87	2.92	2.63	6.67
Agriculture	6,462	6,405	6,573	6,657	6,762	6,867	0.19	0.26	0.32	0.26
LULUCF*	-2,083	-1,932	-1,785	-1,420	-1,000	-680	-1.59	2.84	4.07	-2.81
Waste	138	158	183	209	254	294	3.62	2.84	4.07	4.71

Source: MNET, UNEP
*LULUCF: Land-use, Land-use change, and Forestry

Total GHG emissions are projected to increase 3.25 times from 2006 to 2030. Generally, energy consumption is expected to increase rapidly due to economic and population growth. GHG emission in energy sectors from 2006 to 2030 are expected to increase by 4 times.

Technology Needs Assessment/Available Technologies

An extensive Technology Needs Assessment (TNA) report was conducted for the climate change mitigation activities in Mongolia in 2013 by United Nations Environment Programme (UNEP) and the UNEP-Risoe Centre in collaboration with the Regional Centre Asian Institute of Technology. It analyzed key mitigation technologies in priority sectors of Mongolia where solar thermal - Concentrated Solar Power (CSP) and solar PV (off grid, grid connected and solar home systems) are among the list of priority technologies.

National Action Program on Climate Change (NAPCC) approved by the Parliament of Mongolia in 2011set 2 phases in mitigating GHG emissions and establishing low carbon economy from 2011-2016 and from 2017-2021. The second phase which starts from 2017 include measures to use solar, geothermal and biogas in the heating and hot water supply of buildings as well as explore possibilities to build large scale power and thermal plants using solar power in the Gobi region.

TNA report scored all priority technologies based on capital costs, Operation and Maintenance (O&M) cost, cost effectiveness for mitigation (USD per unit of CO2 mitigation), co-benefit impact of reducing air pollution (improving SOx, NOx, PM etc.), as well as improving healthcare, energy supply and balance of payment. According to this study, overall weighted score for solar PV ranked at 42 out of 100 (below the average for priority technologies) due to high cost of capital. As the study was done in 2013 when the price of solar was higher, this rank will change over the years and make solar more attractive.

Solar PV technology has witnessed probably the highest cost decrease of all energy technologies. According to SREP (2016), the PV module prices reduced approximately 75% in five years. The PV technology in utility-level applications can be classified roughly by two important technical parameters. One is whether the project uses crystalline-silicon (c-SI) modules or amorphous Si thin film modules. The second dimension is whether or not the modules are mounted at a fixed-tilt or on a tracking system.

According to Renewables 2016 Global Status Report, between 2010 and 2015, the global weighted average Levelised Cost of Electricity (LCOE) of utility-scale (>1 MW) solar PV fell by almost 60%, driven primarily by reductions in module costs of around three quarters during this period[4]. In 2015, the most competitive utility scale solar PV projects were regularly delivering electricity for just USD 0.08/kWh, without financial support, compared to a range of USD 0.045/kWh to USD 0.14/kWh for new fossil fuel power (excluding health and carbon mission costs). But even lower costs are being contracted for 2017 and beyond. Tenders during 2015 and 2016 in Dubai (USD 0.06/kWh), Peru (USD 0.05/kWh) and Mexico (USD 0.035/kWh) ably demonstrate this shift. Solar PV is now competing head-to head, without financial support, even in regions with abundant

[4] REN21 (2016) Renewables Global Status Report

fossil fuels. Tenders in Brazil, Chile, Jordan and South Africa all have highlighted that solar PV can be competitive.

Key Barriers and Challenges

Barrier analysis in the UNEP's TNA report considers financial, economic and technical challenges faced by different prioritized technologies in the energy industry sub-sector. Barriers related to solar PVs will be similar to wind energy in terms of system constraints, and have been extracted from the wind project barriers into solar as follows:

List of Economic and Financial Barriers

- **Financing**: high interest rates for loans at financial institutions; lack of low-interest rate RE/EE loan programs; lack of knowledge, experience, and expertise in providing, assessing and evaluating RE/EE loan;
- **Cost**: Cost of upfront capital, transaction (conducting feasibility study, due diligence) and resource (equipment, labor, construction) is relatively high compared to conventional sources
- **Financial incentives**: Lack of financial incentives to RE solutions and favorable treatment of conventional energy (subsidies and low taxes to CHPs; subsidies in energy sector in 2011 were 14.7 billion MNT which is 11 million USD); negative externalities of CHPs have been ignored and not considered in pricing of electricity, subsidies and taxes vs. incentives to RE technologies;
- **Electricity tariff**: Electricity tariff is set below the marginal cost. According to SREP (2015)[5] report, international comparison clearly indicates that the electricity tariffs in Mongolia are substantially lower than in other medium-income countries of Asia. In US cents terms, the Mongolian average tariff quoted in the Yearly Statistical Book of ERC was 6.6 c/kWh in 2015 as compared to 9.4 c/kWh in Thailand or 10.5 c/kWh in the Philippines.
- **Uncertainty:** uncertain electricity tariffs (non-transparent tariff adjustment procedure); uncertain macro-economic environment (volatile inflation rate and high price fluctuations); unstable currency and exchange rates;

List of Non-Financial Barriers

- **Market conditions**: Lack of liberalization in the energy sector; market competition is not fully introduced; energy market is dominated with state-owned suppliers; fair competition is not yet in place; electricity tariff is not liberalized; energy sector is controlled and dominated by state-owned suppliers;
- **Curtailment**: Enforcement of curtailment to RE projects can be occurred. RE generation capacity has the lowest marginal cost and should therefore always be dispatched before thermal plant. Whilst there are technical constraints that limit the flexibility of the old Russian-designed CHP plants, engineering analysis suggests that more could be done by thermal plant operators so that RE generators might be curtailed less frequently than has been observed. Furthermore, as mentioned above, the existing CHP plants are fully depreciated and coal is subsidized, meaning that the existing plants are low cost in strict financial terms.
- **Technical issues:** System constraints and capacity limitation with grid system is a challenge for solar and wind projects;
- **Transparency:** The RE law stipulates, on one hand, that the system is obligated to receive the energy supplied by RE generators, but on the other hand, the system dispatcher has the right to dispatch and consequently may refuse such energy. The matter of obligating to compensate for curtailed energy could be managed by a transparent, universal regulation, but instead is managed by stipulations of the Power Purchase Agreements (PPAs). This leads to the potential for unfair and inequitable treatment of RE generators (or at least a perception on the part of investors).

SREP (2015) report has also summarized key barriers and problems of RE development and suggested possible capacity building activities to overcome them.

[5] Scaling Up Renewable Energy Investment in Mongolia (2015), Investment Plan for Mongolia

Table. C.2.11 Summary of Barriers of RE development in Mongolia with Possible Solutions

Key Barrier	Key Problems	Possible solutions/capacity building
Existing market regulation and structure	Fundamental issues with regulatory reform and planning processes that leave investments in energy infrastructure projects and market development prone to failure	Focus trainings on system operations, regulatory core functions, energy modelling, system planning and policy making
Inadequate financing of the FiT	Negative financial impact on the national transmission company Growing concern over long term FiT payments due to a lack of renewable energy surcharge system.	The FiT system has been addressed by recent change of RE law and changes to the administration of the zero balance account; the main change has been the introduction of a "green surcharge" system in July 2015. Going forward, it is essential to build clear and transparent rules to increase level of RE surcharge according to RE capacity addition.
RE curtailment	Dispatcher's right to curtail versus obligation to accept RE generators energy production	Clarify the dispatching principles in the Mongolian Grid Code. Provide training on wide basis in marginal cost dispatch principles, demonstrating the false economy that existing depreciated power generators are more economical than RE generators. Optimize the dispatch of imported electricity in the network from Russia and thermal power generators.
Licensing Principle Ambiguity	A lack of criteria for rejecting RE applications for licenses in cases the target levels for RE is exceeded or where technical constraints in the transmission grid do not allow construction of further RE capacity.	Develop suitable criteria for inclusion in the regulatory (and possible legal) framework. Design a 'statement of opportunities' process to deliver suitable time-bound incremental targets for RE, to improve transparency to all RE stakeholders. Develop a study on economic and physical grid absorption capacity for RE in Mongolia.

Source: SREP (2015)

Key Policies and Laws

Key Policies and Laws related to energy and RE is summarized in Table.C.2.12.

Table. C.2.12. Key Policies and Laws related to Energy Industry and RE

Name of policy & date of enactment	***Contents/targets related to solar power***
The National Renewable Energy Program 2005	Set a target of increasing the share of renewable energies in the country's total energy production to 20-25 percent by 2020. Targets related to solar: - Increase the penetration of renewable energy in the energy system of Mongolia, improve the structure of power supply, and utilize renewable energy in off-grid soums (districts) and settlements to ensure ecological balance and improve the economic efficiency. - Construct small and medium capacity energy generating facilities in Ulaanbaatar and other cities and towns to reduce air pollution using solar, wind, hydrogen and geothermal resources - Implement pilot projects in Gobi region on very large scale PV power generation system.
The Renewable Energy Law of Mongolia 2007	In order to stimulate investments in renewable energies, the Parliament enacted the Renewable Energy Law, which specified following: i) reference tariffs for renewable energies; and ii) electricity market access rules for grid connected renewable energy projects.

<table>
<tr><td></td><td>
<table>
<tr><th colspan="2">Transmission Network Connected</th><th colspan="2">Distribution Network Connected</th></tr>
<tr><td colspan="2">To be set by the Energy Regulatory Agency</td><td colspan="2">To be set by Regulatory Boards of Aimags[17] and the Capital City</td></tr>
<tr><th>Technology</th><th>USD/kWh</th><th>Technology</th><th>USD/kWh</th></tr>
<tr><td>Wind</td><td>0.080-0.095</td><td>Wind</td><td>0.100-0.150</td></tr>
<tr><td>Hydropower</td><td></td><td>Hydropower</td><td></td></tr>
<tr><td>capacity up to 5 MW</td><td>0.045-0.060</td><td>capacity up to 5 MW</td><td>0.080-0.100</td></tr>
<tr><td></td><td></td><td>2MW 0.50MW < capacity ≤ 2 MW</td><td>0.050-0.060</td></tr>
<tr><td></td><td></td><td>2 MW < capacity ≤ 5 MW</td><td>0.045-0.050</td></tr>
<tr><td>Solar power</td><td>0.0150-0.180</td><td>Solar power</td><td>0.200-0.300</td></tr>
</table>

The RE Law Amendment of 2015
The RE law was amended in 2015 to improve the financial management of the power sector and included the following changes:
- responsibility of managing the Zero-Balance Account was transferred to the National Dispatching Centre from the National Transmission Company
- Introduced a RE green surcharge which recognizes that the existing tariff structure is based on accounting rather than economic principles. In strict financial terms, the existing CHPs are very low cost energy systems compared to new RE systems. Tariff revenues reflect these conditions and do not support FiT payments. The green surcharge is intended to recover revenues sufficient to pay for new RE systems; in this regard the surcharge is a forward looking tariff component.
</td></tr>
<tr><td>The Energy Law 2007</td><td>Regulates matters relating to energy generation, transmission, distribution, dispatching and supply activities, construction of energy facilities and energy consumption that involve utilization of energy resources.</td></tr>
<tr><td>The Government Program (2012-2016) 2012</td><td>Lay down favorable conditions to attract domestic private sector investment in renewable energy sector;
Take measures to enable the country to be self-sufficient in terms of power supply and eventually become a power-exporting country.</td></tr>
<tr><td>National Action Program on Climate Change (NAPCC) 2010</td><td>Strategic Objective 3 – “Mitigate GHG emissions and establish a low carbon economy through the introduction of environmentally friendly technologies and improvement in energy effectiveness and efficiency”:
• Establish a renewable energy fund;
• Develop wind and solar energy production systems;
• Explore possibilities to build large scale combined power and thermal plants using solar power in the Gobi region;</td></tr>
<tr><td>State Policy on Energy (2015-2030) 2015</td><td>- Develop institutional capacity to perform detailed resource assessment of Mongolian renewable energy resources (solar, wind, hydro, geothermal, biomass and etc.), build national renewable energy resource database and perform research and development in field of renewable energy.
- Increase share of renewable energy in national energy capacity to 20% by 2023, 30% by 2030.
- Build favorable legal, tax environment to increase investment in renewable energy, create financial mechanism to support energy production by renewable energy.</td></tr>
</table>

Expected Outcome and Impact of the Program

XacBank’s REP aims to achieve the following outcome and impact shown in Table.C.2.13.

Table.C.2.13. Expected Outcome and Impact of the Program

Expected Outcome of the Program	Expected Impact of the Program
Financing: provide low interest rate loans with longer term; provide guarantees;	Increased finance into RE sources
Market condition: support private sectors in developing RE projects; increase market competition and contribute in increasing the share of private sector involvement in the energy sector	Increased share of RE in the total electricity generation (contribution in meeting 20% target by 2020);
Transparency: increase transparency of RE project development by developing series of REP through GCF	Increased awareness about RE project development to be made publicly available
Project management capability: capacity of project developers will be improved with development of new RE sources	Improved project management capabilities to meet common international practices
Monitoring and Evaluation (M&E): support and oversee M&E; increase the capacity of project developers in calculating, monitoring and evaluating CO2 emissions; increase the capacity of monitoring, reporting and verification (MRV)	Increased capacity to carry out M&E to calculate CO2 emission reduction; increased capacity of reporting and conducting verification activities

C.3. Project / Programme Description

1) Development, construction, commissioning and operation of a 10MW plant in Sumber soum of Govisumber province (southern Mongolia);

   The associated main activities and preliminary timelines are presented in the sections below.

2) The SPP will be connected to the Central Energy System of Mongolia. The SPP will build a substation to connect to the grid. The client has included the cost of building the substation and the required connecting transmission lines in the total financing amount for the power plant.

Please see Section H for the relevant objectives, outputs and outcomes that the program aims to achieve.

C.4. Background Information on Project / Programme Sponsor (Executing Entity)

XacBank overview

Since its founding in 2001, XacBank has created sustainable growth in the banking and financial sector of Mongolia, with continuously expanding operations. Through this expansion, XacBank has remained true to its original vision of “People, Planet, Profit” and aims to represent the interests of all its clients, from mainstream customers to traditionally marginalized Mongolians, such as those in the ger district.

The Bank has an extensive reach throughout the project’s host country of Mongolia. It comprises 86 branches, units and business service centers throughout the nation. XacBank employs 1,700 specialized personnel and more than 1,800 merchants who swiftly serve more than 700 thousand customers with complex financial services using latest state-of-art technology. XacBank’s audited yearly financial statements and annual reports for every year since 2001 are readily available on the website at http://www.xacbank.mn/en/96/about-xacbank/report/annual-report. XacBank is hailed as a model for corporate responsibility and social-impact driven business in Mongolia.

As of December 30th, 2016:

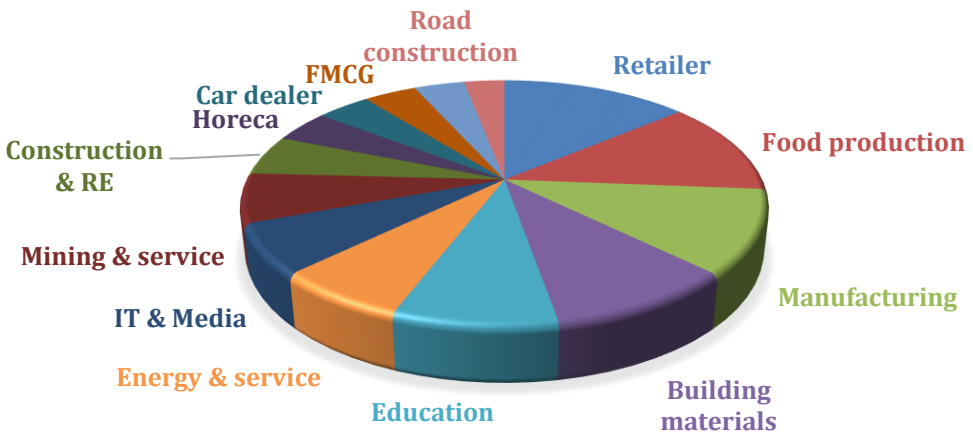
Capital Adequacy Ratio: 18.88%
Credit Rating: Caa1 (Moody's)

XacBank relevant experience
As the project sponsor, XacBank brings a wealth of past management experience on similar projects in similar areas. XacBank is the market leader in providing business loans for energy efficiency and renewable energy solutions with a portfolio of about US$15 million.

Since 2012, XacBank has both directly and indirectly financed a total of US$ 6.4million to renewable energy projects

XacBank's Corporate Banking Division currently employs 20 professionals, comprising relationship managers and credit analysts, whom have rich experience in analyzing and financing large-scale projects for corporate clients. Between 2013 and 2016, XacBank distributed a total of US$45 million in loans through government funding. Aside from government funded projects, the Corporate Banking Division has disbursed more than US$174 million in project financing to large-scale projects. XacBank's current total portfolio stands at one-third SME, one-third retail, and one-third corporate financing, with the Corporate Banking Division's portfolio standing at roughly US$214 million. A detailed list of the portfolio can be found attached in the excel sheet titled "PF List_4.20". In addition to extensive project financing experience, the Corporate Banking Division portfolio is well diversified in order to reduce risk and over-exposure to any single industry (see table below). For this program, the Corporate Banking Division will be handling the financial analysis and disbursement of the funds.

Table 3: Corporate Banking Division portfolio breakdown



C.5. Market Overview (if applicable)

Historical and forecasted market for the product/service

Historical market of solar PV

As described in the Section C.2, the majority of the electricity production comes from coal-fired power plants. Lignite accounted for 95.7% of the total electricity production in 2016 (Ministry of Energy, 2017). Share of

renewable energy sources from the total electricity production was only 4.2% in 2016 of which solar accounts for only 0.01%. This share has increase since Jan 2017 as the 10 MW Darkhan solar PV started supplying electricity to the Central Energy System from the beginning of 2017. List of solar power sources are shown in the Table. C.5.1. There are 7 solar power sources in Mongolia as of March 2017 with a total capacity of 11.33 MW.

Solar power resources

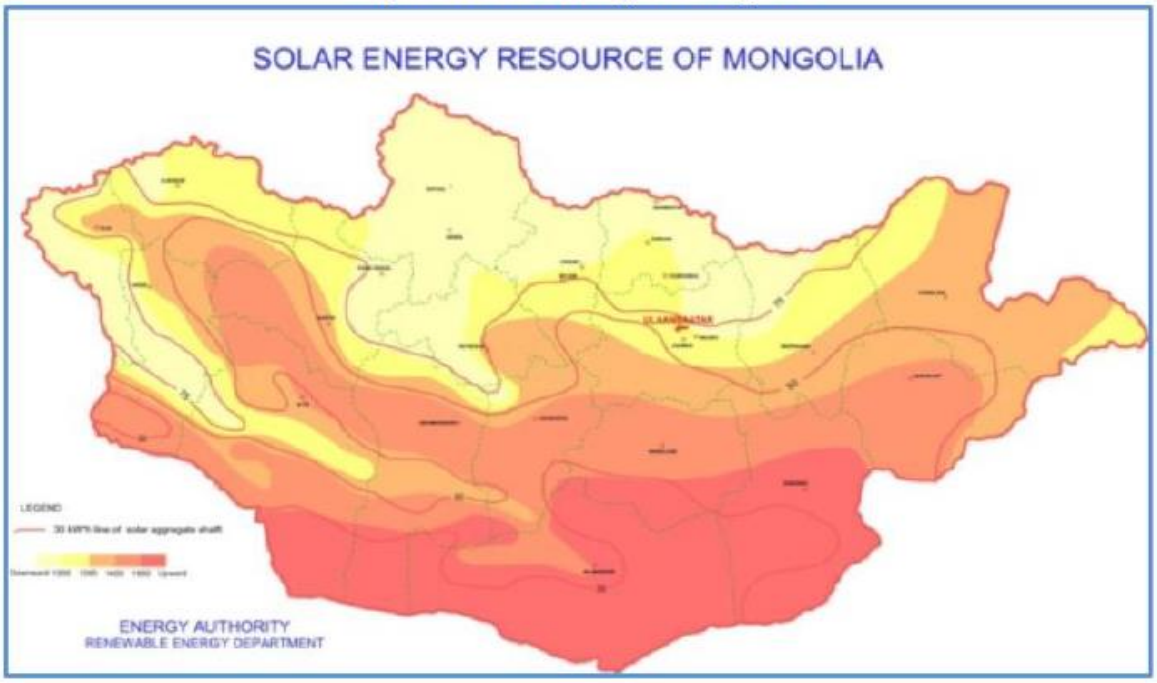
Mongolia has enormous solar resource potential, particularly in the South Gobi region. According to NREL (National Renewable Energy Laboratory), the solar energy potential of Mongolia is 1,500 GW. According to their estimates, Mongolia can, on average, produce 66 MW/km2 from solar energy for a production of 4,774,000 GWh per annum. The number of sunny days averages 270 to 300 days per year, corresponding to 2,250 to 3,300 sunshine hours. Annual solar radiation is estimated to be 1,200 to 1,600 kW per m2 and intensity is estimated at more than 4.3 to 4.7 kW per hour. More than two-thirds of the country receives high levels of incoming solar radiation in the range of 5.5 to 6.0 kWh/m2 per day. Figure C.5.1 shows solar energy potential in Mongolia. The proposed solar project is located in the zone with the most solar radiation.

Forecasted market of solar power

Solar power project developers are increasing drastically over the last few years. As of now, the total amount of solar power project planned reached 354 MW as shown in the Table C.5.2. (Newcom, 2017). According to the latest statistics from Energy Regulatory Committee (ERC), in total 13 companies have received special license to construct solar power plants that totals 247 MW[6].

Construction license to all 13 solar companies have been provided for 3 years starting from 2014. According to the Energy Law of Mongolia, construction license is provided up to 5 years, and can be extended upon completion of conditions specified in the license. 6 out of 13 solar companies signed Power Purchase Agreement (PPA), and the additional 2 is close to signing the PPA. Electricity production and distribution license is provided from 5-25 years.

Figure. C.5.1. Solar Energy in Mongolia



Forecasted market of Renewable Energy Sources in Mongolia

[6] http://en.erc.mn/licensees.html

The total potential of Mongolian renewable energy including wind, solar, geothermal, and hydro resources is estimated by the National Renewable Energy Laboratory (NREL) of the United States Department of Energy to be as high as 2,600 GW. The Gobi Desert in particular, has tremendous renewable energy potential and has favorable climatic and weather conditions to use these resources effectively.

According to ERC website, 924 MW of renewable energy sources received Special License for construction to generate electricity (further referred as construction license). Out of these 924 MW, 552 MW is wind, 247 MW is solar, 92 MW is hydro and 32 MW is for other sources. Out of the 924 MW planned, about 87 MW of installed capacity of renewable energy is already in operation, and generating electricity as described in the section C.2 (see Table C.2.2. for more details of breakdown).

Existing demand for power

ADB report conducted in 2013 includes significant findings on the projected energy market: "As the economy continues to grow, demand for electricity and heat in Mongolia has grown significantly too[7]. Mongolia is already facing power shortages, with peak power demand in the country amounting to over 1000 MW whereas available supply capacity is only 836 MW. In order to bridge this demand-supply mismatch, the country imports electricity from Russia which accounted for 19.9% out of total electricity consumption in 2016 (described in Section C.2). Electricity import within the Central Energy System is reducing from 6% in 2013 to 3% in 2015. Latest 3 month data of electricity import in the CES was described in the section C.2 in table C.2.5. The current electricity import was 1.4% in Jan 2017 and 1.9% in Feb 2017.

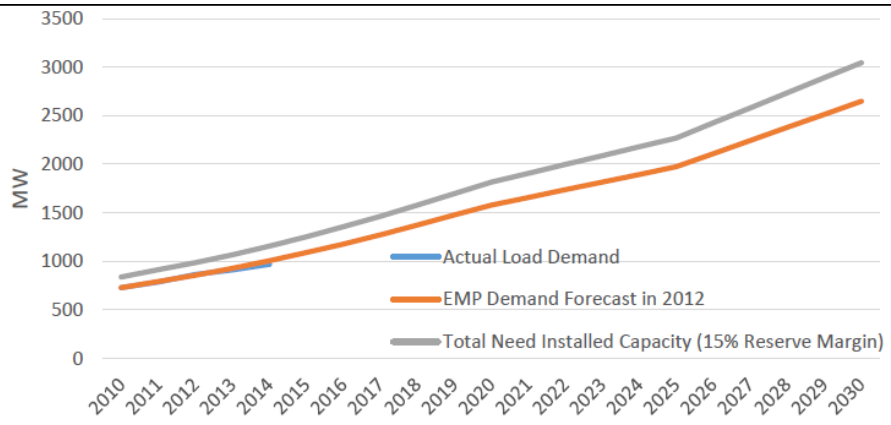
Projected demand for power

However, power and heat demand in the country is expected to grow significantly over the next few years. ADB estimates that power demand in Mongolia, in the medium growth scenario, will more than triple between 2011 and 2020 (from 774 MW to 2404 MW), driven primarily by an over 900 MW increase in power demand from the two large mines (Tavan Tolgoi and Oyu Tolgoi) that are currently under development in the mining region of South Gobi. In the low (CAGR 9.3%) and high (CAGR 10.5%) growth scenarios estimated in the ADB report, total power demand by 2030 is 4073 MW and 4961 MW respectively."

Long term electricity load demand forecasting was carried out in 2012 as a part of updating energy sector master plan, which estimated around 9% of annual demand growth as base case. In spite of recent economic slow-down, actual electricity load demand growth has been on the long term forecasting trajectory. Given that the demand grows in line with such trajectory, load demand growth will be increasing to 2,617 MW in 2030, and the need install capacity to meet demand (including 15% of safety reserve margin) will be more than 3,000 MW (Figure C.5.1.).

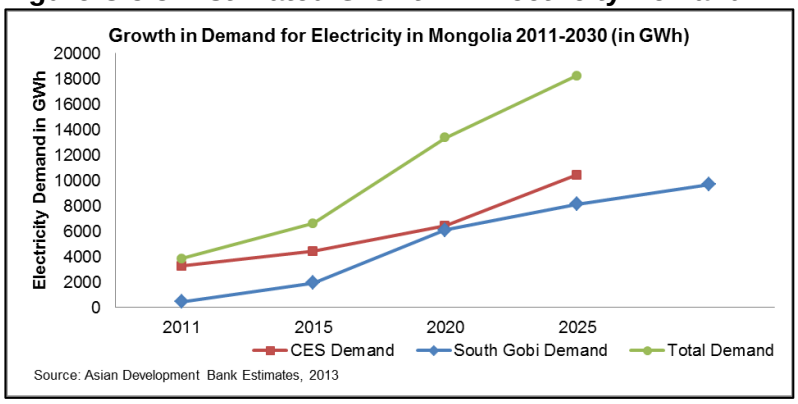
Figure. C.5.2. Electricity Load Demand Forecast and Need Capacity

[7] ADB (2013) Market Assessment for Proposed Financial Intermediary Loan for Clean Energy and Energy Efficiency



Source: SREP (2015)

Figure C.5.3: Estimated Growth in Electricity Demand in Mongolia 2011-2030 (in GWh)

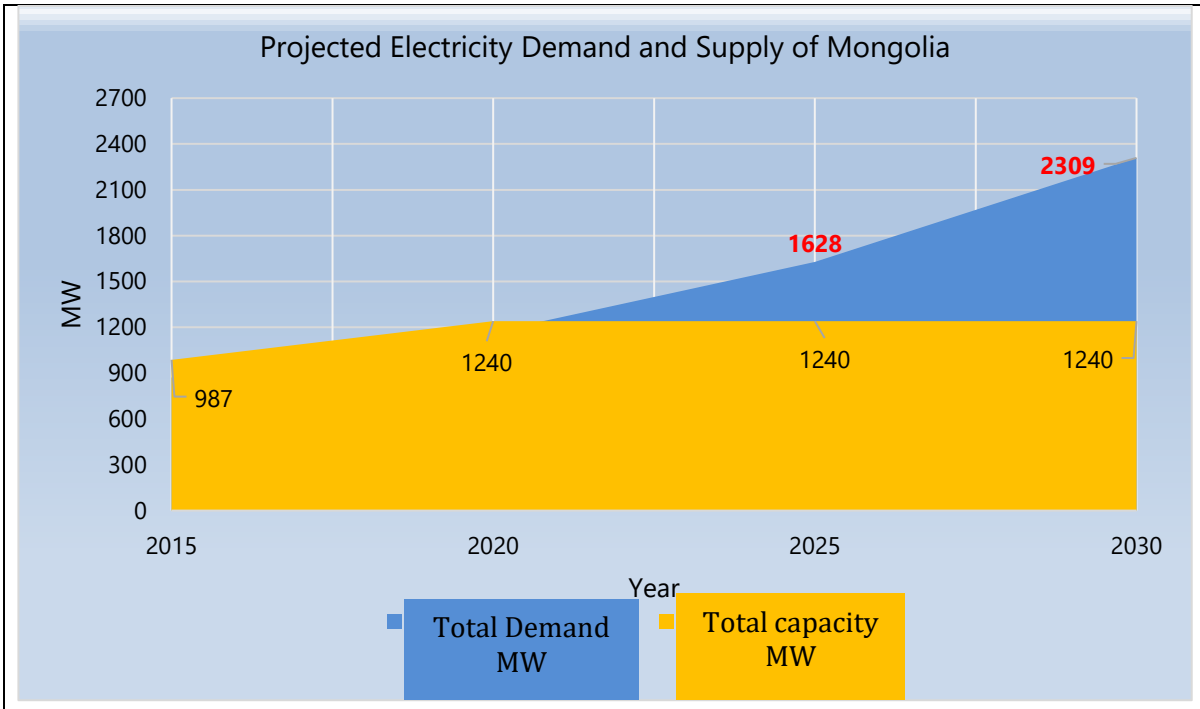


According to SREP (2015) report, the additional RE capacity required by 2023 is around 75 MW. An additional 450 MW will be required by 2030 for a total of 530 MW to reach to 30% of total capacity. All involved parties recognize that renewables are an area where Mongolia has particular potential and must be harnessed to meet the growing gap between supply and demand. The Ministry of Energy has stated that “In order to meet Mongolia’s energy consumption growth for 2015- 2030 and to export electricity, it is necessary to build power stations near mining deposits and big capacity hydropower, wind parks, and solar systems.”

Latest Forecast for Power Demand

In 2016, the experts of ADB re-forecasted the energy demand based on the slowdown in economic activities, and revised annual increase in demand to be 4.4% p.a. Under the lowest scenario, projected energy demand will be 4.4% p.a.

Figure C.5.4. Projected Electricity Demand and Supply of Mongolia



Source: ADB (2016)

Secondly, most of the existing coal-fired power plants are aged as can be seen from the following by "Years Installed" and "Efficiency". This means majority of the country's energy supply's reliability can't be guaranteed and there is risk for supply disruption. This creates an ultimate need for creation of new generation sources.

Thirdly, cost of electricity import is increasing which increased need for local electricity sources. In the past, due to increase in price of import electricity and the increase in amount, the total import cost have increased significantly. Between 2011 and 2015, the cost has increased on average by 13%.

Pricing structure

XacBank's loan policy states that the Bank shall only disburse loans in the same currency as the business's income is in. Therefore, if a company's income is in USD, then they are eligible for USD loans, and the same applies for MNT income businesses. Nearly all of Mongolian business' incomes are in MNT, so the Bank carries the brunt of the currency exchange risk because the Bank receives large sources of funding in USD, and then converts it to MNT in order to disburse in MNT, which represents a large cost to the Bank and in turn, the customer.

In the case of the subproject under this program, the revenues will be based on the feed-in tariff, which the Government of Mongolia has set in USD. As such, the loans will also be disbursed in USD. This allows XacBank to make best use of the GCF concessionality of the loans, as neither party will bear the currency exchange costs described above

The proposed loan tenure entails a 10 year term for the project with 1 year's full grace period from XacBank interest payments, with a capitalized interest component, and 18 months' grace period from principle payment. Capitalized interest will be paid starting in the second year of the tenure, so as not to burden the project owner in the beginning stages of implementation. During this 1 year period, XacBank will still be making interest payments to the GCF. Therefore, XacBank requests that the GCF to disburse to XacBank with maximal possible concessionality and a 10 year tenure for the funds.

Price controls

According to the RE Law of Mongolia adopted in 2007, the following Feed-in-Tariff (FiT) will apply to renewable energy projects (Table C.5.4). Tariffs are guaranteed to investors for a limited period of ten years from the date of the law, i.e. until January 2017. Solar power FiT was set as the highest tariff compared to wind and hydro power sources between 0.15-0.18 USD/kWh. As the FiT was set in 2007, the government is considering amending the FiT for future projects. However, this will not affect projects that have signed PPA.

According to the law, any price difference of electricity generated by a renewable energy power source, connected to a transmission network, shall be absorbed in selling prices of other generators connected to the transmission network.

Subsidies

The following two Government Resolutions will be considered as the incentive to RE project developers. More information about tax exemption is explained in the section C.6.

Table.C.5.8. Government Resolutions of Mongolia

#	Name of Resolution	Date	Details	Categories
303	Exempts from 10% of Corporate Income Tax	23/8/2013	Exempts about 41 environmentally friendly technologies & products	Targeted to wind, solar and hydro power project technologies
191	Exempts from 15.5% of customs and VAT	14/6/2014	Exempts over 100 technologies & products to supports SMEs	Mostly industrial products divided into 25 groups

Table.C.5.9. Investment Law of Mongolia

Name of Law	Purpose	Date	Article #	Details
Investment Law	The purpose of the law is to protect the interests of local investor's rights, interests, encourage investment, and stabilize the tax environment relating to a certain project.	23/8/2013	11	Article 11 focuses on tax incentives for investors. It indicates that imported construction equipment's for Energy Production facilities will be exempt from customs and VAT for up to "0".
			12	Article 12 focuses on nontax related incentive for investors. It indicates the land can be purchases or used for up to 60 years, with an additional one time extension for another 40 years.

Government involvement

Energy sector of Mongolia is controlled and dominated by state-owned suppliers. PPA, FiT, licenses, approvals and all permits shall be obtained from the government authorities. Once the project is operational, project developers shall operate according to the National Grid Code and supply generated electricity within the grid's capacity to absorb RE sources. In that sense, role of government involvement in project operation will remain an important factor.

C.6. Regulation, Taxation and Insurance (if applicable)

Government Licenses and Permits

XacBank acquired its commercial banking license on December 28th, 2001. A copy of said license can be made available if necessary. XacBank does not need to obtain any additional licenses or permits to carry out the proposed activities in this program. Project developers will be in charge of obtaining all necessary licenses and permits to carry out the project. The main licenses, permits and documents are described below in Table C.6.1 by each project.

Regulation

List of all key regulations that support RE development are described in the section C.2. (Table C.2.12). Brief list of the described regulations are shown below:

- The National Renewable Energy Program 2005
- The Renewable Energy Law of Mongolia 2007 (amended in 2015)
- The Energy Law 2007
- The Government Program (2012-2016) 2012
- National Action Program on Climate Change (NAPCC) 2010
- State Policy on Energy (2015-2030) 2015

Insurance

XacBank holds the following insurance policies:

- Corporate Liability Insurance
- Bankers Blanket Bond and Electronic & Computer Crime Insurance Policy
- Directors & Officers Liability Insurance
- Comprehensive Crime Insurance

Sub-project insurance:

XacBank's holding company, Tenger Financial Group, has an insurance company called Tenger Insurance, which provides insurance services to sub-projects financed through XacBank. If necessary, Tenger Insurance provides insurance risk evaluation free-of-charge to sub-projects financed by XacBank. This risk evaluation can be performed during the implementation process of the project as well as at its completion stage. The sub-project under this project will be required to have this insurance risk evaluation performed before the project starts. The evaluation will outline the necessary insurance arrangements for the sub-project. The Bank will require the sub-project to have the necessary insurance arrangements according to the evaluation performed by Tenger Insurance.

Taxation

The GCF is aiming to obtain Privileges and Immunities (P&I) in Mongolia. If successful, XacBank is not required to pay any withholding tax upon receiving funding from the GCF. Otherwise, XacBank will pay the withholding tax.

At project level, during construction phase, there will be VAT tax, Import Tax, and Customs Duties applicable for procurement of CAPEX; however, certain renewable energy equipment are exempt from Import Tax, VAT, and Customs duties under the Minister's Decree. In addition, there will be VAT and Withholding Taxes applicable for any services procured during construction. During operations phase, all other taxes in business as usual case apply.

List of applicable government resolutions and laws are described in the Table.C.5.8 and C.5.9.

Table.C.5.8. Government Resolutions of Mongolia

#	Name of Resolution	Date	Details	Categories

303	Exempts from 10% of Corporate Income Tax	23/8/2013	Exempts about 41 environmentally friendly technologies & products	Targeted to wind, solar and hydro power project technologies
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			12	Article 12 focuses on nontax related incentive for investors. It indicates the land can be purchases or used for up to 60 years, with an additional one time extension for another 40 years.

C.7. Institutional / Implementation Arrangements

XacBank (AE) will oversee the program and provide project finance to the project developers at 49% of their total requested loan amount. The project developer shall secure the rest of the project finance and be in charge of project implementation. Project level governance will be managed by each of the project developers while program level governance will be managed by XacBank. As such, XacBank will manage the facility and provide necessary governance for it.

Roles and responsibilities of the project developer and XacBank are described in the following Figure C.7.1.

Figure C.7.1. Project Structure

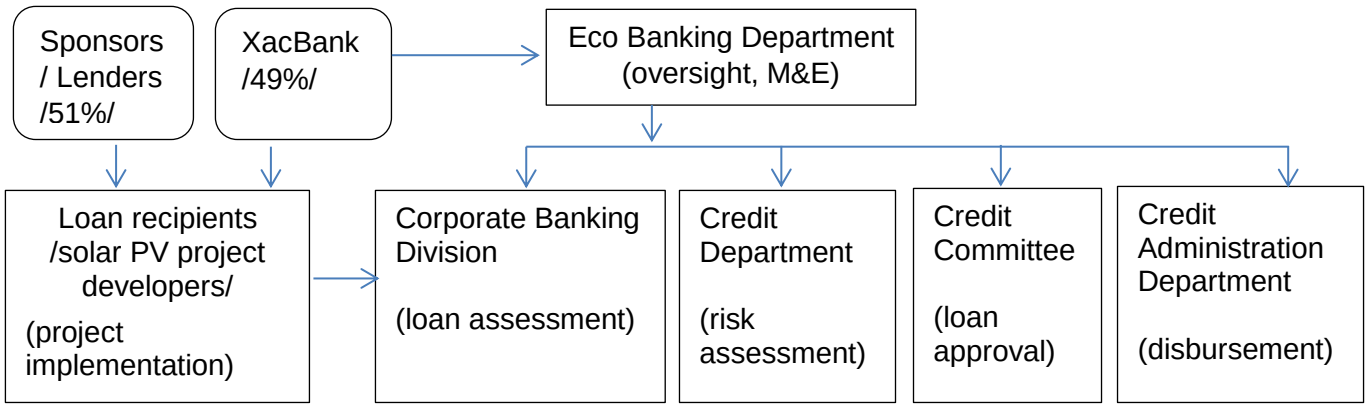
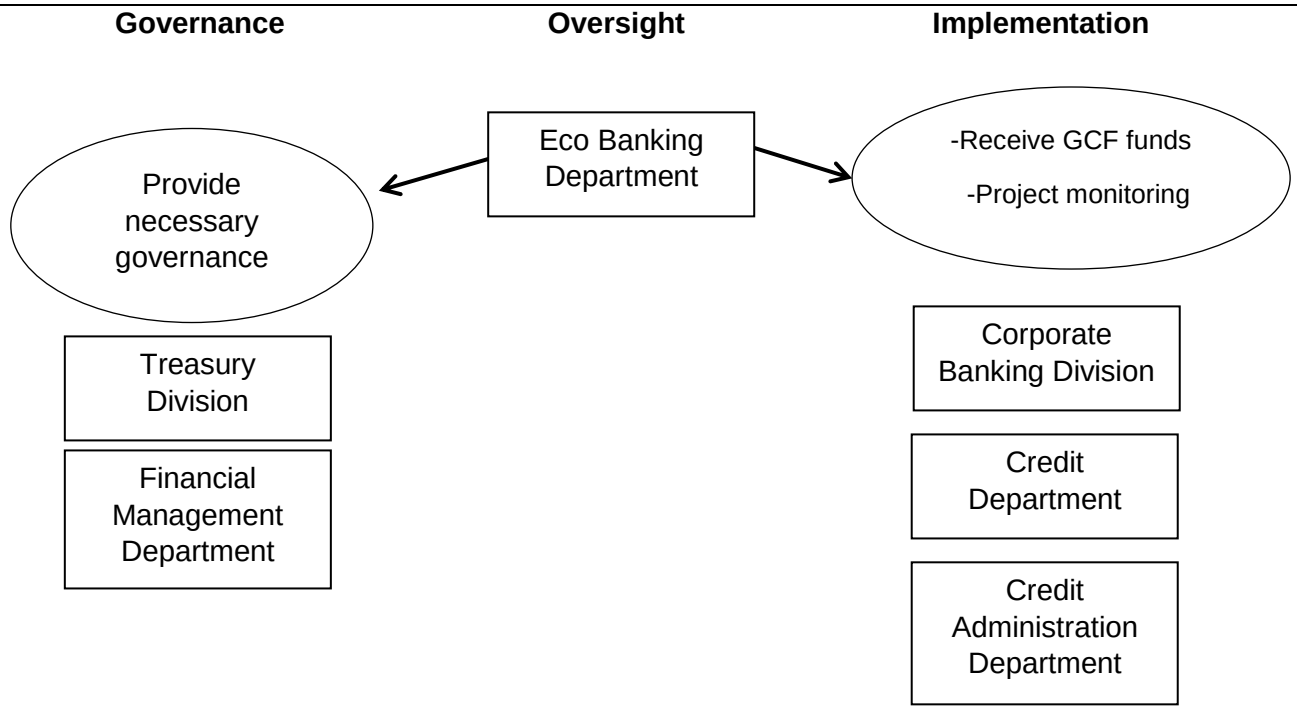


Table.C.7.1. Governance of the Program

Roles & Responsibilities	Project Developers	XacBank
Governance	Project-level management and implementation	Program-level management and oversight
Finance	Secure 51% of the total loan amount	Provide remaining 49% of the requested total loan amount

Figure.C.7.2. Organigram of Project Structure



Program Implementation Process

The process of providing loans to the solar PV project will follow the below normal bank disbursement procedures that are applied to large loans to corporate customers (greater than 1.0 billion MNT or USD 410k), as well as implementation arrangements specific to the subproject as outlined in this section. Additional steps will be required on monitoring and evaluation (M&E) to evaluate the GHG emission reduction.

Loan assessment and approval process are described in detail below:

1) **Loan assessment:**
As this loan proposal is considered a large loan, it will be assessed by two specialists of XacBank's Corporate Banking Division at corporate headquarters. The Credit analyst will do the due diligence to the project and provide loan appraisal based on the following "5-C" analysis and will submit loan appraisal to the Credit Department. Loan appraisal will covers all necessary due diligence measures, including AML and KYC measures, such as where the organization's income, original capital, investors, shareholders, etc. all originate from. Credit risk analyst of the Credit department will provide an independent assessment regarding loan risks.

1. **Customer behavior /CHARACTER/**: determine business structure, management, employee background, experience, productivity, credit history and purpose of loan etc;
2. **Business environment /CONDITION/**: explore the business, premise, equipment, product/service and determine the micro element or consumers, suppliers, competitors, legal environment and other impacting factors and reveal their potential impact on loan repayment;
3. **Loan repayment capacity/ CAPACITY/**: analyze loan repayment resources, short and long term objectives of the business, business plan, and determine the loan efficiency of the business;
4. **Capital for risk coverage capacity/ CAPITAL/**: based on the financial analyses define the real value of the legal entity and study the equity fund, secondary investment (loan from the shareholders) and debts held by related companies
5. **Collateral asset /COLLATERAL/**: define the collateral asset type, quality, structure, ownership/ occupancy, liquidity, adequacy and insurance. These elements shall be regulated by the "Procedure on Collateral Requirements"

2) Additional Documentation for Loan Assessment:

1. Although the loan proposal is greater than 1.0 billion MNT (410k USD) and subject to conducting an Environmental and Social Responsibility Risk Evaluation in accordance with XacBank's Environmental and Social Management System (ESMS), it is a new project where activities are not yet started, so the evaluation would not be made at the stage of due diligence. However, the project would need to undergo general Environmental Impact Assessment (EIA), which needs to be approved by the Ministry of Environment and Tourism of Mongolia. Depending on the result of the general EIA, projects may need to undergo Detailed Environmental and Social Impact Assessment (ESIA). The credit analyst at Corporate Banking Division and Credit risk analyst at Credit Department will review all these assessment documents against the XacBank's requirements.
2. The project developer needs to provide the following information to meet the GHG emission reduction criteria which will be checked and verified by the Eco Banking Department (EBD):
    1. Estimate of CO2 emission reduction calculation with methodology and formula of its calculation whenever it is updated;
    2. Calculation of the grid emission factor for the selected grid (i.e. Central Grid Emission Factor for the SPP) whenever it is updated;
    3. All data used in the calculation of grid emission factor and CO2 emission reduction to verify the data (data needs to be conservative and up to date using the latest methodologies);
    4. Plans on meter calibration as per national and industry standards to verify the accuracy of metering equipment.

3) **Site Visit**: Credit Analyst (and if necessary, Credit risk analyst as well) will conduct an on-site visit to verify information obtained during the interview process. Information on customer behavior, debt coverage capacity, and collateral assets are may be obtained and verified via interviews with third parties.

4) **Loan Proposal**: Following the interview and in-person site visits, the loan applicant and Credit Analyst will prepare a loan proposal.

5) **Review**: The loan proposal is then reviewed by the Credit Committee. After receiving approval from the Credit Committee, the loan will be disbursed. Loan disbursements will be made in tranches according to major milestones of the project implementation schedule as outline in the loan proposal.

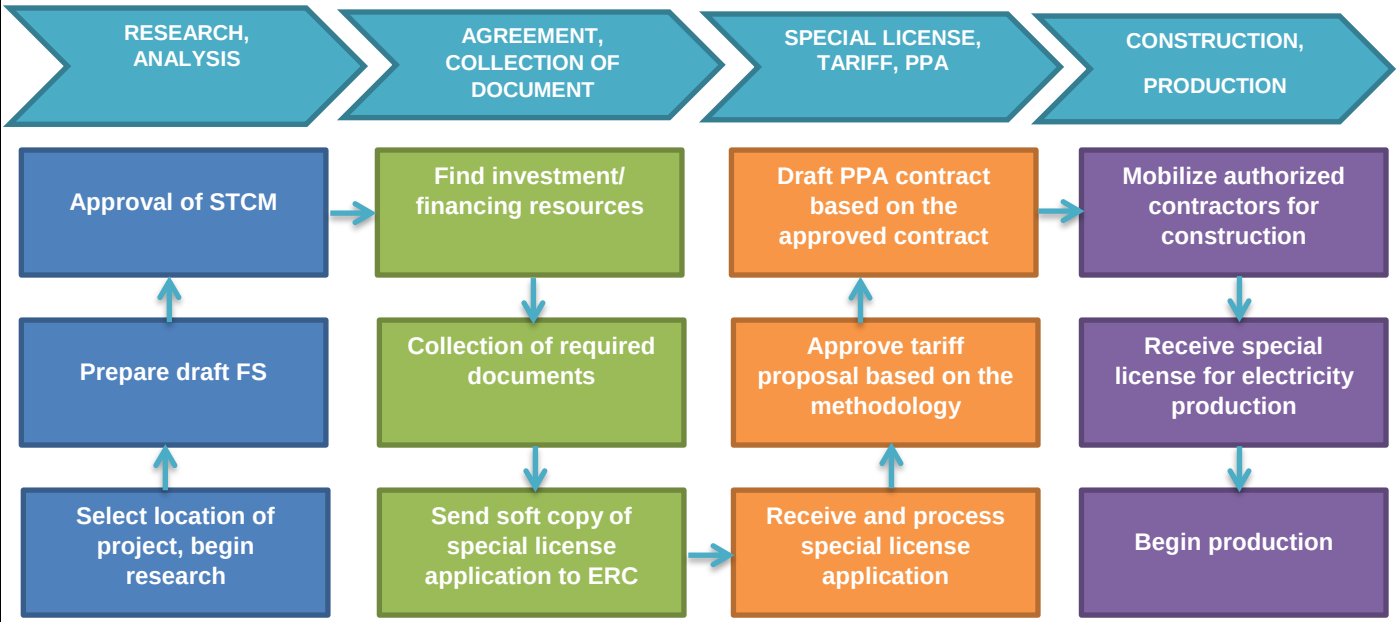
6) **Monitoring**: Following the disbursal, the credit officer conducts scheduled monitoring of the borrower to ensure that the loan is being used for its original purposes.
As part of XacBank's monitoring, the following information will be required from the project developer at the mid-point and at the end of the year:
    i. Financial related information as required by the Corporate Banking Department
    ii. Monthly data of electricity generation and supply to the grid with evidences of electricity sale, meter measurement and meter calibration where applied (as required by the EBD). Monitoring of the generated and supplied electricity will be carried out by the project developers on an ongoing basis and to be reported to EBD twice a year (mid-year and at the end of the year) describing the actual electricity supply vs estimated amounts. Aggregated data will be monitored and recorded by EBD to verify CO2 emission reduction. If project developers obtained new data to update the grid emission factor and the project's CO2 emission reduction, calculation with evidence of data shall be provided to EBD to update the numbers.

7) **Post-Evaluation**: Post-evaluation will be conducted once a year (at the end of the year) to verify if the anticipated electricity generation and CO2 emission reduction has been achieved as planned. The project developer needs to provide evidence of supplied electricity to the grid, evidence of payment made for the sold electricity, meter results since the date of operation and meter calibration test results among others.

Project Implementation Process

The project developer will follow the process described in Figure.C.7.3. to obtain the key licenses related with obtaining construction license for solar PVs and electricity production license which are issued by the ERC.

Figure.C.7.3. Project Development and Licensing Process set by the Energy Regulatory Committee



- Select location of the project and receive authorization to perform basic research from the local administration.

- Draft general feasibility study

- Begin negotiation with projects funders/financiers

- Collect all the required document for Energy Facilities Construction License based on the Energy and Renewable energy law frame, and submit with the application to ERC

-Special license application will be received electronically in an E-License format. If all the requirements are met the request will be processed and approved within 60 days.

-The projects tariff will be approved according to the energy and renewable energy law frame.

-Draft PPA and other relative contracts with "National Dispatching Center" LLC

-Mobilize authorized contractors from construction

-Give operation to State committee when construction work ends

-Begin electricity (heating) operation after receiving license from ERC

Abbreviation:
STCM – Science and technology committee meeting
FS – Feasibility Study
ERC – Energy regulatory Commission
PPA – Power purchasing agreement

C.8. Timetable of Project/Programme Implementation

NB: The outputs and activity numbers in C.8 correspond to the logframe work in H.1, where they are further elaborated upon.

Program-wide Implementation Timeline

TASK	2017				2018				2019				2020				2021				2022				2023				2024				2025				2026				2027				2028			
CALENDAR QUARTERS	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40	Q41	Q42	Q43	Q44	Q45	Q46	Q47	Q48
PROGRAM LIFETIME			Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40	Q41	Q42	Q43	Q44	Q45	Q46
Output 1. *Project assessment by XacBank*																																															
Activity 1.1. Loan assessment and preparation of loan proposal (conducted by Corporate Banking Division)																																															
Activity 1.2. Credit risk assessment and providing independent credit risk opinion																																														

(conducted by Credit Department)																																																
Activity 1.3. Credit Committee approval																																																
Activity 1.4 Submit RSF application																																																
Output 2. *FP Assessment by GCF; RSF assessment*																																																
Activity 2.1. FP assessed by GCF																																																
Activity 2.2. GCF Board approval																																																
Activity 2.3 RSF approval																																																
Activity 2.4. Conclusion of FAA and disburseme nt of funds to XacBank																																																
Output 3.																																																

Disbursement of the sub-loan																																																
Activity 3.1. Conclusion of the Sub-Loan agreement (conducted by Corporate Banking division and Credit Administration department)																																																
Activity 3.2. Disbursement of the loan to sub-borrower (based on Credit Committee resolution and Sub-loan agreement, disburse-ment will be made partially)																																																
***Output 4**. Monitoring and annual performance reports*																																																

(monitoring schedule is subject to change according to the Credit Committee resolution. Monitoring reports will be sent as part of the APR. See H.2 for details)																																									
Activity 4.1. Credit monitoring by Corporate Banking division																																									
Activity 4.2. Emission reduction monitoring by Eco Banking department																																									
***Output 5:** Interim Evaluation report*																																									
***Output 6:** Completion report*																																									
***Output 7:** Final*																																									

Evaluation report

Grant Implementation Timeline

Note: As XacBank is submitting for Q3 approval, activities will not beginning until Q4 of 2017. The section prior to disbursement is marked in orange shading.

Task	2017				2018				2019				2020				2021				2022				2023				2024				2025				2026				2027				2028			
Calendar quarters	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40	Q41	Q42	Q43	Q44
Output 1. Strengthen analytical capabilities																																															
Activity 1.1. Announce PF lead and PF analyst jobs, receive applications																																															
Activity 1.2. Select PF specialist																																															
Activity 1.3. Brief, update, train PF specialists in accordance with XacBank policy																																															
Activity 1.4 PF specialists to lead internal trainings, as inclusive in their contract																																															
Output 2. Strengthen internal capabilities																																															
International trainings																																															
Activity 2.1. XacBank staff secondment at best practice institutions																																															
Activity 2.2 PF modeling, designing and assessing																																															
Activity 2.3 Legal implementation of PFs																																															
Activity 2.4 Measuring and monitoring of the PFs																																															
Activity 2.5 Risk analysis																																															
Activity 2.6 Attending to the workshops, forum and conferences to learn and share best practices																																															

practices	
Output 3 Training and awareness raising of clients	
Activity 3.1. *General awareness raising to stimulate future clients for REP*	
Output 4: Supporting Risk, audit, and legal needs	
Activity 4.1 Third party risk opinion; Independent social and environmental audit; independent engineer who will be responsible for technical monitoring and issue the certificate of completion	As needed
Activity 4.2 Develop PF agreements; drafting of legal documents related to PF	As needed

D.1. Value Added for GCF Involvement

Investments in renewable energy involve higher upfront costs and longer pay back periods than both conventional investments and energy efficiency investments. The costs borne by developers over this payback period need to be minimized to maximize internal rate of return. So far, the project developer has demonstrated the bankability of their projects by sourcing financing for their projects from international investors, in the form of equity. However, to complete their project, they still are in need of loans. Market interest rates in Mongolia are prohibitively high and tenors are prohibitively short for investments in renewable energy. Mongolia's Central Bank's policy rate is 14%, which leads to extremely attractive deposit savings rates (about 15-16% for local currency), which in turn leads to very expensive loan rates, which also come with very short terms (maximum of 5 years, usually less than 3 years). Mongolia's government domestic bond rate is currently at 18%. These conditions illustrate the shortcomings of financing options in Mongolia as well as a lack of access to adequate funds for not only large scale projects, but for the entire country itself. As XacBank is a commercial bank and not a development bank, and despite its efforts to lessen the burden of loans on its customers by attracting sources of funding from international partners, the Bank is still not able to offer sufficient low cost, long term financing. Without the GCF's support, XacBank's ability to finance renewable energy projects such as the project included in this proposal would be extremely limited.

The GCF provides access to funding at competitive rates. GCF involvement will allow XacBank to provide beneficial financial terms to sustainable development project implementers who have been interested in implementing such projects but discouraged by high loan interest rates in Mongolia. With the GCF's ability to provide concessionary loan support (competitive rates and longer tenures), XacBank will be able to offer a loan that allows the project to go forward while not over-burdening the developer with debt during the course of the payback period. Without such concessionary financing, the project would not be able to go forward.

In addition to the clear benefits of GCF involvement for XacBank and the project developer, GCF involvement also benefits the end-beneficiaries of this project i.e. the Mongolian people. Access to consistent electricity supply is a much needed public and social good in Mongolia. See section E.3 for further information on the benefits the program's implementation would provide to end-beneficiaries, including health, economic, and social benefits. As mentioned earlier, without the GCF's support, XacBank's ability to finance renewable energy projects such as the project included in this proposal would be extremely limited. Thus the benefits to end-beneficiaries for GCF involvement are the same as the benefits of the implementation of the project for end-beneficiaries in general, which can be found in E.3.

In addition, as part of the first batch of large-scale on-grid energy generation, there are certainly risks affiliated with the project. Local financial institutions are wary of taking on such risks and lack expertise. However, the GCF's extensive experience in this sector and support for the projects will encourage local FI to increase their involvement in RE financing. Thus, in addition to pure financial needs of the project developers, there is a paradigm-shift value add for GCF involvement in these projects. The GCF's involvement in this proposed solar power program would mark the first experience of developing project finance through GCF's finance in Mongolia to be provided by GCF's National Implementing Entity XacBank with direct access to offer concessional financing terms. Currently, the only other renewable energy projects in existence in Mongolia of comparable scope are the Salkhit wind farm (50 MW) and the Darkhan SPP (10MW).

Finally, the GCF has great value added in being able to support XacBank's ability to develop the necessary capacities for this program through grant funding. This program represents a large increase in XacBank's project financing portfolio. As such, XacBank recognizes its need to on-board project financing specialists, a dedicated portfolio manager, as well as general capacity building for existing staff that would allow XacBank to better implement this renewable energy program. With these capabilities, XacBank will be able to mitigate first-mover risks and become an industry leader in renewable energy implementation capabilities, technical capacity that is sorely needed if Mongolia is to exploit its renewable energy potential.

2. Exit Strategy

Once the funding is provided, the GCF does not need to be highly involved in program operations. The Fund's support is initially required to provide an affordable source of financing to the power plant. XacBank will report on the facility's disbursement to GCF periodically to describe how funding is being used, including financial statements (balance sheet, income statement), GCF loan portfolio quality report, and emission reduction report together with GCF loan portfolio.

The GCF's exit strategy is quite simple, as XacBank will be paying the GCF back directly, based upon the terms that the GCF is able to offer. Exit risk is minimal. GCF exit will coincide with XacBank exit, as both the loan from GCF to XacBank and XacBank to the client will identically tenured. If there arises any NPL during the loan tenure period, XacBank will cover the risk, therefore, it presents no risk to the GCF.

E.1. Impact Potential

Potential of the project/programme to contribute to the achievement of the Fund's objectives and result areas

E.1.1. Mitigation / adaptation impact potential

Total CO2 emission reduction from the solar program will be 306,745 tCO2 for the whole project lifecycle of the solar project based on the most conservative estimations. This is the most conservative calculation using IPCCC default values in the calculation. If the local data will be used emission reduction will be higher as the local data greatly vary from the international values. Calculation of the emissions is show in below Table.E.1.1.

Table. E. 1.1. Total tons of CO2 equivalent to be avoided or reduced per annum

	Projects	Net electricity supply (MWh/y)	Grid Emission Factor (tCO2)	Emission reduction per year (tCO2)	Project Lifetime	Total emission reduction (tCO2)
1	SPP	15,395	0.797	12,270	25	306,745
	Total	15,395	0.797	12,270	25	306,745

Expected total number of direct and indirect beneficiaries and number of beneficiaries relative to total population (e.g. total lives to be saved from disruption due to climate-related disasters)

10 MW SPP has the following benefits:

1) supply electricity to about 20,000 households based on the average monthly electricity consumption of a household at 150-200 kWh source[8].
2) create employment of 200-250 people during the construction period and about 10 people during the operation period.
3) save around 171 thousand liters of water per year which totals to around 4.2 million liters of water for the whole project lifetime of 25 years compared to conventional CHPs which use water to produce electricity and heat Based on water consumption of Thermal Power Plants in the CES, around 9-10 liters of water are used per kWh[9].

Table.E.1.2. Water Savings by Solar Power Project

	SPP
Gross Annual Electricity Generation (MWh)	17,105
Annual Water Savings (liter)	171,050,000
Project lifetime (year)	25
Total water savings for project lifetime (liter)	4,276,250,000

As solar PVs will not use coal, the proposed solar PVs will prevent coal burning that would have been used in power plants to produce the equal amount of electricity. Based on coal consumption of Thermal power plants in the CES, around 0.899 kgs of coal is burned per kWh[10]. Therefore, the SPP will reduce coal

[8] Ulaanbaatar Electricity Distribution Network

[9]

[10]

consumption by about 15 thousand tonnes per year. For the total program duration, total coal saving will be 384 thousand tonnes (calculation is provided below in table E.1.3).

Table.E.1.3. Coal Savings by Solar Power Project

	SPP
Gross Annual Electricity Generation (MWh)	17,105
Annual coal saving (tonnes)	15,377.40
Project lifetime (year)	25
Total coal savings for program lifetime (tonnes)	384,434

E.1.2. Key impact potential indicator

Provide specific numerical values for the indicators below.

GCF core indicators	*Expected tonnes of carbon dioxide equivalent (t CO_2 eq) to be reduced or avoided (Mitigation only)*	*Annual*	12,270
		Lifetime	306,745
	• *Expected total number of direct and indirect beneficiaries, disaggregated by gender (reduced vulnerability or increased resilience);* • *Number of beneficiaries relative to total population, disaggregated by gender (adaptation only)*	*Total*	n.a
		Percentage (%)	n.a
Other relevant indicators	*Examples include:* • *Expected increase in the number of households with access to low-emission energy* • *Expected increase in the number of small, medium and large low-emission power suppliers, and installed effective capacity* • *Expected increase in generation and use of climate information in decision-making* • *Expected strengthening of adaptive capacity and reduced exposure to climate risks* • *Others*		

Emission reduction calculation

Name of the methodology used: approved JCM methodology **MN_AM003 "Installation of Solar PV Systems"**

Emission factor of the national grid: **0.797 tCO2/MWh** which applies the lowest emission factor of coal-fired power plant supplying electricity to the national grid. This value is lower than the grid emission factor for CES, which is 1.154 tCO2/MWh (combined margin, 2012) published by Mongolian government, and it ensures net emission reductions.

Application: 0.797 tCO2/MWh will be applied in case the PV system in a proposed project activity is connected to the Mongolian national grid (supplied by the Central Energy System (CES), Western Energy System (WES), Altai-Uliastai Energy System (AUES), Eastern Energy System (EES), and/or Southern Energy Systems (SES)) including internal grid which is not connected to a captive power generator.

Calculation: In order to identify the emission factor based on the national grid simplistically and secure net emission reductions, this methodology applies the lowest emission factor of coal-fired power plant supplying electricity to the national grid. The calculation of each coal-fired CHP plant emission factors was conducted using the specific fuel consumption of each power plant from the national authority and default

values (Table 2) determined by the national authority and IPCC guidelines. Detailed calculation of emission factor of coal-fired power plants in Mongolian national grid can be seen from this IGES (2016) calculation.

Table. C.2.7. Constants for calculation of emission factor

Item	Values	Reference[4]
CO_2 emission factor for lignite coal	90,900 $kgCO_2/TJ$	IPCC guideline for National Greenhouse Gas Inventories 2006, Chapter 2, stationary combustion
Net calorific value for lignite coal	29.33 TJ/Gg	Mongolian national standard

* Since the auxiliary power consumption is unknown, the plant efficiency of gross electricity generation is applied. This ensures the calculation of a conservative emission factor.

Source: IGES (2016) Calculation of Conservative Emission Factor of Mongolia

Table. E.1.1. Total tons of CO2 equivalent to be avoided or reduced per annum

Projects	Net electricity supply (MWh/y)	Grid Emission Factor (tCO2)	Emission reduction per year (tCO2)	Project Lifetime	Total emission reduction (tCO2)
SPP	15,395	0.797	12,270	25	306,745

The same calculation of grid emission factor was done by IGES in Sep 2016 as part of JCM project development[11]. All data used to calculate the grid emission factor can be seen from IGES (2016) calculation.

E.2. Paradigm Shift Potential

Degree to which the proposed activity can catalyze impact beyond a one-off project/programme investment

E.2.1. Potential for scaling up and replication (Provide a numerical multiple and supporting rationale)

Scale-up potential (program level):

XacBank will continue its Renewable Energy Program (REP), bundling similar solar projects together, and develop new REPs for other RE sources including wind and other potential projects. Therefore, the possibility of replication and expansion of the REP is high and highly potential given the abundant RE sources within Mongolia that was described in detail in Section C.5.

In addition, with the inclusion of grant funding, XacBank would be able to develop its project financing and large scale renewable technology capabilities in such a way as to make the realization of further iterations of the REP program seamless

Scale-up potential (geographical):

National

The SPP project has the potential to propel a paradigm shift in Mongolian energy supply. The energy system in Mongolia is divided into five areas. The Central Energy System (CES) is the largest and includes the Dalanzadgad Energy System (DES) in the South Gobi. The smaller energy systems are the Western Energy System (WES), the neighboring Altai-Uliastai Energy System (AuES), and the Eastern Energy System (EES).

[11] IGES (2016) Calculating Conservative Emission Factor of Mongolia

The central region is currently powered in overwhelming majority by coal. In addition, the Central and Western energy systems are interconnected with and dependent upon energy generation from Russia. The Central Energy System is the largest and most high-profile, due to its service of the capital, Ulaanbaatar. The integration of self-sufficient and renewable-powered energy sources in this high-profile area would be demonstrative of the power of renewables not only in provincial, low-growth settings, but also in serving the high-growth over-taxed central grid (Western Energy System (WES), the neighboring Altai-Uliastai Energy System (AuES), and the Eastern Energy System (EES)). These systems are secondary to the central system, and have the potential, based on natural resources and regional demand, to become renewable-powered at much faster rate than the central energy system. The project here proposed could demonstrate the viability and bankability of solar integration and encourage the other energy systems to expand development of renewables.

The expansion of self-sufficient and renewable energy powered energy systems could begin with the two secondary energy systems in the south and east of Mongolia. The other projects would be similar indicators of the viability and bankability of solar throughout the four energy systems.

International

Even once Mongolia achieves energy independence through the implementation of renewables, there remains further scale-up that could be implemented. The Mongolian market is relatively small, with only 3 million people. By comparison, the renewable energy potential is enormous, estimated at 2.6 terawatts. If and once cross-border grid infrastructure is developed to export renewable energy, Mongolia could become a net exporter of energy. IRENA writes “The notion of exporting renewable power from the Gobi Desert through the Asian Super Grid (ASG) is attracting increasing interest from investors and developers. The grid would connect Mongolia, Russia, China, the Republic of Korea (South Korea) and Japan.”

E.2.2. Potential for knowledge and learning

Experience from the first solar and wind project development in Mongolia are described below with the program’s contribution in strengthening RE project development, knowledge sharing and capacity building.

Development of the first wind farm (50 MW Salkhit wind farm) brought significant experience to Mongolia’s renewable energy sector development in terms of negotiating, signing and implementing the very first Power Purchase Agreement (PPA), integrating RE source into the Central Grid, and understanding the operation of RE sources within the current National Grid Code. From project developers perspective, it also became the first experience of constructing a RE source, employing over 500 people during construction period with about 20 subcontractors. Project finance experience of finalizing financial close with international investors and meeting international best practices of developing and operating a RE source greatly contributed in increasing the capacity of both private sector players and government side from regulatory stand point. All of the next RE projects followed Salkhit wind farm’s experience of developing and integrating a RE source into the national grid.

While Salkhit wind farm was developed as a Clean Development Mechanism (CDM) building local capacity from CDM side, development of the first solar PV (10 MW Darkhan solar PV) is bringing great deal of experience not only for developing solar projects in general and integrating it into the Central Grid, but also on how to develop solar PVs as a Joint Crediting Mechanism (JCM). The project has project design documents, established monitoring and reporting standards, methodologies and templates, as well as calculations of CO2 emission reduction based on verifiable data. All of this information are publicly available, and can be used as an example for future projects.

In the case of the 10 MW Darkhan solar PV, project development experience of constructing and operating the solar PV into the Central Grid is providing useful benchmark experience to compare the proposed solar project that is pursued in this funding proposal.

Based on the above experience of the first wind and solar projects, XacBank's REP for the SPP can contribute to the development and operation of SPPs into the national grid for the following reasons:

1) Firstly, XacBank's solar program will be the first experience of developing project finance through GCF's finance in Mongolia to be provided by GCF's National Implementing Entity XacBank with direct access to offer low interest rate loans. In this respect, the first mover risk is certainly present, but as the other side of the coin, so is paradigm shift potential present. This experience will contribute greatly to the project developer in resolving financial closing for 49% of the total investment cost with affordable interest rate as well as obtaining finance from local entity rather than multilateral banks.
2) Secondly, the first mover risk will be mitigated by the inclusion of grant funding to develop XacBank capabilities in project financing and renewable energy financing. Thus, the program will be able to capitalize on paradigm shift potential with the means of taking necessary steps to reduce risk and raise the level of expertise and knowledge in this sector in general.
3) Thirdly, XacBank's solar program will contribute in experience sharing of solar project development as the sanitized version of the full funding proposal will be publicly available. Therefore, future solar projects can benchmark their projects with the proposed projects, and replicate the project development and implementation experience. This especially applies to the calculation of grid emission factor and CO2 emission reductions so that the capacities of both project developers and the government agencies will further improve in developing data necessary for mitigation projects.
4) Fourthly, integration of more solar projects will improve the government's capacity to better manage RE sources within the grid's capacity to absorb RE sources. Government agencies would need to further improve their research and management capabilities in integrating the increasing RE sources into the grid, amend the National Grid Code to make it friendly to RE sources, as well to take necessary measures to increase the share of RE sources in the total electricity generation. This will be directly related to how the government will implement the future PPAs, how it will resolve curtailment issues if occurred as the number of RE sources are likely to increase. It will also affect the government's decision in progressing hydro power plants to balance the intermittence of solar and wind energy sources.

E.2.3. Contribution to the creation of an enabling environment

Contribution to creation of enabling environment

The project has great paradigm shift potential as it will serve as proof of concept for the viability of renewables in Mongolia. The implementation of the project will open up the market conditions for the establishment of other similar projects. Aside from these tangible enabling changes, a successfully implemented project will have intangible enabling effects in terms of demonstrating the financial and environmental viability of such a project to other interested project developers and FIs, thus stimulating the supply side of renewables through their partnership.

In addition, the ability of the project to receive financing will send a message that despite high upfront capital costs, renewable energy projects can be bankable with long repayment tenors and access to proper capital.

Innovation:

While solar power is one of the more developed renewable technologies worldwide, solar power infrastructure beyond small residential-use cells is certainly “innovative” in Mongolia. Most commonly, solar power is used off-grid in countryside dwellings to power simple appliances such as phones and televisions. However, there is currently only one newly-operational 10 MW solar plant in Darkhan city. This project would be the second utility scale SPP in Mongolia.

Aside from the relative innovation of the project in Mongolia, there are numerous challenges in the Mongolian landscape that would be cause for solar technology innovation at large. The first is the extreme temperatures. For example, few solar plants are designed to withstand -40 degree Celsius temperatures common throughout the 6-month Mongolian winter. Finding a cost effective way of operating in this climate will certainly be a Mongolia-specific innovation that will allow for the technology to spread to other regions in the country and in Central Asia. On this note, it is important to comment from a technical risk mitigation standpoint that the projects included in this program have undergone thermal cycling tests that have shown the projects’ ability to operate between -40C and +85C temperatures.

E.2.4. Contribution to regulatory framework and policies

Development and implementation of the solar program will affect and strengthen the improvement of National Grid Code which regulates operation of all power sources within the Grid. Since the first RE source (50 MW Salkhit wind farm) became operational in 2013, a lot regulations related with RE had to change to integrate the new source. RE law was amended in 2015 and made several important amendments to improve the financial management and resolve the issues that were faced by the Salkhit wind farm. Salkhit wind farm project showed importance of implementing PPA to the government officials.

With integration of the 10 MW Darkhan solar project in 2016 and supply of electricity to the Central Grid since 1 Jan 2017, there is currently more experience to absorb electricity from solar power. Therefore, the development of new RE sources will naturally strengthen the national policies and regulations.

As discussed in C.1, the implementation of the Salkhit wind farm has led to the discovery of various regulatory ambiguities that have the potential to limit the full effectiveness of medium- and large-scale on-grid renewable energy projects. In addition, as mentioned above, these projects are innovative in their areas. Undoubtedly, there will be implementation or operational challenges. However, as the first in their field, the project itself will clear the way for future projects, thus representing a regulatory paradigm shift. Their smooth implementation will demonstrate the capacity of local and national grid operations and energy regulations to accommodate these new energy sources.

E.3. Sustainable Development Potential

Wider benefits and priorities

E.3.1. Environmental, social and economic co-benefits, including gender-sensitive development impact

Economic

There are numerous economic benefits to this program. Firstly, the SPP will create employment opportunities (described in the Table.E.3.1). Secondly, it will reduce electricity import (as described in the Table.E.1.4-E.1.6). Thirdly, the project will add 10MW of new solar power capacity into the Mongolia's installed power capacity, supplying electricity of about 0.26% of the total country's electricity generation (described in Table.E.3.2).

Table.E.3.1. Number of people to be employed by the Solar Project

Project	Construction phase	Operation phase
SPP	200-250	10-15

Based on the Ministry of Energy's March 2017 statistics, total electricity imported in the CES was 226.5 million kWh which is 4% of the total electricity consumption with the CES. If this 10 MW SPP supplies 15.3 million kWh of net electricity to the CES, it will reduce electricity import of CES by 6.7%.

Social

Proposed solar program has the following social benefits:

1) 10 MW SPP will supply electricity to about 20,000 households based on the average monthly electricity consumption of a household at 150-200 kWh source[12].
2) The SPP will create employment of 250-500 people during the construction period, and about 10-15 people during the operation period.

[12] Ulaanbaatar Electricity Distribution Network

The project has the potential for significant social development improvements in the area of health and safety. For the Central Energy System suppliers, the relevant health and safety concern is Ulaanbaatar and other regional urban centers, where air pollution is a big issue. Health scientists have conservatively estimated that air pollution in Ulaanbaatar is the major contributor to 10% of mortality in the city (http://www.ncbi.nlm.nih.gov/pubmed/23450113), with the same report writing that "air pollution represents a major public health risk to the residents of Ulaanbaatar." Pollution in provincial cities can also rise to dangerous levels. The presence of PM2.5 is the result of coal-fired power plants and individual coal-fired stoves used to heat homes. While the impact of these projects might not be immediately noticeable, it is anticipated that the paradigm shift they initiate has the potential to significantly reduce to health risk posed by inner-city large scale coal fired plants.

Environmental

The here proposed solar program has the following environmental benefits:

1) Compared to conventional CHPs which use water to produce electricity and heat, solar PVs will not use any water. In that sense, this project saves water. Based on water usage of Thermal Power Plants in the CES, around 9-10 liters are used per kWh[13]. Based on the amount of annual gross electricity generation from each projects, around 171 million liters of water will be saved per year. If to consider the total project lifetime of the project, the total water savings will be equal to 4.3 billion liters of water for a total duration of 25 years.

Table.E.1.2. Water Savings by the SPP

Gross Annual Electricity Generation (MWh)	17,105
Annual Water Savings (liter)	171,050,000
Project lifetime (year)	25
Total water savings for project lifetime (liter)	4,276,250,000

As solar PVs will not use coal, the proposed solar PVs will prevent coal burning that would have been used in power plants to produce the equal amount of electricity. Based on coal consumption of Thermal power plants in the CES, around 0.899 kgs of coal is burned per kWh[14]. Therefore, the project will reduce coal consumption by about 15 thousand tonnes per year. For the total program duration, total coal saving will be 384 thousand million tonnes (calculation is provided in table E.1.3).

Table.E.1.3. Coal Savings by the SPP

Gross Annual Electricity Generation (MWh)	17,105
Annual coal saving (tonnes)	15,377.40
Project lifetime (year)	25
Total coal savings for program lifetime (tonnes)	384,434

Mongolia has one of the highest carbon dioxide emissions per capita in the world, at 4.33 tons[15]. This is mostly due to excessive dependence on coal for electricity and heat generation, old and inefficient infrastructure (characterized by high transmission losses), old energy intensive equipment in industries, and traffic congestions in the capital.

[13] Newcom (2017) Feasibility Study of 24 MW Salkhit Solar Project
[14] Newcom (2017) Feasibility Study of 10 MW Salkhit Solar Project (based on Project Design Document and CO2 emission reduction of the 50 MW Salkhit Wind Farm Project)
[15] OECC. "Report of the Cooperation Programme on Developing the JSM Seeds in Mongolia, Feasibility Studies on Joint Crediting Mechanism Projects towards Environmentally Sustainable Cities in Asia", *The Overseas Environmental Corporation Center, Japan*, (2014): 1.

All the major energy systems are powered by coal-fired power plants. Replacing coal power plant dependence with renewables will improve air quality, and reduce GHG emissions. Reducing coal as the fuel for an economy, while expanding the energy available, is good for business and good for the environment.

The poor air quality caused by coal-burning power generation has an effect beyond the human dimension. The most vulnerable sectors to climate change are "the agricultural, livestock, land use, water resources, energy, tourism and residential sectors"[16]. Melting of permafrost (covering 60% of Mongolia's surface) will affect agricultural practices, water resources and infrastructure. The agricultural and livestock areas are expected to be severely impacted, which will in turn affect the country's society and economy. For quantitative analysis on environmental co-benefits, please see section E.1

Gender-sensitive development impact

Knowledge acquisition of local workforces is a key social and economic benefit of these projects. The project developers will work together with the AE to ensure that these co-benefits are shared equally across genders. Stakeholder engagement will actively seek to include representative gender groups so that the needs and impacts of the projects upon these groups are fully analyzed. These proactive efforts will be combined, of course, with diligent subscription to all relevant gender laws of Mongolia, available in Annex II. The full list of steps taken by the projects to ensure gender mainstreaming and equal access to co-benefits is summarized in the Gender Action Plan (annex 6).

It should be noted that Mongolia has very progressive gender environment. Unlike many other developing countries, Mongolia has a strong presence of women in the formal workforce and in particular in managerial positions. A 2013 World Bank report estimates that female participation in the Mongolian workforce is 57%.Women are also over-represented in education. Thus, it should be kept in mind that gender-sensitive analysis looks toward the inclusion of all genders, not exclusively women.

Political

Energy independence is a stated political goal and national security priority of the Mongolian government. This project would include political co-benefits by moving Mongolia closer to this goal.

E.4. Needs of the Recipient

Vulnerability and financing needs of the beneficiary country and population

E.4.1. Vulnerability of country and beneficiary groups (Adaptation only)

Not applicable as the program is mitigation.

E.4.2. Financial, economic, social and institutional needs

Vulnerability of the country

Mongolia is at high risk from climate change. The key impacts of climate change in Mongolia as explicated in the INDC of Mongolia are:

- 70% of pastoral land degraded; biodiversity compromised
- Increased risk of winter dzud (heavy snow, cold fronts, storms); death of livestock; economically forced urban migration, exacerbating the challenges of urban settlements
- Declining water resources, with 12% of rivers, 21% of lakes, and 15% of springs having already been depleted, destroyed, or dried up.

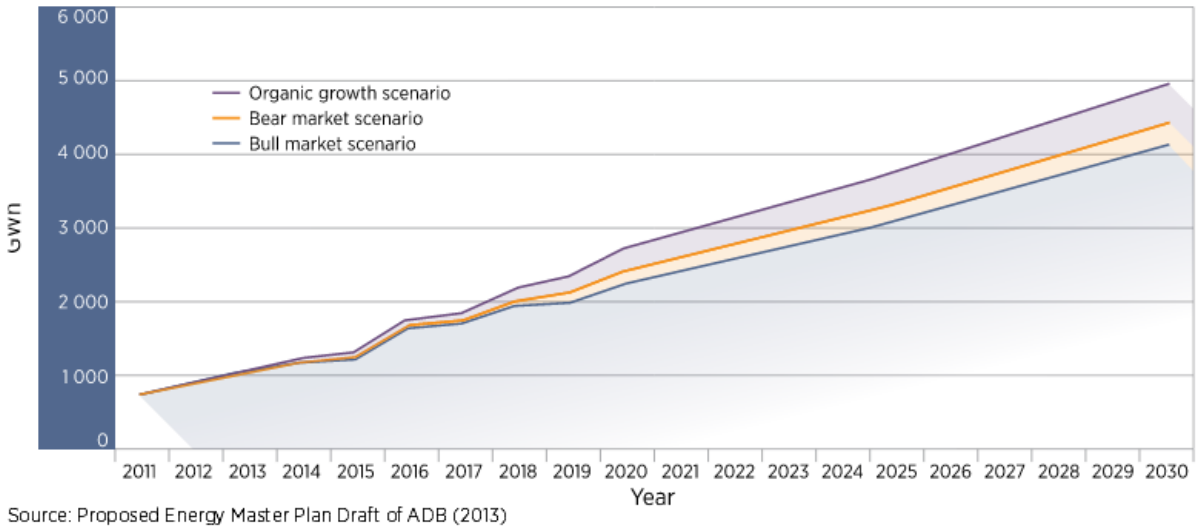
[16] Ibid

- Intensification of dry climatic conditions; increased forest sand steppe fire frequency; forest area has been reduced by 0.46% annually due to these conditions
- Climate zone shifts; increased outbreaks of new emerging infectious diseases.

Mongolian people face many challenges to provide electricity due to the sparsely situated population and the given tough winter condition. Currently the main power suppliers are aging coal fire plants, and the majority of electricity consumption occurs in the Central Energy System. The mining developments will require increasing power demand growth, especially in the rural areas where most of the current and potential mines will be located. Therefore new power generation to supply the demand is required to maintain these zones.

Economic and social development level of the country and affected population

The power demand is still expected to increase in the years to come. The Government of Mongolia estimates that 500-600 MW will be added to existing demand by 2020, corresponding to an average annual growth rate of 3.5%, as illustrated below:



Source: Proposed Energy Master Plan Draft of ADB (2013)

Opportunities have emerged for renewable energy systems, for wind and solar applications, with the growing demand for domestic and regional electricity. The Mongolian Government has recently set goals in the Green Development Policy to increase the renewable energy share from the total power generation capacity to reach 20% as of 2020 and 30% in the following decade. These targets may seem highly ambitious, but reachable in absolute terms.

The government of Mongolia has the following five components of renewable energy policy layout to reach the targets:

1) Incentives – covers both supply (producers of renewable energy) and demand side incentives (primary buyers).
2) Licensing and permitting guidelines – regulations related policy to issue licenses, approval FiT and Model PPA)
3) Renewable energy resource exploitation policy – refers to the approach to exploit the opportunities for renewable energy
4) Grid integration policy – the policy covers areas such as grid codes for interconnection, system operations, and enhancing flexibility of grid
5) Public awareness and human resource development – policies to increase public awareness of solar and wind power benefits, and development of human capacity in area of renewable energy.

A survey conducted among private sector RE developers, in March 2015, indicated that developers face difficulties in accessing commercial financing in Mongolia (EBRD 2015, Scaling Up Renewable Energy Plan). The project developers for the RE program are private entities, even with the policies at hand, they still face financial barriers, such as high interest rates and high collateral costs. There are no local financial alternative in Mongolia, project developers would have to seek and secure concessional financing from international finance institutes.

Below are listed the scope of these groups, their needs, and the benefits they stand to gain from the program:

Stakeholder/beneficiary groups	Needs	Benefits
Government of Mongolia: Ministry of Environment and Tourism (MOET) Ministry of Energy (MOE) Ministry of Finance (MOF)	• Burden ease on national power grid • Reduce budget spent on energy imports • Reduce electricity loss • Slow pace of climate change • Private sector cooperation with national energy and climate related priorities including the Energy Conservation Law and stated goals to economic diversification	• Supplying clean energy for upcoming energy demand • Less dependence on imported energy and reduced electricity transmission losses • Promoting energy security through diversity of supply • Contribution towards Mongolia's INDC Renewable energy production of 20% by 2020 • Supply power generation to current and upcoming mining • Local job creation at the solar plants • CO2 emission reduction
Borrowers – Project developers	• Affordable financing • Technical assistance	• Access to affordable long term financing • Fund that ensures foreseeability, transparency, and fairness. • Access to locally available trained human resources to support and sustain scale up • Technical knowledge
Financial Intermediary – XacBank	• New line of credit at low cost to generate RE investment during trying economic conditions	• Access to affordable long term financing for Solar plants • Marketing opportunity • Promote RE projects
Local	• Need of energy supply as demand for energy are increasing • Local employment	Availability of energy Short and long term employment Training local workforce Consumers awareness ability to integrate renewable energy

E.5. Country Ownership

Beneficiary country (ies) ownership of, and capacity to implement, a funded project or programme

E.5.1. Existence of a national climate strategy and coherence with existing plans and policies, including NAMAs, NAPAs and NAPs

Alignment with the country's national climate priorities

Due to the national threat that climate change poses, as well as a commitment to multilateral efforts to cap global temperature increases, Mongolia has already adopted a number of climate finance initiatives. Ahead of COP21, Mongolia submitted their Intended National Determined Contributions (INDC), which outlines national priorities, goals and approaches to the mitigation of and adaption to climate change. Mongolia's priorities vis-a-vis climate change can be considered in two categories: mitigation and adaptation.

This proposed program is directly in line with a number of explicitly stated policy initiatives on the part of the Mongolian government. In order to achieve the Mongolian government's stated goal of a 14% reduction in total national GHG emissions, the INDC outlined a number of policies across the energy, industrial, agricultural, and waste sectors. The proposed program is in line with Mongolia's INDC as it relates to increasing the share of renewable energy production. In addition to this general alignment, the program falls under the following INDC goal: "increase the share of renewable electricity capacity to 30% of total electricity generation capacity, from 7.62% in 2014." In addition to the INDC, the SREP IP is part of the government's comprehensive plan, which is expected to facilitate development of 20% of the renewable energy target for year 2020 and 30% by year 2030.

The other major source for climate finance initiatives are the Nationally Appropriate Mitigation Actions (NAMA) submitted by Mongolia. The NAMAs relevant to this project include increasing renewable options, particularly solar power, as well as switching from coal-based heating to electricity-based heating for individual households. In a 2015 presentation, the Ministry of Energy said "coal can be the main resource to develop energy cooperation for Mongolia nowadays, but in the future, renewables can be a leading one.[17]

In 2007, the government of Mongolia enacted the Renewable Energy Law to stimulate renewable energy development. It was accompanied by a set of regulatory arrangements with a feed-in-tariff (FIT) for renewable energy to increase its share to 20% by 2020 and 30% by 2030. Renewable energy deployment has made steady progress. The current share of renewable energy in total capacity is 7.92% (84.15 MW). As the IRENA report says "this new piece of policy aims to transform Mongolia into an energy exporter underpinned by advanced and environmentally friendly energy technologies that can be adopted on a competitive market regime." [18] As a result of implementing the proposed project, Mongolia's renewables share from the installed capacity will increase from 7.48% to 8.34%.

Source: extracted from the Table C.2.3. Installed Capacity of Power Sources of Mongolia. Data is from the Ministry of Energy (March 2017).

E.5.2. Capacity of accredited entities and executing entities to deliver

Capacity of accredited entities or executing entities to deliver

In addition to being aligned with the national climate priorities, XacBank is confident of the government's capacity to support the AE in the implementation of this program. In the past, XacBank has had an

[17] Ministry of Energy, 2015, http://www.unescap.org/sites/default/files/Mr.%20Yeren-Ulzii%20-%20Mongolia%20Presentation.pdf

[18] IRENA, 2016, http://www.irena.org/DocumentDownloads/Publications/IRENA_RRA_Mongolia_2016.pdf

effective working relationship with the National Designated Authority in both a formal capacity and an informal advisory role. In addition, the implementations of the FiT regulations have been strengthened in recent years. All solar projects are aligned with the national climate priorities.

Accredited entity: XacBank

The AE is also the Executing Entity of this program. See section C.4 for further information on the capacity of XacBank as the accredited entity to implement this proposed program with respect to the activities they it is expected to undertake.

E.5.3. Engagement with NDAs, civil society organizations and other relevant stakeholders

XacBank (the AE) has well-established processes for engagement with the relevant stakeholders as well as civil authorities so as to ensure both country and private sector ownership. In addition, XacBank has an established relationship with the local NDA. The AE has worked closely with the NDA as well as other civil authorities, such as the Ulaanbaatar Municipality, on the implementation of previous projects. For this program, government entities have been consulted on both a formal level, as in the case of the No Objection Letters, and on an informal level, as valuable consultative assets. The NDA has been consulted on the development of this funding proposal, contributing valuable country-specific knowledge, and has indicated their support for the project through the signing of a No Objection Letter. Lines of communication between the AE and the NDA will continue to be utilized in later stages of program development, such as during the composition and fine-tuning of this funding proposal.

In addition to the NDA, the AE recognizes the importance of engaging with local stakeholders in the areas where the projects will be implemented, and will develop a full stakeholder engagement plan in order to address this issue. Further, the AE has been constantly engaged with the project owners in the development of this proposal, through information requests as well as in a consultative capacity. The project is located in Mongolia, owned by Mongolian companies, and the Executing Entity is also Mongolian, it has a strong country ownership claim.

Moreover, XacBank has utilized the GCF's gender resources and expertise through consultative meetings in order to develop a strong Gender Action Plan. Crucial to gender-sensitive stakeholder engagement is the engagement of local CSOs who work on the issues of women's economic empowerment.

E.6. Efficiency and Effectiveness

Economic and, if appropriate, financial soundness of the project/programme

E.6.1. Cost-effectiveness and efficiency

The financial structure as mentioned below in Section E.6.2 is necessary due to the financial market conditions of Mongolia, which has been explained in detail in previous sections of this document.

With regards to this, without support from the GCF, the program would not have access to concessionary funding (competitive interest rate, longer loan tenure), mainly due to the size of the required investments and the high costs associated with financing renewable energy projects in Mongolia through domestic sources of funding. GCF funding does not crowd out any private or public investments, as a shortage of adequate funding exists in Mongolia. Compared to XacBank's previous MSME proposal, which calculated the core indicator for the cost per tCO2eq based on its experience in running an emissions reduction program since 2013 and arrived at total cost per tCO2eq reduced of US$ 50.24, with the GCF portion being US$16.74, this program's corresponding figures of total cost per tCO2eq reduced of US$57.24, with GCF portion being US$ 28.19 seem to be in-line and reasonable. The difference in the GCF portion comes from the larger amount of non-GCF co-financing in the MSME program (66.7%) as compared to this program (51%).

E.6.2. Co-financing, leveraging and mobilized long-term investments (mitigation only)

Source of Funding	Amount (US$ mln)	%
Equity	8,906,870	50.73%
GCF Senior Debt	8,650,050	49.27%
Total project cost	17,556,920	100.00%

E.6.3. Financial viability

As the funding received from GCF in the form of senior debt will be structured to be the same length as the PPA's for each subproject, the project's financial viability beyond the GCF's intervention is not a risk for neither XacBank nor the GCF. For the duration of the PPA (and the senior debt), the projects will generate a steady, reliable income based on the electricity generated and the agreed-upon FiT for each subproject. As such, the financial viability during this period is quite solid.

Nominal Pre-tax IRR with the GCF's support: 15.69%

Without the GCF's support, due to the high cost, short-tenure nature of the other financing options available domestically, the IRR would be negative, thereby rendering the project unable to be implemented.

The debt financing will be on-lent to the client from the GCF through XacBank, and XacBank will be making payments directly to the GCF for the agreed upon period between the two parties. As such, GCF's exit strategy is quite simple, with very low risk. Further details on the exit strategy can be found in the Exit Strategy section of this proposal.

E.6.4. Application of best practices

Within the XacBank's Renewable Energy Program (REP), the first selected technology was solar PVs due to its development potential in Mongolia, reach resource and reduced cost. However, other technologies including wind will be considered and added into XacBank's future REP.

E.6.5. Key efficiency and effectiveness indicators

GCF core indicators

Estimated cost per t CO_2 eq, defined as total investment cost / expected lifetime emission reductions (mitigation only)

(a) Total project financing	US$ 17.56million
(b) Requested GCF amount	US$ 8.65 million
(c) Expected lifetime emission reductions overtime	306,745 tCO_2eq
(d) Estimated cost per tCO_2eq (d = a / c)	US$ **57.24 / tCO_2eq**
(e) Estimated GCF cost per tCO_2eq removed (e = b / c)	US$ **28.19 / tCO_2eq**

Calculation of the lifetime emission reductions overtime is described in the section H.1.2 (shown in below table).

Table. E.1.1. Total tons of CO2 equivalent to be avoided or reduced per annum

Projects	Net electricity supply (MWh/y)	Grid Emission Factor (tCO2)	Emission reduction per year (tCO2)	Project Lifetime	Total emission reduction (tCO2)
SPP	15,395	0.797	12,270	25	306,745

Describe the detailed methodology used for calculating the indicators (d) and (e) above.

Estimated cost per tCO_2eq (d = a / c) is calculated by dividing the total project finance cost by the reduced CO2 emissions. The same applies for GCF cost per tCO_2eq removed (e = b / c). Calculations are shown in below table.

Table.6.5.1. Calculation of cost per tCO_2eq

in US$	Loans requested from GCF*	Project total cost
SPP	8,650,050	17,556,920

(a) Total project financing	17,556,920
(b) Requested GCF amount	8,650,050
(c) Expected lifetime emission reductions overtime	306,745 tCO_2eq
(d) Estimated cost per tCO_2eq (d = a / c)	US$**57.24 / tCO_2eq**
(e) Estimated GCF cost per tCO_2eq removed (e = b / c)	US$**28.19 / tCO_2eq**

Expected volume of finance to be leveraged by the proposed project/programme and as a result of the Fund's financing, disaggregated by public and private sources (mitigation only)

Describe the detailed methodology used for calculating the indicators above.

Described in Table. E.1.1. Total tons of CO2 equivalent to be avoided or reduced per annum and Table.6.5.1. Calculation of cost per tCO_2eq (in above section).

Please describe how the indicator values compare to the appropriate benchmarks established in a comparable context.

Compared to XacBank's previous MSME proposal, which calculated the core indicator for the cost per tCO2eq based on its experience in running an emissions reduction program since 2013 and arrived at total cost per tCO2eq reduced of US$ 50.24, with the GCF portion being US$16.74, this program's corresponding figures of total cost per tCO2eq reduced of US$57.24, with GCF portion being US$ 28.19 seem to be in-line and reasonable. The difference in the GCF portion comes from the larger amount of co-financing in the MSME program (66.7%) as compared to this program (51%).

Source of Funding	Amount (US$ mln)	%
Public	8,650,050	49.27%
Private	8,906,870	50.73%
Total	17,556,920	100.00%

The project's leverage ratio is 0.97:1 between public and private financing for this proposed program.

**** The information can be drawn from the project/programme appraisal document.***

F.1. Economic and Financial Analysis

Loan disbursement structure

From GCF to XacBank

Tenure of 10 years, with semi-annual repayments.

From XacBank to subprojects:

If this proposal is successfully approved by the GCF board, and disbursement is made in a timely fashion, the construction for the SPP will begin immediately.

Without access to GCF co-financing, the project would have little chance of success for many reasons. Mainly, there is a lack of sufficient project financing available domestically, and the available funds certainly do not come with long enough tenures (typically less than 5 years) or the same concessionality required to make these large-scale renewable energy projects a success. These factors have been explained in greater detail in other sections of this proposal, mainly E.6.3, B.2, and D.1.

For further details regarding economic and financial justifications, please refer to the financial model for the subproject as attached in the indexes of this proposal.

F.2. Technical Evaluation

Within XacBank's Renewable Energy Program (REP), the first selected technology was solar PVs due to its development potential in Mongolia, reach resource and reduced cost. However, other technologies including wind will be considered and added into the XacBank's REP. The choice of solar panel type would have significant impact on electricity production of the solar power plants.

F.3. Environmental, Social Assessment, including Gender Considerations

1. Project Development ESMS

The project developer has included as part of their comprehensive feasibility studies, an environmental and social risk assessment survey, as well as a risk management system. These have been attached in the annex for reference.

The Bank will require each project owner to provide an ESIA, approved by the Ministry of Environment and Tourism.

2. XacBank Internal Social and Environmental Management System (SEMS)

In addition to the assessments conducted by the project developer, XacBank plans to follow its own internal SEMS. This will ensure that the sub-project financed through the program will comply fully with all requirements needed to ensure mitigation of environmental and social risks related to the implementation of these projects. XacBank will also define roles and responsibility for designated staff members for the oversight and on-going implementation of our SEMS. As this has been the Bank's practice since the SEMS was internally adopted in 2002, with revisions made in 2008, 2011, and 2014, all of which had to be approved by XacBank's Board of Directors.

XacBank provides annual reports on environmental and social practice to the Mongolian Bankers Association (as part of the Sustainable Finance Initiative), EBRD, FMO (Netherlands), MEF and GMF (Luxembourg), Global Climate Partnership Fund (Luxembourg), DEG (Germany), OeEB (Austria), Proparco (France), in conformity with the respective credit agreements and the Shareholders' Agreement. Reporting to the GCF will be based on the results of this monitoring.

Environmental and Social Responsibility Risk Evaluation

Risk evaluations are carried out for all Bank loans that are more than MNT 50,000,000 (approximately US$25,000) and have tenors more than 12 months, based on a comprehensive scorecard, including sections on environmental issues, social and labor issues, and compliance issues. Each risk category is rated from 6 to 1, with 6 being the least risk and 1 being the highest. The Bank is determined to demonstrate the utility of its SEMS to its stakeholders, including clients, and closely monitors the environmental performance of these borrowers and actively manages any instances of non-compliance to rectify such situations.

When evaluating the environmental and social risks associated with a sub-project, the Bank will consider a wide variety of factors, including, but not limited to, the following:

1. Nature of the sub-borrower's business (e.g. micro, small, or medium-sized business sector).
2. Does the sub-borrower have any particular current exposures that represent high environmental and social risks?
3. Does the sub-borrower have appropriate waste management solutions?
4. Does the sub-borrower have any water pollution management?
5. Does the sub-borrower's activities cause any damage or contamination to the local soil or cause excessive dust?
6. Does the sub-borrower's activity cause any undue air pollution?

Also taken into consideration are the sub-borrower's employee work place safety, health and hygiene practices and whether or not they cause any adverse effect to the local areas and community. Furthermore, all sub-projects financed by the Bank must comply with the Bank's SEMS List of Excluded Activities and Mongolia's national environmental, health, safety and labor regulations and standards.

Monitoring

The project developer will be required by the Bank to submit environmental and social reports on an annual basis according to the format provided by the Bank. The format will integrate the Environmental and Social Responsibility Risk Evaluation, which is a comprehensive assessment comprising environmental, social, labor, and compliance issues. The Bank reserves the right to conduct site visits to financed sub-projects to monitor the implementation of the Bank's requirements as necessary.

3. Gender Considerations

The project will aim to promote gender equality in the implementation of the program. XacBank has prepared an overall Gender Action Plan, which includes specific activities, expected outputs, outcomes and impacts as well as monitoring indicators. Resources will be allocated to integrate these into the implementation of the program. Further details regarding gender considerations can be found in the Gender Action Plan attached in the annex 6 of this document..

F.4. Financial Management and Procurement

XacBank has implemented a robust Financial Data Management System with world-class certified data-secure IT infrastructure. The Bank uses a fully updated version of the FlexCube software developed by Oracle as the Financial Information System. All reports produced by FlexCube are then run through an internally developed system called XacBanker, which translates reports and distributes them to the correct departments at the correct intervals. These systems will be used to facilitate the financial management and reporting of the program. All reporting is done in accordance with International Financial Reporting Standards. The bank is fully audited by internationally recognized auditing firms such as Deloitte and Ernst & Young, in accordance with International Standards on Auditing.

Financial management of the program will be guided by XacBank's accounting policies and procedures, as well as by procedures related to the financial and operational aspects of project management administration. The Bank will require the subproject owners to submit annual audited financial statements within six months of their fiscal yearend. Details regarding the Bank's financial and operational aspects can be found within the Funding Management Strategy (available in English), as attached in annex 7 of this proposal.

GCF funds will be registered following XacBank's "chart of accounts" under the relevant "GL" (General Ledger) account, which will be opened specifically for GCF –related activities; separate from the Bank's other sources of funding.

XacBank will be the Executing Entity of this program. Therefore, the disbursement will be conducted in accordance with the Credit Risk Management Policy (CRMP); the General Procedure on Loan Operations, the Loan Operations Guideline, the Procedure on Business Loans, and the Guidelines on Appraisal/Assessment and Monitoring of Business Loans, and all other relevant credit activity guidelines and procedures. These procedures also defined the monitoring methods on loan disbursement and credit monitoring.

XacBank has the capacity to implement variable frequencies of reporting to ensure with the utmost transparency that the funds are being used effectively and appropriately.

Financial reporting on the GCF will be provided on a semi-annual basis, as is standard, covering the period of January to December (inclusive). If more frequent financial reporting is required, this will be subject to negotiations at the time of the signing of the relevant funding agreement.

XacBank has an Internal Audit Division. Its mission is to add value through an independent appraisal of all of XacBank's operations and activities and governance. The result of such appraisal is improved operational efficiency, risk analysis and management, and internal control systems so as to aid XacBank in achieving its corporate objectives. As is stated in XacBank's Audit Division Charter, the division operates under the principles of "integrity, objectivity and confidentiality."

Beyond the Internal Audit functions, the regular and on-demand monitoring function also serves as an Internal Control check at both the branch and headquarters level.

XacBank will use its own procurement policies for operations that receive financing from this program. However, the initial funding from GCF is a facility for lending purposes. Therefore, borrowers' procurement of the borrowed fund will be regulated by appropriate loan policies and guidelines. XacBank's policies on such matters require that funds from XacBank loans be used only for procurement of activities specifically contracted with borrowers. Furthermore, the AE will require and ensure that its procurement policies and procedures will be applied by the sub-projects of the program.

G.1. Risk Assessment Summary

Please provide a summary of main risk factors. Detailed description of risk factors and mitigation measures can be elaborated in G.2.

1. Operational and maintenance risk – risk of mismanagement of the PV plant's operations
2. Political and Regulatory risks- Lower than expected electricity prices in the long-run.
3. Lack of ability to pay from Government for FiT- risk of not being able to claim the full payments of the feed-in tariff (FiT) over the lifetime of the power purchasing agreement (PPA).
4. Currency risk- FiTs set in USD may pose financial pressure for the government
5. Construction Risk – risk of having schedule delays and/or costs overruns in the construction of the PV plant
6. Environmental and social risks around the Project
7. Lower than expected electricity output/technology risk
8. Safety
9. Curtailment of renewable energy
10. Delayed disbursement of funds

The above risks are further described in section G.2 below.

G.2. Risk Factors and Mitigation Measures

Selected Risk Factor 1- Operational and maintenance risk

Description	Risk category	Level of impact	Probability of risk occurring
Operational and maintenance risk – risk of mismanagement of the PV plant's operations	Technical and operational	Medium (5.1-20% of project value)	Medium

Mitigation Measure(s)

There is a scarcity of expertise in this field in Mongolia at the moment, with only one similar project in operation (in December, 2016). As such, the project owner will need to assure that all relevant staff are properly trained and are ready to handle the day-to-day operational and management aspects of the solar power plant.

Selected Risk Factor 2- Political and Regulatory risks

Description	Risk category	Level of impact	Probability of risk occurring
Lower than expected electricity prices in the long-run.	Financial	Low (<5% of project value)	Medium

Mitigation Measure(s)

The profitability and stability of the project relies highly on the electricity price sold to the central grid via the power purchasing agreement (PPA).

The project owner has negotiated PPAs with tenure of 10 years, with a fixed feed-in tariff for the duration of the PPA. As the loan to the sub-borrower will also be tenured at 10 years, the risk is mitigated sufficiently.			
Selected Risk Factor 3- PPA and FIT risks			
Description	Risk category	Level of impact	Probability of risk occurring
FIT risks - risk of not being able to claim the full payments of the feed-in tariff (FiT) over the lifetime of the power purchasing agreement (PPA).	Financial	Medium (5.1-20% of project value)	Medium
Mitigation Measure(s)			
Renewable energy (RE) projects are to be compensated for the electricity produced and sold back to the grid according to the agreed upon FiT and time period (minimum 10 years) in the PPA. The compensation is drawn down from a renewable energy fund which is specially designated to reimburse costs associated with RE projects, mainly the FiT payment. The 50MW Salkhit wind farm had some challenges in receiving full compensation according to the signed PPA during the early stage of operation as it was the first case. However, payment issues have been resolved now. As more and more RE projects come online, it may be the case that the fund does not have enough funds to be able to compensate all projects fully for the minimum of 10 years. This risk has been mitigated by the fact that currently, there is already a built-in cost of MNT 3.95 per kWh of electricity used in Mongolia, payable by all users of power in the country. The moneys collected through this cost (not additional cost, already baked into the electricity prices) are pooled into the designated FiT fund.			
Selected Risk Factor 4 - Currency risk			
Description	Risk category	Level of impact	Probability of risk occurring
Currency risk- FiTs set in USD may pose financial pressure for the government	Financial	Medium (5.1-20% of project value)	Low
Mitigation Measure(s)			
The law makes FiTs payable in MNT (calculated on the exchange rate of the central bank on the day of the payment) which greatly encourages foreign investors. However, this effectively passes the currency exchange risk onto the government. When the Mongolian currency depreciates, as it has done dramatically against the US dollar in recent years, the government comes under financial pressure. However, the currency risk for both the borrower and the Bank are mitigated greatly by the fact that the FiT are pegged to the USD FX rate.			
Selected Risk Factor 5 - Construction risk			
Description	Risk category	Level of impact	Probability of risk occurring
Construction Risk – risk of having schedule delays and/or costs overruns in the construction of the PV plant	Technical and operational	Low (<5% of project value)	Low
Mitigation Measure(s)			

Based on the example of an almost identical project in Darkhan, which was the first Mongolian large scale (10MW) solar power plant, which became operational in December 2016, there is minimal risk of any construction delay. Darkhan project's construction to full operationality was completed in 4 months (from July 2016 to November 2016). These risks can be mitigated and managed through regular monitoring of the project's progress, to ensure that they are moving forward according to the detailed implementation schedule and project schedule established prior to the start of construction. The construction of the solar power plant is planned to be finish construction within 3-4 months before the start of the winter seasons. Should the construction be unable to finish before this time period, the construction will be postponed to resume in early spring. The EPC contractor will be responsible for the timely construction of the solar power plants and will cover any additional costs related to the construction of the SPP.

Selected Risk Factor 6

Description	Risk category	Level of impact	Probability of risk occurring
Environmental and social risks around the Project	Social and environmental	Low (<5% of project value)	Low

Mitigation Measure(s)

Before disbursement loans, XacBank will require each project owner to submit an ESIA that is fully approved by the Ministry of Environment and Tourism.
The project has a social and environmental risk assessment conducted during the feasibility study stages. The Bank will also apply its standard SEMS (Social and Environmental Management System) to the project, which does a comprehensive assessment of its ESS (environmental and social safeguards) implications, while engaging all relevant stakeholders, including the local community that will be most affected by the project. The Bank does not finance any projects that have higher than a medium-level ESS impact, and in such cases, the Bank requires that the project owner take the necessary steps towards remedying the issues that cause any negative impacts on the local environment and community. Solar power plants in general do not pose any significant level environmental or social impacts.

Selected Risk Factor 7

Description	Risk category	Level of impact	Probability of risk occurring
Lower than expected electricity output/technology risk- Plant doesn't match the expected electrical output, either due to lower than expected performance of panels, technical problems with the plant (outages, breakdowns, etc.), adverse weather conditions (rain/snow/sand/dust storms), or solar radiation risk	Technical and operational	Medium (5.1-20% of project value)	Low

Mitigation Measure(s)

These factors have been taken into consideration during the feasibility study stage, and have been accounted for. The equipment is studied to be suitable to the local weather conditions (verify this), the

necessary precautions will be taken to take care of the equipment during its lifetime. Also, the positioning and angling of the panels have been studied extensively to select optimal positioning. Solar PV is more predictable; thus, easier to dispatch compared to other renewable energy sources such as wind. In addition, as income generation for the projects are mainly dependent on the electricity produced, this is an important factor to consider. To further mitigate this risk, the subproject will be required to establish a designated 'debt reserve account' at the Bank, which will be controlled by XacBank.

Selected Risk Factor 8

Description	Risk category	Level of impact	Probability of risk occurring
Safety	Social and environmentalSocial and environmentalSocial and environmental	Low (<5% of project value)Low (<5% of project value)Low (<5% of project value)	LowLowLow

Mitigation Measure(s)

Health and safety risk of local people accessing the site and potentially dangerous areas within the site. Good communication and public awareness via a community liaison officer. Clear identification of and enforcement of safety/exclusion zones. Under EPC contract, international and best industry practice safety and environmental issues will be followed.

Selected Risk Factor 9

Description	Risk category	Level of impact	Probability of risk occurring
Curtailment of renewable energy	Technical and operational	Low (<5% of project value)	Low

Mitigation Measure(s)

RE generation capacity has the lowest marginal cost and should therefore always be dispatched before thermal plant. CHP4 is, de facto, acting as the load following generator in the system. However, it has had no formally/contractually designated responsibility to do so, and no financial incentives to carry out this function.

Compared to wind energy which occurs during night time, solar plants have less risk for curtailment as energy production occurs during peak demand hours.

Selected Risk Factor 10

Description	Risk category	Level of impact	Probability of risk occurring
Financial Risk- Delayed disbursement of funds	Financial	High (>20% of project value)	Medium

Mitigation Measure(s)

The project is relying on the GCF's funding coming through in November, 2017. If the proposal is approved during B18, then XacBank would request that all the relevant agreements (FAA) and disbursements be made in a timely manner. Although the construction season does not begin until April, the project owners would still need to begin procurement of supplies and conduct pre-ground breaking construction activities prior to that. If the disbursement of funds should take 6 months as it did for XacBank's previously approved GCF program (which was approved in December, 2016), then it would be a major roadblock for the successful implementation of the subproject.

Other Potential Risks on the Horizon

** Please expand this sub-section when needed to address all potential material and relevant risks.*

H.1. Logic Framework.

Please specify the logic framework in accordance with the GCF's Performance Measurement Framework under the Results Management Framework.

H.1.1. Paradigm Shift Objectives and Impacts at the Fund level[19]						
Paradigm shift objectives						
Shift to low-emission sustainable development pathwaysShift to low-emission sustainable development pathwaysShift to low-emission sustainable development pathways	- The proposal involves a "shovel ready," private sector-led, solar power plant, which will result a long term, readily quantifiable, significant and cost-effective CO2 emission savings. - If supported by risk-taking and patient capital, the project has the potential to demonstrate the ability of sound renewable energy projects to be bankable and effective, and promote the shift of a coal-based energy system with enormous renewable energy potential (estimated at 2.6 terawatts) to a renewables system - Project would assist and support the government of Mongolia's ambitious commitment to generate 30% of electrical power from renewable energy sources by 2030, despite the challenging financial and commodity markets impacting Mongolia's economy. - Following GCF financing, local financial institutions will feel safer to increase their exposure to large-scale renewables, thus help increase Mongolia's renewable generation capacity (and associated CO2 displacement). - Grant funding will allow for the addition of project financing experts and technical training to staffs and make XacBank the first Mongolian financial institutions with specialized staff dedicated for the implementation and management of renewable energy projects					
Expected Result	**Indicator**	**Means of Verification (MoV)**	**Baseline**	**Target**		**Assumptions**
				Mid-term (if applicable)	Final	
Fund-level impacts						
M1.0 Reduced emissions through increased low-emission energy access and power generationM1.0 Reduced emissions through increased low-emission energy access and power generationM1.0 Reduced emissions through increased low-emission energy access and power generation	*Tonnes of carbon dioxide equivalent (t CO2eq) reduced (core indicator)*	Annual CO2 performance monitoring reporting and validation	0	153,372 tCO2	306,745 tCO2	CO2 emission reduction was based on the most conservative calculations and data using international default values. Therefore, CO2 emission reduction can be increased if local data will be available.

[19] Information on the Fund's expected results and indicators can be found in its Performance Measurement Frameworks available at the following link (Please note that some indicators are under refinement): http://www.gcfund.org/fileadmin/00_customer/documents/Operations/5.3_Initial_PMF.pdf

H.1.2. Outcomes, Outputs, Activities and Inputs at Project/Programme level						
Expected Result	**Indicator**	**Means of Verification (MoV)**	**Baseline**	**Target**		**Assumptions**
				Mid-term (if applicable)	Final	
Programme-wide outcomes	**Outcomes that contribute to Fund-level impacts**					
M6.0 Increased number of small, medium and large low-emission power suppliers	MWs of Low emission energy capacity installed, generated and/or rehabilitated as a result of GCF support:	Commissioned and project completion certificates	0	n/a	10MW	GCF financing approved, projects successfully implemented
Grant outputs	**Outputs that contribute to outcomes**					
1.Strengthen analytical capabilities	Number of experienced project finance professionals on-boarded	Project financing staff CVs to be submitted	0	1	1	Assuming such experts are available for hire and willing to work in Mongolia. Note: mid term in this case is program mid-term i.e. 5th year
2.Strengthen internal capabilities	Number of staff to develop project finance and large scale renewable energy related trainings	Training completion certifications	0	30	30	Trainings to be divided amongst staff as relevant, conducted for first 3 years. Assuming interested partner institutions can be found for internship and suitable training programs are able to accommodate XacBank
3. Training and awareness raising of clients	Project developers/clients trained	Attendance list, photos	0	800	800	200 attendees per event, event organized annually for 4 years. Assuming an interest of project developers and a growing number of potential projects for REP

4.Supporting risk, audit, legal needs	Third party risk opinion and/or audit and/or engineer consultants engaged	ToRs, opinion documents	0	n/a	n/a	No targets have been set, these services would be contracted as they arise. Assuming such services will be selectively needed during the project lifetime
Project-basis outputs	**Outputs that contribute to outcomes**					
1.GoM-related documentation: licenses, tariff agreements	Number of licenses received	Document adverts and outreach	1	1	1	Assuming successful lease, agreement and construction negotiations between project developers and relevant authorities
	Tariff/power purchasing agreements signed	Document adverts and outreach	1	1	1	Assuming successful lease, agreement and construction negotiations between project developers and relevant authorities
	Dispatch agreements signed	Document adverts and outreach	0 (granted after operation)	1	1	Assuming successful lease, agreement and construction negotiations between project developers and relevant authorities
	Stakeholder agreements	Document adverts and outreach	0	1	1	Assuming successful lease, agreement and construction negotiations

						between project developers and relevant authorities
2. Construction of plants	Number of plants constructed in compliant fashion	Site visit	0	1	1	Assuming successful import of products, lack of defect, standard weather allowing for installation
3. Technical Commission review	Number of authorized agreements received	Document adverts and outreach	0	1	1	Assuming review conducted by commission in timely manner, review criteria consistent.
4. Final documentation received	Sites fit for operation based on final documentation	Document copies provided	0	1	1	Assuming cooperation of relevant government and municipal entities, and favorable review of site
5. Site enters operation	Number of sites feeding energy into the grid	Purchase of energy bills	0	1	1	Assuming standard weather conditions
6. Developed capacity	Number of people/institutions trained (NB: this is different from grant activities as it relates to the technical capacities of the implementing actors, e.g. construction staff, engineers, etc., rather than of XacBank)	MOUs, list of trained participants	0	250	265	Assuming participation by academic and other partners, and employee interest in training
7.Completed gender Mainstreaming	Number of gender mainstreaming plans designed and implemented	Policy developed, and report on liaison with relevant stakeholders	0	1	1	Assuming cooperation of GCF experts, and project developer

						commitment to the effort
8.Transmission line for grid connection built	km of transmission line	Project completion, power sales	0		2.2 km	Assuming successful construction in standard weather conditions and cooperation of municipal authorities
9. Power generation delivered to grid	Annual GW Power delivered	Metering, power sale	0		15.3 GWh/year	Assuming construction completed by projected date, smooth grid transfer

Programme-wide Activities	**Description**	**Inputs**	**Description**
1.1.	Loan assessment and preparation of loan proposal (conducted by Corporate Banking Division)	1.1.1	Submission of information from external partners; internal data analytics and proposal production
1.2.	Credit risk assessment and providing independent credit risk opinion (conducted by Credit Department)	1.2.1	Evaluation of proposal by relevant internal departments against internal standards and risk capacity
1.3.	Credit Committee approval subsequent to credit committee project presentation (Committee comprised of bank leadership)	1.3.1	Presentation at credit committee meeting; internal discussion amongst credit committee members
1.4.	Submit RSF application to (conducted by Corporate Banking Division)	1.4.1	Make loan appraisal and proposals in RSF templates, translate to English
2.1	FP assessed by GCF Board in October, 2017	2.1.1	GCF advice during drafting process;
2.2.	GCF Board approval	2.2.1	Board meeting
2.3.	RSF approval	2.3.1	RSF committee meeting
2.4.	Conclusion of FAA and disbursement of funds to XacBank	2.4.1	Legal inputs from relevant parties; final agreement of XacBank leadership
3.1.	Conclusion of the Sub-Loan agreement (conducted by Corporate Banking	3.1.1	Input of Corporate Banking division and Credit Administration department in

	division and Credit Administration department)		cooperation with project developer to reach agreement; Finalize loan agreements with any conditions required by XacBank's Credit Committee, loan contract to be made according to RSF contract templates.
3.2.	Disbursement of the loan to sub-borrower in the proportions outlined in the model	3.2.1	Based on Credit Committee resolution and Sub-loan agreement, disbursement will be made partially
4.1.	Credit monitoring by Corporate Banking division, in accordance with department policies and procedures	4.1.1	Reports from project developer, financial statements
4.2.	Emission reduction monitoring by Eco Banking department	4.2.1	Reports from project developer, relevant documentation, site visit
5.1	Produce Interim Evaluation report	5.1.1	Monitoring and evaluation data
6.1	Produce Completion reports in accordance with GCF standards	6.1.1	Monitoring and evaluation data; project closure information
7.1	Produce Final Evaluation report in accordance with GCF standards	7.1.1	Monitoring and evaluation data; program closure information
Grant activities	**Description** (for further quantifiable activity targets, see the attached grant budget)	**Inputs**	**Description**
1.1	Announce PF lead and PF analyst jobs, receive applications	1.1.1	Design job terms, engage HR department, international development bank alumni network
1.2	Select one international senior PF specialist	1.2.1	Multiple-stage interview process with candidate selected based on XacBank priority needs with regard to implementation of the GCF project
1.3	Brief, update, train PF specialist in accordance with XacBank onboarding training policy	1.3.1	HR department, Eco Banking department, Corporate department all to be engaged
1.4	PF specialist to lead internal trainings, as inclusive in their contract	1.4.1	Eco Banking department, Corporate department, HR

			department, and other staff who would benefit from such training all to be engaged
2.1	XacBank staff to complete week-long secondment at best practices institutions.	2.1.1	Recommendations taken from GCF, week-long engagements in relevant departments for skill acquisition and best practices learning
2.2	XacBank staff to receive training/develop capacities on PF modeling, designing and assessing	2.2.1	International training, corporate team to be primary beneficiaries
2.3	XacBank staff to receive training/develop capacities on legal implementation of PFs	2.3.1	International training, legal team to be primary beneficiaries
2.4	XacBank staff to receive training/develop capacities on measuring and monitoring of the PFs	2.4.1	International training
2.5	XacBank staff to receive training/develop capacities on risk analysis	2.5.1	International training , Eco Banking and Risk department to be engaged
2.6	Attending to workshops, forum and conferences to learn and share best practices	2.6.1	Domestic, stimulate knowledge sharing and industry development from grant activities
3.1	General awareness raising to stimulate future clients for REP program (est. 200 guests reached annually)	3.1.1	Marketing, NGOs/associations with relevant networks, event spaces, outside trainers
4.1	Third party risk opinion; Independent social and environmental audit; independent engineer who will be responsible for technical monitoring and issue the certificate of completion	4.1.1	Contracted as needed from relevant experts
4.2	Develop PF agreements; drafting of legal documents related to PF	4.2.1	Contracted as needed from relevant experts

H.2. Arrangements for Monitoring, Reporting and Evaluation

Monitoring, Reporting and Evaluation

The project developer will be in charge of the Monitoring and Reporting of the SPP. XacBank will provide the developer with Monitoring and Reporting plans and relevant templates based on the JCM methodology, and they in turn will provide XacBank with reports based on the agreed upon intervals for the project.

Once the project will be operational, the developers shall monitor the SPP's electricity generation and supply to the grid on daily, monthly and annual basis, and develop the Monitoring Report for the first year of operation. The Monitoring Report will be evaluated by an independent party hired by XacBank, and will provide XacBank with an evaluation report. The Evaluation Report will verify both the electricity supply to the grid and emission reduction from the SPP.

Monitoring, reporting, and evaluation arrangements shall comply with the relevant GCF policies as appointed in the MAF, AMA and other relevant documents. XacBank will report to the GCF on a periodic basis as agreed with the GCF, on the status of GCF funded activities throughout the relevant reporting period as specified in the following table. These reports will include the disbursements made during the relevant period, the implementation status of the sub-project and the monitoring of results and impacts of the sub-project.

Table H 2.1. Reporting milestones from XacBank to GCF

Milestones/Reports	**Expected Dates**
Start of Implementation	*upon effectiveness of the FAA*
Annual Performance Report including the Monitoring Report	*On annual basis for the period ending on 31 December within sixty (60) days after the end of the relevant annual period, with the first APR required to be submitted following the end of the calendar year after the Parties have entered into the relevant FAA, and the last APR required to be submitted within six (6) months of the end of the relevant Reporting Period (unless otherwise specified in the FAA). Annual Monitoring Report and Verification Report will be submitted with the APR.*
Interim Evaluation report	*Five years after the effectiveness of the FAA*
Completion report	*1 month after the end of the full loan repayment*
Final Evaluation report	*2 months after the end of the Tenor*

PLEASE PROVIDE METHODOLOGIES FOR MONITORING AND REPORTING OF THE KEY OUTCOMES OF THE PROJECT/PROGRAMME.

Methodologies to be used for monitoring and reporting of the key outcomes of the solar PV projects will be similar to the existing methodologies used in the 10 MW Darkhan solar PV which made all of its methodologies and templates publicly available on the following website; therefore all of the forms are readily available:

https://www.jcm.go.jp/mn-jp/projects/22

I. Supporting Documents for Funding Proposal

☒ NDA No-objection Letter

☒ Feasibility Study

☒ Integrated Financial Model that provides sensitivity analysis of critical elements (xls format, if applicable)

☒ Confirmation letter or letter of commitment for co-financing commitment (If applicable)

☒ Project/Programme Confirmation/Term Sheet (including cost/budget breakdown, disbursement schedule, etc.) – *see the Accreditation Master Agreement, Annex I*

☒ Environmental and Social Impact Assessment (ESIA) or Environmental and Social Management Plan (If applicable)

☒ Appraisal Report or Due Diligence Report with recommendations (If applicable)

☐ Evaluation Report of the baseline project (If applicable)

☒ Map indicating the location of the project/programme

☒ Timetable of project/programme implementation

** Please note that a funding proposal will be considered complete only upon receipt of all the applicable supporting documents.*

Annex 10: NDA No Objection Letter

MINISTRY OF ENVIRONMENT, AND TOURISM
NATURE CONSERVATION FUND
7th floor, 22 building, Amar street, 8th micro-district,
Sukhbaatar district, Ulaanbaatar, Mongolia
Tel: (976-11) 310753, Fax: (976-11) 310743
E-mail:contact@nct.mn, http://www.nct.mn

Date 17 March 2017 No 47

To: The Green Climate Fund ("GCF")

Re: Funding Proposal for the GCF by XacBank
regarding the Renewable Energy Program #1 - Solar

Dear Madam, Sir,

We refer to the programme, "Renewable Energy Program #1–Solar" which consists of a total of 44 MW in solar power plant projects in Mongolia as included in the funding proposal submitted by XacBank to us on 14 March 2017.

The undersigned is the duly authorized representative of the Ministry of Environment and Tourism, Dr. Batjargal Zamba, the National Designated Authority/focal point of Mongolia.

Pursuant to GCF decision B.08/10, the content of which we acknowledge to have reviewed, we hereby communicate our no-objection to the programme as included in the funding proposal.

By communicating our no-objection, it is implied that:

(a) The government of Mongolia has no-objection to the programme as included in the funding proposal;
(b) The programme as included in the funding proposal is in conformity with Mongolia's national priorities, strategies and plans;
(c) In accordance with the GCF's environmental and social safeguards, the programme as included in the funding proposal is in conformity with relevant national laws and regulations.

We also confirm that our national process for ascertaining no-objection to the programme as included in the funding proposal has been duly followed.

We acknowledge that this letter will be made publicly available on the GCF website.

Kind regards,

Dr. Batjargal Zamba
National Focal Point for the GCF

Environmental and social report(s) disclosure

Basic project/programme information	
Project/programme title	Renewable Energy Program #1 - Solar
Accredited entity	XacBank LLC
Environmental and social safeguards (ESS) category	Intermediation 2 (I2)

Environmental and Social Impact Assessment (ESIA) (if applicable)	
Date of disclosure on accredited entity's website	Not Applicable
Environmental and Social Management Plan (ESMP) (if applicable)	
Date of disclosure on accredited entity's website	Not Applicable
Resettlement Action Plan (RAP) (if applicable)	
Date of disclosure on accredited entity's website	Not Applicable
Any other relevant ESS reports and/or disclosures (if applicable)	
Description of report/disclosure	Environmental and Social Management System (ESMS)
Date of disclosure on accredited entity's website	2017-06-02
Language(s) of disclosure	English and Mongolian
Link to disclosure	English: https://www.xacbank.mn/en/565/about-xacbank/social-responsibility/eco-bank/gcf-news/esms-on-renewable-energy-program-solar Mongolian: https://www.xacbank.mn/mn/565/about-xacbank/social-responsibility/eco-bank/gcf-news/esms-on-renewable-energy-program-solar
Other link(s)	-