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IDA/R2018-0403/1

January 9, 2019

Closing Date: Tuesday, January 29, 2019 at 6:00 p.m.

FROM: Vice President and Corporate Secretary

Nepal - Private Sector-Led Mini Grid Energy Access Project

Project Appraisal Document

Attached is the Project Appraisal Document regarding a proposed grant and a proposed loan from the Strategic Climate Fund Grant Scaling Up Renewable Energy Program (SCF-SREP) Private Sector-Led Mini-Grid Energy Access Project (IDA/R2018-0403), which is being processed on an absence-of-objection basis.

Distribution:
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Document of

The World Bank

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Report No: PAD2441

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED STRATEGIC CLIMATE FUND SCALING UP RENEWABLE ENERGY PROGRAM GRANT

IN THE AMOUNT OF US$5.61 MILLION

AND A

PROPOSED STRATEGIC CLIMATE FUND SCALING UP RENEWABLE ENERGY PROGRAM CREDIT

IN THE AMOUNT OF US$2.0 MILLION

TO

NEPAL

FOR A

NEPAL: PRIVATE SECTOR-LED MINI-GRID ENERGY ACCESS PROJECT

December 27, 2018

Energy and Extractives Global Practice
South Asia Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective October 31, 2018)

Currency Unit =	Nepalese Rupee (NPR)
NPR 118.33=	US$1
US$0.00845 =	NPR 1

FISCAL YEAR

July 1 – June 30

ABBREVIATIONS AND ACRONYMS

AEPC	Alternative Energy Promotion Center
CAPEX	Capital Expenditure
CIF	Climate Investment Fund
CVU	Credit Vertical Unit
DA	Designated Account
E&S	Environmental and Social
EIRR	Economic Internal Rate of Return
ESCO	Energy Service Company
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESIA	Environmental and Social Impact Assessment
FI	Financial Intermediary
FM	Financial Management
FY	Fiscal Year
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIZ	German Agency for International Cooperation *(Deutsche Gesellschaft für Internationale Zusammenarbeit)*
GoN	Government of Nepal
IP	Indigenous Peoples
IPF	Investment Project Financing
ISR	Implementation Support Review
IUFR	Interim Unaudited Financial Report
kW	kilo Watt
kWh	kilo Watt hour
MoEWRI	Ministry of Energy, Water Resources and Irrigation
MHP	Micro Hydropower Plant
MTF	Multi-Tier Framework
NEA	Nepal Electricity Authority
O&M	Operation and Maintenance
PAD	Project Appraisal Document

PB	Partner Banks
PDO	Project Development Objective
PMT	Project Management Team
POM	Project Operational Manual
PPA	Power Purchase Agreement
PPSD	Project Procurement Strategy for Development
RESP	Renewable Energy Subsidy Policy
RET	Renewable Energy Technology
RPF	Resettlement Policy Framework
SLA	Subproject Loan Agreement
SCF	Strategic Climate Fund
SA	Sub-Loan Agreement
SREP	Scaling Up Renewable Energy Program
TA	Technical Assistance
TRC	Technical Review Committee
VCDF	Vulnerable Community Development Framework

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Practice Manager:	Demetrios Papathanasiou
Task Team Leader(s):	Subodh Adhikari, Francesca Lo Re

BASIC INFORMATION

Country(ies)	Project Name	
Nepal	Nepal: Private Sector-Led Mini-Grid Energy Access Project	
Project ID	Financing Instrument	Environmental Assessment Category
P149239	Investment Project Financing	F-Financial Intermediary Assessment

Financing & Implementation Modalities

[ ] Multiphase Programmatic Approach (MPA)	[ ] Contingent Emergency Response Component (CERC)
[ ] Series of Projects (SOP)	[ ] Fragile State(s)
[ ] Disbursement-linked Indicators (DLIs)	[ ] Small State(s)
[✓] Financial Intermediaries (FI)	[ ] Fragile within a non-fragile Country
[ ] Project-Based Guarantee	[ ] Conflict
[ ] Deferred Drawdown	[ ] Responding to Natural or Man-made Disaster
[ ] Alternate Procurement Arrangements (APA)	

Expected Approval Date	Expected Closing Date
31-Jan-2019	30-Apr-2023

Bank/IFC Collaboration

No

Proposed Development Objective(s)

The Project Development Objective (PDO) is to increase electricity generation capacity from renewable energy mini-grids in selected areas by mobilizing ESCOs.

Components

Component Name	Cost (US$, millions)
Component 1: Credit Facility to support Renewable Mini-grid Subprojects	5.61
Component 2: Technical Assistance to the Mini-grid Sector, ESCOs and Partner Banks and Project Management Support	2.00

Organizations

Borrower:	Government of Nepal, Ministry of Finance
Implementing Agency:	Alternative Energy Promotion Centre (AEPC)

PROJECT FINANCING DATA (US$, Millions)

SUMMARY

Total Project Cost	16.97
Total Financing	16.97
of which IBRD/IDA	0.00
Financing Gap	0.00

DETAILS

Non-World Bank Group Financing

Counterpart Funding	6.00
Borrower/Recipient	6.00
Trust Funds	7.61
Strategic Climate Fund Credit	2.00
Strategic Climate Fund Grant	5.61
Commercial Financing	3.36
Unguaranteed Commercial Financing	3.36

Expected Disbursements (in US$, Millions)

WB Fiscal Year	2019	2020	2021	2022	2023
Annual	0.32	1.15	2.96	2.78	0.40
Cumulative	0.32	1.47	4.43	7.21	7.61

INSTITUTIONAL DATA

Practice Area (Lead)	Contributing Practice Areas
Energy & Extractives	Finance, Competitiveness and Innovation

Gender Tag

Does the project plan to undertake any of the following?	
a. Analysis to identify Project-relevant gaps between males and females, especially in light of country gaps identified through SCD and CPF	Yes
b. Specific action(s) to address the gender gaps identified in (a) and/or to improve women or men's empowerment	Yes
c. Include Indicators in results framework to monitor outcomes from actions identified in (b)	Yes

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	Substantial
2. Macroeconomic	Moderate
3. Sector Strategies and Policies	Substantial
4. Technical Design of Project or Program	Moderate
5. Institutional Capacity for Implementation and Sustainability	High
6. Fiduciary	Substantial
7. Environment and Social	Moderate
8. Stakeholders	Substantial
9. Other	
10. Overall	Substantial

COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

[ ] Yes [✓] No

Does the project require any waivers of Bank policies?

[ ] Yes [✓] No

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	✓	
Performance Standards for Private Sector Activities OP/BP 4.03		✓
Natural Habitats OP/BP 4.04	✓	
Forests OP/BP 4.36		✓
Pest Management OP 4.09		✓
Physical Cultural Resources OP/BP 4.11	✓	
Indigenous Peoples OP/BP 4.10	✓	
Involuntary Resettlement OP/BP 4.12	✓	
Safety of Dams OP/BP 4.37		✓
Projects on International Waterways OP/BP 7.50	✓	
Projects in Disputed Areas OP/BP 7.60		✓

Legal Covenants

Sections and Description

No later than ninety (90) days of the Effective Date, establishment of Project Management Team (PMT) [SCF Grant Agreement, Schedule 2, Section I. A. 1.; SCF Loan Agreement, Schedule 2, Section I. A. 1.; Project Agreement, Schedule 2, Section I. A. 1.]

Sections and Description

No later than ninety (90) days of the Effective Date, establishment of Technical Review Committee (TRC) [SCF Grant Agreement, Schedule 2, Section I. A. 2.; SCF Loan Agreement, Schedule 2, Section I. A. 2.; Project Agreement, Schedule, Section I. A. 2.]

Sections and Description

No later than ninety (90) days of the Effective Date, establishment of Credit Vertical Unit (CVU) [SCF Grant Agreement, Schedule 2, Section I. A. 3.; SCF Loan Agreement, Schedule 2, Section I. A. 3.; Project Agreement, Schedule, Section I. A. 3.]

Sections and Description

No later than one (1) month of the Effective Date, adoption of Project Operational Manual [SCF Grant Agreement, Schedule 2, Section I. A. 4. (a); SCF Loan Agreement, Schedule 2, Section I. A. 4. (a); Project Agreement, Schedule, Section I. A. 4. (a)]

Sections and Description
No later than three (3) months of the Effective Date, hiring of a financial management specialist [SCF Grant Agreement, Schedule 2, Section I. A. 5.; SCF Loan Agreement, Schedule 2, Section I. A. 5.; Project Agreement, Schedule, Section I. A. 5.]

Conditions

Type	Description
Effectiveness	Condition of Effectiveness of the SCF Grant Agreement: execution of Subsidiary Grant Agreement between GoN and AEPC [SCF Grant Agreement, Article 5.01. (a)]
Type	Description
Effectiveness	Condition of Effectiveness of the SCF Grant Agreement: execution of the SCF Loan Agreement and fulfillment of all conditions precedent to its effectiveness (other than the effectiveness of the SCF Grant Agreement) [SCF Grant Agreement, Article 5.01. (b)]
Type	Description
Effectiveness	Condition of Effectiveness of the SCF Loan Agreement: execution of Subsidiary Loan Agreement between GoN and AEPC [SCF Loan Agreement, Article 5.01. (a)]
Type	Description
Effectiveness	Condition of Effectiveness of the SCF Loan Agreement: execution of the SCF Grant Agreement and fulfillment of all conditions precedent to its effectiveness (other than the effectiveness of the SCF Loan Agreement) [SCF Loan Agreement, Article 5.01. (b)]

NEPAL

NEPAL: PRIVATE SECTOR-LED MINI-GRID ENERGY ACCESS PROJECT

TABLE OF CONTENTS

I. STRATEGIC CONTEXT

A. Country Context

1. Over the past decade, Nepal's economy has performed reasonably well. Growth averaged 4.3 percent (at market prices) over 2005-15. Although declining as a share in the economy, agriculture continues to play a large role, contributing over 30 percent of value-added. The service sector has grown in importance, accounting for half of value-added in recent years. Industry and manufacturing have grown more slowly and their relative share in the economy has averaged 16 percent of Gross Domestic Product (GDP) over the past decade. Similarly, exports continue to struggle, while imports are fueled by remittances. However, remittance as a share of GDP has recently been on a declining trend due to lower oil prices that have impacted economic prospects in those countries with large Nepalese migrants. Inflation was in single digits for most of the past decade, with the peg of the Nepalese rupee to the Indian rupee providing a nominal anchor. Fiscal balances remained sustainable owing to strong revenue growth and modest spending. The incidence of poverty, measured against the national poverty line, fell by 19 percentage points between Fiscal Year (FY) 2003/04 and FY 2010/11. In FY 2010/11[1], 15 percent of the population was counted as poor. Most multidimensional indicators of poverty also showed improvements across regions in Nepal. However, these gains remain vulnerable to shocks and setbacks, as evidenced by the 2015 earthquakes which were followed by trade disruptions resulting, in GDP growth of 0.6 percent in 2016, the lowest in 14 years.

2. Data released by the Central Bureau of Statistic (consisting of a revision of the FY2017 growth rate and an updated estimate for FY2018), show that growth has been strong, despite the external shock from floods. In mid-August 2017, the worst flood in decades destroyed 64,000 hectares of standing crop, contributing to an estimated reduction in the agriculture growth rate from 5 to 2.8 percent (in FY2017 and FY2018, respectively). This contributed to a reduction in overall GDP growth from 7.9 to 6.3 percent in FY2018. Government revenue continued to perform well but spending also picked up significantly in FY2017 compared to previous years. Nevertheless, ambitious expenditure targets envisioned in the budget have not been met and the quality of spending has not improved with 60 percent of the capital spending occurring in the last quarter. Also, spending pressures have increased in the first half of FY2018 due to fiscal transfers, as well as spending on elections, capital goods and the transition to federalism. High inflation in the past two years has moderated sharply due to moderating inflation in India and improving supply side constraints.

3. Inflation slowed to 4.2 percent year-over-year (y-o-y) in December 2017 but increased to 6 percent (y-o-y) in March 2018 owing to a sharp uptick in vegetable prices. Meanwhile, credit growth slowed to 16.7 percent (y/y) in early 2018 compared to its peak of 31.9 percent in 2017; but deposits growth continued to decline, pushing up interest rates. On the external side, the cumulative effect of a sharp trade balance deterioration and a slow growth of remittances is putting significant pressure on the current account. Economic activity, affected by the worst floods in decades, is particularly affecting agriculture output. This contributed to the slowdown in growth from its peak of 7.9 percent in FY2017 to an estimated 6.3 percent in FY2018.

[1] Poverty data were last updated in 2010. The World Bank will be collaborating with the Central Bureau of Statistics to update national poverty estimates using the Annual Household Survey data (2013/14 – 2016/17) and prepare the next Nepal Living Standard Survey.

4. A new government, backed by an unprecedented majority in Parliament, took office on February 15, 2018. This follows successful elections for all three tiers (local, state and federal) of the new state architecture defined by the 2015 constitution, marking a protracted-but-successful conclusion of a political transition that began with the signing of the Comprehensive Peace Agreement in November 2006. State governments largely mirror the coalition at the center. At the sub-national level, funds, functions and functionaries hitherto managed by the central, district and village authorities are moving to the seven new provinces and 753 local governments for which new legislation, institutions and administrative procedures are being formalized as constitutionally prescribed. Meanwhile, the central level authority is being streamlined with a focus on national policies and oversight. This profound level of state restructuring is expected to result in improved outreach and service delivery in the medium term but is likely to take time before becoming fully operational.

B. Sectoral and Institutional Context

5. Considerable challenges remain in providing adequate and reliable electricity supply to the people of Nepal. Despite having rich hydropower resources for power generation, the current total installed capacity is about 1,000 MW[2]. The existing generation was not sufficient to meet the peak demand of about 1,500 MW in 2017/18. Due to increased power imports from India, the supply situation in the country has dramatically improved in recent years. The Nepal Electricity Authority (NEA), the country's state-owned utility, recently announced that it has abolished the declared load shedding; nevertheless, unannounced power cuts still plague the country.

6. According to the Bank's Multi Tier Framework (MTF) Survey[3] of 2017, 95 percent of the population of Nepal have access to electricity. The MTF household survey also shows that only 72 percent of households are connected to the national grid. In addition, the actual consumption of electricity remains very low at about 177 kWh per capita.[4] As a result, a significant share of households still relies on off-grid solutions as their primary source of electricity, including solar-home system, pico-hydro, solar lantern, and rechargeable batteries.

7. Off-grid energy systems[5] are often more practical and economic in remote rural areas; however, their success is inconsistent. Currently, about 1,700 off-grid micro hydro plants (MHPs) — almost all of them community-owned[6] — have been installed throughout the country with total installed capacity of about 30 MW. These communities, generally, do not have business acumen to commercially run mini-grids. Key challenges observed in community-owned mini-grids are: i) sub-optimal mix of residential and non-residential customers and low utilization factors[7]; ii) gaps in efficient plant operations and maintenance (O&M); iii) flat tariff structures and absence of innovative tariff mechanisms; iv) high dependence on subsidies, from 40 percent to 60 percent of the capital cost; and v) absence of commercial

[2] Economic survey report, Ministry of Finance 2017/2018.
[3] The MTF survey, funded by the World Bank, was conducted between July and November 2017 and covered 6,000 households in seven provinces and three ecological regions (mountains, hills, and Terai).
[4] Economic survey report, Ministry of Finance 2017/2018.
[5] Mainly micro-hydro and solar.
[6] Of the plants surveyed by MTF nearly 95% were owned by communities
[7] Utilization factor is defined as the ratio of actual energy produced to the designed production capacity over a period of time.

debt and equity financing. In addition, the mechanism to properly utilize mini-grid assets after the arrival of the national electric utility grid in some rural areas has been inadequate.

8. Both the technical potential and business opportunities exist for the private sector to deploy mini-grids and provide energy services. An International Finance Corporation (IFC) study[8] suggested that 78 MW of electricity can be generated from micro hydropower projects (smaller than 100 kW). The study further estimated potential of mini-hydropower projects (between 100 kW and 1 MW) was around 369 MW. The study estimated US$316 million of public and private financing would be required to build 48 MW of micro hydropower projects by 2023.

9. To improve and sustain the off-grid electricity supply model, the Government of Nepal (GoN) has chosen to encourage greater private sector management and commercial financing through public-private partnerships (PPP). It has recognized the need to move away from a subsidy-dependent model toward a more commercial model. To do so, it has recognized a need to promote greater private management and/or ownership of the mini-grid systems to help to attract investment. It also recognized the need to provide more proactive and targeted market and institutional development support to foster successful development of these investments, while ensuring protection of consumer rights.

10. Currently, a subsidy scheme is the predominant form of support by the GoN and is expected to be phased out once the commercial sustainability of the new off-grid business model using PPPs is established. To encourage the private sector, the GoN introduced a revised Renewable Energy Subsidy Policy (RESP) in 2016. The overall strategy of the RESP 2016 is to: i) maximize the use of renewable energy resources and technologies and service delivery; ii) support the growth of the renewable energy market by attracting private sector, mobilizing credit, and reducing investment risks; and iii) encourage public-private partnerships (PPPs). Furthermore, NEA and the Alternative Energy Promotion Centre (AEPC) – a GoN Institution established with the objective of developing and promoting renewable/alternative energy technologies in the country -- have recently agreed on guidelines for interconnection of existing mini-grids, which is expected to reduce the risk associated to grid arrival in the mini-grid areas. AEPC is the organization that channels subsidies to the existing mini-grids based on RESP 2016. In FY2016/17, AEPC disbursed approximately US$15 million as subsidies to MHPs and solar mini-grids.

11. In addition to providing subsidies, in 2014 AEPC selected seven financial institutions to participate in a scheme to mobilize credit for the Renewable Energy (RE) sector. Nevertheless, despite their familiarity with the general energy sector[9] neither these financial institutions nor the private sector were able to effectively implement the scheme for mini-grids. In addition to the barriers mentioned above, this can be attributed to developers and financier's limited knowledge and experience with mini-grid services, constraints of the scheme design, as well as remoteness of the mini-grid service areas for appraisal and monitoring purposes. In FY2016/17, commercial banks lent NPR 0.26 million to only two MHP.

12. The GoN requested the World Bank's support to help address barriers to private sector participation in the renewable energy mini-grid sector. The proposed Project will aim to address these barriers by successfully demonstrating new approaches that will promote PPPs. Private entities and cooperatives will be mobilized to provide electricity services to rural areas as "energy service companies"

[8] International Finance Corporation, 2014, "Addressing Private Sector Opportunities in Decentralized Energy Access Market: Assessment of Nepal Small Scale Energy Market," Kathmandu

[9] With the total outstanding portfolio in energy sector of about USD 133 million

or ESCOs. These specialized ESCOs will crowd-in the necessary technical expertise and financing capacity to develop, build, own and operate renewable mini-grid projects. They will have access to better credit terms and stronger project development support through the Project. The improved policy environment through RESP 2016 and the effective implementation of this Project are expected to create opportunities for this specialized ESCO business model to succeed in providing energy access to the rural areas.

C. Relevance to Higher Level Objectives

13. The proposed project is consistent with the Country Partnership Framework (CPF) for Nepal (FY2019–23)[10] (Report No. 121029-NP). The CPF has identified that unavailability of energy supply has been one of the major obstacles in investment, productivity, and livelihood opportunities. In order to improve the energy supply situations, in its focus area 2, the CPF has emphasized, among others, the need to promote renewable energy solutions, including the opportunities to capture private sector efficiencies through PPPs.

II. PROJECT DESCRIPTION

A. Project Development Objective

14. The Project Development Objective (PDO) is to increase electricity generation capacity from renewable energy mini-grids in selected areas by mobilizing ESCOs.

PDO-Level Indicators

15. The achievement of the PDO will be measured using the following indicators:

(a) Generation capacity of energy constructed or rehabilitated (MW)

(b) People provided with new or improved electricity service (Number)

(c) Capital mobilized by private companies (US$)

B. Project Components

16. The project is designed to support renewable energy mini-grid market development by introducing conditions to gradually shift from subsidized model to a commercial business model. The project aims to demonstrate that private sector and private capital can be mobilized in the mini-grid sector. By substituting community ownership with private ownership, the project envisages clear incentives for sustainable technical and financial performance of subprojects. Overall, this project is expected to provide electricity services to different types of customers – typically known as Anchor, Business and Communities (ABC) customers[11]. Based on the quantum and profile of power demand from different customers, the developers will be able to design their business plans that include, among others,

[10] CPF discussed at Board on August 7, 2018

[11] Typical Anchor customers include the customers who need constant power supply and generally include telecom towers, cable TV operators, hotels. Business customers include the commercial establishment such as bakeries, agricultural processing facilities, metal works, and so on. which can adjust their demand based on the tariffs. Communities are the general households, public institutions and so on. who have fixed load use pattern with typical peak during morning and evening time.

tariff differentiation, customized service plans, cross subsidies and so on. The subprojects are expected to diversity revenue streams, increase utilization factors, and become financially viable. Given the long absence of private investment in the sector, this project is designed to spur the interest of private entities and demonstrate success. The total cost for the proposed project is US$16.97 million, of which Strategic Climate Funds (SCF) funding is USD 7.61 million

Component 1: Credit Facility to Support Renewable Energy Mini-grid Subprojects (US$3.61 million of SCF Grant and US$2 million SCF Credit financing, which will complement US$6 million of GoN subsidy and US$3.60 million investment by ESCOs)

17. This component will provide an approximately US$5.61 million to be intermediated by AEPC[12] through on-lending to eligible financial institutions, henceforth referred to as 'Partner Banks' (PBs) in local currency. Of this SCF financing, US$3.61 million will be in the form of grant and US$2 million in the form of a concessional loan to the GoN. The PBs will on-lend long-term funds to ESCOs to finance mini-grid subprojects. The ESCOs in this project are envisaged to be legal private-sector enterprises and cooperatives, established for developing and operating mini-grids.

18. This component will mainly support the following types of subprojects: (a) construction of new micro-hydro, solar hybrid[13] and wind mini-grid subprojects, (b) rehabilitation and/or upgradation of existing mini-grid subprojects, and (c) the interconnection of the mini-grids with the national grid. The subprojects will be part of the ongoing government scheme to develop micro/mini-hydro and solar subprojects in the country. AEPC is currently identifying a list of the subprojects that may participate. A list of tentative subprojects and their status is archived in project documents.

19. The project design is flexible and result indicator targets can be adjusted based on uptake of subproject types. The ESCO's and subprojects for investment will be selected based on the established eligibility criteria agreed with the World Bank and stipulated in the Project Operational Manual (POM), adopted by AEPC. The eligibility criteria will reflect, among others, promotion of rural energy access, proposed incremental renewable energy capacity, projected utility time lines for national grid extension to the subproject area, and promotion of mini-grids that have the most potential for commercial viability.

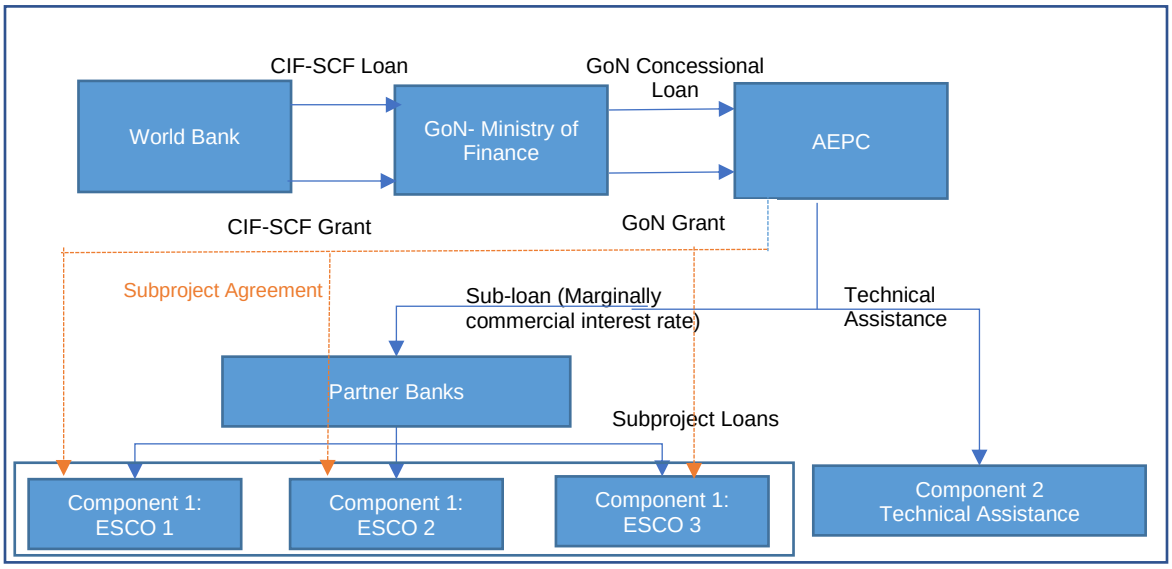
20. PBs meeting the eligibility criteria will be allowed to participate in the project. PB's eligibility criteria will be stipulated in POM. PBs can enroll in the project based on their financial health (including adequate profitability, capital, and quality portfolio with sound financial indicators). This information will be submitted by PBs to AEPC along with their request for enrollment. AEPC will assess the information provided by the PBs against the eligibility criteria and determine whether the applicant PB can join the project, subject to No Objection by the World Bank. AEPC will on-lend funds through eligible and selected PBs to ESCOs. The PBs will assume the credit risk of the subproject loans.

[12] AEPC has been considered as an eligible partner to implement the project as wholesaler, in partnership with commercial banks who have the capacity to act as financial intermediary (FI) as required for private sector-led mini-grid subprojects, in view of (a) AEPC's governance and administrative structure, policies, and effective project monitoring mechanism in technical aspects and its present and past experience in implementing the projects in renewable energy sector and (b) pool of banks available in the market having adequate profitability, capital, and quality portfolio with sound financial indicators and experience in renewable energy lending.

[13] Solar hybrid subprojects include solar-MHP subprojects, solar-battery storage subprojects, solar-wind subprojects, and solar-diesel generator subprojects, among others.

21. AEPC will sign Sub-Loan Agreements (SAs) with the selected PBs. The PBs will sign Subproject Loan Agreements (SLAs) with ESCOs. On-lending will take place on an 'open door' and 'first-come first-serve' model for the eligible ESCOs (and subprojects) through the PBs. PBs will also be served on a 'first-come first-serve' basis until the funding is fully used. Performance of PBs will be assessed periodically to ensure that they continue to meet the eligibility requirements. The PBs sub-loan amount will be equivalent to the aggregate amount of principals of all the subproject loans made by the respective PB.

Figure 1. Project Organization Fund Flow Chart



22. Under this component, GoN will provide the fund obtained under the SCF Loan Agreement as a concessional loan to AEPC and the fund obtained under the SCF Grant Agreement as a grant to AEPC to be mobilized as sub-loans. The general terms and conditions for AEPC to mobilize sub-loans though the credit facility is presented in Annex 1.

23. By participating in this project, the PBs can: (i) diversify their credit portfolio; (ii) work towards compliance with Central Bank's directive on development sector financing[14]; and (iii) increase their capacity in energy sector project financing.

24. This credit facility will incentivize PBs to invest in renewable energy mini-grids with longer tenures and at competitive interest rates than could be obtained under the previous schemes and which match better the project asset lifecycle and cash flows. The open-door policy for PBs will enable the ESCOs to select the PBs with the best offers. For the sustainability of the credit facility, AEPC intends to use the reflows of the repayments from the PBs by setting up a revolving fund which can be used to finance new subprojects.

Component 2: Technical Assistance to the Mini-grid Sector, ESCOs, and Partner Banks and Project

[14] Local commercial banks are required to follow the investment directive issued by the central bank from time to time. According to the latest directive, the commercial banks are required channel 25% of their lending to the productive sector including agriculture, energy, tourism, and small and medium enterprises.

Management Support (US$2 million of SCF Grant)

25. This component will provide required TA to AEPC, ESCOs, and PBs to implement the project. The funds allocated under this component will be used in support a range of institutional capacity development, technical assistance and training activities including the following:

(a) Project management support

(i) **Support of the Project Management Team (PMT):** This subcomponent will support the PMT and Technical Review Committee (TRC) by financing its operating costs, consultants, goods and other services needed ensure project management support for the sub-project design, and monitoring and evaluation. The TRC will comprise notable industry experts with several years of experience in the sector and will independently review subproject appraisal by AEPC and advise AEPC management on: (i) eligibility of subprojects to participate in this project, and (ii) amount of public sector subsidy that can be provided to each subproject. In addition, this subcomponent will also support the establishment of Grievance Redress Mechanism (GRM) within the PMT.

(ii) **Enhancement of AEPC's capacity as a credit wholesaler:** This subcomponent will also support AEPC's capacity enhancement in credit management and mobilization. It will include the establishment of a Credit Vertical Unit (CVU), dedicated to loan disbursement and portfolio monitoring within AEPC as well as for the monitoring of performances of disbursed loans. The CVU will be established with adequate credit appraisal and monitoring procedures and systems in place, alongside hiring dedicated staff to enhance AEPC's capacity to act as financial intermediary (FI) during project implementation.

(b) **Training and capacity development:** This subcomponent will support training and capacity development activities of the relevant stakeholders. These include, among others, the Ministry of Energy, Water Resources and Irrigation (MoEWRI),[15] AEPC, PBs, and ESCOs, and industry service providers. Private sector ownership of mini-grid has been nominal in Nepal for more than a decade. This subcomponent will cover approaches to granting permits to ESCOs in a more coordinated manner from central and local authorities including the guideline, standards, and capacity development for interconnection. For ESCOs, the training and capacity development will include business model development and optimization, business administration, technology selection, quality control and management, O&M, tariff management,[16] and project financing analysis. For PBs, training will cover credit due diligence, risk assessment in project financing in the renewable energy, monitoring of portfolio and loan performance, and related activities to enhance lenders' ability and confidence in rural mini-grid projects. In addition, the capacity of AEPC, PBs, ESCOs, and industry service providers will be strengthened in procurement, financial management (FM), environmental and social (E&S) assessment and management. The subcomponent will also increase capacity of potential community-based entrepreneurs to establish formal companies and gradually transition from informal 'functional groups/user committees'.

[15] Under the recent restructuring, AEPC is under the remit of Ministry of Energy, Water Resources and Irrigation (MoEWRI).

[16] Capacity of ESCOs will be strengthened to use time-of-use tariffs to incentivize more off-peak consumption by nonresidential consumers—particularly in MHP subprojects. Where appropriate, capacity of ESCOs will be strengthened to use prepaid meters to mitigate collection risks.

Through targeted awareness campaigns, women will be encouraged to participate in training and capacity building activities so that they take leadership roles in mini-grid companies, and that women-led or women-owned productive end use enterprises benefit from electricity.

(c) **Preparation of studies and key project documents:** This subcomponent will support the preparation of feasibility studies, technical design, E&S assessments, and bid documents of subprojects. AEPC may use bid documents to solicit proposals from ESCOs. In addition, it will support the preparation of key project documents including Memoranda of Understanding, agreements, and contracts among AEPC, ESCOs, and PBs. This will also support the preparation of necessary technical standards and guidelines for MHP, solar, and wind mini-grids and interconnection subprojects. Support will also be provided for strengthening organizational set-up of RE agencies at both federal and sub-national levels.

(d) **Support on promotional activities**: This subcomponent will support promotion of the mini-grid solutions among various stakeholders (ESCOs, financiers, business/household customers). Female-headed households and women-led or women-owned businesses will be targeted through awareness campaigns and communication materials to encourage them to connect with mini-gird and safely and productively use electricity. In addition, this subcomponent will also promote the sharing of experiences, networking, and outreach between ESCOs, financiers, business/household customers, rural community mobilization, and networking events/programs, and socioeconomic surveys.

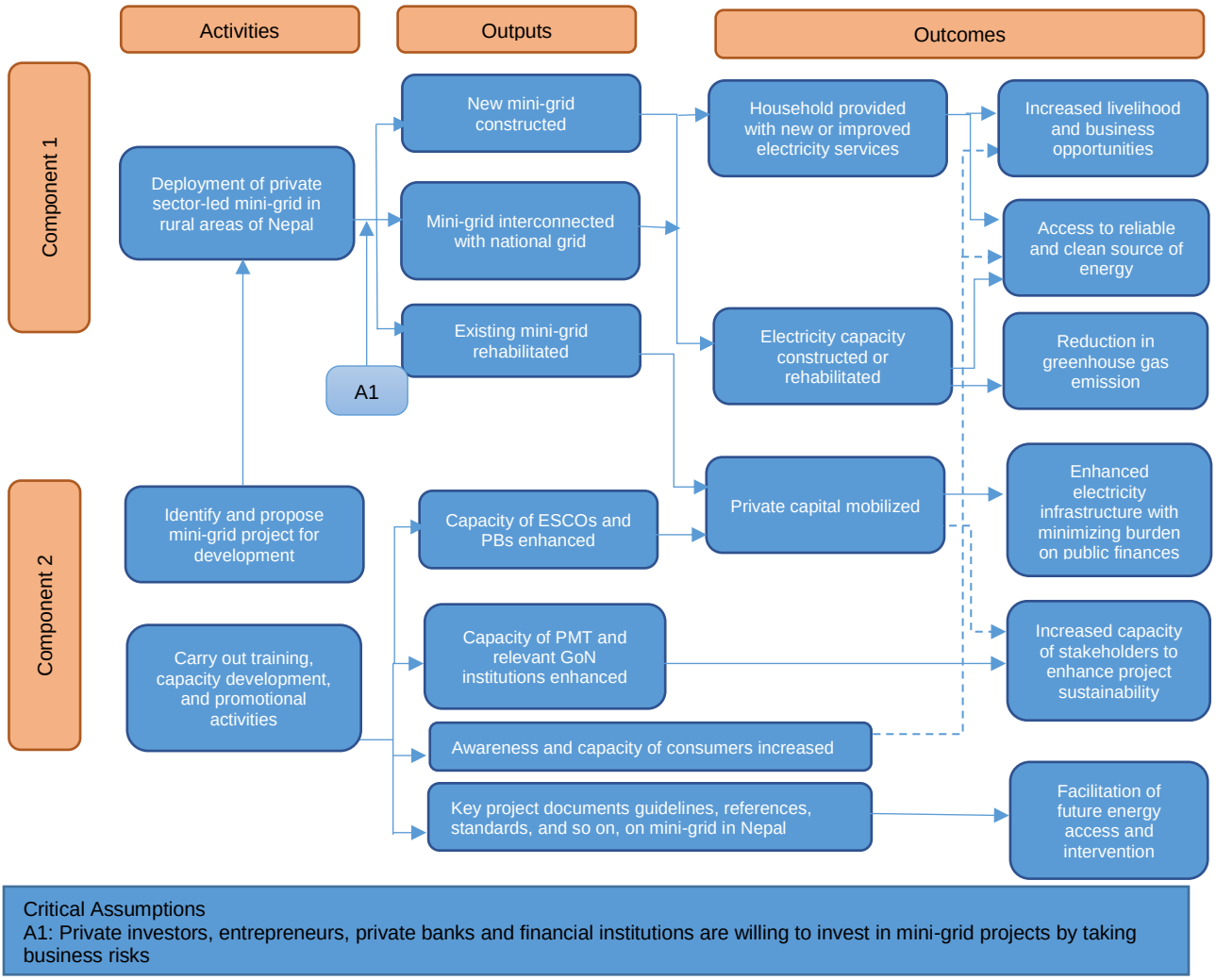
C. Project Beneficiaries

26. The ultimate project beneficiaries are rural residential and nonresidential customers, who will gain access to new or improved energy services in rural areas through renewable energy mini-grids. The use of electricity will replace their consumption of mainly diesel, kerosene, and batteries as well as other non-conventional energy sources. In addition, ESCOs and PBs will benefit from the availability of long-term credit facility. Additionally, the GoN/AEPC, PBs, and ESCOs will benefit from capacity development and training to promote private sector participation. Besides, the project will fund targeted communication and capacity building to women to enhance their role and participation in the sector.

D. Results Chain

The result chain is presented in the figure below

Figure 2. Result Chain



E. Rational for Bank Involvement and Role of Partners

27. This project will institutionalize long-term commercial financing for private-sector mini-grids and will demonstrate the feasibility of market based credit financing. This will help the development partners in sustainably mobilizing credit through their programs. Currently, Asian Development Bank (ADB) and the German Agency for International Cooperation (*Deutsche Gesellschaft für Internationale Zusammenarbeit*, GIZ) provide credit to community owned mini-grids. However, their programs are yet to support private sector mini-grids.

F. Lessons Learned and Reflected in the Project Design

28. This project draws lessons from World Banks's Financial Intermediary (FI) operations in Bangladesh and Rwanda. Operations in these countries provides examples in: (i) establishing appropriate

eligibility criteria for PBs, ESCOs, and subprojects, (ii) subproject appraisal process, (iii) fund flow mechanisms, (iv) POM, and (v) SA and SLA.

29. The project has been informed by past studies and analyses[17]. All studies indicate: (i) need for private sector engagement for operational and commercial efficiency; (ii) need for public sector investment to enable sustainable returns to private sector while maintaining affordable tariff to rural consumers; and (iii) need for developing capacity of financial institutions and private sector to move from subsidy-based model to commercially sustainable enterprises; (iv) people are willing and able to pay for adequate and reliable electricity service; (v) management of mini-grids must be improved; and (vi) grid arrival is a major threat to existing mini-grids.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

30. AEPC will have the overall responsibility for the implementation of the project (both Component 1 and Component 2) through the PMT. AEPC will host the PMT funded by Component 2. The PMT will be headed by a project manager who will be assisted by the relevant AEPC staff and specialists such as solar and MHP engineers, financial analyst, procurement specialist, safeguard specialists, and so on. The PMT will be responsible for managing day-to-day activities of the project. As and when required, the PMT will be supported by external consultants, experts, and specialists. In addition, the TRC will support AEPC PMT and management in making key subproject decisions. CVU, within AEPC, will support AEPC activities as credit wholesaler, PBs selection, loan disbursement, and portfolio monitoring.

31. For project preparation, AEPC has assigned a project manager, who is supported by relevant technical, safeguard, and procurement specialists deputed from AEPC's other departments and units. AEPC is currently in the process of procuring key consultants/specialists with target of having them on board immediately after the project is approved.

32. A POM, acceptable to the Bank, will detail the procedures for mobilizing subsidy and credit for eligible subprojects. The subprojects that are considered for the development can be broadly classified into two categories: (a) subprojects identified by AEPC, where ESCOs are solicited for development, and (b) subprojects identified by ESCOs and proposed for development. For the subprojects under category (a), AEPC/PMT will conduct a preliminary due diligence to be able to solicit proposal on a competitive basis from the potential ESCOs. If required, ESCOs will further study the subprojects and request loan from the PBs. For the subprojects under category (b), ESCOs will be responsible for selecting the subprojects on their own, and after completing the necessary studies, they will propose the subprojects to the PMT for further consideration. PBs will conduct credit appraisal on proposed subprojects and make credit decisions. If required, TA from PMT will made available to support PBs in appraising and monitoring subprojects. The steps for sub-project selection is presented in Annex 1.

[17] Nepal Scaling Up Electricity Access through Mini and Micro Hydropower Application (2015) and Study on Performance of Renewable Energy Development Program (REDP)/Renewable Energy for Rural Livelihood (RERL) Supported Community Managed Micro Hydropower Projects (2014)

33. Appropriate clauses in the subproject agreement will enable AEPC to monitor technical fiduciary and safeguards policies compliance by ESCOs. Further details of implementation arrangement are archived in the project document.

B. Results Monitoring and Evaluation Arrangements

34. Monitoring of project implementation progress and results indicators, as well as progress toward achievement of the PDO, will be the responsibility of AEPC and PBs and ESCOs. ESCOs will provide primary data on installed capacity of mini-grids, number and type of customers, and electricity supplied. ESCOs will also provide data on relevant gender indicators. ESCOs and PBs will provide data on private capital mobilized. The PMT will collect data and reports from PBs and ESCOs. The PMT will also report on Component 2 indicators pertaining to TA and sector capacity building. The PMT will prepare and submit quadrimester project progress report to the World Bank in conjunction with the World Bank's implementation support review no later than 45 days after the end of the period covered by such report.

35. Results Framework (RF) and Monitoring (section VII) has annual intermediate targets for project indicators. Intermediate targets are cumulative. The end target reflects the indicator's final value. The World Bank will conduct Implementation Support Review on a semiannual basis throughout the project's life to gauge the project's periodic performance. An Implementation Completion and Results Report of the project will be prepared and submitted no later than six months after the closure of the project to evaluate the project's overall performance.

36. **Citizen engagement.** The project will engage citizen and stakeholders in designing as well as monitoring and evaluating the performance of the mini-grid subprojects. Baseline data on subprojects will be collected through their detailed feasibility studies and E&S assessments. ESCOs and/or AEPC will organize rural community meetings (inviting potential residential and nonresidential costumers, both men and women), focus group discussions, and socioeconomic surveys, as necessary, during subproject preparation and E&S studies. The impacts of electrification, including specifically on women, will be monitored by continuing the socioeconomic surveys targeting the same subprojects on an annual basis after the subprojects' commissioning. Initial citizen engagement has already been carried out through the Environmental and Social Management Framework (ESMF) consultations. Citizens will also have opportunities to share their feedback and concerns through grievance redress mechanisms at subproject and project levels. The citizen engagement measures are captured in the RF.

C. Sustainability

37. The GoN has demonstrated strong commitment and ownership of the proposed operation. The project concept was developed under AEPC's leadership through an extensive and participative consultation process that started as part of the SREP Investment Plan preparation for Nepal. The focus is on improving the enabling environment for private sector participation in mini-grid subprojects. The project supports in demystifying policies and procedures for stakeholders to engage and collaborate with each other in a relatively certain and sustainable manner.

38. The project is designed to improve sustainability of the mini-grid sector in Nepal. The outreach and business development activities under Component 2 will keep ESCOs engaged and informed. TA activities improving the regulatory environment will further generate and sustain interest from ESCOs. It is expected that by the end of the project, commercial banks will have increased confidence for investing

in mini-grid subprojects, and their familiarity with the sector will be reflected in favorable loan terms and conditions.

IV. APPRAISAL SUMMARY

A. Economic and Financial Analysis[18]

39. **Economic analysis.** The economic analysis shows a good economic rate of return for the mini-grids in Nepal. The economic analysis takes a conservative approach to the estimation of benefits of mini-grids—these include the avoided cost of diesel use[19] and reduced environmental damage (in terms of reduced greenhouse gas (GHG) emission). The economic analysis indicates that the project is viable with and without environment benefits. The analysis shows that the hydro and solar mini-grids' economic rate of return (ERR) of about 25 and 21 percent respectively. Without the benefits from reduced GHG emissions, the returns are 20 percent and 15 percent. The lower returns for solar subprojects is mainly due to higher investment and operating costs (mainly due to requirements for battery replacement). For the typical 100kW[20] plant, interconnection project is also expected to yield return of about 20 percent with the increased utilization from 40 to 50 percent. The entirety (100 percent) of the proposed project's financing contributes to climate change mitigation co-benefit as the investments in mini-grids proposed under the project will result in electricity generation from renewable energy.[21]

40. **Financial analysis.** Financial analysis was conducted to evaluate a preliminary business case for the mini-grid schemes. It is assumed that nearly 50 percent of Capital Expenditure (CAPEX) subsidy will be provided to the new mini-grids, while 20 percent will be financed through equity and the remaining 30 percent will be financed through debt. However, as per RESP 2016, subsidies are not available for the rehabilitation of existing mini-grid and interconnection subprojects. It is assumed that 30 percent of the cost of rehabilitation and upgradation subprojects will be covered through equity and the remaining will be financed through debt.

41. For MHP mini-grids' (both new and rehabilitated) Internal Rate of Return (IRR) is about 15 percent. This rate is expected to increase with the increased utilization factor. For solar mini grids, IRR is about 11 percent. Solar plants are designed and sized to cater the available loads, thus, further increase in utilization factor for these plants may be difficult. However, due to continued reduction in the cost of solar power generation, it is possible that financial returns from solar mini-grids will increase over time. Besides, with more optimal planning (phased deployment of generation and keeping them close to demand), a reduction in capital cost (nearly 30 percent) may be possible for solar mini-grids. For the interconnection schemes, the project IRR is about 14 percent at 70 percent utilization.

42. **Sensitivity analysis.** A sensitivity analysis was conducted to calculate the switching values for the key cost and benefit drivers. The sensitivity analysis indicates that in the following conditions, the Economic Internal Rate of Return (EIRR) will dip below 10 percent (which is the economic discount rate).

[18] The economic and financial analysis details are presented in Annex 2.

[19] The cost of diesel generation is considered as proxy as significant percentage of demand for electricity is expected to arise from business establishments and households who are willing to invest in generators.

[20] Averaged sized plants that are expected to be the candidate for the interconnection in Nepal in the initial phase

[21] Subcategory 1.1: Electricity Generation under Category 1: Renewable Energy in *Joint Report on Multilateral Development Bank's Climate Finance*, 2016

The analysis shows that the subprojects are economically feasible even with significant cost overruns, reduced utilization, and reduced cost of diesel generation.

Table 1. Economic Sensitivity Analysis for the Mini-grid Schemes

Variable	Unit	Switching Values (10% EIRR)	
		Micro-hydro	Solar
Capital cost	US$ per kW	10,000	8,500
Utilization factor	Percent	20	49
Cost of diesel generation	US$ per kWh	0.18	0.22

B. Technical

43. The project recognizes the risks inherent in energy access mini-grid sector in Nepal and is designed to mitigating them. The project is designed to mobilize ESCOs and commercial financing to move the sector away from community-owned and subsidy-based model. Through training and advisory support, the project will enhance capacity of AEPC, PBs, and ESCOs in subproject identification, appraisal, preparation, implementation, and O&M. Both MHP and solar mini-grids are mature technologies. The project will help in demonstrating that private sector can sustainably operate them in the Nepali context. Furthermore, the project will support improvement, and adoption of relevant policy, regulations, and technical standards and guidelines, which will further open-up the sector for commercial investment.

44. **Investment Project Financing (IPF) Policy compliance review.** The project includes a line of credit and therefore is subject to the World Bank's IPF Policy on Financial Intermediary Financing. The arrangements outlined in the Project Appraisal Document (PAD) are compliant with IPF Policy requirements.

45. **Institutional setup and FI's eligibility criteria.** AEPC's capacity to act as wholesale lender is limited due to its limited on-lending track record and lack of systems, procedures, and staffing to conduct credit appraisal and portfolio monitoring. However, AEPC has been considered as an eligible partner to implement the project in partnership with commercial banks. The selection of AEPC as wholesaler has been done in view of AEPC's governance and administrative structure, policies, project monitoring mechanism, and its present and past experiences in implementing the projects in the renewable energy sector. PBs must have adequate profitability, capital, and portfolio quality with appropriate indicators and experience in renewable energy lending. A CVU will be established within AEPC to support the PMT with adequate procedures, systems, and dedicated staff with adequate skills.

46. **Financial institutions**: The selection of the PBs to be conducted by AEPC under the project and the no-objection procedure from the World Bank will further ensure that participating PBs[22] are well-managed, with adequate corporate governance structure and sound financial performance indicators, to operate at market conditions and to implement the project. Of the total 28 Class A commercial banks, in 2014, AEPC screened and selected seven well-performing PBs with experience in extending credit in the energy sector. Five of those banks are IFC investee clients in Nepal

[22] There are currently total of 28 class A commercial banks in Nepal. These and other banks that meet the eligibility criteria can participate in this project

47. **Use of directed credit.** The approach of mixing subsidies with commercial credit for ESCOs is consistent with the Government's strategy. By crowding in the private sector, it meets the MFD approach of the World Bank Group. Without long-term financing and TA, scarce credit will not flow to renewable energy subprojects. However, under no circumstances can the interest rate on the credit portion of assistance be priced below a marginally commercial interest rate and follows market-based approach for commercial lending.

48. **Recommendations and monitoring.** At midterm review, APEC and the Bank teams will assess options to leverage additional lending through commercial banks. The commercial banks will be encouraged to increase the amount of their lending vis-à-vis long term financing provided by the Project to them. As the subprojects financed by the credit facility are in the underdeveloped segment of the financial market, it will be important to track the interest rates charged by FIs to the companies.

C. Financial Management

49. AEPC has experience implementing World Bank financed projects. The Financial Management (FM) capacity of the PMT will be built further with FM consultant support on overall financial management of the Project. The credit officer of Credit Vertical Unit (CVU) will manage disbursement to PBs including monitoring of disbursements and utilization of sub-loans. AEPC will only on-lend to eligible PBs. PBs, ESCOs and subprojects will be screened and selected based on agreed-upon eligibility criteria in the POM. Furthermore, the screening and selection of ESCOs/ Sub-projects by PBs ensures financial viability of the sub-projects and strengthens their monitoring. AEPC will obtain quarterly reports from PBs on performance of subproject loans, including the disbursement of them. PBs will obtain these information from ESCOs with quarterly reports for the same. AEPC will obtain annual audited financial statements of ESCOs and PBs within six months of the end of FY. PMT and CVU will closely coordinate in managing disbursement, financial reporting and monitoring requirements of sub-loans. The Interim Unaudited Financial Reports (IUFRs) for the Project will be submitted to the Bank by 45 days from quadrimester end and the Project audit report by six months from FY end. The details of implementation arrangements, required internal controls and monitoring arrangements will be included in the POM.

50. The Bank's disbursement to AEPC will be based on IUFRs that reports on disbursement forecasts with adjustments of expenditures incurred. The disbursement in the form of advance to Designated Account (DA) will be provided by the Bank for all Components. For Component 1, AEPC will disburse to PBs from DA based on sub-loan payment request submitted by PBs, as evidenced in signed SLAs. Subsequent disbursement for the same sub-loan from DA to PBs will be based on settlement of previous loan installments as reported in ESCOs' progress reports and ESCOs withdrawal schedule in SLA. Disbursement from the Bank can also be based on reimbursement, direct payment, and special commitment. The disbursement and fund flow details will be included in the Disbursement Letter issued by the Bank and POM, as appropriate. The sub-projects will be co-financed with the resources from GoN, ESCOs, and World Bank as appropriate. While the extent of co-financing can't be determined at this stage, the audited financial statement will provide such detail.

D. Procurement

51. Bank's Procurement Regulations is not applicable in Component 1. Substantial amount of funds are expected to be used toward non-procurement activities such as subproject loans to ESCOs through PBs. Selection of the PB and outflow of SCF loans will follow the standard procedures in the

implementation arrangements. The participating ESCOs will be allowed to procure contracts and select suppliers for their subprojects following the Best Commercial Practice. Procurement of goods and services, mainly small-value procurements and selection of individual consultants under Component 2, possess moderate procurement risks. Procurement risks will be minimized by hiring a Procurement Specialist (consultant) for the project and through oversight by WB. Project Procurement Strategy for Development (PPSD) and Procurement Plan for the first 18 months of the project implementation period have been prepared by AEPC and reviewed and approved by the Bank. Systematic Tracking of Exchanges in Procurement (STEP) system will be used for monitoring procurement under the project.

E. Social (including Safeguards)

52. The project is categorized as FI in accordance with OP 4.01.[23] Exact subprojects that would be financed are not known at this stage. Hence, a coherent approach to ensure that all key project participants (AEPC, ESCOs, and PBs) adequately fulfil their responsibilities for Environment and Social (E&S) risks and impacts assessment, management, and monitoring has been described in the Environment and Social Management Framework (ESMF) prepared by AEPC and disclosed on July 16, 2018. AEPC organized the ESMF consultation on November 9, 2017. About 50 attendees representing civil society organizations, ESCOs, industry associations, PBs, and public sector agencies participated in the consultation.

53. In terms of specific social risks, the project will deliver positive social benefits to rural communities by providing electricity. Subprojects are expected to be in areas where the majority of the beneficiaries may be underserved. It is expected that there would be indigenous peoples (IP) communities present in the proposed subproject areas under consideration. The World Bank's OP 4.10 (Indigenous Peoples) is triggered and a Vulnerable Community Development Framework (VCDF) has been prepared and integrated into the ESMF. Sub project activities may lead to land acquisition. Thus, OP/BP 4.12 (Involuntary Resettlement) is triggered. Subprojects that involve large-scale resettlement resulting from potential land acquisition will not be considered for financing, but to mitigate risks, a Resettlement Policy Framework (RPF) has been prepared and integrated into the ESMF.

54. Effective community engagement is central to the project's success given that the private sector model is new for Nepal's mini-grid sector. A stakeholder engagement approach, including a grievance mechanism for affected communities, has also been articulated as part of the ESMF. AEPC and ESCOs will have a shared responsibility for this aspect.

F. Environment (including Safeguards)

55. Some of the subprojects may be in protected or conservation areas that may contain sensitive / critical natural habitats. Hence, besides OP 4.01, OP 4.04 (Natural Habitats) has been triggered.[24] Additionally, E&S impacts associated with subprojects may involve labor and working conditions issues

[23] Even though the project involves private sector companies and financial intermediaries, application of OP 4.03 (Performance Standards for Private Sector Activities) instead of OP 4.01 and consequently World Bank safeguard policies was not found to be suitable for the project design and implementation arrangements. AEPC, a government agency functioning as the wholesale FI under the project and will assume primary oversight responsibility for assuring timely preparation and quality of E&S impact assessment and mitigation measures.

[24] However, OP 4.36 has not been triggered, as it is expected that the predominant nature of impacts on natural habitats and IP is covered under these respective policies.

during construction and operation, as well as community health and safety issues, including those associated with access roads. Impacts on cultural heritage are also identified as likely in many rural areas of Nepal where mini-grids may be located, and hence OP 4.11 has been triggered. The ESMF includes screening, assessment, and risk mitigation measures for these potential impacts of subprojects.

56. The process for assessment and management of E&S risks and impacts of subprojects is documented in the ESMF. AEPC will act as both the project implementing agency and as a wholesale FI. ESCOs must prepare safeguard instruments, guided by ESMF, once subprojects to be financed are identified and detailed designs are under preparation. AEPC will assume primary responsibility for overseeing the process of assessment and management of E&S risks and impacts of subprojects, including: (i) E&S screening of subprojects supported from the credit facility; (ii) determining subproject E&S category/risk level (high, medium, or low) in line with ESMF[25]; (iii) reviewing and ensuring quality of the Environmental and Social Impact Assessments (ESIAs) and/or Environmental and Social Management Plans (ESMPs) and other instruments as well as the clearance function for E&S assessment and management instruments prepared by ESCOs[26]; (iv) ensuring that all relevant clearances are obtained under the GoN regulations and World Bank requirements; (v) ensuring that outcomes of E&S risks and impacts assessment are integrated into the process for subproject selection and preparation conducted by AEPC; (vi) ensuring that appropriate legal covenants concerning E&S compliance are included in Subproject Agreement between AEPCs and ESCOs; (vii) ensuring that ESCOs carry out risk mitigation and monitoring measures under the ESMPs, including the associated costs; (viii) monitoring of ESCOs' compliance; (ix) implementing the capacity-building plan for all key stakeholders; (x) maintaining a grievance redress mechanism and cause ESCOs to do the same.

57. In FI projects, capacity of all key stakeholders is critical for adequately managing the risks. To that extent, the ESMF incorporates an E&S capacity building plan and budget for AEPC and all key stakeholders. This includes an approach to gradually build capacity of PBs to assume greater responsibility for E&S due diligence in the longer term (2-3 years after the start of project implementation). At that time, ESMF may be revised to reflect this aspect.

58. **Climate and disaster risk**. The project was screened for short- and long-term climate change and disaster risks. In particular, MHP subprojects supported under the project are expected to be exposed to the precipitation and flooding risk. The higher than normal rainfall and accelerated melting of glaciers due to climate change will expose both the MHP and solar mini-grid subprojects to flooding risks. On the other extreme, lower rainfall and decreased river discharge will decrease the power generation capacity of MHP subprojects. Nepal lies in active fault zone and earthquakes can damage subproject structures. Furthermore, the rainfall and earthquake induced landslides can damage the subprojects, particularly in the hilly areas. As the part of the subproject due diligence and preparation, AEPC will review how ESCOs are managing the climate and disaster risks in their subproject designs. The TA for preparing standards and guidelines under Component 2 will address the climate and disaster risks. In addition, subprojects will

[25] No subprojects equivalent to WB category A are expected at this stage. High risk category in the ESMF does not necessarily correspond to WB category A but is only meant to differentiate risk levels to assist AEPC in prioritizing scope and nature of the E&S assessment.

[26] In case of subprojects that are prepared by AEPC, AEPC may carry out ESIA and prepare ESMP that ESCOs will be required to comply with. In case of interconnections, AEPC will support interconnection subproject owners and PBs providing sub-loans for interconnection subprojects in E&S due diligence. To that extent, AEPC will prepare standard ESMPs for interconnection subprojects and ensure that these are provided to interconnection subproject owners and PBs that will finance these projects (to be included in Subproject Agreements).

be encouraged to obtain insurance against damages caused by natural calamities, including floods, earthquakes, and landslides.

G. Other Safeguard Policies (if applicable)

59. OP 7.5 (Projects on International Waterways) has been triggered as MHP subprojects are drawing water from various tributaries of main river system in different river basin in Nepal, which ultimately flows to India. However, it was determined that quantities of water affected by MHP subprojects under this project would divert only a small quantity of water from streams, and in some cases, such streams may not be part of international waterways for the purpose of OP 7.50. Besides, subprojects to be implemented under this project are part of a larger ongoing schemes under the Government's rural electrification program set out in the Rural Energy Policy (2006). Therefore, the exception to the notification requirement under paragraph 7(a) of OP 7.50[27] has been obtained from the World Bank's Regional Vice President for South Asia Region on April 14, 2018. Subprojects in disputed areas would not be considered for financing, and hence OP 7.60 is not triggered.

H. World Bank Grievance Redress

60. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service.
For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

I. Gender

61. Findings from the 2013 Gender Environment and Social Inclusion Gap Assessment of AEPC and available project monitoring data have been used to inform the gender analysis. Women's engagement is minimal in the mini-grid sector- of the 78 qualified MHP companies that work with AEPC, only two are owned by women. One of the reasons for this is the low participation of women in AEPC RE trainings (24 percent between 2016 and 2017).[28] AEPC will work with gender specialists to develop women-centric training activities which specifically develop technical and business management skills needed to engage/start/own/manage ESCOs. The indicators to monitor this are (a) number of women trained to engage in the mini-grid sector (Baseline 0, Target 50) (included in the RF) and (b) number of women-owned and/or led companies engaged in the mini-grid sector (Baseline 2, Target 4) (included in the POM

[27] OP 7.50 had details of when the exceptions can be sought.
[28] Report on Capacity Building Activities in the Nepal RE sector: 2016-2018, AEPC and the World Bank. In 17 workshops and trainings on micro- and mini-hydro conducted in this period, only 35 women participated compared to 352 men (10 percent). Twelve of these trainings were technical (manufacturing, installation, and operations) in nature and others focused on management, business, and enterprise development.

and monitored through the progress report).

62. Available data from AEPC's nine mini-grid based renewable energy project shows that only 6 percent of the total beneficiaries are female-headed households. Women mostly run small informal enterprises- (66 percent of the total) and very few (16 percent) own small and micro enterprises[29]. To help address this gap, AEPC provides subsidies to ESCOs as incentives to improve connections for female-headed households (NPR 4,000 per connection). Additionally, AEPC also provides 10 percent (up to NPR 10,000) of investment cost to productive end use enterprises operated by female-headed households.[30] AEPC will raise awareness of the targeted subsidies among ESCOs and consumers through radio programs, leaflets and consultations visits. The indicators include: Number of Women businesses provided with new or improved electricity service – Baseline 0, Target 82 (included in RF); Number of women provided with new or improved electricity service- Baseline 0, Target 63,000.00; and Number of female-headed households provided with new or improved electricity service- Baseline 0, Target 420.00 (latter indicators will be included in POM and monitored through progress report). Data will be gathered through ESCOs customer database and AEPC's survey.

63. The gap assessment of the RE sector found that leadership and decisions making structures are dominated by men.[31] Currently, only a few ESCOs are operating in Nepal. However, there are many micro-hydro user committees[32] (MHUC), which can serve as a good proxy for ESCOs to understand women's participation in mini-grid subproject governance structures. A survey of 64 Micro-Hydro User Committees (MHUC) found no women chairpersons, and only 4 women secretaries and 23 treasurers.[33] AEPC will commission a study to better understand constraints for leadership and meaningful participation of women in ESCOs and community user committees, and formulate an action-plan to push for more women in leadership positions. The indicator is: Number of women members in ESCOs leadership positions (Baseline: 0, Target: 33 percent) (will be included in POM and monitored through progress report).

IV. KEY RISKS

64. The overall implementation risk is Substantial. The project risks were identified based on AEPC's lack of recent experience in working with ESCOs. Risk mitigation measures were identified based on lessons learned from the previous/ongoing donor-funded energy projects; the successful experiences in other countries to address similar governance-specific issues in the energy sector; and consultations with development partners, concerned local and national groups, and experts. The key risks and mitigation measures are discussed in the following paragraphs.

65. **Political and Governance risks.** Political and Governance risks are rated as Substantial. In contrast to the frequent changes in government that characterized Nepal's decade-long transition to federalism, the new government enjoys an unprecedented super-majority in Parliament. Along with new constitutional checks and a far fewer number of political parties, there is a much greater degree of optimism for stability in the coming days. However, state restructuring on this scale is uncharted territory

[29] AEPC Data Analysis Fiscal year 2015/16
[30] 2016 Renewable Energy Subsidy Policy.
[31] Per the government requirement in social mobilization guideline, 2014 - Women are also encouraged to hold one or more of the three leadership positions (president, secretary, or treasurer). The government requires a 33 percent female participation in the user committees for every mini-grid.
[32] ESCO are companies with a governance structure; MHUC are committees with governance structures formed to run projects.
[33] The 2014 Study on Community Managed Micro Hydropower Projects for REDP/REDL

for Nepal and smoothing the transition from the previous unitary system to the new federal one will remain a daunting task. The new system, in principle, provides opportunities to decentralize development benefits and make service delivery more effective and accountable. However, the risks of jurisdictional overlap between the three tiers of government, lack of clarity and coherence between policies and devolved powers, and duplication of efforts will remain high during the coming few years. Key aspects of the new system require further definition and may continue to be contested by different population groups. Despite the lack of clarity at this early stage to define roles, rules and create governance capacity at the provincial and local levels, the overall political and governance risk has decreased.

- **Mitigation measures.** The government, at all levels, are committed to providing universal access of electricity. AEPC envisions supporting the different levels of the government in improving their participation and processes. Component 2 will support strengthening AEPC's institutional capacity, including organization structure and project management support, that aim to help it collaborate with the new federal and state agencies

66. **Sector strategies and policies risk.** The risk from sector strategies and policies is Substantial. Policies in the sector continue to evolve. Changes and adjustment in policies that include the sub-project selection, subsidy delivery, financing mechanisms, and tariff determination need to be conductive for the private sector participation.

- **Mitigation measures.** Component 2 will increase capacity of GoN and its relevant institutions in formulating and refining appropriate policies and strategies that promote the private sector participation. In addition, component 1 will also make available longer tenure finances with competitive interest rates than could be normally be obtained to match better the project asset lifecycles and cash flows.

67. **Institutional capacity for implementation and sustainability risk.** This risk is rated High. To achieve the PDO, several stakeholders in the renewable energy and rural electrification sector, including potential ESCOs, local communities/villagers, residential and nonresidential customers, consultants, contractors, the GoN, development partners, and local PBs, need to perform.

- **Mitigation measures.** Component 2 supports comprehensive training and capacity development activities for AEPC, government agencies, ESCOs, PBs, and industry service providers —including the preparation of necessary codes and guidelines for sub-project construction and operation. In addition, this component will also provide support in designing grid-compatible mini-grids compliant with NEA's grid code. In addition, the guideline for interconnection of mini-grids with national grid will be strengthened. Additionally, TRC and CVU will be instituted in APEC to support project implementation.

68. **Fiduciary risk.** Fiduciary risk is Substantial. AEPC's capacity in FM and procurement needs to be enhanced, especially with regard to on-lending and credit management. AEPC has no experience of working in a World Bank FI operation. The capacity of AEPC for managing fund flows to PBs and for monitoring performance of PBs and subprojects needs to be developed.

- **Mitigation measures.** AEPC PMT will be provided with training as needed, and guidance to mitigate the fiduciary risk by implementing FM and procurement practices satisfactory to the World Bank. A POM, acceptable to the World Bank, will be developed to guide the

project staff in financial and procurement management of the project. The FM and procurement practices at AEPC will be periodically assessed as part of regular monitoring. FM and procurement capacity will be enhanced by hiring consultants as being done in other World Bank-financed projects implemented by AEPC**.**

69. **Stakeholder risk.** Stakeholder risk is rated Substantial. Energy access mini-grids owned and operated by private sector is not a common practice in Nepal. Both AEPC and private sector have limited experience in working with each other. The subprojects will depend on revenues collected from the rural consumers and assets will be in rural and remote areas. For subprojects to be successful, they must be acceptable to the beneficiary communities and their local governments. PBs must also be confident in investing in these subprojects. Alignment of stakeholder interest is critical for achievement of PDOs.

- **Mitigation Measure:** The project actively reduces the risk facing the stakeholders and enhances incentives for their participation. Long-term funding coupled with technical support in identifying, preparing, appraising, and implementing subprojects will provide additional incentives for PBs and ESCOs. Outreach, communication, and consultations will help in securing buy-in of local communities and governments.

VII. RESULTS FRAMEWORK AND MONITORING

Results Framework
COUNTRY: Nepal
Nepal: Private Sector-Led Mini-Grid Energy Access Project

Project Development Objective(s)

The Project Development Objective (PDO) is to increase electricity generation capacity from renewable energy mini-grids in selected areas by mobilizing ESCOs.

Project Development Objective Indicators

Indicator Name	DLI	Baseline	Intermediate Targets					End Target
			1	2	3	4	5	
To increase electricity generation capacity from RE mini-grids in selected areas by mobilizing ESCOs								
Generation capacity of energy constructed or rehabilitated (CRI, Megawatt)		0.00	0.00	0.40	2.00	3.60	3.80	3.80
People provided with new or improved electricity service (CRI, Number)		0.00	0.00	18,000.00	68,400.00	118,800.00	126,000.00	126,000.00
Capital mobilized by private companies (Amount(USD))		0.00	0.00	374,000.00	1,775,000.00	3,176,000.00	3,363,000.00	3,363,000.00

Intermediate Results Indicators by Components

Indicator Name	DLI	Baseline	Intermediate Targets					End Target
			1	2	3	4	5	
Component 1: Credit Facility to Support Renewable Energy Mini-grid Subprojects								
Number of new mini-grid subprojects supported by the project (Number)		0.00	0.00	2.00	8.00	14.00	15.00	15.00
Number of rehabilitated mini-grid subproject supported by the project (Number)		0.00	0.00	0.00	2.00	4.00	4.00	4.00
Number of mini-grid interconnection subproject supported by the project (Number)		0.00	0.00	2.00	5.00	8.00	9.00	9.00
Net greenhouse gas emissions (CRI, Tones/year)		0.00	0.00	4,883.17	15,964.22	27,045.27	29,486.86	29,486.86
Number of businesses provided with new or improved electricity service (Number)		0.00	0.00	20.00	40.00	62.00	82.00	82.00
Number of Women businesses provided with new or improved electricity service (Number)		0.00	0.00	6.00	13.00	20.00	27.00	27.00
Number of households provided with new or improved electricity service (Number)		0.00	0.00	3,600.00	14,400.00	25,200.00	27,000.00	27,000.00

Indicator Name	DLI	Baseline	Intermediate Targets					End Target
			1	2	3	4	5	
Annual electricity output from renewable energy (Gigawatt-hour (GWh)) (Gigawatt-hour (GWh))		0.00	0.00	4.60	14.90	25.20	27.50	27.50
Component 2: Technical Assistance to Mini-grid Sector, ESCOs, and PBs and Project Management Support								
People trained in project preparation and implementaiton (Number)		0.00	30.00	60.00	90.00	120.00	150.00	150.00
Number of women trained to engage in mini-grid sector (Number)		0.00	10.00	20.00	30.00	40.00	50.00	50.00
Consultations with citizens and consumer feedback surveys with publicly disclosed reports summarizing findings (Yes/No)		No	Yes	Yes	Yes	Yes	Yes	Yes
Specialist services procured for project implementaiton (Yes/No)		No	Yes	Yes	Yes	Yes	Yes	Yes

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Generation capacity of energy constructed or rehabilitated		Trimester	Project Progress		AEPC

			Report		
People provided with new or improved electricity service		Trimester	Project Progress Report		AEPC
Capital mobilized by private companies		Quadrimester	Project Progress Report	AEPC will collect the data from the partner banks.	AEPC

Monitoring & Evaluation Plan: Intermediate Results Indicators					
Indicator Name	**Definition/Description**	**Frequency**	**Datasource**	**Methodology for Data Collection**	**Responsibility for Data Collection**
Number of new mini-grid subprojects supported by the project		Quadrimester	Project Progress Report	Project progress and completion report from ESCOs	AEPC
Number of rehabilitated mini-grid subproject supported by the project		Quadrimester	Project Progress Report	Project progress and completion report from ESCOs	AEPC
Number of mini-grid interconnection subproject supported by the project		Quadrimester	Project Progress Report	Project progress and completion report from ESCOs	AEPC
Net greenhouse gas emissions		Quadrimester	Project Progress Report	Project progress report	AEPC

Number of businesses provided with new or improved electricity service		Quadrimester	Project Progress Report	ESCOs customer data base and AEPC's survey	AEPC
Number of Women businesses provided with new or improved electricity service		Quadrimester	Project Progress Report	ESCOs customer data base and AEPC's survey	AEPC
Number of households provided with new or improved electricity service		Quadrimester	Project Progress Report	ESCOs customer data base and AEPC's survey	AEPC
Annual electricity output from renewable energy (Gigawatt-hour (GWh))		Quadrimester	Project progress report	AEPC's project progress report	AEPC
People trained in project preparation and implementaiton		Quadrimester	Project Progress Report	AEPC's project progress report	AEPC
Number of women trained to engage in mini-grid sector		Quadrimester	Project Progress Report	AEPC's project progress report	AEPC
Consultations with citizens and consumer feedback surveys with publicly disclosed reports summarizing findings		Quadrimester	Project Progress Report	AEPC's project progress report	AEPC
Specialist services procured for project implementaiton		Quadrimester	Project Progress	AEPC's project progress report	AEPC

			Report		

ANNEX 1: IMPLEMENTATION ARRANGEMENTS AND SUPPORT PLAN

COUNTRY: Nepal
Nepal: Private Sector-Led Mini-Grid Energy Access Project

Project Institutional and Implementation Arrangements

1. AEPC will be the government counterpart and implementing agency for this project. AEPC is the lead agency tasked with the development of off-grid renewable energy schemes in Nepal. Its activities include formulating renewable energy policy, planning, and facilitating the implementation of the policies/plans, including administrating the GoN subsidies to the renewable energy schemes.

2. AEPC has experience of implementing World Bank projects and is currently implementing the SREP-Supported Extended Biogas Project (P131592). The AEPC has been considered an eligible partner to implement the project as wholesaler, in partnership with commercial banks who have the capacity to act as retail financial intermediaries. The project preparation is being led by a project manager supported by relevant technical, safeguard, procurement specialists deputed from AEPC's other departments and units. AEPC is currently in the process of procuring key consultants/specialists for PMT. A PMT within AEPC will be formally instituted for the project implementation, which will have, among others, the following responsibilities:

- Ensuring overall implementation of the project, including management of the annual work plan and budget
- Maintaining financial accounts
- Conducting day-to-day supervision and quality control activities
- Monitoring ESCO's activities
- Preparing periodic progress reports
- Monitoring and evaluating the progress and outcome of the project
- Solicitating ESCOs and reviewing technical proposals
- Monitoring subproject construction
- Supervising the cross-cutting issues, including gender, citizen engagement, IP, and other social and environmental issues; and
- Providing cross-cutting technical support to PBs and ESCOs

3. The PMT will be led by a project manager with support from the following team members:

- Mini- and Micro-hydropower specialist – 1;
- Solar/wind energy specialist – 1;
- Procurement specialist – 1;
- Monitoring and evaluation specialist – 1;

- Financial assessment specialist – 1;
- Financial management specialist – 1;
- Business development officer - 1
- Social safeguard specialist - 2
- Environmental safeguard specialist - 2

4. In addition, a credit unit to with the competent credit officer will also be instituted who will support the PMT on the issues of credit mobilization.

5. The composition of the PMT team will be reviewed jointly by the GoN, AEPC, World Bank teams regularly and will be adjusted based on the workloads. As and when required, the PMT team will be supported by a team of consultants, for example, for the training and capacity-building activities, preparation of guidelines and standards, preparation of project feasibility studies, subproject construction supervision, short-term tasks to strengthen the project team on required skills, and so on. If required, relevant consultants and technical specialists will be mobilized by the PMT to prepare necessary studies for AEPC to solicit proposals from ESCOs.

6. The PMT will be supplemented by a TRC. The TRC will comprise a solar expert (for solar-hybrid mini-grids), a hydropower expert (for micro/mini-hydropower mini-grids), an environmental specialist, and a social specialist (as appropriate). AEPC PMT will submit its recommendations to the TRC, which will advise the AEPC management on the eligibility and subsidy provision for subprojects.

7. The subprojects that are considered for the development can be broadly classified into two categories: (a) subprojects identified by AEPC, where ESCOs are solicited for development, and (b) subprojects identified by ESCOs and proposed for development. For the project implementation, ESCOs will submit their proposal to the AEPC PMT in the prescribed format. The PMT, after reviewing the proposal, will conduct the necessary technical assessment and, if the proposal is found feasible, will recommend the subproject for debt financing. During the review, the PMT will also assess the subproject's eligibility to receive the subsidies. The TRC will review the PMT's recommendation and advise the AEPC management on eligibility and subsidy. The decision to provide debt financing to subprojects lies solely with PBs, which will perform its own credit appraisal. If required, the technical support to conduct such appraisals will be made available from the PMT. ESCOs will build, own, and operate the subprojects.

8. The steps for subprojects' selection and approval under both categories --- will be as follows:

(a) ESCOs, after conducting necessary studies, will present the subproject to the PMT and TRC, which will appraise the subproject based on the agreed eligibility criteria.

(b) If the subproject is deemed viable by the PMT/TRC, AEPC will notify the ESCO.

(c) The ESCOs will then approach PBs for the subproject loans.

(d) PBs, upon their discretion, will conduct credit appraisal of the proposed subprojects. During the appraisal, if required, the PBs will seek further technical support from AEPC's PMT.

(e) If the subproject is approved, the PBs will notify AEPC of its intention to lend.

9. The TA financed by the project is critical for preparing subprojects and supporting and building capacity of all the stakeholders involved. In this project, PBs will make the final decision on the credit based on the outcome of their credit appraisal. ESCOs will be responsible for compliance with the World Bank's safeguards instruments for their subprojects. During the supervision, the PMT will report such compliance by ESCOs.

10. Once the subproject is under implementation:

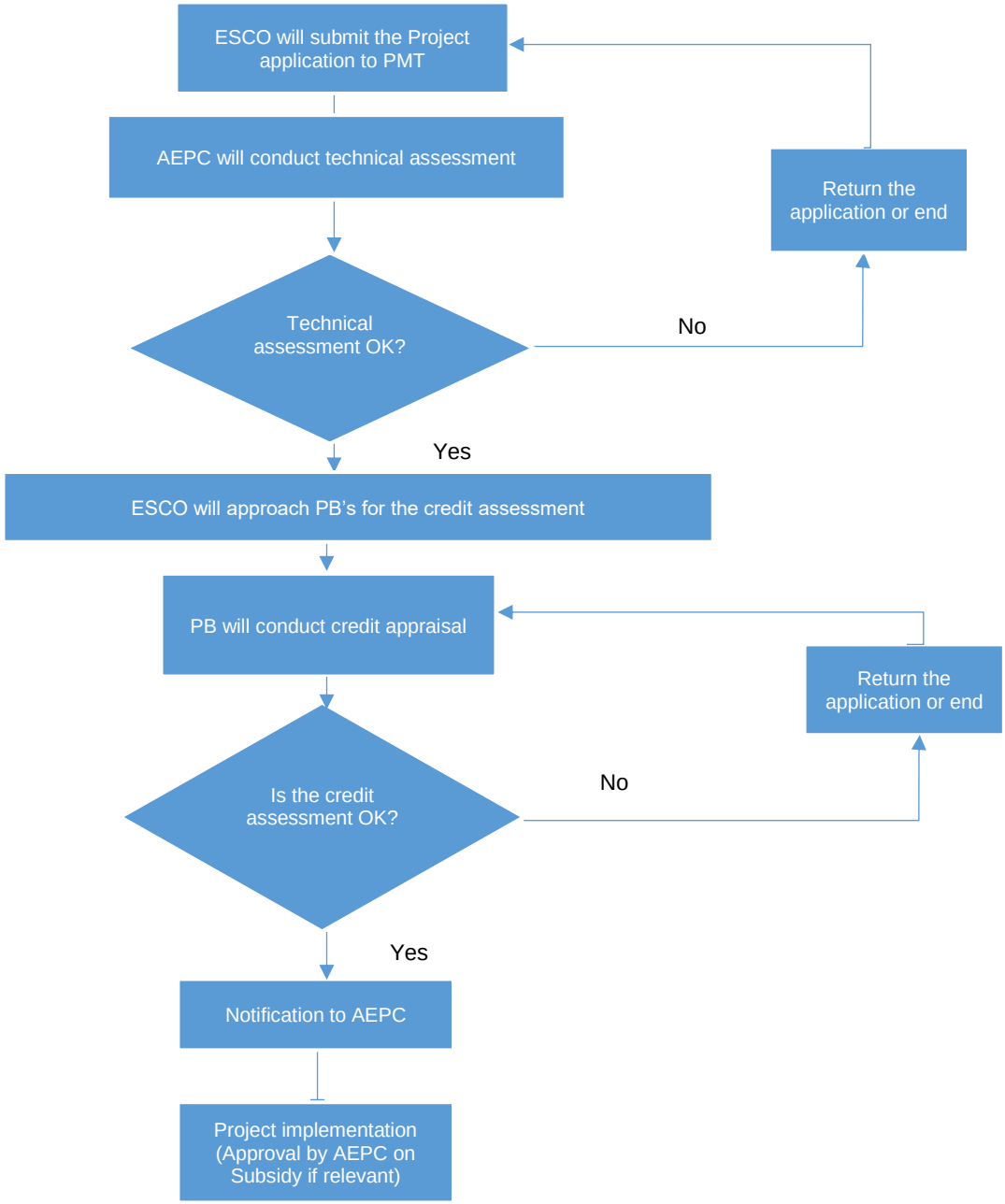
(a) ESCO will implement mini-grid subprojects complying with fiduciary and safeguard requirements of the project.

(b) The PMT will monitor the subprojects' implementation progress, technical performance, and compliance.

(c) The CVU will monitor the credit facility disbursement and collection alongside portfolio performances of the PBs and disbursement of subproject loans.

11. The overall project process flow chart is presented in figure 1.1.

Figure 1.1. Process Flow Chart



Financial Management

12. **Financial Management (FM) Capacity.** A full time dedicated FM specialist to support PMT will be hired within three (3) months from the Effective Date of the Project. Given the capacity constraint of AEPC on on-lending and disbursement management of Sub-loan, it has also agreed to hire Credit Officer in CVU. FM specialist and Credit Officer will closely coordinate in terms of financial reporting, monitoring and

disbursement management of sub-Credits.

13. **Planning and Budgeting.** The proposed project will follow the government planning and budgeting procedure. The PMT will prepare overall budget and work program based on inputs from the respective unit, e.g. Planning, CVU. The budget will be proposed through the Line Ministry Budget Information System (LMBIS), which ensures the detailed basis of required activities and nature of expenditures for the budget preparation. Implementation of these budgets and work programs will be monitored by the PMT and reported on a quadrimester basis through the Interim Unaudited Financial Reports (IUFRs).

14. **Funds Flow.** The disbursement from the Bank will be IUFR-based. DA, managed by PMT, will be established at Nepal Rastra Bank to facilitate disbursements. Advance equivalent to subsequent two quadrimesters' projections will be disbursed to the DA with adjustment for expenditures incurred. From the DA, the PMT can make payments to vendors for expenditures incurred based on invoices. The payments to PBs from DA will be based on sub-loan payment request by PBs, as evidenced in signed SLAs. Subsequent disbursement from DA to PBs for the same sub-loan will be based on settlement of previous loan installments as reported in ESCOs' progress reports and ESCOs withdrawal schedule in SLA. Disbursement from the Bank can also be based on reimbursement for expenditures pre-financed from Government treasury. Direct payments to vendors can also be made by the Bank. The minimum threshold for both reimbursement and direct payment by the Bank will be specified in the Disbursement Letter. If required, provision for special commitment can also be provided for payment against Letter of Credits (LoC)s opened by PMT. The disbursement and fund flow details will be included in the Disbursement Letter issued by the Bank and POM, as appropriate.

15. The Government's Financial Administration Regulation will be followed for overall funds management. Roles and responsibilities for fund management are clearly described in the Regulation. FM staff/ consultant will ensure that the project funds are effectively managed.

16. **Accounting, Financial Reporting and Internal Controls.** The Government's cash basis accounting system will be followed. Based on the same, IUFRs will be prepared on quadrimester basis and submitted to the Bank within 45 days from quadrimester end. The format and the content of IUFRs has been agreed during Negotiations. Accounting information will be maintained in the accounting software by PMT which also reports on activity-wise information. All the required ledgers related to Bank disbursement including the Designated Account Ledger, Grant Register etc. will be maintained at the PMT. AEPC's timeliness and quality of accounting and financial reporting substantially improved under SREP. The internal control process of the Government will be applied, including internal audit. As per the Government policy, emphasis will be placed on ensuring that internal audit is conducted on a quadrimester basis, which is an important tool of the internal control system. The FM consultant will help ensure timely and quality accounting, financial reporting and effective internal controls. The FM Consultant will also support in ensuring establishment and operationalization of effective monitoring mechanism. This aspect needs to be emphasized in AEPC.

17. For the sub-loans, AEPC will only on-lend to eligible PBs that the Bank has provided no-objection to based on adequate profitability, capital, and quality portfolio with sound financial indicators and experience in renewable energy lending. Based on technical approval from TRC, ESCOs will apply sub-loans to PBs. PBs will decide sub-loans eligibility based on financial viability and other aspects considering the

eligibility criteria. SLAs will be done between respective PBs and ESCOs which will include, in addition to sub-loan terms and conditions, provisions on financial reporting, auditing and monitoring requirements. AEPC will obtain quarterly reports from PBs for disbursements made and expenditures incurred on the sub-loans. PBs will obtain quarterly reports from ESCOs for expenditures incurred for sub-loans based on which PBs will provide information to AEPC. These information will feed into the IUFRs to be submitted to the Bank on quadrimester basis. AEPC will also obtain annual audited financial statements of ESCOs and PBs within six months of the end of FY. CVU and PMT will closely coordinate in obtaining information for sub-loans. The autonomy of PBs in approving sub-loans ensures financial viability of ESCOs and the monitoring by PBs further strengthens monitoring on intended purpose usage of the funds. In addition, from AEPC, the Credit Officer of CVU will monitor disbursements and utilization of sub-loans. The general terms and conditions for sub-loan mobilization through credit facility is as follows:

(a) Terms and Conditions of SAs between AEPC and PBs

(i) The sub-loans will be made available to the PBs at a marginally commercial interest rate and will include, at a minimum, the cost of the World Bank funding to GoN plus a marginally commercial markup reflecting: (i) AEPC's administrative costs and (ii) Risk markup. As the product is new and innovative and there is no yield curve in Nepal, the marginally commercial interest rate will be also determined and benchmarked based on the risk perceived by the banks in the market for the renewable energy sector.

(ii) PBs can access long-term financing under SA based on signing and implementation of SLA. PBs will repay AEPC based on the repayment plan established in the SA. The SA repayment plan will be based on the repayment plan of the underlying SLA.

(iii) PBs will provide AEPC with a set of documentation for all subproject loans to enable it to maintain all project records and make them available for ex-post review by the World Bank or by external auditors, as necessary.

(b) Terms and conditions of SLAs between PBs and ESCOs:

(i) Subproject loans will be evaluated in accordance with the PBs' credit appraisal procedures.

(ii) SLAs will be signed between PBs and ESCOs.

18. The required details of monitoring mechanisms and periodicity will be included in the POM. These and other specific aspects for effective project operations and internal controls required in addition to the Government's existing regulations, especially considering the FI function of AEPC, will be included in the POM.

19. **External Audit.** The project financial statements including Designated Account statements will be audited by the Office of the Auditor General (OAG). The external audit report for each year of project implementation will be submitted to the Bank within 6 months from the end of each fiscal year. To avert

delays in audit report submission, PMT will coordinate with OAG by May of each year to ensure that the Project's audit is scheduled in a timely manner.

20. **Supervision Plan.** Project implementation progress will be closely monitored. Key FM fiduciary work includes: (i) implementation support to the project and informing the task team of FM issues or required improvements; and (ii) review of financial/audit reports and preparing summaries of such reports for further action if required.

21. Fiduciary risk is assessed as "Substantial" considering the FI function of AEPC with no capacity and prior experience.

Disbursements

22. **Allocation of SCF Grant and Loan proceeds.** Disbursement under the proposed funding will be made as specified in the Table 1.1., which indicates the amounts and percentages of financing.

Table 1.1. Disbursement Table

Category	Amount of the Grant Allocated (in USD)	Percentage of Expenditures to be Financed (inclusive of Taxes)
(1) Sub-loans under Component 1	3,610,000	100% of amount to be disbursed as sub-loan
(2) Goods, works, non-consulting services, Training, Incremental Operating Costs and consulting services under Component 2	2,000,000	100%
TOTAL AMOUNT	5,610,000	

Category	Amount of the Loan Allocated (in USD)	Percentage of Expenditures to be Financed (inclusive of Taxes)
(1) Sub-loans under Component 1	2,000,000	100% of amount to be disbursed as sub-loan
TOTAL AMOUNT	2,000,000	

TOTAL AMOUNT FOR THE PROJECT (in USD)	7,610,000

Procurement

23. Procurement shall follow the procedures outlined in the World Bank's Procurement Regulations for IPF Borrowers July 2016 (revised November 2017) and most of the procurement activities do not exceed the thresholds allowable for adopting a national approach in Nepal.

24. AEPC has prepared a simplified PPSD, acceptable to the World Bank, along with the Procurement

Plan for 18 months. Procurement arrangements that are agreed through the PPSD, prepared by doing proper market analysis will help efficient procurement processes to ensure value for money. Procurement under Component 2 will be supported by a dedicated procurement specialist in the PMT.

Environmental and Social (including safeguards)

25. Because the subprojects may result in adverse E&S risks and impacts, OP 4.01 (Environmental Assessment) is triggered. The project is categorized as FI in accordance with OP 4.01. Treatment of subprojects, when location is known, involves the application of relevant safeguard polices based on site-specific E&S risks and impacts pursuant provisions of the ESMF cleared by the World Bank on July 16, 2018. ESMF also incorporates RPF, Vulnerable Community Development Plan, citizen engagement, and a GRM.

26. In accordance with OP 4.01 provisions for projects involving FIs, the World Bank requires appropriate E&S screening and assessment of all proposed subprojects and ensuring that ESCOs carry out appropriate ESIAs, if needed, for subproject and prepare ESMPs that will describe the necessary mitigation measures. Managing E&S risks and impacts for this multilevel project means that AEPC, PBs, and ESCOs shall develop and maintain adequate systems, procedures, and capacity for identifying, managing, and monitoring risks and impacts of subprojects commensurate with their types, scope, and nature.

27. The AEPC will act as both the project implementing agency and as a wholesale FI as it relates to flow of funds and will also assume primary responsibility for overseeing the entire process of assessment and management of E&S risks and impacts of subproject and ensure that all key stakeholders fulfil their respective responsibilities. AEPC's responsibilities include:

(a) Initial E&S screening of subprojects supported from the credit facility for mini-grid development and including E&S conditions in the legal documents for ESCOs.

(b) Identifying subproject E&S category/risk level (high, medium, or low) and commensurate site-specific risks and mitigation measures.

(c) Reviewing and ensuring quality of the ESIAs and/or ESMPs that must be prepared by ESCOs[34] once the locations of subprojects are identified and detailed designs are in the process of being prepared.

(d) Ensuring that all relevant clearances are obtained under the GoN regulations and World Bank requirements.

(e) Ensuring that outcomes of the ESIA—including resulting ESMPs for mitigation of identified risks and impacts—will be integrated into the process for subproject selection and preparation conducted by AEPC.

(f) Ensuring that ESCOs carry out risk mitigation and monitoring measures under the ESMPs, including the associated costs.

(g) Monitoring compliance of ESCOs with the ESMPs.

[34] In case of interconnections, complete ESIAs may not be required and only an ESMP may be sufficient.

(h) Implementing the capacity-building plan for all key stakeholders, as needed and commensurate with their respective roles.

(i) Maintaining a grievance redress mechanism and cause ESCOs to do the same.

28. An E&S capacity-building plan is important to ensure that all key stakeholders are able to fulfil their roles. Component 2 will finance the E&S capacity-building plan. The key areas of focus in the plan are as follows:

(j) E&S screening;

(k) Implementation of ESIA and mitigation plan;

(l) Disclosures and dissemination of environmental safeguard documents;

(m) Supervision, monitoring, and reporting;

(n) Compensation for RPF/VCDF;

(o) Environmental safeguard expert (remuneration);

(p) Social safeguard expert (remuneration);

(q) TRC (remuneration for TRC members); and

(r) Safeguard capacity building/training staff (AEPC, ESCOs, PBs, management of transmission line RoW issues [community based])

Monitoring and Evaluation

29. Monitoring of project implementation progress and results indicators, as well as progress toward achievement of the PDO, will be the responsibility of AEPC as and participating entities, such as PBs and ESCOs engaged in mini-grid development. AEPC PMT will collect data and reports from participating entities and present progress in achieving the key and intermediate indicators to the World Bank every quadrimester.

Strategy and Approach for Implementation Support

30. The overall implementation risk for the project is rated Substantial. Institutional capacity and fiduciary risks drive the overall risks. Accordingly, the Implementation Support Plan will focus on risk mitigation measures, considering the following factors:

(a) The project implementation agency, AEPC, has sufficient experience in financing rural community-based mini-grids but limited experience in private sector-led mini-grids.

(b) PBs have limited or no experience in financing private sector-led mini-grids and ESCOs and have limited in-house technical expertise to undertake due diligence on submitted subproject loan requests from ESCOs.

(c) There are limited number of ESCOs, which have developed MHP or solar mini-grids in rural areas. The existing ESCOs have limited experience in developing mini-grid subprojects through commercial financing.

(d) The interconnection market is at the emerging stage. As of now, only few interconnection projects have been implemented by communities. As such, there is limited knowledge on the interconnection business processes, O&M, technologies, and so on among ESCOs.

31. The strategy for implementation support is to (a) strengthen capacity and processes in AEPC and (b) engage sector experts to support AEPC. Through Component 2, the project will support the APEC in instituting an appropriately staffed PMT, which will be supplemented by experts in the TRC. The POM of the project will streamline and clarify processes and tools for implementation and monitoring. The World Bank task team will support AEPC through technical and review missions. Furthermore, the World Bank will engage sector experts to advise AEPC, PBs, and ESCOs in subproject design and implementation and in preparing regulations, guidelines, and standards.

Implementation Support Plan and Resource Requirements

32. The proposed implementation support requirements are as described in tables 1.2 and 1.3.

Table 1.2. Implementation Support Requirements

Time	Focus	Skills Needed	Resource Estimate	Partner Role
First 12 months	• Project start-up • Finalizing the POM • Establishing SCF loan financing mechanism • Overseeing the process of E&S risk assessment for subprojects • Enhancing capacity of ESCOs on E&S assessment and management • Promotion activities for private sector-led mini-grid development • Selection of mini-grid subprojects • Detailed design execution for the subproject • Technical and financial studies for interconnection of existing mini-grids • Studies and designing SREP risk-sharing mechanism • Capacity development	• Project management • Rural electrification (mini-grid, mini-hydro, solar, wind, hybrid, and interconnection) • Financial market • Financial solution • E&S safeguards • Procurement • FM • Marketing • Monitoring and evaluation • Capacity development	US$ 175,000	
12–48 months	• Construction of subprojects • Monitoring ESCOs' mini-grid constructions	• Project management • Rural electrification (mini-grid, mini-hydro,	US$140,000/year	

	• Monitoring ESCOs' mini-grid business operation • Annual survey to monitor impacts of ESCOs' mini-grid • Monitoring and evaluation of SCF loan lending by PBs and repayment from ESCOs • Review and update (if needed) the POM • Implementation of interconnection projects • Establishing risk-sharing mechanism • Monitoring the project procurement and disbursement • Monitoring safeguards	solar, wind, hybrid, interconnection) • Financial market • Financial solution • E&S safeguards • Procurement • FM • Marketing • Monitoring and evaluation • Capacity development		

Table 1.3. Skills Mix Required (annual)

Skills Needed	Number of Staff Weeks	Number of Trips	Comments
Team leader	20	—	Country office based
Energy specialist	20	2	Headquarters based
Financial sector specialist	10	—	Country office based (International Staff)
Financial sector specialist	5	—	Country office based
Environmental Specialist	15	2	Headquarter based
Social specialist	15	—	Country office based
Procurement specialist	5	—	Country office based
FM specialist	5	—	Country office based

ANNEX 2: ECONOMIC AND FINANCIAL ANALYSIS

COUNTRY: Nepal
Nepal: Private Sector-Led Mini-Grid Energy Access Project

1. **Economic analysis**. The economic analysis was carried for (i) representative case of 200 kW[35] new micro-hydro project; (ii) representative case of 200 kW micro-hydro rehabilitation project; (iii) representative case of 200 kW new solar project; and (iv) representative case of 100kW[36] micro hydro interconnection project. The counterfactual scenarios for all investment is the avoided cost of diesel use[37] and reduced environmental damage (in terms of reduced greenhouse gas [GHG] emission). The diesel cost was estimated to be about US$0.84 (approx. NPR 88) -- equivalent to about US$0.34 per kWh of power generation, which was expected to escalate at 2 percent annually. The benefit from GHG reduction was estimated referring to World Bank's guidance note[38]. CAPEX of a new MHP mini-grid was estimated at US$4,000 per kW. Similarly, the CAPEX for rehabilitation of the micro-hydro was considered as 50 percent of the CAPEX of new plant, which involved the replacement and repair of electromechanical and civil works[39]. While there was limited experience with solar mini-grids in the country, elsewhere CAPEX was observed to be about US$ 4500 per kW of demand served,[40] with battery storage option. The replacement cost for capital maintenance included replacing batteries and substantial maintenance for solar mini grids in every six years and substantial overhauling of hydro-electromechanical equipment of MHP projects in every ten years. The CAPEX for interconnection of the mini-grid with the grid was estimated at US$90,000, including for the cost of line (about 3 km long), transformers, switchgears, and necessary control systems. In Nepal, the utilization rate of MHP schemes was typically below 40 percent[41]. Particularly, for the interconnection projects, after the interconnection, the utilization was expected to increase at least by 10 percentage point to 50 percent.

2. The economic analysis shows that the new micro hydro and solar mini-grids' economic rate of return (ERR) of about 25 and 21 percent respectively. The lower returns for solar subprojects was mainly due to higher investment and operating costs (mainly due to requirements for battery replacement). For the rehabilitated micro-hydro projects, due to lower investment costs, the economic return increased to 45 percent. Without carbon costs, the returns were 20 percent and 15 percent for the new micro-hydro and solar schemes respectively. For rehabilitation scheme, this rate was about 35 percent. Similarly, the

[35] The results of these representative cases (for micro-hydro and solar) can be replicated for the projects ranging from 100 kW to 1 MW.
[36] Averaged sized plants that are expected to be the candidate for the interconnection in Nepal in the initial phase. The results can also be replicated to the larger sizes plants
[37] The cost of diesel generation is considered as proxy as significant percentage of demand for electricity is expected to arise from business establishments and households who are willing to invest in generators.
[38] Guidance note on shadow price of carbon in economic analysis (2017)
[39] As there are limited number of solar mini-grids in Nepal, only the rehabilitation of micro-hydro project is considered in the analysis.
[40] Solar installed capacity considered is higher than demand (about twice) as excess capacity is needed to meet night-time demand that is required for storage including storage losses. Hence kW peak of solar is different from kW load unlike hydro and other technologies.
[41] The micro-hydro schemes are typically designed to meet the demand during the dry season.

interconnection project was expected to yield economic return of about 20 percent. Without carbon benefits, this return was expected to reduce marginally to 19 percent.

3. **Financial analysis.** Financial analysis was conducted to evaluate a preliminary business case for the mini-grid schemes. It is assumed that nearly 50 percent of CAPEX subsidy would be provided to the new mini-grids, while 20 percent would be financed through equity and the remaining 30 percent will be financed through debt. However, as per RESP 2016, subsidies may not available for the rehabilitation of existing mini-grid and interconnection subprojects. In such case, it is assumed that 30 percent of the cost would be covered through equity and the remaining would be financed through debt.

4. With average residential tariff of approximately NPR 10/kWh and commercial tariffs of NPR 15/kWh[42], and at utilization factor of 40 percent, MHP mini-grids' (both new and rehabilitated) Internal Rate of Return (IRR) was about 15 percent. The similar IRR for both new and rehabilitated projects were due to significant amount of subsidies that would be available to the new mini-grid projects. For solar mini grids, IRR was about 11 percent with the utilization factor of 80 percent[43]. However, due to continued reduction in the cost of solar power generation, it would be possible for financial returns from solar mini-grids to increase over time. Besides, with more optimal planning (phased deployment of generation and keeping them close to demand), a reduction in capital cost (nearly 30 percent) might be possible for solar mini-grids. For the interconnection schemes the project IRR was low at 4 percent with the interconnection tariff of NPR 6/kWh[44] which was equivalent to NEA's PPA rate with IPPs. However, there is significant potential to increase this return with higher utilization, and IRR increases to 14 percent at 70 percent utilization.

5. **Sensitivity analysis.** A sensitivity analysis was conducted to calculate the switching values for the key economic cost and benefit drivers. The sensitivity analysis indicated that in the following conditions, the ERR would dip below 10 percent (which is the economic discount rate). The analysis showed that the micro hydro (both new and rehabilitated), solar mini-grids, and interconnection subprojects were economically feasible even with cost overruns, reduced utilization, and reduced cost of diesel generation.

Table 2.1. Economic Sensitivity Analysis for the Mini-grid Schemes

Variable	Unit	Switching Values (10% ERR)			
		Micro-hydro (New)	Micro-hydro (Rehabilitation)	Solar	Interconnection
Capital cost	US$ per kW	10,000	10,000	8,500	170,000[a]
Utilization factor	Percent	20	13	49	47
Cost of diesel generation	US$ per kWh	0.18	0.13	0.22	0.24

[a] Total CAPEX of the interconnection system in US$

[42] This tariff is comparable to the NEA's tariff for urban households and commercial customers. However, NEA's tariff for typical rural households and small industry are less.

[43] This factor is assumed to be achieved with the higher share of anchor and business loads with constant daily power demands

[44] Average of current posted PPA tariff rate of NPR 4.8/kWh for wet season and NPR 8.4/kWh for the dry season

6. The return of interconnection project is sensitive to the utilization rate. Similarly, the return in micro hydro schemes (both new and rehabilitated) is sensitive to both utilization rate and investment costs. Currently the consumption of non-residential (anchor and business) customers constitute only about 20 percent of the total generated energy[45]. The rest is utilized by relatively low consuming household/community customers. Overall, for all projects there is opportunity to operate at higher utilization factor. For the solar mini-grids, besides the utilization rate, the benefits may also come from the reduction on investment costs.

[45] It is estimated that these consumers have high consumption rate of nearly 500kWh per month as against typical rural household customers with the consumption rate of about 26 kWh per month