Environmental Assessment and Review Framework

April 2014

Nepal: South Asia Subregional Economic Cooperation (SASEC) Power System Expansion Project
- Mini-grid Renewable Energy

Prepared by Alternative Energy Promotion Centre for the Asian Development Bank.

CURRENCY EQUIVALENTS
(as of 1 March 2014)

Currency unit – Nepalese rupee/s (NRs)
NRs1.00 = $0.01043
$1.00 = NRs95.91

Abbreviations and Units

ADB	Asian Development Bank
AEPC	Alternative Energy Promotion Centre
CDM	Clean Development Mechanism
CER	Certified emission reduction
CFUG	Community Forest Users Group
COPB	Country Operation Business Plan
DDC	District Development Committee
DEEU	District Energy and Environment Unit
EA	Executing Agency
EARF	Environmental Assessment and Review Framework
EHS	Environmental, health and safety
EMP	Environmental Management Program
GESI	Gender equity and social inclusion
GoN	Government of Nepal
GRM	Grievance redress mechanism
GWh	Giga-watt hour
IA	Implementing Agency
IEE	Initial Environmental Examination
IUCN	International Union for Conservation of Nature
kW	Kilowatt
kWp	Kilowatt peak
MMH	Mini-micro hydropower mini grid
MoE	Ministry of Energy
MoEnv	Ministry of Environment, Science and Technology
MoF	Ministry of Finance
MoWR	Ministry of Water Resources
MW	Megawatt
NGO	Non-government organization
NRREP	National Rural Renewable Energy Program
PIU	Project Implementation Unit
REA	Rapid Environmental Assessment
RSC	Regional Service Centre
RoW	Right-of-way
SCF	Strategic Climate Fund
SPS	Safeguard Policy Statement
SWM	Solar and/or wind power mini-grid
tCO_2e	tons carbon dioxide equivalent
UC	User Committee
UNNFCC	United Nations Framework Convention on Climate Change
VDC	Village Development Committee

NOTE

In this report, “$” refers to US dollars.

Table of Contents

List of Tables

List of Figures

1. INTRODUCTION

1. This document presents the Environmental Assessment and Review Framework (EARF) for the assessment for sub-projects of Alternative Energy Promotion Centre (AEPC)'s component (the Project) of the South Asia Subregional Economic Cooperation (SASEC) Power System Expansion Project.[1] The Project include (i) community-level micro-grids powered by mini-micro-hydropower plants (MMH), solar, and solar-wind hybrid plants (SWM); and (ii) capacity development of selected stakeholders, including support for project implementation, and promotion of productive energy use activities.

2. Community-initiated energy sub-projects will be progressively identified, screened and assessed during Project implementation. The EARF outlines the procedures that will be followed for environmental assessment and review of proposed sub-projects in accordance with the Asian Development Bank (ADB) *Safeguard Policy Statement* (SPS, 2009), noting that environmental assessment of these sub-projects is not required under Government of Nepal (GoN) planning requirements. The EARF is intended primarily for use and reference by: (i) AEPC; and (ii) ADB; but also by (iii) the Ministry of Environment, Science and Technology (MoEnv) (iv) participating communities and their Village Development Committees (VDCs); and (v) other stakeholders, including equipment vendors and energy services suppliers. The EARF will be translated into Nepali and disseminated accordingly, with the English version posted on the ADB website.

2. PROJECT AND OUTPUT OVERVIEW

3. The Project will promote household, institutional, business and community access to social and commercial energy services through the installation of off-grid RE systems, and will facilitate productive end use of clean energy. The Project is needed as rural consumers, comprising about 83% of the population, currently rely primarily on fuelwood and other traditional biomass for energy (the bottom of the energy consumption pyramid). Only 49% of the rural population is connected to the grid[2] (the last-mile consumers), with 75% of rural households still utilizing fuelwood for cooking. The remaining half of the rural population remains off-grid, i.e., beyond the last mile of the national electricity network.

4. Recent country diagnostic studies indicate that unequal access to infrastructure, including electricity, is one of the critical constraints to Nepal's inclusive growth[3]. The low coverage of the national grid, increasing demand for rural electrification, appropriateness of decentralized energy systems in sparsely populated rural area, availability of renewable energy resources, and the need to respond to climate change are some key drivers for the promotion of renewable energy deployment in rural Nepal. The Project will (i) bring about transformational impacts through scaling up energy access using renewable energy technologies, poverty reduction, gender and social inclusiveness and climate change mitigation, and (ii) ensure sustainable operations through capacity building. The Project will provide access to energy and facilitate productive end uses of energy at the "bottom of the pyramid" in rural locations remote from the national grid.

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[1] The AEPC's component was originally identified and prepared as a stand-alone project. After extensive consultation, ADB and the Government of Nepal agreed to combine the it with the SASEC Power System Expansion Project. This EARF is applicable to the AEPC's component and subprojects.

[2] Central Bureau of Statistics of Nepal. 2011. *Nepal Labor Force Survey 2008*, Kathmandu.

[3] Asian Development Bank, United Kingdom Department for International Development, and International Labor Organization. 2009. *Country Diagnostic Studies – Highlights of Nepal: Critical Development Constraints*. Manila London, and Geneva.

5. The focus of the Project is on the installation of a large number of small RE sub-projects across dispersed locations in Nepal that are not connected to the existing electricity grid (Table 1). The Project outputs will be:

(i) mini-micro hydropower (MMH) mini-grid development, up to 4.3 MW total capacity;
(ii) solar and/or wind power mini-grid (SWM) development, in up to 15 villages; and
(iii) capacity development of AEPC and selected stakeholders, including support for project implementation.

6. MMH plants are run-of-river designs located on small to medium sized streams and irrigation canals, with an installed capacity between 100 kW and 1 MW. Assuming average capacity of 200 kW per plant, 21 - 22 MMHs would be installed with aggregate capacity of 4.3 MW. A typical MMH plant will supply power to more than one village.[4]

7. Typical SWM installations are likely to consist of either (i) 10-15 kWp solar panel capacity, or (ii) hybrid systems with 10-15 kWp solar panels plus 2-3 wind turbines each of 5 kW capacity, or (iii) 2-3 wind turbines each of 5-10 kW capacity. Assuming average capacity of 20 kW per plant, around 25 SWMs will be installed, with an aggregate capacity of around 0.5 MW. A typical SWM plant will supply power to one village.

Table 1: Sub-Project Types and Estimated Total Installed Capacity

Sub-Project Type	Assumed Average Installed Capacity per Sub-Project (kW)	Estimated Number of Sub-Projects	Estimated Total Installed Capacity (MW)	Estimated Beneficiary Households
MMH	200	21	4.3	21,500
SWM	20	25	0.5	2,500[1]
Total	**-**	**46**	**4.8**	**24,000**

1 – Assumes 5 households/kW capacity.

8. The Project's Executing Agency will be AEPC. The existing National Rural Renewable Energy Program (NRREP) Steering Committee will serve as the Steering Committee for the Project. Steering Committee members include representatives from MOF, MOE, MoEnv and AEPC. A project implementation unit (PIU) will be set up in AEPC, and will be supported by a consultant team[5] funded by the Project. The RSCs will provide implementation support at field level. The project will be executed over a period of approximately five years from the date of loan effectiveness.

9. The $5 million loan from Asian Development Fund (ADF)[6] was included in Nepal Country Operation Business Plan (COBP)[7] in November 2012 for financing the Project. The Strategic Climate Fund (SCF)[8] will co-finance $11.4 million grant[9]. The Project will form part of the

[4] According to the NREPP study (2011), about 7-8 households can be supported by each kW of MMH capacity.
[5] The consultants include full time and short term experts, to help PIU on project procurement, monitoring and evaluation. The consultants will have dual reporting function to both AEPC and ADB.
[6] Nepal is not eligible for ADF grant from 2013 due to economic improvement.
[7] ADB. 2012. Nepal Country Operations Business Plan 2013-2015. Manila. The loan amount was revised from $20 million to $5 million after extensive dialogue with the Government of Nepal.
[8] The SCF co-financing is to be administered by ADB.
[9] This amount includes $580,000 for Project Preparation Technical Assistance.

Government's NRREP[10], with NRREP co-financing project implementation and promotion of productive energy use activities. The Government will on-lend the ADB loan to AECF; the SCF grant will be passed on as a grant to AEPC.

10. Sub-projects will be developed, owned, and operated by local communities. Sub-projects will be identified by local communities and proposed to AEPC for potential support. If selected for consideration, feasibility assessments (including environmental and social assessments) will be conducted. Local communities will be required to provide at least 10% of the total sub-project cost in the form of equity, which establishes the community as the owner.

11. Each MMH plant will be implemented under an individual turnkey contract. The project development procedure will generally follow current AEPC practice and comply with ADB's Procurement Guidelines (2010, as amended from time to time). An imprest account will be established for payments to construction contractors and other service providers. The Development Procedure for MMH plants is provided in Appendix A. This component will also include future participation of financial institutions via CREF, based on successful experience of the Micro Hydro Debt Fund.

12. SWM plants face more challenges on the affordability of the tariff and sustainability of each sub-project compared to MMH plants due to higher upfront capital cost per benefiting household. To reduce capital cost by utilizing economies of scale, bundled procurement based on turnkey contracts will be undertaken, considered feasible due to standardized major equipment such as the solar PV modules, wind turbines, and battery banks. Procurement will be conducted in two batches, with the first batch being fully subsidized, and the second batch involving a 10% contribution by communities to the total cost of each sub-project. Suppliers will be paid directly by ADB. The Development Procedure for SWM plants is provided in Appendix B. Additional details on funds flow and other implementation arrangements will be incorporated into the project administration manual.

13. Consultants (individuals or firms) for capacity development will be recruited in accordance with ADB's Guidelines on the Use of Consultants (2013, as amended from time to time). All procurement to be financed under ADB fund and/or ADB administered funds will be carried out in accordance with ADB's Procurement Guidelines (2013, as amended from time to time).

3. ASSESSMENT OF LEGAL FRAMEWORK AND INSTITUTIONAL CAPACITY

3.1 Legal Framework

14. Mini-micro energy installations, including all of the proposed types of sub-projects, are exempt from environmental assessment under GoN regulatory requirements, as set out in the *Environment Protection Act, 1997* and *Environment Protection Rules, 1997* [11] and subsequent amendments. Only hydropower installations of 5 megawatts (MW) or greater installed capacity are required to have an IEE or environmental impact assessment. MMH and SWM plants are not subject to Nepal regulatory requirements under the Act and Rules. Despite this, other GoN laws, regulations, policies and guidelines may be applicable to the Project based on the location, design and operation of sub-projects which are mostly yet to be determined, as

[10] NRREP is a governmental single window program for rural and renewable energy development. The Joint Financing Agreement on NRREP has been signed by Norwegian Embassy and Danish Embassy recently, and is expected to be signed by DFID and KfW by middle of 2013.

summarized in Table 2. AEPC will work with sub-project communities to ensure that any necessary licenses are obtained in accordance with applicable regulations.

Table 2: Environmental Regulatory Framework Relevant to the Project

Acts, Regulations, Policies and Guidelines	Content
Electricity Act, 1992	~ Governs the use of water for hydropower production. ~ Establishes a system of licensing. ~ Sets out the powers, functions and duties of a licence holder. ~ Provides certain financial incentives for licence holders. ~ Sets out the powers of the government. [1]
Electricity Regulation, 1993	~ Sets out the procedure for obtaining a license. ~ Deals with the acquisition of house and land and compensation. ~ Sets out the powers, functions and duties of licence holders.
Hydropower Development Policy, 2001	Hydropower development is emphasized with due consideration of environmental protection.
Water Resources Act, 1992	~ The umbrella Act governing water resource management. ~ Declares the order of priority of water use. ~ Vests ownership of water in the State. ~ Provides for the formation of water user associations and establishes a system of licensing. ~ Prohibits water pollution.[1]
Local Self Governance Regulation, 2000	~ Sets out the powers, functions and duties of VDC, Municipality and DDC in relation to water and sanitation. ~ Establishes the procedure for the formulation of water-related planning and project implementation.[1]
National Parks and Wildlife Conservation Act, 1973	Specifies limitations on activities in parks and conservation areas, including construction and clearing of vegetation

1 – taken from WaterAid, 2005.

15. The *Electricity Act, 1992* (Section 3) requires any person or corporate body who wants to conduct survey, generation, transmission or distribution of electricity over 1,000 kW (1 MW) to obtain a license under the Act. Given that REREAP MMH plants are likely to be no larger than 1 MW, applications for these sub-projects are not required, however when the project has a capacity of between 100-1,000 kW certain information must still be provided to the prescribed officer before generating, transmitting or distributing hydroelectricity. Under Section 3 of the *Electricity Regulation 1993* the following particulars must be provided: (i) detailed description of the project; (ii) map of the project (showing main structure/s); (iii) source of water and quantity of water to be utilized; (iv) area where electricity is to be distributed and estimated number of consumers to be benefited; (v) whether the water resource to be utilized has already been utilized by another or not, if so, particulars of the same; and (vi) other necessary particulars.

16. The *Water Resource Act, 1992* Clause 7 sets out the priority uses of water that shall generally apply. Hydropower takes priority over the use of water for cottage industries, industrial enterprises, mining, navigation and recreation, but is a lower priority than the use of water for drinking and domestic use, irrigation or agriculture. Clause 9 describes conditions for the use of water for hydroelectric purpose. Clauses 18 and 19 deal with water quality standards and water pollution, while Clause 20 stipulates that while utilizing water resources, it shall be done so in such a manner that "*no substantial adverse effect be made on environment by way of soil erosion, flood, landslide or similar other cause*".

17. Provisions of the *Hydropower Development Policy, 2001* that relate to REREAP MMH plants include (i) generating "*at low cost by utilizing the water resources available in the country*"; (ii) the extension of "*reliable and qualitative electric service throughout Nepal at a*

reasonable price"; (iii) "*electrification of remote rural areas shall be encouraged by operating small and micro hydropower projects at the local level"*; and (iv) "*support for the development of rural economy by extending the rural electrification*". The Policy requires the mitigation of adverse environmental impacts likely to result from the operation of hydropower projects. This includes a key provision that requires the release of an environmental flow from each diversion weir, essentially to maintain the sustainability of aquatic ecosystems and other river uses, set out as:

> "*Provision shall be made to release such quantum of water which is higher of either at least ten per cent of the minimum monthly average discharge of the river/stream or the minimum required quantum as identified in the environmental impact assessment study report.*"

18. The *Local Self Governance Regulation, 2000* Clause 68 empowers VDCs to monitor and supervise development work implemented in the VDC. Clause 49 indicates that for infrastructure not approved by the Government of Nepal, an application for approval has to be lodged with the VDC, although given that the VDC is part of the process of initiating a sub-project it is unsure if this will apply.

19. The *National Parks and Wildlife Conservation Act, 1973* deals with the conservation and management of wildlife and habitat. The Act would apply to sub-projects proposed in national parks. The Act restricts entry into national parks without prior permission of the concerned authority. According to Article 5 of the Act, hunting of animals or birds, building or occupying houses, shelters or structures, occupying, clearing or planting or growing in any part, cutting, felling, removing or overshadowing any tree and removing any quarry or any other activities in national parks are banned. Under the *National Parks and Wildlife Conservation Regulation, 1974*, permission is required for entry into designated national parks. Section 22 of the Regulation deals with the permission required to prepare an inventory of plants and animals in national parks and wildlife conservation areas. Under Section 6 of the *Wildlife Reserve Regulation, 1977*, entry, construction of houses or sheds, clearance of forest and forest products, quarrying and overnight stay in a reserve area is prohibited unless authorized in writing by the relevant GoN authority. Section 11 of the Regulation restricts surveys and research works in these areas without prior written approval. All vehicles and persons passing through reserve areas are subject to security check. Under Article 7 of the *Buffer Zone Management Regulation, 1994*, clearance of forests and forest products, acquisition of land, use of quarry sites and hunting in buffer zones is restricted unless written approval of the relevant GoN authority is obtained.

3.2 International Environmental Agreements

20. Nepal is a party to the following international environmental conventions that may have some broad relevance to proposed Project activities:

(i) United Nations Framework Convention on Climate Change (UNFCCC) – for parties to take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. The related Kyoto Protocol includes the Clean Development Mechanism (CDM) which allows RE and other greenhouse gas reduction projects to earn and sell certified emission reduction (CER) credits. Some sub-projects are expected to qualify for CDM registration, but CER revenue will not be mobilized as up-front cofinancing.

(ii) Convention on Biodiversity - the objectives of the Convention are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. The Project has the potential to affect biodiversity by disrupting the movement of significant fish species or by the removal of unique habitat or flora species. Article 14 of the Biodiversity Convention states that adequate attention should be given to minimize and/or avoid adverse impacts on protected species if a project area is the core habitat of such species. The GoN has included 17 plant species and 39 animal species in its protected list. Appropriate mitigation measures to minimize or avoid impacts on protected species from sub-project construction and operation are required.

(iii) Ramsar Convention on wetlands of international significance – Nepal has nine listed Ramsar sites that are all medium to large water bodies (each 90 ha or more in area). MMH plants have the theoretical potential to affect wetlands by impeding fish migration, but this is highly unlikely as they will be located in the upper catchments of small streams or on irrigation canals. Inflows into these wetlands will not be affected by MMH plants as each sub-project will involve small scale run-of-river stream diversions over short stretches of streams (500-1,000 m in length).

(iv) Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal - the overarching objective of the Convention is to protect human health and the environment against the adverse effects of hazardous wastes, achieved through (i) a reduction of hazardous waste generation and promotion of environmentally sound management of hazardous wastes; (ii) restriction of transboundary movements of hazardous wastes; and (iii) a regulatory system applying to cases where transboundary movements are permissible. Nepal plans to install a battery management facility that will operate in accordance with the Convention's rules and guidelines. This plant will enable lead acid batteries, including batteries from the Project, to be recycled in Nepal rather than the current practice of recycling and/or disposal in India.

3.3 ADB Policy

21. The key objectives of ADB *SPS 2009*, are to: (i) avoid adverse impacts of projects on the environment and affected people, where possible; (ii) minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and (iii) help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks. *SPS 2009* requirements include assessing impacts, planning and managing impact mitigations, preparing environmental assessment reports, disclosing information and undertaking consultation, establishing a grievance mechanism, and monitoring and reporting. *SPS 2009* also includes particular environmental safeguard requirements pertaining to biodiversity conservation and sustainable management of natural resources, pollution prevention and abatement, occupational and community health and safety, and conservation of physical cultural resources. SPS 2009 requires incorporation of preventive and protective measures consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's *Environment, Health and Safety Guidelines.* Of particular importance are *SPS 2009* requirements for biodiversity conservation, which are as follows:

The borrower/client will assess the significance of project impacts and risks on biodiversity[12] and natural resources as an integral part of the environmental assessment process [specified in paragraphs 4–10 of SPS 2009]. The assessment will focus on the major threats to biodiversity, which include destruction of habitat and introduction of invasive alien species, and on the use of natural resources in an unsustainable manner. The borrower/client will need to identify measures to avoid, minimize, or mitigate potentially adverse impacts and risks and, as a last resort, propose compensatory measures, such as biodiversity offsets, to achieve no net loss or a net gain of the affected biodiversity.

a. Modified Habitats

In areas of modified habitat, where the natural habitat has apparently been altered, often through the introduction of alien species of plants and animals, such as in agricultural areas, the borrower/client will exercise care to minimize any further conversion or degradation of such habitat, and will, depending on the nature and scale of the project, identify opportunities to enhance habitat and protect and conserve biodiversity as part of project operations.

b. Natural Habitats

In areas of natural habitat,[13] the project will not significantly convert or degrade[14] such habitat, unless the following conditions are met:

(i) No alternatives are available.

(ii) A comprehensive analysis demonstrates that the overall benefits from the project will substantially outweigh the project costs, including environmental costs.

(iii) Any conversion or degradation is appropriately mitigated.

Mitigation measures will be designed to achieve at least no net loss of biodiversity. They may include a combination of actions, such as postproject restoration of habitats, offset of losses through the creation or effective conservation of ecologically comparable areas that are managed for biodiversity while respecting the ongoing use of such biodiversity by Indigenous Peoples or traditional communities, and compensation to direct users of biodiversity.

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[12] The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

[13] Land and water areas where the biological communities are formed largely by native plant and animal species, and where human activity has not essentially modified the area's primary ecological functions.

[14] Significant conversion or degradation is (i) the elimination or severe diminution of the integrity of a habitat caused by a major, long-term change in land or water use; or (ii) the modification of a habitat that substantially reduces the habitat's ability to maintain viable populations of its native species. Significant conversion may include, for example, land clearing; replacement of natural vegetation (for example, by crops or tree plantations); permanent flooding (by a reservoir for instance); drainage, dredging, filling, or canalization of wetlands; or surface mining.

c. Critical Habitats

No project activity will be implemented in areas of critical habitat[15] unless the following requirements are met:

(i) There are no measurable adverse impacts, or likelihood of such, on the critical habitat which could impair its high biodiversity value or the ability to function.

(ii) The project is not anticipated to lead to a reduction in the population of any recognized endangered or critically endangered species[16] or a loss in area of the habitat concerned such that the persistence of a viable and representative host ecosystem be compromised.

(iii) Any lesser impacts are mitigated in accordance with the second paragraph on natural habitats noted above.

When the project involves activities in a critical habitat, the borrower/client will retain qualified and experienced external experts to assist in conducting the assessment.

d. Legally Protected Areas

In circumstances where some project activities are located within a legally protected area, in addition to the requirement specified in para. 28, the borrower/client will meet the following requirements:

(i) Act in a manner consistent with defined protected area management plans.

(ii) Consult protected area sponsors and managers, local communities, and other key stakeholders on the proposed project.

(iii) Implement additional programs, as appropriate, to promote and enhance the conservation aims of the protected area.

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[15] Critical habitat is a subset of both natural and modified habitat that deserves particular attention. Critical habitat includes areas with high biodiversity value, including habitat required for the survival of critically endangered or endangered species; areas having special significance for endemic or restricted-range species; sites that are critical for the survival of migratory species; areas supporting globally significant concentrations or numbers of individuals of congregatory species; areas with unique assemblages of species or that are associated with key evolutionary processes or provide key ecosystem services; and areas having biodiversity of significant social, economic, or cultural importance to local communities. Critical habitats include those areas either legally protected or officially proposed for protection, such as areas that meet the criteria of the Word Conservation Union classification, the Ramsar List of Wetlands of International Importance, and the United Nations Educational, Scientific, and Cultural Organization's world natural heritage sites.

[16] As defined by the Word Conservation Union's Red List of Threatened Species or as defined in any national legislation.

22. The ADB principles for biodiversity conservation will be applied at the sub-project screening stage and for subsequent assessments. Proposed sub-projects whose area of influence includes natural habitat, critical habitat, protected forest, buffer zone or legally protected area[17] will be subject to prior review by ADB, and will be initially considered as environment Category B for purposes of assessment. Sub-projects located within sensitive habitats will be considered, as the net benefits are expected to far outweigh any potential negative impacts. Category A sub-projects will not be eligible for financial support from the project.

3.4 Institutional Capacity

23. All sub-projects will be community-driven, formally initiated by communities requesting assistance from AEPC via DEEU and RSCs in the form of development and financial support for the installation and operation of RE installations. AEPC, through the PIU, is responsible for the design and environmental assessment of sub-projects, and monitoring their environmental management during construction and operation. AEPC staff expertise will be complemented by a network of qualified consultancies that will be utilized to assist in preparing the Project pipeline of sub-projects as required, including sub-project feasibility studies, safeguard assessments, environmental management plans (EMPs) and monitoring reports.

24. AEPC has been working as the implementing agency for various off-grid RE development programs over a number of years, and during this time has developed strong in-house capacity to identify, appraise, supervise installation, monitor operation and report on the types of small RE sub-projects that will be funded under the Project. AEPC follows well-established procedures for feasibility analysis, sub-project design, and environmental and social impact assessment, including procedures for vulnerable communities assessment.

25. Project-facilitated capacity development within AEPC will focus on managing, implementing and promoting RE development and, at regional level, gender equality and social inclusion (GESI)-based community participation and management of energy systems. Capacity development activities will be implemented through participation in relevant courses and seminars and through “learning-by-doing”, with technical backstopping by PIU.

3.5 Anticipated Environmental Impacts

26. Individual RE sub-project installations will be classified as either ADB environment category B or C as they will involve physical works but are expected to have limited, insignificant, and manageable, direct and induced adverse environmental and social impacts. Individual MMH subprojects are expected to be category B. Solar and solar-wind hybrid subprojects involving land disturbance are expected to be category B. All other subprojects are expected to be category C.[18]

27. The potential adverse impacts of MMH sub-projects are:

(i) Construction activities – vegetation clearance and ground disturbance; earthworks, erosion and sedimentation, and water quality decline; temporary interruption of services (e.g. irrigation canals); installation of mini-grid distribution lines; and

[17] The area of influence will generally include land within 2km of a project site but may cover a wider area and include downstream habitat in the case of hydropower installations.
[18] Category A sub-projects will not be eligible for financial support from the project.

(ii) Operation - the diversion of water from a section of stream/river for power generation and the related impact on river/water uses and aquatic ecosystems.

28. The potential long-term impact of MMH sub-projects relates to the possible utilization of up to 90%+ of total annual stream flows, given that the minimum release from the weir must be "*the higher of either at least ten per cent of the minimum monthly average discharge of the river/stream or the minimum required quantum as identified in the environmental impact assessment study report*" as per the *Hydropower Development Policy 2001* (MoWR, 2001). This diversion of water will potentially affect existing stream uses in the dewatered section between the intake and tailrace outlet (typically 600-1,000 m long). The establishment of a local transmission and distribution line system linking a number of villages may require the removal of vegetation within the right-of-way (RoW).

29. The adverse environmental impacts of SWM sub-projects are expected to be minor due to their small size and location within existing built-up areas (in yards, buildings, along tracks, etc). Typical SWM installations are likely to be consist of either (i) 10-15 kW solar panel capacity, or (ii) hybrid systems with 10-15 kW solar panels plus 2-3 wind turbines each of 5 kW capacity, or (iii) 2-3 wind turbines each of 5-10 kW capacity. These plants will include inverters and battery storage in a purpose-built powerhouse of about 40 m^2 footprint. SWM mini-grid distribution lines are expected to mainly range between 1,000-3,000 m in total length. The adverse impact of these facilities will be limited to minor disturbance during construction, although noise emitted by the wind turbines at various wind speeds may be an additional impact where houses are located in close proximity.

30. A common potential impact of SWMs arises from the periodic replacement of used lead acid batteries. This impact should be avoided by the planned recycling of battery components in a proposed facility to be installed in Nepal, as well as future replacement of lead acid batteries with lithium ion and/or other advanced technologies. The ongoing NRREP programme has a special component to manage used lead acid batteries from rural electrification. AEPC will inform participating communities about required used battery management in compliance with international standards.

31. The construction period is highly variable depending on the type of sub-project. SWM plants can be completed in 1-2 months, while MMHs generally take up to 12-18 months to install. In remote areas equipment will be transported by porter (foot access) or mule from the nearest road. Construction camps will not be required due to the small scale of installations, short time frame for construction, and availability of local labor.

32. Each sub-project will deliver net benefits in the form of expanded access to energy and productive end uses of energy that will far outweigh any potential adverse impacts. Benefits that will accrue to different sub-projects will include: reduced use of fossil fuels (i.e. kerosene for lighting and petrol to run generator sets); reduced use of fuelwood for household lighting in some villages, leading to reduced deforestation rates/forest regeneration; reduced labor required for biomass collection; improved quality of life associated with access to reliable electricity services (e.g. better lighting, ability to run additional household appliances); and reduced cost of energy in many instances. Benefits will accrue from value-added economic activity that will occur as a result of access to a more reliable supply of energy. Such activities include the establishment of new or more efficient enterprises, including agricultural processing (e.g. grain husking, poultry production), and small enterprises such as carpentry and tea shops. Social services will also benefit, including schools, health clinics, and community radio stations.

3.6 Environmental Assessment and Review of Sub-Projects

33. The environmental assessment of the overall Project and individual sub-projects has been undertaken in accordance with ABD SPS 2009 requirements, noting that there are no specific planning requirements for off-grid renewable energy projects with less than 5 MW capacity under the *Environment Protection Act, 1997* and *Environment Protection Rules, 1997*. Assessment will involve (i) assessing the overall Project in an IEE, (ii) screening potential sub-projects against environmental and social criteria, and (iii) preparing an environmental assessment for each selected sub-project that was not assessed as a sample subproject in the Project IEE.

3.7 Project IEE

34. The overall Project has been classified as ADB environment category B based on the likely RE sub-project types, installed capacity, and locations of the sub-projects, as determined by the Project's most environmentally sensitive component: the diversion of stream flows by mini-micro hydro sub-projects.[19] All sub-projects will be either environment category B or C. Accordingly, the project IEE is being prepared in accordance with ADB's SPS (2009) requirements for sector loans, with the main objectives being to:

(i) provide an environmental and social baseline description of the Project;
(ii) identify and describe the Project's potential environmental and social impacts;
(iii) design mitigation measures to minimize adverse impacts;
(iv) describe the Project's public consultation process and Grievance Redress Mechanism (GRM); and
(v) provide Environmental Management and Monitoring Plans for the overall Project (including defining institutional responsibilities, capacity building and training plans, and budgeting).

35. The Project IEE is based on the assessment of five representative sub-projects. These sample sub-projects were selected to represent the range of sub-project types (two micro-hydropower projects, two solar-wind mini-grids and one solar mini-grid) and different physiographic regions where they are likely to be installed. The sub-project assessments provide a good indication of the types and significance of the likely adverse impacts and benefits of the overall Project and of the adverse impacts and benefits of each of the RE sub-project types.

3.8 Sub-Project Screening

36. AEPC will screen individual sub-projects against (i) sub-project selection criteria (Appendix C), and (ii) potential environmental and social impacts. The sub-project ADB environment categories are expected to be:

- **MMH** – category B where they involve intra-basin river diversion with a weir and installation of extensive distribution lines;[20] and

[19] A separate IEE has been prepared for the on-grid components.
[20] Categories will be assigned based on the ADB REA checklist or a checklist developed specifically for the Project. Most of the MMHs may be Category B; category C may apply where water is diverted between irrigation canals.

- **SWM** – category B for installations involving land disturbance, and Category C for roof-top installations.

37. MMH plants will be screened using ADB's *Rapid Environmental Assessment* (REA) *Checklist* for hydropower that has been adapted to mini-micro projects (Appendix D), to determine the environment category and identify the main adverse impacts. MMH plants are expected to be category B. SWM sub-projects will be screened using the project-specific environmental assessment checklist (Appendix E) to identify if any of these sub-projects are category B, and provide the first part of the desktop environmental assessment required for these sub-projects to meet ADB SPS requirements.

38. As noted above (paragraph 22), proposed sub-projects whose area of influence includes natural habitat, critical habitat, protected forest, buffer zone or legally protected area will be subject to prior review by ADB, and will be initially considered as environment Category B for purposes of assessment. Sub-projects located within sensitive habitats will be considered, as the net benefits are expected to far outweigh any potential negative impacts. Any sub-project proposed in a protected area will be eligible for Project support only if it (i) is permitted under GoN legislation (e.g., areas equivalent to International Union for Conservation of Nature (IUCN) Category 2 or less stringent categories which allow multiple land use activities), (ii) is allowed under protected area management plans, and (iii) complies with ADB safeguard requirements for habitats and legally protected areas. RE installations in such areas are likely to provide benefits by reducing fuelwood collection and use, and replacing diesel or petrol generator sets, therefore the net environmental effect is expected to be a benefit if carefully sited.

3.9 Sub-Project Environmental Assessment Preparation

39. Third-party consultants will prepare an IEE for each category B sub-project in consultation with participating VDCs and other stakeholders, following existing AEPC procedures. The IEE will be consistent with the outline and content contained in ADB guidelines, but will exclude the general material that is adequately covered in the Project IEE, namely: Executive Summary; Policy, Legal and Administrative Framework; Analysis of Alternatives (apart from discussing any obvious site alternatives); Grievance Redress Mechanism, etc). The contents of a MMH IEE are outlined in Appendix F. The level of detail and comprehensiveness of each sub-project IEE will be commensurate with the significance of the potential impacts and risks.[21] The two case study MMH sub-project assessments contained in the Project IEE provide a good indication of the type of information and level of detail required in each sub-project IEEs. Where a sub-project is proposed within or adjacent to a protected area a sufficiently detailed IEE with an effective environmental management plan will be required.

40. As described above, for category C sub-projects a tailored 1-2 page assessment form that (i) screens the sub-project to determine that it is category C as expected or identifies it as Category B due to special circumstances, and (ii) provides a brief desktop environmental and social assessment that satisfies the SPS requirements, will be completed. Where a sub-project is proposed within a protected area then the assessment will take the form of an IEE (the findings of the IEE may support re-categorization from B to C). The level of detail contained in most IEEs will be commensurate with the potential significance of the adverse impacts (in accordance with the ADB *SPS 2009* environmental safeguards policy principle number 1).

[21] ADB SPS (2009); OM Section F1/OP, paragraph 7, page 2, 4 March 2010.

3.10 Review

41. ADB will review the Project IEE that covers five sample sub-projects, and after ADB Board approval, AEPC will take the lead on environmental assessment and review. During the first year of project implementation ADB will review each IEE on a no-objection basis. After year 1, ADB will review AEPC's environmental safeguards implementation capacity to determine if prior "no objection" reviews are still necessary. It is anticipated that after year 1, ADB will review (i) on a spot basis sub-projects that are located within or may affect protected areas, and (ii) on a routine basis as part of Project review missions and EA reporting requirements.

4. CONSULTATION, INFORMATION DISCLOSURE, AND GRIEVANCE REDRESS MECHANISM

4.1 Consultation and Information Disclosure

42. ADB's SPS (2009) requires projects to carry out meaningful public consultation on an ongoing basis. All sub-projects will be community-initiated and community-based, and as such consultation is built into and central to the sub-project design process from initiation onwards. Public consultation will: (i) begin early and carry on throughout the project cycle; (ii) provide timely disclosure of relevant information, understandable and accessible to people; (iii) ensure a free and un-intimidated atmosphere without coercion; (iv) ensure gender inclusiveness tailored to the needs of disadvantaged and vulnerable groups; and (v) enable the incorporation of all relevant views of affected people, and stakeholders into project decision making, mitigation measures, the sharing of development benefits and opportunities and implementation issues. For any subprojects proposed in protected areas, the protected areas management team will be consulted to ensure the subproject is consistent with protected area management plans. The PIU and any appointed environmental assessment consultants will be open to contact/consultation by the public on environmental assessment matters during sub-project IEE and desktop environmental assessment preparation and design investigations.

43. All communication handouts shall be written in Nepali and all consultations will be documented. All relevant views raised during consultation shall be reported in the environmental assessment report, and considered in sub-project design and reflected in the environmental management plan as appropriate. Attendance sheets and notes of consultations shall be included in the environmental assessment report as proof that consultation/s had been held.

44. Information disclosure will follow the procedure for ADB environment category B projects, and AEPC equivalent procedures. It is the policy of the ADB to have environmental assessment reports made available/accessible to the general public. The following EA-related documents will be posted on the ADB website: (i) draft EARF, before Project appraisal; (ii) Final or updated EARF, upon receipt; and (iii) overall project IEE report and EMP. Hard copies of the EARF and IEE reports (in English and Nepali) will be made available for perusal at the ADB Office in Nepal, at AEPC head office, and at other locations accessible to stakeholders (to be determined by the AEPC).

4.2 Grievance Redress Mechanism

45. AEPC has an existing procedure to receive inquiries and complaints about project-related activities (developed for other donor-funded projects), and to respond to such inquiries and complaints. As the sub-projects are community-originated and community-based, consultation is built into and central to the sub-project development process.

46. A grievance redress mechanism (GRM) will be established to receive and facilitate the resolution of affected persons (AP) concerns, complaints, and grievances on project implementation and operational issues, including negotiated/voluntary land donation, relocation, income restoration, environmental management and other construction and operation related issues. The GRM is designed to be proactive and accessible to all APs to address their concerns grievances and issues effectively and swiftly, in accordance with ADB *SPS 2009*. RSC will inform the community about the GRM during the first stage of community mobilization. The GRM is based on five consecutive levels of action aimed at resolving issues as soon as possible and within a set time frame, as described below.

47. **First level of GRM:** The first level of intervention to address grievances and complaints will be through the VDC. Many grievances can be resolved by providing correct and complete information early in the sub-project development process. The RSC representing the EA/PM or PIU will deploy the communications manager (CM) to listen to and provide information to APs to try to resolve their issues. The CM may seek the assistance of the project safeguards specialists to help resolve the issue. The CM will keep record of: (i) the name of person(s) making the complaint, (ii) the date the complaint was received, (iii) nature of the complaint, (iv) location, and (v) how the complaint was resolved (if resolved). These reports will be submitted to the EA and the project safeguard specialist on a monthly basis.

48. **Second level of GRM:** If the grievance remains unresolved the CM will forward the complaint to the EA's project manager (EA/PM) and project safeguard specialist. The person filing the grievance will be notified by the CM that his/her grievance was forwarded to the EA/PM and project safeguard unit. Grievances will be resolved through consultation and interaction with APs with support of CUGs/SPFG. The EA will answer queries and find resolution for grievances regarding various issues including social, or livelihood impacts and environmental impacts. The project safeguard specialist will undertake the corrective measure/s in the field within seven days of the decision. The project safeguard specialist will fully document the following information: (i) the name of person/s, (ii) date of the received complaint, (iii) nature of the complaint, (iv) location, and (v) how the complaint was resolved (if resolved).

49. **Third level of GRM:** If the grievance remains unresolved, it will be referred to Grievance Redressal Committee (GRC). The GRC will be headed by the PM, with other members consisting of chairman of the sub-project VDC, Ward Secretary, representative of APs and Chairmen of CUGs/SPFGs. The affected person will be given the opportunity to present his/her concerns/issues at the GRC. The GRC will meet when necessary, with all costs of each hearing borne by the project. The GRC will suggest corrective measures at the field level and issue directions that these measures are implemented within 15 days. The project safeguard specialist will act as the GRC secretary, responsible for processing and placing all papers before the GRC, recording decisions, issuing minutes of the meetings, and taking follow-up action to see that formal orders are issued and the decisions are carried out. The structure of VDC-level GRC is illustrated in Figure 1.

50. **Fourth level of GRM:** If the above process fails to adequately resolve the concern/grievance to satisfactory of the AP, the AP can seek DDC intervention to resolve the issue by requesting the GRC Secretary to forward the matter to the DDC-level Public Hearing Committee (PHC). The PHC will be represented by the CDO (Chairman of PHC), PM of EA, Project Social Safeguard Specialist (Secretary of PHC), concerned VDC Chairman, concerned Ward Secretary, concerned CUG Chairman, and a member of the CBO. The affected person can present his/her concerns/issues at the PHC. The PHC will meet when necessary, with all

costs of the hearing borne by the project. The PHC will suggest corrective measures at the field level and issue directions that should implement the directions within 30 days of the decision taken. The project safeguard specialist will work as the secretary of the PHC and will be responsible for processing and placing all papers before the PHC, recording decisions, issuing minutes of the meetings, and taking follow-up action to see that formal orders are issued and the decisions are carried out. The structure of the district-level PHC illustrated in Figure 2.

51. **Fifth level of GRM:** If all of the above resolution methods fail, the AP can seek legal redress through Nepali's judicial system or appropriate administrative system.

Figure 1: VDC-Level Grievance Redress Committee

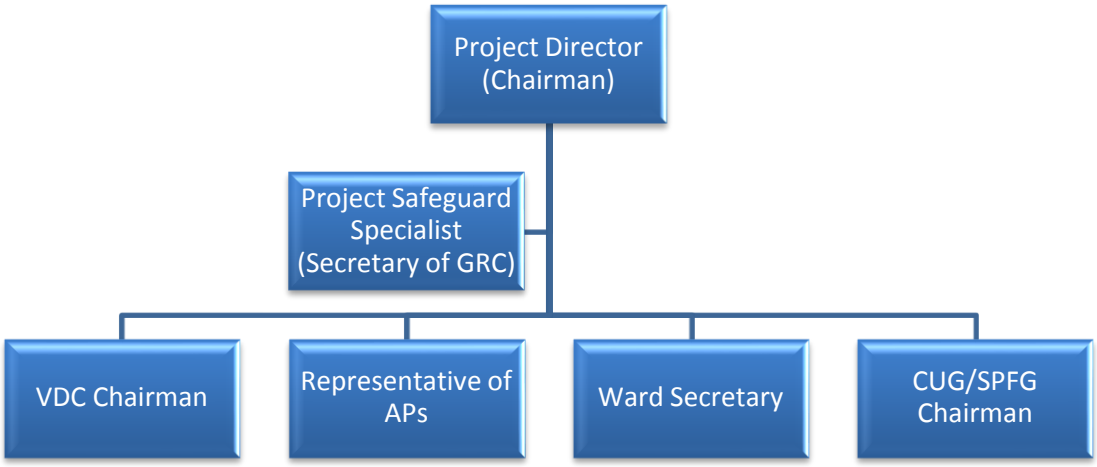
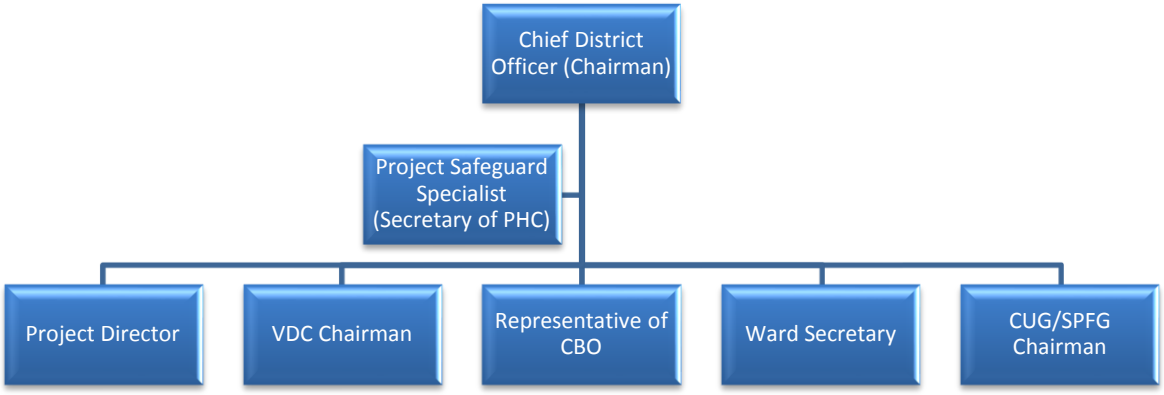


Figure 2: District-Level Grievance Redress Committee



5. INSTITUTIONAL ARRANGEMENTS AND RESPONSIBILITIES

52. The key institutions involved in Project management and implementation, including the environmental assessment and review process for sub-projects, are DEEUs, RSCs, AEPC and the PIU, VDCs, etc., as described below.

MoEnv

53. MoEnv, AEPC's parent ministry, chairs the existing NRREP Steering Committee, which will also serve as the Steering Committee for the Project. The Steering Committee includes representatives from Ministry of Finance (MOF), Ministry of Energy (MOE), MoEnv, and AEPC as members. MoEnv will also provide oversight to AEPC and will also be responsible for reporting to the ADB.

AEPC/PIU

54. AEPC will be the Project Executing Agency (EA), supported by the REREAP PIU established within AEPC and a technical consultant team funded by the Project. The PIU will be responsible for overseeing sub-project compliance with environmental and social safeguard requirements based on the EARF provisions that include: (i) sub-project selection taking into account environmental screening criteria; (ii) sub-project environmental assessments prepared in the form of an IEE (category B sub-projects) or desktop assessment (category C sub-projects) in accordance with the requirements set out in this EARF; (iii) appropriate public consultations and disclosures; (iv) effective management of the grievance redress mechanism; and (v) EARF compliance reported in the environmental monitoring report. The PIU or its appointed technical consultants will conduct routine visual inspections of construction activities, including site pegging, vegetation clearance, earthworks, etc.

55. Regional Service Centers (RSC), funded by NRREP and covering all rural areas in Nepal, will be engaged to provide implementation support at the field level, including EMP implementation. New RSCs and additional experts for existing RSCs will be recruited if required.

VDCs

56. For each IEE, the RSCs along with VDCs will take the lead in organizing the benefiting communities, and will support AEPC and the PIU, during public consultation. VDCs will provide the PIU with available baseline data, and/or assist the PIU in obtaining required baseline data. As beneficiaries of the improvement works, it is the duty of the villagers to participate actively in public consultations and social surveys.

DEEUs

57. DEEUs will be engaged in promotional activities at district level. Each DEEU will be actively involved in demand creation and decentralized (bottom up) planning of the DDC. All renewable energy activities have to be prioritized in the planning process and approved by DDC council. DEEU/Ss will be involved in monitoring of systems installed by any organizations and quality control.

Consultants, Construction Contractors, Equipment Suppliers, and Other Service Providers

58. Consultants will be contracted by AEPC as required to assist in the preparation of the pipeline of sub-projects. This will include consulting services to complete IEEs and desktop environmental assessments for individual sub-projects.

59. Construction contractors, equipment suppliers, and other service providers will be engaged to install sub-projects. Construction contractors will have primary responsibility for environmental and social management and worker health and safety at sub-project construction sites under their control. They will be required to adhere to AEPC's environmental, health, and safety (EHS) guidelines and implement relevant sub-project environmental and social management measures prior to and during construction. This will include implementing controls such as spoil disposal, reconnection of cut services, and revegetation to stabilize sites. They will also be responsible for the provision of appropriate personal protective equipment (e.g., hard hats, safety boots, and hearing protection) to their workers. Equipment suppliers and other service providers are expected to adhere to best EHS management practices consistent with the scope of their activities.

Asian Development Bank

60. ADB will (i) review project implementation and update the EARF as necessary (based on findings of review missions); (ii) review the Project IEE prior to ADB Board consideration; (iii) periodically review sample sub-project IEEs and desktop environmental assessments; (iv) review Project monitoring reports; and (v) officially disclose environmental safeguards documents on its web site in accordance with the ADB *Public Communications Policy* (2011). ADB will also review REA Checklists for proposed MMH sub-projects to enable it to provide guidance to AEPC/PIU on SPS (2009) requirements.

6. MONITORING AND REPORTING

61. The AEPC PIU will prepare an overall Project monitoring report every six months during Project implementation and submit this to the ADB. The PIU will also prepare environmental management reports in accordance with the Projec t IEE and environmental management plan every six months during construction (or at the end of construction when it takes less than six months), and once between 6-12 months after the commencement of sub-project operation. The environmental management reports will cover EMP implementation, focusing on compliance and any needed corrective actions. Public consultation will be conducted as necessary during construction. ADB will conduct periodic review missions which will include a review of safeguard implementation issues.

MINI HYDRO DEVELOPMENT PROCEDURE

DDC/VDC Level Demand Assessment by AEPC/RSCs

- Community level energy demand assessment (i.e. households, community services and PEU demands)
- UC interest in equity contribution assessment
- Pre-feasibility study to design project size to meet demands of households, community services and productive energy use.

Subproject Detailed Feasibility Study (DFS) and PEU baseline preparation

- RSCs make demand of required social mobilizers to AEPC
- Engagement of DFS preparation consultants by AEPC
- Engagement of social mobilizers to support DFS consultants and PEU baseline preparation.
- Submission of DFS report including PEU baseline by consultants
- Establishment of Technical Review Committee (TRC) in AEPC, participated by representatives from PFIs who will onlend ADF loan as credit to UC or (or private entrepreneur)
- DFS approved by TRC
- UC and AEPC to share cost of DFS

Community Mobilization & Sub project approval

- Provisional approval of subproject which meets selection criteria and UC creating a CEF
- Community organization formed and mobilized by social mobilizers.
- CEF established with UC and AEPC as co-signatories
- Local economic development (LED) committee established to promote PEU.
- AEPC approval of bank ac/ and financial audit controls UC starts collecting funds as community contribution. (Sources of contribution: equity, debt from ADF loan etc)
- CEF jointly managed by AEPC and the UC.
- UC (or private entrepreneur) start preparing PEU business plans with supports from RSC and starts mobilizing funds for PEU
- UC (or private entrepreneur) submit finance application to PFIs, and PFIs conduct preliminary appraisal
- UC (or private entrepreneur) deposited at least 3% of procurement cost in CEF
- Subproject approval including the business plans for PEU promotion by AEPC

Subproject Procurement

- Bidding documents preparation by AEPC with support of PIC
- *ADB approval of bidding documents for the sample subproject (Based on satisfactory performance of AEPC, bidding documents for subsequent subprojects will be post-facto approved by ADB)*
- AEPC Technical Review Committee for sample subproject bid evaluation (AEPC/PIU, UC, PFIs) with support of PIC, and submission to ADB for concurrence *(Based on satisfactory performance of AEPC, bid evaluation report for subsequent subprojects will be post-facto approved by ADB)*
- *Turnkey Contractor Selected*
  - *Contract Agreement signed between turnkey Contractor and AEPC*
  - *Financial close. Loan Agreement signed between PFIs and UC or (or private entrepreneur)*

Subproject Construction & Commissioning

- AEPC/RSC manage turnkey contractor
- Negotiating tariff within communities for PEU services with supports from RSC.
- Supports for PEU is made available to entrepreneurs through LED committee
- Independent verification of project construction based on approved criteria (primarily for E&M and civil structure)
- *For ADB administered fund, disbursement per provisions of bidding documents, in compliance with ADB Loan Disbursement Handbook.*
- *For credit onlent by commercial banks, disbursement per provision of loan agreements between commercial banks and UC or (or private entrepreneur), in line with schedule of disbursement of ADB administered fund*
- Completion certificate issued by AEPC after commissioning

Management and O&M of Power System

- Turnkey contractor for training UC *(or private entrepreneur)* on O&M
- AEPC/RSC support training of UC *(or private entrepreneur)* for plant Management
- Plant O&M contract for large projects (>100 kW)
- AEPC/UC/*private entrepreneur* approval of O&M contract
- UC *(or private entrepreneur)* hires manager to collect tariffs
- Operator to operate the plant
- UC *(or private entrepreneur)* gradually payback equity of AEPC through tariff collection
- UC*(or private entrepreneur)* fully owned the plant

CEF-Community Energy Fund; DDC-District Development Committee; DFS-Detailed Feasibility Study; LED- Local Economic Development; PEU- Productive Energy Use; PFI- Participating Financial Institution; PIC-Project Implementation Consultant; PIU-Project Implementation Unit; RSC-Regional Service Centre; UC-User Community

APPENDIX B

SOLAR AND SOLAR- WIND HYBRID MINI-GRID DEVELOPMENT

DDC/VDC Level Demand Assessment by AEPC/RSC

- Community level energy demand assessment (i.e. households, community services and PEU demands)
- UC interest in equity contribution
- Awareness creation of new program publicizing need to get UC applications submitted by a specific due date with UC commitments to create CEF, as applicable
- Pre-feasibility study to design project size to meet demands of households, community services and productive energy use.

Subproject Detailed Feasibility Study (DFS) and PEU baseline preparation

- RSCs will make a demand of required social mobilizers to AEPC
- Engagement of DFS preparation consultants by AEPC
- Engagement of social mobilizers to support DFS consultants and PEU baseline preparation.
- Submission of DFS report including PEU baseline by consultants
- Establishment of Technical Review Committee in AEPC
- DFS approved by AEPC
- UC and AEPC to share cost of DFS

Community Mobilization and sub project approval

- Provisional approval of subproject subject to meeting selection criteria and UC creating a CEF
- Community organization formed and mobilized by social mobilizers.
- CEF established with UC and AEPC as co-signatories
- Local economic development (LED) committee established to promote PEU.
- AEPC approval of bank ac/ and financial audit controls
  UC starts collecting funds to cover the cost of mini-grid system as community contribution. (Sources of contribution: equity, debt from ADF loan etc)
- CEF jointly managed by AEPC and the communities.
- UC (or private entrepreneur) start preparing business plans with supports from RSC and starts mobilizing funds for PEU
- UC deposited at least 5% of procurement in CEF
- Subproject approval including the business plans for PEU promotion.

Subproject Procurement by Bundling and Batches

- Applications of approved subprojects from multiple UCs bundled
- Bidding documents preparation for turnkey package (design, supply and install) for sample subprojects (3 villages) by AEPC
- ADB approval of bidding documents for the sample subprojects *(the ADB's standard bidding documents for plant (turnkey) are applied to set a template for subsequent subpojects (one turnkey package through ICB)*
- Bidding documents for sample subprojects issuance and contractors submission of bids
- Review Committee for bid evaluation
- ADB approval for bid evaluation reports (technical and financial) for the sample subprojects [(The approved bid evaluation report *sets a template for subsequent subpojects (one turnkey package through ICB)*)
- Contract agreement singed between AEPC and Turnkey contractors

Subproject Construction & Commissioning

- AEPC/RSC manage turnkey contractors
- Negotiating tariff within communities for PEU services with supports from RSC.
- Supports for PEU is made available to entrepreneurs through LED committee
- Disbursement per provisions of bidding documents, in compliance with ADB Loan Disbursement Handbook.
- Completion certificate issued by AEPC after commissioning

Management and O&M of Power System

- Turnkey contractor support training of UC for plant Management and O&M
- UC to O&M the plant and collect tariffs

CEF-Community Energy Fund; DDC-District Development Committee; DFS-Detailed Feasibility Study; LED- Local Economic Development; PEU- Productive Energy Use; PIC-Project Implementation Consultant; PIU-Project Implementation Unit; RSC-Regional Service Centre; UC-User Community

APPENDIX C

SUB-PROJECT SELECTION CRITERIA

The following criteria will guide the identification of potential sites for subprojects of Output 3 under the Project. The selection criteria draw on the guidelines and project selection criteria developed by AEPC for renewable energy projects.

Selection Criteria	Mini-micro Hydropower	Solar and Solar-Wind Hybrid Mini-Grid
Technical	Adequate flow in the river, adequate head at the site and stable terrain. The installed capacity of the plant is conventionally calculated on the basis of flow for 11 months. For these mini hydro plants this criteria should be relaxed to 6 months exceedance. The project design of the mini-grid shall be grid compatible.	No proven resource of micro hydro power resource nearby. Adequate solar and wind energy resources. Wind resource data to be measured at least for one-year (that includes all the seasons), at height 10 m or above the ground level. For hybrid project, the annual averaged wind power density should be more than 35 W/m2 at hub height, and solar irradiance should be more than 4 kWh/m2/day The project design of the mini-grid shall be grid compatible.
Economic	EIRR for the project shall not be less than 12%	EIRR for the project shall not be less than 12%
Environmental	Sub-projects that will not be supported by the Project include: (i) any projects assessed as category A; (ii) subprojects directly located on/in biologically sensitive or significant habitat (e.g. on a site with endangered flora or fauna); and (iii) subprojects in legally protected areas where the proposed development is not permitted under Government legislation.	
	Environmental mitigation measures should be included in the detailed feasibility study report.	Environmental mitigation measures should be included in the detailed feasibility study report. Particularly battery management process/guideline should be included in the mini-grid solar/wind package
Resettlement	Sub-projects shall not involve resettlement of local people, nor relocation of existing dwellings	Sub-projects shall not involve resettlement of local people, nor relocation of existing dwellings
Community Willingness & Contribution	The community should demand the system and contribute in cash or kind no less than 10% of the subproject cost in line with the Renewable Energy Subsidy Policy. The contribution in cash should to be deposited in the account jointly managed by AEPC and community prior to subproject approval by AEPC. Any acquired land for the subproject shall be contributed by the communities.	The community should demand the system and contribute in cash or kind no less than 10% of the subproject cost. The contribution in cash of minimum 3% of project cost shall be deposited in the account managed by AEPC and the community prior to subproject approval by AEPC. Any acquired land for the subproject shall be contributed by the communities.

	The community should provide evidence of their contribution to the project to be considered for support under the project	The community should provide evidence that the contribution from communities are assured to be considered for support from the project.
Productive Use of Electricity	The proposed scheme must include a feasible business plan. At least 20% of the installed capacity should be used for productive uses.	The proposed scheme must include a feasible business plan. At least 20% of the installed capacity should be used for productive uses
Multiple Use of Water	The targeted communities shall get water right clearance from concerned department and shall demonstrate that there is no issue of using water for power generation Multi-purpose projects that use water for irrigation and drinking water in addition to power generation should get high priority	Not applicable
Water Use and Land Use	There should be no conflict on the water and land use rights in the source stream/river. The community is solely responsible to resolve conflicts, if any, before implementation. The community has to provide evidence in writing from the concerned offices stating their rights for water and land use	There should be no conflict on land use rights for the project site. The management committee is solely responsible to resolve conflicts, if any, before implementation. The committee has to provide evidence in writing stating their right to use the land
Accessibility	The project will ensure that the project site will not be connected to the national grid in the next 5 years. The project site shall be accessible to at least fair roads within half day walking distance	The project will ensure that the project site will not be connected to the national grid in the next 5 years The project site shall be accessible to at least fair roads within half day walking distance
Gender and Social Inclusion	The targeted communities will preferably be composed of socially excluded groups of people and shall commit to include them in every project related activity	The targeted communities will preferably be composed of socially excluded groups of people and shall commit to include them in every project related activity
Sustainability of Project Operations	The community/users group should have clear procedures for project management and Operation & Maintenance of the project The plant operators should be trained and capable to operate and maintain the power plant by the time the manufacturer hands over the power plant	The community/users group should have clear procedures for project management and Operation & Maintenance of the project The plant operators should be trained and capable to operate and maintain the power plant by the time the manufacturer hands over the power plant

APPENDIX D: MINI-MICRO HYDROPOWER RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: REREAP NEPAL:

Sector Division:

A. Basic Project Design Data

1. Dam height, m =_____
2. Surface area of reservoir, (ha) =_____
3. Estimated number of people to be displaced =_____
4. Rated power output, (MW) =_____

Other Considerations:

1. Water storage type: ___ reservoir ___ run of river

Sector Division:

A. Basic Project Design Data

1. Dam height, m =_____
2. Surface area of reservoir, (ha) =_____
3. Estimated number of people to be displaced =_____
4. Rated power output, (MW) =_____

Other Considerations:

1. Water storage type: ___ reservoir ___ run of river
   ___ pumped storage
2. River diversion scheme: ___ trans-basin diversion ___ in-stream flow regulation
   ___ in-stream diversion
3. Type of power demand to address: ___ peak load ___ base load

Environment Categorization Notes

Category B – if the sub-project has any of the following features:

- Located in a sensitive landscape
- Stream/river diversion, resulting in the partial dewatering of a river section for at least part of the year
- Downstream water/river uses compromised by project-induced flow changes

Category C – if the sub-project has both of the following features:

- Irrigation channel diversion
- Not in a sensitive landscape

Screening Questions	Yes	No	Remarks
B. Project Location Is the dam and/or Project facilities adjacent to or within any of the following areas?			
▪ Unregulated river			
▪ Undammed river tributaries below the proposed dam			
▪ Unique or aesthetically valuable land or water form			
▪ Special area for protecting biodiversity			
▪ Protected Area			
▪ Buffer zone of protected area			
▪ Primary forest			
▪ Range of endangered or threatened animals			
▪ Area used by indigenous peoples			
▪ Cultural heritage site			
▪ Wetland			
▪ Mangrove			
▪ Estuary			
C. Potential Environmental Impacts Will the Project cause…			
▪ short-term construction impacts such as soil erosion, deterioration of water and air quality, noise and vibration from construction equipment?			
▪ disturbance of large areas due to material quarrying?			
▪ disposal of large quantities of construction spoils?			
▪ clearing of large forested area for ancillary facilities and access road?			
▪ impounding of a long river stretch?			
▪ dryness (less than 50% of dry season mean flow) over a long downstream river stretch?			
▪ construction of permanent access road near or through forests?			
▪ creation of barriers for migratory land animals			
▪ loss of precious ecological values due to flooding of agricultural/forest areas, and wild lands and wildlife habitat; destruction of fish spawning/breeding and nursery grounds?			
▪ deterioration of downstream water quality due to anoxic water from the reservoir and sediments due to soil erosion?			
▪ significant diversion of water from one basin to another?			
▪ alternating dry and wet downstream conditions due to peaking operation of powerhouse?			
▪ significant modification of annual flood cycle affecting downstream ecosystem, people's sustenance and livelihoods?			
▪ loss or destruction of unique or aesthetically valuable land or water forms?			

Screening Questions	Yes	No	Remarks
▪ proliferation of aquatic weeds in reservoir and downstream impairing dam discharge, irrigation systems, navigation and fisheries, and increasing water loss through transpiration?			
▪ scouring of riverbed below dam?			
▪ downstream erosion of recipient river in trans-basin diversion?			
▪ increased flooding risk of recipient river in trans-basin diversion?			
▪ decreased groundwater recharge of downstream areas?			
▪ draining of downstream wetlands and riparian areas?			
▪ decline or change in fisheries below the dam due to reduced peak flows and floods, submersion of river stretches and resultant destruction of fish breeding and nursery grounds, and water quality changes?			
▪ loss of migratory fish species due to barrier imposed by the dam?			
▪ formation of sediment deposits at reservoir entrance, creating backwater effect and flooding and waterlogging upstream?			
▪ significant disruption of river sediment transport downstream due to trapping in reservoir?			
▪ environmental risk due to potential toxicity of sediments trapped behind the dams?			
▪ increased saltwater intrusion in estuary and low lands due to reduced river flows?			
▪ significant induced seismicity due to large reservoir size and potential environmental hazard from catastrophic failure of the dam?			
▪ cumulative effects due to its role as part of a cascade of dams/ reservoirs?			
▪ depletion of dissolved oxygen by large quantities of decaying plant material, fish mortality due to reduced dissolved oxygen content in water, algal blooms causing successive and temporary eutrophication, growth and proliferation of aquatic weeds?			
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?			
▪ large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?			
▪ creation of community slums following construction of the hydropower plant and its facilities?			
• social conflicts if workers from other regions or countries are hired?			
▪ uncontrolled human migration into the area, made possible by access roads and transmission lines?			
▪ disproportionate impacts on the poor, women, children or other vulnerable groups?			
▪ community health and safety risks due to the transport, storage, and use and/or disposal of materials likely to create physical, chemical and biological hazards?			

Screening Questions	Yes	No	Remarks
• risks to community safety due to both accidental and natural hazards, especially where the structural elements or components of the project (e.g., dams) are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?			

A Checklist for Preliminary Climate Risk Screening

Country/Project Title:

Sector :

Subsector:

Division/Department:

Screening Questions		Score	Remarks[22]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?		
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?		
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?		
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?		
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?		

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high risk project.

Result of Initial Screening (Low, Medium, High):_____

Other Comments:_____
_____

Prepared by: _____

[22] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

APPENDIX E: SOLAR AND SOLAR-WIND MINI-GRID SUB-PROJECT ENVIRONMENTAL ASSESSMENT CHECKLIST

Sub-Project Name: ----------

Location: ---------- village

Ward No. ------, ---------- VDC, ---------- District

1. Project Description

Total capacity: -------- MW

Solar panels:
- number --------
- capacity/panel -------- Wp

Wind turbines:
- number --------
- capacity/turbine -------- kW
- tower height -------- m
- blade length -------- m

Powerhouse area: -------- m^2

Distribution line length: -------- m

2. Project Site

Total structure footprint: -------- m^2

Distribution line RoW area: ---------- m length x 3 m wide RoW = -------- m^2

Land type:	cultivation	forest	shrubland
	grassland	yard	degraded land
Ownership:	private	government	community
Protected Area (PA) or PA buffer zone:	yes	no	

If yes, name & describe (distance & location relative to site, etc): ----------

---

Other unique values on

site or nearby: primary forest unique / aesthetically valuable landform

cultural heritage site other

If yes, name & describe (value, distance & location relative to site, etc): ----------

---

---

3. Benefits

Power supply:

- households -------
- institutions School/s ----------

Health post/s ----------

- businesses ----------

- community facilities (e.g. street lights) ----------

---

4. Adverse Impacts

Forest clearance: ------- m^2 for main structures

------- m^2 for distribution line RoW

Any conservation significant species to be cleared: yes no

If yes, name species & describe significance: ----------

Turbine noise:

- sound pressure level --------- dB(A)
- closest residence --------- m
- residence down wind for part of year yes no
- estimated max. noise at residence --------- dB(A)

APPENDIX F: TABLE OF CONTENTS FOR MINI-MICRO HYDROPOWER SUB-PROJECT IEES

1. Description of the Sub-Project

- Summary of project features – location, main structures, operating regime, maintenance

2. Description of the Environment

- Description of bio-physical and socioeconomic conditions on site and in the area of influence, including:

  - hydrology – average monthly river flow/s
  - land use on project sites
  - river use in the dewatered section and further upstream
  - terrestrial ecology
  - Protected Areas
  - socioeconomic features

3. Anticipated Environmental Impacts and Mitigation Measures

- Prediction and assessment of potential adverse and positive bio-physical, socioeconomic and physical cultural resource impacts

- Proposed impact avoidance/mitigation measures

4. Information Disclosure, Consultation, and Participation

- Stakeholder engagement processes, including information disclosure and consultation

- Summary of comments and concerns received

- Planned information disclosure

- Consultation and participation process during Project implementation

5. Greivance Redress Mechanism

- Grievance redress framework, timeframe and mechanisms

6. Environmental Management Plan

- Summary of impacts and risks with associated management measures

- Monitoring measures and reporting procedures

- Implementation schedule, institutional/organizational arrangements, and estimated costs

- Performance indicators

7. Conclusion

- Conclusions drawn from the assessment