

PROJECT INFORMATION DOCUMENT (PID)
CONCEPT STAGE

Report No.: PIDC59313

Project Name	Business Models for Private Sector-Led Mini-Grid Energy Access Project (P149239)
Region	SOUTH ASIA
Country	Nepal
Project ID	P149239
Borrower(s)	Ministry of Finance
Implementing Agency	Alternative Energy Promotion Centre (AEPC)
Environmental Category	F-Financial Intermediary Assessment
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I. Introduction and Context

Country Context

Nepal, a landlocked country with a per capita income of US\$717 per year, where 25 percent of the population survives on less than US\$1.25 per day, is currently facing an energy crisis of unprecedented proportions. Despite having rich hydropower resources of up to 82,000 MW, the current total installed capacity is 787 MW including generations from the Nepal Electricity Authority (NEA) and independent power producers. Existing generation even after being supplemented by purchases from India is insufficient to meet the demand. Forced load shedding, with attendant economic consequences, has been inevitable. The country has made substantial progress on some development indicators, such as achieving a sharp reduction in infant and maternal mortality and reaching gender parity in education. According to the national census published in 2013, electricity access has been extended to 75 percent of the population. However, Nepal continues to suffer from the adverse impacts of inadequate and unreliable electricity supply, which remains a key obstacle for lifting more people out of poverty.

Notwithstanding the reported national access rate of 75 percent, actual consumption of electricity remains very low because of severe limitations in the supply of electricity, which has not kept up with the sharp rise in demand of recent years. Annual electricity consumption is about 132 kWh per capita even for urban Nepal, where access rates are relatively higher, compared to per capita consumption levels of 1,010 kWh for India, 2,600 kWh for China, and 13,246 kWh for the United States. Around 50 percent of the population of 27.5 million has access to grid electricity, while the remaining 25 percent is served by off-grid solutions. While off-grid solutions provide relatively reliable, albeit limited, electricity supply in the rural areas, access to the grid does not necessarily imply reliable access to electricity due to load shedding of up to 14 hours per day in the dry season between December and March.

This situation was further exacerbated by the 7.8 magnitude earthquake of April 25, 2015, and the 7.3 magnitude earthquake of May 12, 2015. Major damages were found in electricity generation facilities and the associated distribution networks. The total cost of physical damage is estimated at US\$178 million, and about 603,000 households lost access to electricity, due to either damage of the electricity supply facilities or collapse of their homes.

Off-grid communities are served by 1,152 community-owned micro hydropower plants (MHPs) with total installed capacity of 22.8 MW and 600,000 solar home systems (SHS) with total capacity of about 40 MW, that have been installed by individual households for lighting purposes. A total of 262 MHP facilities with installed capacity of 3.7 MW along with 115,438 SHS and 156 institutional solar photovoltaic (PV) systems were damaged and forced out of service by the earthquakes, affecting more than 81,000 households.

Reconstruction efforts were hindered by an unofficial blockade at the Nepal-India border that started upon the promulgation of a new constitution on September 20, 2015 and lasted more than four months. The shortage of gasoline and diesel for transportation and LPG for cooking shifted energy demand toward electricity. Electricity became consumers' alternative for imported LPG, placing additional burden on an electricity system that was ill-equipped to serve even the lower pre-blockade demand. Many rural households, lacking other alternatives, reverted to gathering fuelwood for cooking purposes, threatening the gains in forest cover the country has achieved through community forestry over the years.

Sectoral and Institutional Context

Renewable energy development is one of the highest priorities of the Government of Nepal (GoN), which has a goal of ensuring universal access to modern energy services by 2030. In response to the energy crisis, the Government prepared a concept note on 'National Energy Crisis Prevention and Electricity Development Decade', which outlines a series of measures primarily to facilitate the development of large hydropower projects in the country. However, the importance of decentralized energy systems must not be underestimated when 25 percent of the population is reliant on off-grid electricity, mainly from micro-hydropower mini-grids and SHS, and where grid extension remains unlikely in the near future due to the difficult and remote terrain. Therefore, Nepal's energy sector priority is not only to maximize its on-grid energy production and delivery, but also at the same time to modernize its off-grid energy sector on which a large part of the population will depend for the medium term. Part of the effort to modernize the off-grid energy sector would have to include the recognition of off-grid electricity delivery as a service rather than a product.

Alternative Energy Promotion Centre (AEPC), which was established in 1996, is the implementing agency of what is now the Ministry of Population and Environment (MoPE) for rural and renewable energy solutions. AEPC has been implementing a subsidy-driven model that has subsidized renewable-energy-based rural electrification on the basis of 'installed generation capacity' and 'number of households connected.' There have been only limited efforts to support operation and maintenance of installed facilities and to incentivize demand growth. This traditional public sector-supported top-down model of off-grid electricity delivery stops with the deployment of generation technology (SHS and MHP), and end users are fully responsible for all aspects of operation, maintenance, repair, and load management. The delivery of generation capacity has been seen as an end in itself; subsidies are paid out to private installers by the AEPC when the asset is commissioned. A small amount is withheld to ensure after-sales service from installers during the warranty period, after which it is disbursed. There has been no incentive to promote electricity as a 'service' that will enable higher consumption, greater productivity, and improved quality of life. Availability of electricity is important to allow for productive uses, and daytime supply is especially important to

support income generation activities for off-grid businesses and community members.

Relationship to CAS

The proposed project is consistent with the joint IDA/IFC/MIGA Country Partnership Strategy for Nepal (FY2014–18) dated May 1, 2014 (Report No. 83148-NP), which stresses the importance of boosting economic growth and competitiveness through increased electricity supply and improved energy access. Specifically, the proposed project will contribute to Pillar 1, Outcome 1.1 of the Nepal Country Partnership Strategy: ‘Increased supply of electricity, including import, and improved access to reliable and affordable electricity within Nepal’.

II. Proposed Development Objective(s)

Proposed Development Objective(s) (From PCN)

16. The Project Development Objective (PDO) is to increase electricity delivery from renewable energy mini-grids by mobilizing private energy service company (ESCO).

17. The market for private sector-led renewable-energy-based mini-grid will be developed through technical assistance (TA) and financial support. Funding for the mini-grid subprojects will be sourced from the SREP, private developers, the NRREP and the Central Renewable Energy Fund (CREF), and the Government.

Key Results (From PCN)

18. The key results expected and associated indicators are as follows:

PDO indicators:

- (a) Generation capacity of energy constructed or rehabilitated (MW)
- (b) People provided with new or improved electricity service
- (c) Annual electricity output from renewable energy (GWh)

Intermediate indicators:

- (a) Number of private sector-developed mini-grid subprojects
- (b) Number of annual consultations with citizens and surveys with publicly disclosed reports summarizing findings
- (c) Number of beneficiaries disaggregated by type of customers, that is, anchor, business, and community (A-B-C) and women-headed business and households

III. Preliminary Description

Concept Description

The proposed project consists of three components: (a) Support to Mini-grid Subprojects, (b) Preparation for Mini-grid Interconnections, and (c) Project Management. The total cost for the proposed project is US\$ 6.0 million.

Component 1: Support to Mini-grid Subprojects (US\$4.7 million). This component will support the establishment of about seven renewable energy mini-grids based on the A-B-C business model, which will provide modern energy services to A-B-C customers in rural and urban areas. Two subcomponents will provide support to both investment financing and TA necessary to open up the energy service company (ESCO) market.

o Subcomponent 1A: Financial Support for the A-B-C Business Model Mini-grid (US\$4.2 million).

This subcomponent will provide financing support to ESCOs to facilitate financial closure and enhance financial viability of the subprojects. The SREP grant will be provided to ESCOs in the form of loans with a marginally commercial interest rate for subprojects whose proposals (based on Detailed Design (DD) results) are approved by the Independent Evaluation Panel (IEP) and the Technical Review Committee (TRC). The SREP loan will be provided to ESCOs through a few of the CREF partner banks or a new financing channel established by selecting partner banks specifically for this project. Disbursement of the loan will be in tranches tied to explicit milestones in project preparation and implementation. For example, ESCOs will be eligible to receive 50 percent of the total loan as the first tranche when the subproject gets approval for construction (based on the DD results). Support for a subproject shall be revoked when construction has not started within six months from the first lending. According to construction progress until successful completion and testing and commissioning of a subproject, the rest of 50 percent of the total loan will be provided every trimester. With the proposed US\$4.2 million in loan, about seven mini-grids of capacity from 100 kW to 1,000 kW can be supported. To attract subproject developers, the SREP loan conditions should compare favorably to the benefits that the developer could get by opting for the full amount of the government subsidy or by accessing CREF loans from other donors instead. The SREP loan terms, such as with grace period and longer repayment period, will be set to attract ESCOs and to help them in making their business sustainable.

For the rural model, after the AEPC shares market intelligence regarding demographic patterns, electrification rates, locations of anchor and business customers, and other salient facts, potential ESCOs will be invited to submit expressions of interest to establish mini-grids in about five locations. On a competitive basis, promising candidates will be selected by the IEP and the TRC to carry out DD and prepare business plans for funding consideration (it is possible that some subprojects among about five candidates will be dropped at this stage). These DDs will be partially funded from the TA budget for the project. Upon completion and submission of DDs and final business plans, another round of evaluation by the IEP and the TRC will determine the subprojects eligible for the SREP loan. For the urban model, the AEPC will accept subproject proposals (or initial business plan based on feasibility studies) from ESCOs. The IEP and the TRC will evaluate the submitted subproject proposals and select about five eligible subprojects for the DD execution and detailed business plans preparation, partially funded from the project's TA budget. Completed DD results and prepared final business plans for proposed subprojects for the urban model will be evaluated by the IEP and the TRC again to decide eligibility for the SREP loan (it is possible that some proposed subprojects will be dropped at this stage).

o Subcomponent 1B: TA to the A-B-C Business Model (US\$0.5 million). The project will support the identification, financing, implementation, and performance assessment of subprojects utilizing the A-B-C business model or other innovative business models in both rural and urban areas. ESCOs will receive training and advisory support. ESCOs that are interested in entering the access to energy business will be assisted with market research and information on suitable technologies that are currently being used successfully in developing country environments, so that they can decide which types of technology partners to approach on their own for a business engagement.

The project will also provide technical support to ESCOs to help them address the challenges in accessing funding sources. Technical support will help build the confidence of anchor customers, which may be skeptical of the ESCO's ability to provide continuous and reliable power as stipulated in the Power Purchase Agreement (PPA), and partner banks, which may be unsure about the ESCO's ability to pay back its debt on time.

This subcomponent will support TA activities, such as:

o Partial cost support for DD executed by ESCOs (except for two pilot subprojects for which DDs may be prepared using either AEPC or World Bank budget during the project preparation period)

- o Creation of an enabling environment, such as the preparation of technical specifications for mini-grids and prepaid metering system.
- o Promotional activities and capacity building among stakeholders. This includes promotional activities/workshops to connect developers, financiers, anchor customers, end users, and so on. This component will also support capacity development activities aimed at filling specific knowledge gaps among relevant stakeholders (for example, training on business plan development for ESCOs and assessment of business proposals for commercial banks). Activities for capacity building will be aligned with the World Bank-supported Nepal Renewable Energy Training Program, whose target audience, technologies, and content are especially relevant to the proposed project.
- o Rural community consultations (inviting both men and women from B and C customers), focus group discussions, periodic socioeconomic survey (for example, a baseline survey and yearly surveys after the subprojects' commissioning), and analysis to monitor the impacts of electrification, including on citizen engagement and gender, by collecting data from the same interviewees. These citizen engagement activities will support the creation of an enabling environment for subprojects and inform awareness raising activities.

Component 2: Preparation for Mini-grid Interconnections (US\$0.8 million). This component will allow the AEPC, NEA, mini-grid owners, and potential private sector operators to test different technical arrangements and business models for future interconnections of existing and new mini-grids to the main grid in rural areas. These mini-grids could be powered by hydropower, solar, or hybrid generating systems. This component will have two subcomponents:

- o Subcomponent 2A: Financial Support for Different Interconnection Options (US\$0.5 million). Financial support to cover the grid connection costs of four existing mini-grids in rural areas will be provided by the project. The mini-grid subprojects will be chosen to test alternative physical and business arrangements. This subcomponent will provide funding support for the physical equipment and software needed for interconnection of pilot subprojects for both MHPs and solar mini-grids, whether community or privately owned.

- o Subcomponent 2B: TA to Support Different Interconnection Options (US\$0.3 million). Under this subcomponent, technical and financial studies will be funded to prepare technical standards as well as to identify appropriate financing instruments to support future grid connection of mini-grids in rural areas. In addition, consultations with stakeholders (commercial banks, local communities, mini-grid owners, potential private sector operators, and the GoN) will be held to create an enabling environment. The engineering support from the TA will focus on the technical requirements for achieving an operationally reliable physical interconnection that will allow the mini-grid to operate either in parallel with the main grid or as a stand-alone small electrical system during times of blackouts on the main grid. The business advisory from the TA will explore options to bring in private operators who can assist existing community-owned MHPs in achieving efficient, reliable, and coordinated operations once the interconnection takes place.

Component 3: Project Management (US\$0.5 million). This component will support the AEPC to institute and sustainably maintain the Project Implementation Unit (PIU). In particular, it will help in hiring key AEPC contract staff/consultants for the PIU and establish an IEP. The IEP will consist of international and national technical and financial experts to evaluate subproject proposals submitted by ESCOs. Only subprojects approved by the IEP and AEPC (TRC) are eligible to receive the SREP loan. This component will also support the preparation of the Project Operational Manual (POM), including a monitoring and evaluation framework, and other key documents such as a standardized PPA to facilitate long-term engagement between ESCOs and anchor customers, standardized expressions of interest from potential ESCOs to participate in the subprojects, a standardized DD

format to demonstrate viability of proposed subprojects, standard bidding documents for potential ESCOs to select contractors, and so on.

IV. Safeguard Policies that Might Apply

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

V. Financing (in USD Million)

Total Project Cost:	8.00	Total Bank Financing:	0.00
Financing Gap:	0.00		
Financing Source		Amount	
Borrower		0.00	
Strategic Climate Fund Credit		2.00	
Strategic Climate Fund Grant		6.00	
Total		8.00	

VI. Contact point

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