Environmental and Social Management Plan

of

100 kWp Kankasundari Solar Mini Grid Subproject, Jumla

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List of Abbreviation

ACAP	Annapurna Conservation Area Project
AEPC	Alternative Energy Promotion Centre
BES	Brief Environmental Study
CSR	Corporate Social Responsibility
EIA	Environmental Impact Assessment
EPA	Environment Protection Act
EPR	Environment Protection Rule
ESCOs	Energy Service Companies
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Screening
E&S	Environmental and Social
GBV	Gender Based Violence
GESI	Gender Equality and Social Inclusion
GoN	Government of Nepal
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
HHs	Households
IEE	Initial Environmental Examination
Km	Kilometre
kWp	Kilowatt Peak
masl.	Metres Above Sea Level
MGEAP	Mini-Grid Energy Access Project
MoEWRI	Ministry of Energy, Water Resources and Irrigation
NA	Not Applicable
NEA	Nepal Electricity Authority
OP	Operational Policies
PBs	Partner Banks
PV	Photovoltaic
RAP	Resettlement Action Plan
RM	Rural Municipality
SEA/SH	Sexual Exploitation & Sexual Abuse and Sexual Harassment
VCDP	Vulnerable Community Development Plan
WB	The World Bank

Executive Summary

Alternative Energy Promotion Centre (AEPC), the apex government body under the Ministry of Energy, Water Resources and Irrigation (MoEWRI), has been implementing the Private Sector-Led Mini-Grid Energy Access Project (MGEAP) since June 2019 with support from the World Bank. The objective of the MGEAP is to increase electricity access and delivery from renewable energy mini-grids (solar, hydro, wind, and hybrid) by mobilizing private Energy Service Companies (ESCOs).

Sundrops Energy Pvt. Ltd, an ESCO for Kankasundari Solar Mini Grid Subproject has expressed an interest for the installation of the solar mini grid with capacity of 100 kWp capacity in Kankasundari Rural Municipality of Jumla district to meet an energy demands of entrepreneurs and households of Ward No. 6 of the Rural Municipality. Therefore, Environmental and Social Safeguard team of the MGEAP has conducted Environmental and Social Screening (ESS) of the proposed subproject as mandated by the Environmental and Social Safeguard Framework (ESMF) of MGEAP. The ESS team assess the environmental and social impacts during the field visit and the subproject is categorized as Low Risk, as not any significant environmental and social impact is envisaged.

The main objective of the ESMP is to ensure that the environment and its surrounding areas are protected and developed to meet the needs of the local people, other stakeholders and safeguard the interests of the common people. It also provides guidance to the ESCO to understand environmental and social issues related to the subproject and their obligation towards safeguarding the environment and social aspects during the execution of the subproject activites and facilitate decision-making process.

The proposed land of approx. 1500 m^2 for the installation of solar modules and construction of powerhouse of subproject is located in the Birat Community Forest and is managed by Community Forest User's Group. The land is of forest land and it is left barren for a long time. Therefore, significant environmental and social issues have not been envisaged during the field observation of proposed solar PV modules installation site, powerhouse construction site, potential load centre and Transmission & Distribution route. However, some of the potential social impacts are (i) there might be disturbance to school due to noise produce during construction activities (ii) occupational health and safety as well as community health & safety during the construction and operation phase of subprojets; (ii) the transmission and distribution lines will pass along the road alignment.

During the consultation with the community people it is found that the semiskilled and unskilled workforce required for the construction of the subproject is available in the local community. The ESCO will give priority to the local people for the employment, ensure a functioning Grievance Redress Committee (GRC) throughtout the subproject lifecycle, and conduct periodic stakeholder consultations to disseminate subproject related information. The ESCO has planned to provide orientation to workers about the national laws and project policies on GBV & sexual exploitation and abuse and sexual harassment (SEA/SH) and other transmission of communicable diseases, labour and working condition etc.

Consultation with community people, entrepreneurs and meeting with the representatives of local government revealed that the electricity demand is high in the proposed area. During the consultation, local people were enthusiastic to have the subproject in their area considering that the subproject will be curial to provide electricity to households as well as enterprises and opening new

prospect of economic opportunity in their locality. Additionally, people have shown their commitment to support the subproject.

As the proposed subproject is leasing the forest land that is managed by Birat Community Forest User Committee and the area of land is less than 1 Ha, it is required to conduct Brief Environmental Study (BES) as mentioned in the Schedule 1 of the *Environmental Protection Rules 2020*. As per the GoN requirement ESCO has prepared the BES and received the approval from RM (Local Government) on 2079/08/14 (30 November 2022) (Annex-4). Furthermore, ESCO has initiated the process of leasing the land from concerned authority. Considering the limited environmental and social impact revealed by E & S Screeing Report, Environmental and Social Management Plan (ESMP) of the solar mini grid subproject has been prepared.

1 Introduction

Alternative Energy Promotion Centre (AEPC) is the apex government body under the Ministry of Energy, Water Resources and Irrigation (MoEWRI), established to promote the use of alternative/renewable energy technology to meet the energy needs in Nepal. The Private Sector-Led Mini-Grid Energy Access Project, supported by the World Bank, has been implemented by AEPC from June 2019. The objective of the program is to increase electricity access and delivery from renewable energy mini-grids (solar, hydro, wind, and hybrid) by mobilizing private Energy Service Companies (ESCOs). The project will deliver financing support to ESCOs to facilitate financial closure and enhance financial viability of the subprojects, provided to ESCOs in the form of loans through participating Banks (PBs), ESCOs to facilitate financial closure and enhance financial viability of the subprojects. The loans will be channelized through commercial class "A" bank of ESCO's choice.

1.1 Background

Jumla District is a part of Karnali Province which lies in mid-western region of Nepal. It covers an area of 2,531 km² and has a population of 119,377 (Census 2078). Chandannath Municipality is the center of Jumla District. It is located at 2,514 meters (8,251 feet) elevation. Kankasundari Rural Municipality is one of the rural municipality out of 8 rural municipalities of Jumla district. Kankasundari Rural Municipality- 6, Jumla district, Karnali Prolvince is the proposed site for Kankasundari Solar Mini Grid subproject, which is approximately 55 km away north from the district headquarter Khalanga, Jumla.

Kankasundari RM is surrounded by Patarasi Rural Municipality on the East and Kalikot district on the West, Mugu district on the North, and Sinja Rural Municipality on the South. Kankasundari has total 8 wards, which are scattered across 225.39 square kilometers of geographical area and the total population of the rural municipality according to 2022 (2078 BS) Nepal census is 13,687 individual. The density of this rural municipality is 58/km2 (150/sq mi).

Sundrops Energy Pvt. Ltd, an ESCO for Kankasundari Solar Mini Grid Subproject has expressed an interest for the installation of solar mini grid of 100 kWp capacity in Kankasundari Rural Municipality, Jumla district to meet the energy demands of entrepreneurs/hotels and households of Ward No. 6 the Rural Municipality. Therefore, Environmental and Social Safeguard team of the MGEAP has conducted Environmental and Social Screening (ESS) of the proposed subproject on November 10 and 11, 2021 as mandated by the Environmental and Social Safeguard Framework (ESMF) for MGEAP. Considering the minimal environmental and social impact and low risk catergorization by E & S Screeing Report, Environmental and Social Management Plan (ESMP) of the solar mini grid subproject has been prepared. ESMF provides the guidance on the level of study required to address the potential environmental and social (E&S) risks and impact, and specifies the process for managing such risks and impacts based on regulatory framework of the Government of Nepal (GoN) and Operational Policies (OPs)[1] of the World Bank.

[1] *This project was originally processed and approved under the World Bank's old safeguard policies, which therefore apply OPs rather than the ESF.*

1.2 Subproject Description

The proposed subproject of Kankasundari Solar Mini Grid subproject is located in Kankasundari Rural Municipality-6 of Jumla district, Karnali province which is approximately 55 km away north from the district headquarter Khalanga. It is located at latitude 29°24'21.92" N and longitude 81°59'56.35"E in east with 45º to 50º land facing towards west south sunshine. There are 8 wards in Kankasundari Rural Municipality and the subproject intends to electrify 295 households (HHs), 23 enterprises and 10 community facilities of Ward No. 6. As there is no national grid power supply, people are using solar home systems and other sources of electricity like ***Jharo*** [2]for lighting purpose. Community facilities such as government buildings, schools, health post as well as small scale enterprises such as saw mill, furniture factory, workshops, and community people are facing trouble due to shortage of reliable and affordable source of energy. The subproject will include installation of solar PV modules, T&D line (5.46 km overhead line) and construction of powerhouse. The access road will not be constructed for this subproject as the existing road will be used.

Salient feature of the subproject is presented in **Table 1**.

Table 1: Salient Feature of Kankasundari Solar Mini Grid Subproject

S.N.	Heading	Particulars	Description
1	ESCO	Name of the ESCO	Sundrops Energy Pvt. Ltd.
2	Category	Subproject Category	Greenfield
3	Subproject	Name of the Subproject	Kankasundari Solar Mini Grid Subproject
		Capacity	100 kWp
		Powerhouse area, m^2	1500 m^2
		Length of Transmission and Distribution line (meter)	Approximately 5.46 km of overhead line
4	Plant Location	GPS Coordinates	Latitude: 29°24'21.92"N Longitude: 81°59'56.35"E
		Altitude	2480 masl
		Province & District	Karnali Province, Jumla
		Rural Municipality/Municipality	Kankasundari RM
		Village	Ward No.6 Lharja Pachaibada – 295 HHs Datheokhar Tole: 65HHs (Dalit: 62HHs) Rokayabada: 35HHs Pachaibada: 17HHs Jachauribada: 55HHs Lharja Tole: 108HHs (Dalit: 80HHs) Goruchaur: 15HHs

[2] *People use this piece of pine wood as the source of light, which is one of the major sources of indoor air pollution and pose fire hazard*

S.N.	Heading	Particulars	Description
		Approximate Distance from Nearest Highway to Subproject Site	Approximately 55 Km away north from the district headquarter Khalanga, Jumla
		Approximate Distance from Nearest Road Head to Subproject Site	Approximately 0.25 Km
5	Households/ Total Beneficiaries	Total No. of Beneficiary Households	295 (Total Population: 1,314 Female: 660 & Male: 654)
		Total No. of Businesses	23
6	Land Profile	Type of Land	GoN
		Ownership of Land	Government and Managed by Forest User Committee
		Current Land Use Pattern	Barren
		Topography and Orientation	Slope and South Facing
7	Land Acquisition	Willing Buy/Willing Sale	N/A
		Leased Land	The process of leasing the land has been initiated and it will be leased before the subproject agreement carried out between AEPC and ESCO

There are 8 wards in Kankasundari Rural Municipality and it intends to electrify 295 HHs and 23 business enterprises of Ward No. 6. Access to reliable and affordable electricity is one of the key constraints for the development of this area. People are using electricity supplied through solar home system for lightning and mobile charging as there is no power supply from National Grid. RM Ward Office, Health post, schools, hotels, small scale enterprises, eateries and community people are facing trouble due to shortage of electricity.

Distribution of Households, Businesses/Anchor:

Total Loads: 328

Total Number of Households: 295

Public Institutions: 10 Nos. (School: 3, Health Centers: 1, Ayurbedic Community Hospital: 1, RM Ward Office: 1, Birthing Center: 1, Dalit Awas: 1, Salt Trading: 1, Shiva Temple: 1)

Total Number of Businesses: 23 Nos.

- Hotels: 15
- Saw Mill: 2
- Metal Workshop: 1
- Bike and Car Workshop: 2
- Grinding Milling: 3

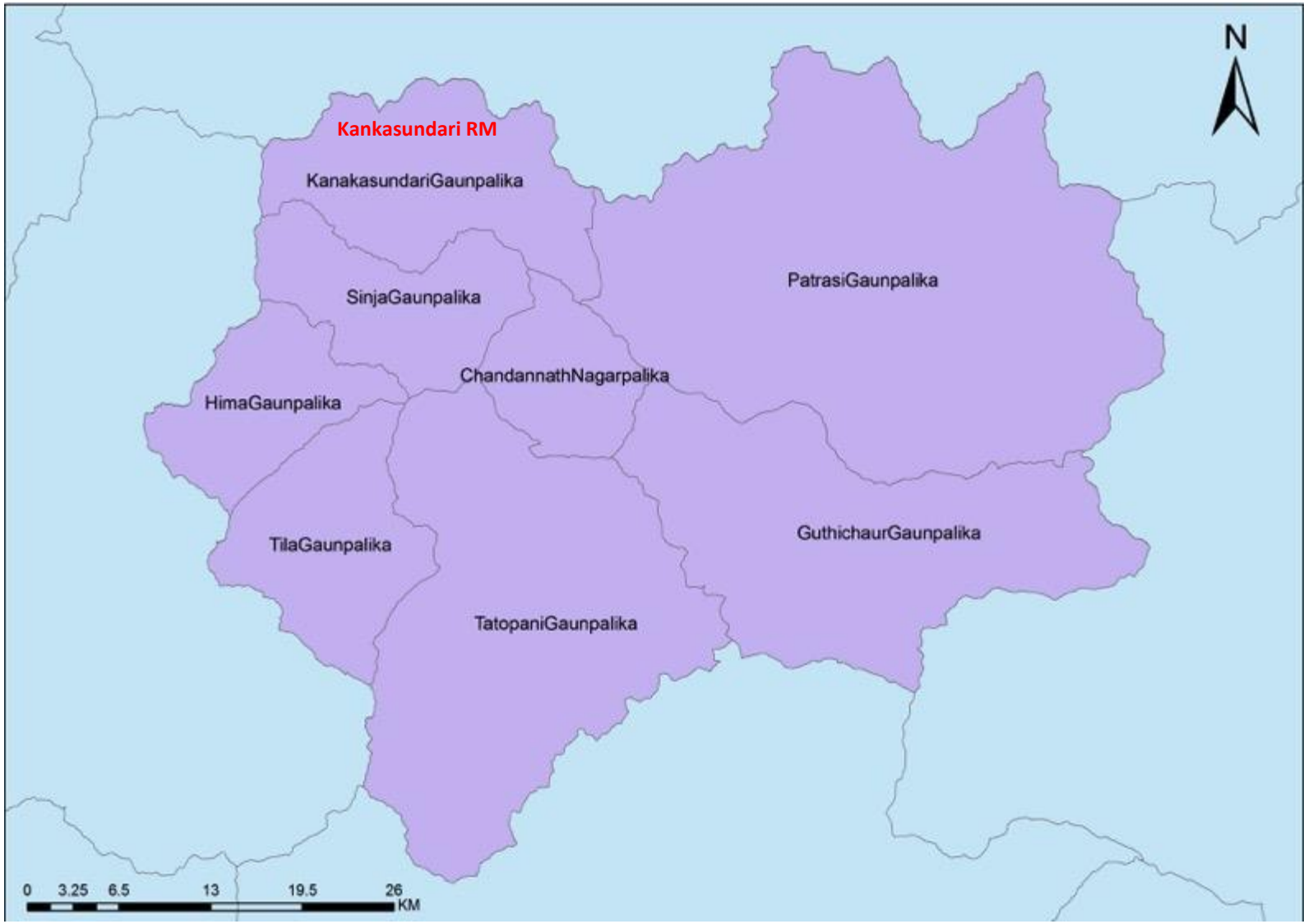

Figure 1: Map showing Kankasundari Rural Municipality in Jumla District

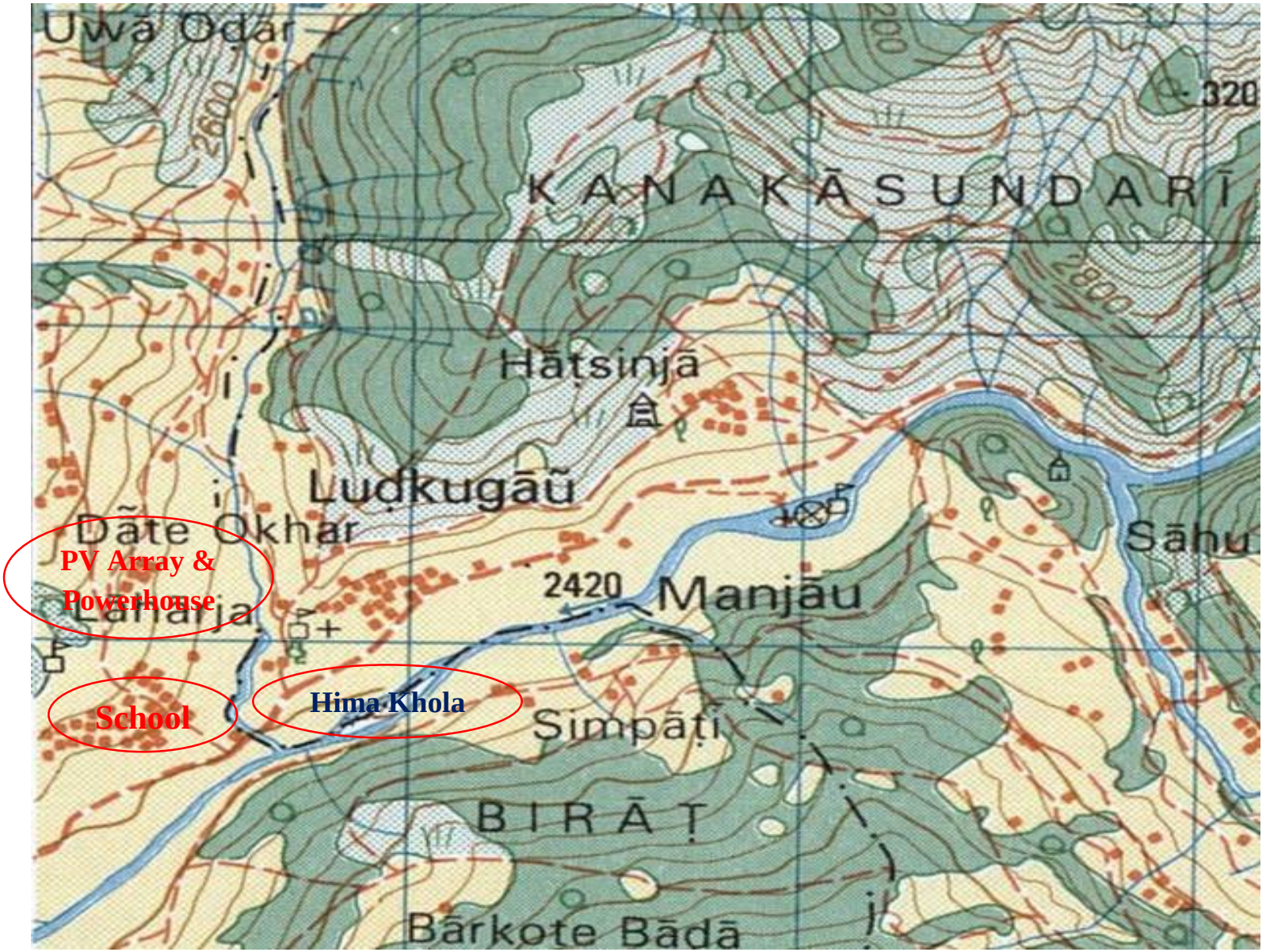

Figure 2: Topographic Map of Kankasundari Solar Mini Grid Subproject

Figure 3: Google Map of the proposed subproject location

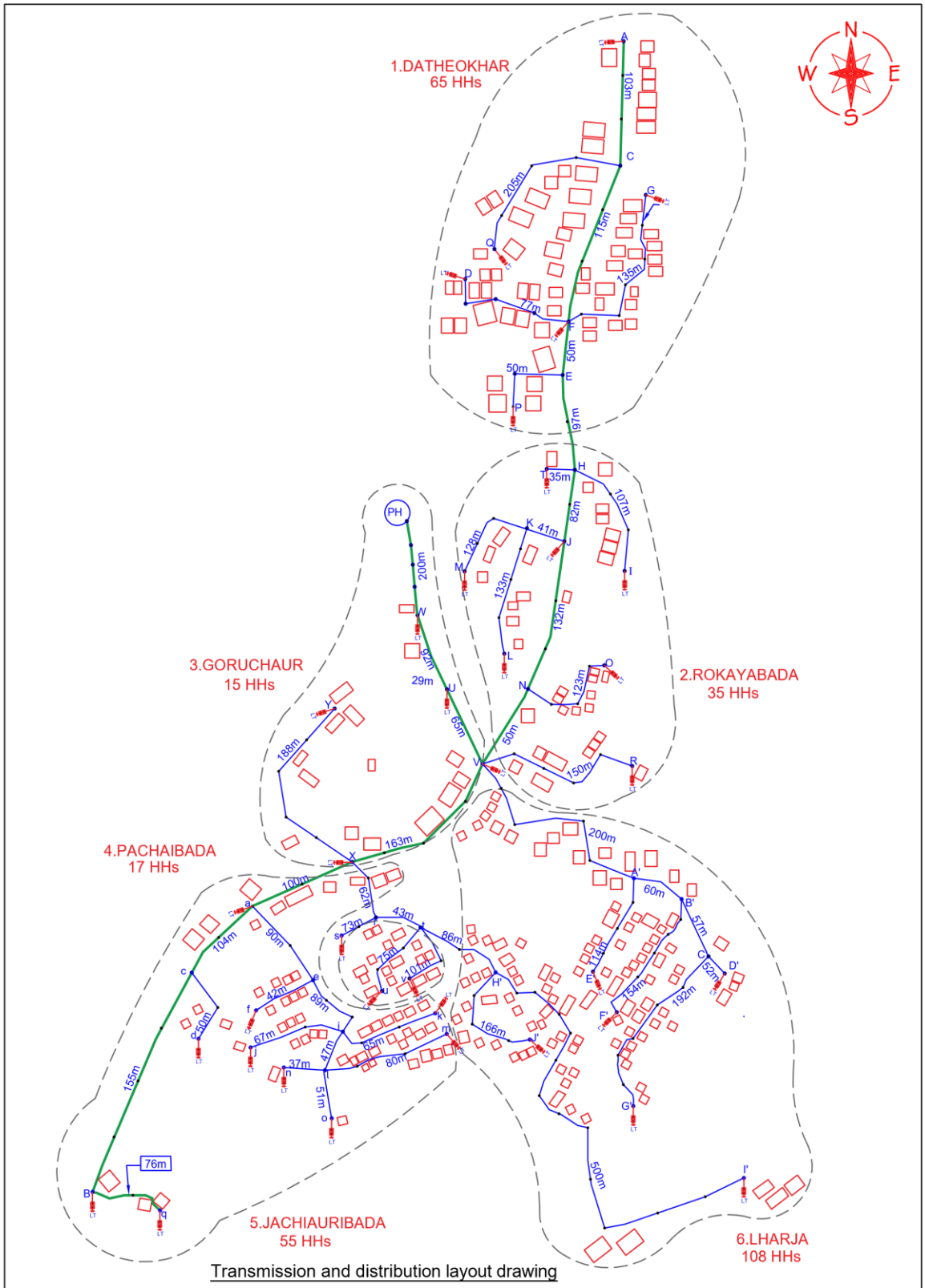

Figure 4: Layout Transmission and Distribution line showing load centre

1.3 Site Preparation and Construction

As the proposed land for PV array installtion and powerhouse construction is flat and slightly slope, site preparation for the installation of PV modules and construction of powerhouse involve only simple land labeling and do not involve major land excavation and cutting and filling work. The subproject requires approximately 1,500 m^2 of land for PV modules installation and powerhouse construction. Since the proposed land for the subproject is GoN land which is managed by the Birat Community Forest, the minute and letter from the Birat Community Forest Users Committee agreening to provide land for the use of Kankasundari SMG is presented in **Annex 1** and a letter from the Birat Community Forest Users Committee is presented in **Annex 2**. The overhead transmission and distribution (T&D) line will be of approx. 5.46 km and will pass through the public land along the roadside. The necessary approval will be taken from the local government to use of the public/GoN land for T&D before the start of construction.

1.4 Subproject Design

A brief description on the design of Kankasundari Solar Mini Grid subproject is provided in **Table 2**.

Table 2: Description on Kankasundari Solar Mini Grid Subproject Design

S.N.	Heading	Particulars	Description
1	Solar Resource Potential, Technology and Capacity	Solar Insolation	5.23 kWh/m^2/day
		Type of PV Module	Monocrystalline
		Capacity of Each Module	545 Wp
		Module Efficiency	21.13%
		Total No. of Modules	184 Nos.
		Total PV Array Capacity	100.28 kWp
		Type of Inverter	PV Inverter
		Capacity of Each Inverter	50 kVA
		Inverter Peak Efficiency	98.6 %
		No. of Inverters	2 Nos.
		Total Inverter Capacity	100 kVA
		Type of Inverter	Battery Inverter
		Capacity of Each Inverter	15 kVA
		Inverter Peak Efficiency	96%
		No. of Inverters	6 Nos.
		Total Inverter Capacity	90 kVA
		Type of Charge Controller	MPPT
		Capacity of Each Controller	4.8 kW
		Charge Controller Peak	99 %

		Efficiency	
		No. of Charge Controllers	5 Nos.
		Total Charge Controller Capacity	24 kW
		Type of Battery	OPzV VRLA Tubular Gel
		Capacity of Each Battery	2V 2000 Ah
		No. of Batteries	96 Nos.
		Total Battery Capacity	384 kWh
2	Transmission and Distribution*	ABC Twisted Cables	
		4 Core 95 mm^2 for 3-Phase 4 Core 50mm^2 for 3-Phase 2 Core 50mm^2 for 1-Phase	1.270 Km 1.690 Km 2.5 Km
		Pole Type & Number 410 SP-13 (8 meter)	 150 Nos.
3	Electricity Generation	Estimated Annual Energy Yield	332,142 kWh
4	Cost Estimate	Estimated Subproject Cost	NRs. 55,000,000/-

There is no national grid power supply and as consultation with local people, there is less possibility of national grid extension in the subproject area in near future. The subproject is designed in a way that the designed system is grid compatible and it can be connected to the grid upon the arrival of grid in the area.

1.5 Workforce Requirement

Approximately 30 human resources will be mobilized during the construction phase which will include 5 skilled, 5 semi-skilled and 20 unskilled human resources. Skilled human resources include Electrical/Electronics Engineer, Civil Overseer and Electrical Overseer. The required human resources will be hired from the local area based on availability and their interest. Those human resources (especially skilled) who are not available locally, will be hired from outside the subproject area. During the operation phase, an operator and support staff will be hired locally based on skill and experience. ESCO after hiring required personnel for the operation phase from local area, ESCO will provide trainings to enhance his/her capacity minimizing the staff turnover rate during operaton phase. ESCO may seek technical support from the AEPC/MGEAP to capacitate human resources.

2 Objective of the ESMP

The ESMF of AEPC/MGEAP has provisioned to conduct Environmental and Social Management Plan (ESMP) for the subproject categorized as ‘low risk’ based on the environmental and social screening. The main objective of preparing ESMP is to ensure that the environment and its surrouniding areas are protected and developed to meet the needs of the local people, other stakeholders and safeguard the interests of the common people. It also provides guidance to the ESCO to understand environmental and social issues related to the subproject and their obligation

towards safeguarding the environment and social aspects druing the execution of the subproject activites and facilitate decision-making process. Other specific objectives of ESMP are:

- To identify, predict and assess potential adverse and beneficial environmental and social impacts from the subproject implementation.
- To define the roles and responsibilities of all stakeholders associated with environmental and social management of the subproject.
- To identify and describe the measures for avoidance, minimization and mitigation of identified impacts/risks and cost associated with such measures.
- To define environmental and social management mechanism to ensure the implementation of measures for avoidance, minimization and mitigation of identified impacts/risks.
- To establish a monitoring and reporting mechanism in line with the provision in the ESMF of MGEAP.
- To have periodic stakehokder consultations with affected people, community and other relevant stakeholders and to establish the subproject based Grievance Redress Mechanism.
- To prepare and implement various mitigation plans such as Emergency Preparedness and Response Plan, Occupational Health and Safety Plan, Transport Management Plan, Labor Management Plan etc.

3 Methodology for the Preparation of ESMP

The safeguard team comprised of Senior Environmental Safeguard Expert and Social Safeguard Expert of AEPC/MGEAP visited the proposed site of Kankasundari Solar Mini Grid subproject for Environmental and Social screening and categorization of the subproject. The team utilised screening checklist annexed in the ESMF for information collection and categorized the subproject as 'low risk' based on the identified impacts/risks. Moreover, community people were informally consulted[3] (had informal interviews while walking around and been in eateries in subproject area) to get their individual opinion and information on the proposed subproject.

Therefore, this ESMP report is prepared based on the screening report, field visit observation, and desk review of available resources, consultation with local people and other relevant stakeholders.

[3] Consultation with local people while walking around and been in eateries in subproject area to collect information.

4 Environmental and Social Baseline Assessment

4.1 Physical Environment

4.1.1 Topography

Jumla district is a Himalyan mountain region of which elevations ranges from 915 m to 4679 m. The district is surrounded by Dolpa in the east, Kalikot in the west, Mugu in the North and Jajarkot in the South. The total area of district is 2531 sq km and the district headquarter is Khalanga.

The proposed site for the installation of PV modules and the construction of powerhouse/control room lies in Himalayan mountation region at an altitude of 2460 metres above sea level (masl). Most of the proposed subproject area lies in moderate sloppy area with slope terrain. Not any sign of landslide and other instability was found during the site visit. The land is a slop land facing south.

4.1.2 Geology and Soil Type

The proposed subproject area lies within the higher Himalayan zone of the Mid-Western Region. The lithology of this zone comprises mainly of medium to low grade metamorphic rocks like phyllite, quartzite, schist which are typically fine to coarse grained Gneiss with frequent marble beds. The dominant rock types present in the subproject area include sedimentary and metamorphic rock consisting of shale, mudstone and limestone. The major soil types of the subproject area are alluvial and colluvial soil. Alluvial soil is dark grey and consist of gravel of about 40 to 50%, sand of about 20 to 30% and fines about 5 to 15%.A fine is noncohesive and micaceous. Colluvial soil is light grey to dark grey and light brown to dark brown in colour and often consist boulders of about 70 to 80 % and gravel comprised of about 20 to 30 %.Shape of coarse material is angular to irregular. The fines of colluvial deposit are low plastic in nature.

4.1.3 Climate and Rainfall

The climate of the subproject area varies from sub-tropical to alpine. The area experiences strong seasonal climatic variations, with wet monsoons from June to September and dry weather from October to May. January is the coldest month in Jumla with an average high-tmperature of 3.3°C and an average low-temperature of -6°C. The annual average rainfall (2014) was found to be 757.0 mm (DHM 2017).

4.1.4 Air Quality

The proposed site is located away from the residential area and it is in community forest. Not any activities that might pollute air of the area are observed. Moreover, not any activities such as construction work or development project is going on in or nearby vicinity of the proposed land. Therefore, the quality of air observed during field visits can be considered to be good and within the acceptable range.

4.1.5 Water Quality

The nearest river is the Hima River which is approximately 1000 m away from the proposed site. The source of drinking water, Dhyam Khanepani is approximately 4000 m away from the subproject site. As there is not any activities which may pollute water in the river, the quality of water can be considered as good.

4.1.6 Noise Quality

The proposed site being in remote area with minimum or insignificant vehicular movement. Hence, no any major sources of noise pollution are observed during field survey.

4.1.7 Soil Erosion and Land Stability

There was not any evidence of landslide in the subproject area during the field visit. The proposed site and load centre areas are stable.

4.1.9 Approach Road

The proposed site is reachable via existing seasonal motorable earthern road of two lanes upto the subproject sites. Thus, it will be planned to transport required construction materials, solar PV modules and other equipment during dry season to facilitate the uninterrupted subproject execution.

4.2 Biological Environment

4.2.1 Vegetation and Forest Resources

The proposed subproject area is located in sub-tropical climate zone, therefore it has a wide range of flora and fauna. The proposed site is located at Birat Community forest which is shown in **Figure 3.** The transmission and distribution line will not be along forest area, which will be constructed along road side. The major vegetation compositions of the forest are Chiuri(*Bassia butyracea*), Khanayo (*Ficus semicordata*), Bainsh (*Salix tetrasperma*), Sindure (*Buddleia paniculata*), Gunde, Rani Khirro (*Sepium insigne*), Khayer (*Acacia catechu*) , Sal (*Shorea robusta*) Khasru (*Quercus semecarpifolia*), Ipil Ipil (*Leucaena species*), Banjh (*Quercus leucotricophora*), Bamboo (*Dendrocalmus strictus*), Dudhilo (*Ficus nerifolia*), Dhaturo, Bhimal, Kapur (*Cinnamomum camphora*), Bhorle, Chutro (*Berberis aristata*), Chutro (*Berberis spp*.), Aiselu (*Rubus ellipticus*), Teetepati (*Artemisia vulgaris*), Siundi (*Euphorbia royleana*), Aankh (*Calatropha giganteum*), Sajiwan (*Jatropha curcas Linn*.), Areri (*Acacia Pennata*), Asuro (*Adhatoda vasica*), Khar (*Themada triandra*), and Dubo (*Cynodon dactylon*). Among the plant species present in the forest area, only Simal (*Bombax ceiba*), Khayer (*Acacia catechu*) and Sal (*Shorea robusta*) are the protected plant species. People around the subproject area depends on the forest resources for firewood collection, fodder, timber, grazing etc.

4.2.2 Fauna (Mammalian and Avian) and Fish Species

Information on mammalian and avian fauna in the subproject area were collected through field observation and consultation with local peoples. None of the faunal species were sighted during field survey and it is always not possible to detect the presence of wildlife and record their activity in their natural environment in a limited time frame, so equal preference was given to the mentioning by local people. List of mammalian and avian fauna reported around the subproject region are presented in **Table 3**. The major river in the Subproject is the Hima River, which is rich in fish diversity. The major species found are katle (*Catla catla*), Asla (*Schizothroax plagiostomus*) and Tite (*Psilorrhynus psedochensis*). During consultation it was found that local people from subproject area are not engaged in fishing profession.

Table 3: List of Mammalian and Avian Fauna

S.N.	Local name	Scientific name	Abundance	Conservation Status
Mammalian Fauna				
1.	Common Chituwa	*Panthera pardus*	Protected	CITES II
2.	Assamese monkey	*Macaca assamensis*	Protected	CITES II
3.	Clouded leopard	*Neofelis nebulosa*	Protected	CITES I
4.	Hanuman langur	*Semnopithecus entellus*		CITES I
5.	Jackal	*Canis aureus*		CITES III
6.	Blue Rock Pigeon	*Columba livia*		CITES III
7.	Indian Fox	*Vulpes bengalensis*		CITES III

The most available bird in the forest are Jungle fowl (*Gallus gallus*). Crow (*Corvus splendens*), Parakeet *(Psittacula kramen*), Cuckoo (*Cuculus mocropterus*), Lampuchhre, Ranichara, Bhyakkur, Nyauli, Kalij, Dhukur (*Streptopalia spp*.), Red vented Bulbul (*Pycnonotus cafer*) and Indian Treepie (*Dendrocutte vagubundra*), Kukhurke (*Magalaima spp*.) are also found in the subproject area.

4.3 Socio-economic and Cultural Environment

Sundrop Energy Pvt. Ltd, an ESCO for Kankasundari Solar Mini Grid Subproject has expressed an interest for the installation of solar mini grid of 100 kWp capacity in Kankasundari Rural Municipality, Jumla district to meet the energy demands of entrepreneurs/hotels and households of Ward No. 6 of the Rural Municipality.

Agriculture (including livestock) is the major economic activity of the subproject area, though the agricultural and cultivable land is limited to 15% of the total land aviable in the rural municipality (https://kankasundarimun.gov.np/content). Most of the male youths go to India or other parts of Nepal or overseas for work. The crops that they (people of Ward No. 6) produce from their agriculture land is only sufficient for 3-6 month. Marshi Rice, Maize, apple, walnuts, beans and herbal products are some of crops majorly grown in subproject located Ward.

4.3.1 Demography

According to 2078 Census of Central Bureau of Statistics (CBS) and Kankasundari RM's Website (https://kankasundarimun.gov.np), total population & Households (HHs) of Jumla district, Kankasundari RM and Ward No. 6 of Kankasundari RM is presented in table below;

Table 4: Total Population and Households

District, RM & Ward	Total HHs	Male	Female	Total Population	Total Population (CBS 2011)
Jumla District	22,400	58,513	59,480	118,393	107,695
Kankasundari RM	2,733	6,807	6,880	13,687	13,216
Ward No. 6	295	654	660	1,314	1,344

(Source: https://kankasundarimun.gov.np and CBS 2078)

The subproject Ward No. 6 covers only 1.10% population of Jumla district and 9.6 % population of Kankasundari RM.

4.3.2 Caste Ethnicity

The subproject site for installation of solar modules and construction of powerhouse/control room is located in Ward No. 6 of Kankasundari RM, Jumla district, with an altitude 2460 meter above sea level. Kankasundari Rural Municipality was inhabitted by mostly the people of Chhetri caste. People of several other castes who live in Kankasundari are Brahmin - Hill, Kami, Sarki, Thakuri, Damai/Dholi, Lohar, Gharti/Bhujel, Dalit[4] Others, etc. As per census 2011, the top five castes of people in Kankasundari Rural Municipality are Chhetri 63.33% (8,370), Brahmin - Hill 12.73% (1,682), Kami 7.30% (965), Sarki 5.34% (706) and Thakuri 4.54% (600) with total population of 12,323. However, cast and ethnic composition of Ward No. 6 is 70% Dalit, 20% Chhetri and 10% Bhramin.

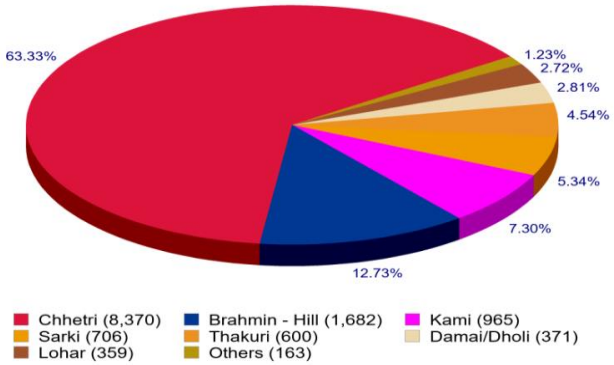

Figure 5: Population by Caste of Kankasundari RM

Source: Census 2011

The nearest settlement from the subproject site is Laharja Village and is approximately 100 m away east from the site. It has 90 households. The subproject area hosts the mixed settlement of Dalits and Brahmin/Chhetri. Like other community of subproject areas, dalit community also depends on agriculture, livestock and migration labourer for their living and literacy rate among dalit community in subproject area is found relatively less than other castes. Indigenous people do not resides in the subproject area.

4.3.3 Land Use and Ownership

The proposed land to install solar PV modules and construct powerhouse is barren and is managed by Birat Community Forest User Committee. The community forest User's Committee agreed to facilitate ESCO during the process of taking the land on lease for the purpose of energy generation by the Solar Mini Grid.The proposed land is not used as a way to access commoner property as well. For the transmission and distribution line road side land will be used. As the road side land is public, the approval from local authority will be taken for the use of road side land before the

[4] *Those communities who, by virtue of atrocities of caste-based discrimination and untouchability, are most backward in social, economic, educational, political and religious fields*

commencement of T & D related works. However, the ESCO has conduct a Brief Environmental Study as per the requirement of the GoN and after receiving BES approval from RM (Annex-4), the process of leasing the land from GoN has been initiated. As the land is left barren for a long time and has no use, the proposed land to be used by the subproject will not have any significant impact.

Approximately 1,500 m^2 land will be used for the subproject, for PV modules installation and for powerhouse construction. Hence, the construction of the solar mini grid subproject will not impact the existing land use.

Figure 6: Land for the PV Modules installation and construction of powerhouse

4.3.4 Physical Resources in the Subproject Area

The presence of local infrastructures like school, roads, communication, irrigation canals, temples, and health post are found in the nearest settlements of the subproject area. In the field visit it is found that people of local community are found happy with the proposed Kankasundari Solar Mini Grid in the hope that the electricity generated from Mini Grid will support the community to participate in economic activities, especially to run hotels and retail shops as the subproject area is located on the way to the popular touristic destination of the country, Rara Lake. People have plans to establish businesses such as fruit processing factories, furniture, grinding mills, hotels etc.

4.3.5 Cultural Resources in the Subproject Area

People of heterogeneous culture are the beneficiaries of the subproject and they celebrate most of the festivals celebrated in Nepal. The people who resides in the subproject area follow the Hindu Religion and celebrates major Hindu festivals such as Dashain, Tihar, Janaipurnima, and Maghe Sakranti. The Kankasundari RM is well known as the origin of Khas (Nepali) language and has historical/cultural importance. The popular Birat Palace, Paandav Gufa, Kanka Sundari temple are in the RM. However, the subproject activities would not affect such religious and cultural events. Furthermore, the land used for the subproject is not used for the any type of religious and customary practices by the community people of subproject area.

5 Relevant Policies, Legislations, Guidelines and Standards

The Government of Nepal (GoN) has a well-established legal framework for environmental assessment of development projects. The most relevant national policies, acts and guidelines of the GoN concerning environmental management, which are relevant to the proposed project, are listed as follows. A comparison among GoN and World Bank policies and gaps in policies are presented in **Annex 4**.

The Constitution

- The Constitution of Nepal

Plans and Policies

- Fifteenth Plan
- Rural Energy Policy, 2006
- Renewable Energy Subsidy Policy, 2022

Acts and Rules

- Environment Protection Act, 2019 and Environment Protection Rules, 2020
- Local Government Operation Act, 2074 (2017)
- Solid Waste Management Act, 2011
- Child Labor (Prohibition and Regulation) Act, 2000
- Labor Act, 2074 (2017)
- National Foundation for Upliftment of Aadibasi/Janjati Act, 2002

Guidelines/Frameworks

- National Environmental Impact Assessment Guidelines, 1993
- Environment and Social Management Framework (ESMF), 2018

Standards

- National Ambient Air Quality Standards, 2003
- Nepal Vehicle Mass Emission Standards, 1999
- National Ambient Sound Quality Standard, 2012

International Polices and Conventions

- World Bank Safeguard Policy (OP 4.01 Environment Assessment)
- Convention on Biodiversity (CBD), 1993
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973
- Convention (No.169) Concerning Indigenous and Tribal Peoples in Independent Countries, 1989

6 Assessment of Environmental and Social Impacts and Mitigation Measures

6.1 Construction Phase

6.1.1 Land Use and Land Take

The proposed land to install solar PV modules and construct powerhouse is barren and is managed by Birat Community Forest. The land is left barren and the community people do no use it for any specific purpose. Approximately 1500 m^2 proposed land will be used for the installation of solar PV modules and construction of powerhouse/control room. The proposed land is not used as a way to access commoner property as well. For the transmission and distribution line road side land will be used. Approval will be taken from the local government to use the land for T&D. In addition, approximately 5.46 Km of overhead Transmission and Distribution (T&D) line will be constructed to electrify the households of Ward No. 6 of Kankasundari Rural Municipality with 11kV/400-230V. In total approx. 1,500 m^2 will be used by the subproject which is in the process of taking approval in long term leased. The management of Birat Community Forest User Committe has provided their written commitment agreeing to provide land for the use of Kankasundari SMG (Annex-1). Hence, land use as an impact is considered to be moderate in magnitude, site specific and long term in duration.

6.1.2 Air Quality

Subproject activities does not involve significant air pollution sources. Heavy equipment will not be required for construction purpose. The construction works are expected to be completed in 2-3 months from commencement. Air pollution is likely to cause due to;

- Earthworks such as levelling, grading, excavation works and movement of vehicles in earthen roads, especially during windy conditions
- Cement dust in construction sites

Air pollution will be limited to the construction area and are expected to be generated in small concentration and dispersed rapidly within the area. Therefore the effects are localized and temporary which implies that any deterioration in air quality at subproject location is unlikely to be significant and is expected to be transient. Air pollution is envisaged to be low in magnitude, site specific and short term in duration.

Specific Mitigations

- Regular water spraying in stored spoils and excavated areas
- Provide PPE such as breathing masks, safety goggles and face shield
- Regular maintenance of equipment used for construction
- Regular monitoring of air quality at the worksite and nearby community
- Cover the stockpile to prevent dust and run off

6.1.3 Water Quality

The Hima River is about 1000 m distance from subproject site so the river water will not get affected by construction activities. It is expected that contamination of drinking water sources is unlikely as there are no drinking water sources in close vicinity of subproject construction site. The major water source in the subproject site is Dhayam Khanepani which is approximately 4000 m

away from the proposed site. Impacts on water quality is not envisaged nevertheless following site specific mitigation measures will be adopted to ensure no impacts on adjacent water body.

Specific Mitigation

- Construction of sanitary toilet at the construction site
- Wastewater discharge in septic tank
- Install temporary drainage works (channels and bunds) in areas required for sediment and erosion control and around storage areas for construction materials.
- Hazardous material storage sites shall be covered and runoff from refuelling and work sites shall be treated before being disposed off.
- Install temporary sediment basins, where appropriate, to capture sediment-laden run-off from site.
- Stockpile materials away from drainage lines
- Prevent entering all solid and liquid wastes in the river by installing fence, sedimentation point and carrying out other measures

6.1.4 Noise Quality

Earthworks and excavation (for land lebelling), material haulage, backfilling and installation of PV modules, and other equipment as well as powerhouse construction are noise producing activities in the construction site. However, the settlement at the subproject site is sparsely distributed. Hence, noise from the subproject construction activities does not significantly impact surrounding population. Noise impact is considered to be direct, reversible, low magnitude, site specific and short term in duration.

Specific Mitigations

- Construction activities will be restricted to day time only
- Workers will be provided with hearing protection devices such as ear muffs and ear plugs, if required
- Regular maintenance of equipment used for construction
- Regular monitoiring of noise level at the worksite and nearby community

6.1.5 Waste Management

Non-hazardous waste generated during construction includes warpping paper, wood, cement bags, plastic, styroform used for protection of equipment and mud, whereas batteries (after used period about 15 years), scrap metals, sharp objects broken glass, absorbent material, etc. are some hazardous waste that might be generated during construction. Improper management of such wastes will cause soil pollution, water pollution, visual impacts, impacts on health and safety of workers as well as general public. Considering the size of the subproject and quantity of waste generated, the magnitude of impact is considered to be low, extent is site specific and the duration is short term.

Domestic waste will be generated by the people who will be directly and indirectly involved in the subproject construction. The amount of waste generated will depend upon the number of people working in the subproject and more importantly, the number of people who temporarily migrate to the subproject area during construction, including construction crew, members of their family, and people who supply goods and services to the workers. However, the predicted impact is considered to be low in magnitude, site specific and short term in magnitude.

Specific Mitigation

- Used cement bags, plastic, empty containers will be stored at designated places and sold in market to scavengers
- Bio-degradable and food waste will be buried in pit for composting or used as feed material for livestock
- Prepare and implement Waste Management Plan

6.1.6 Muck and Spoil Disposal

Spoil will be generated by the construction work such as digging, quarrying, and excavation in very small quantity. Thus, generated muck/spoil will be used for the backfilling purpose. If there is improper disposal of spoil material, it may cause destruction of productive land. The muck generated from construction activities are soil mixed with boulders, soft soil, etc. The magnitude of impact is low, extent is site specific, and duration is short term.

Specific Mitigation

- Reuse of muck for land labelling purpose
- Spoil disposal site should be identified by the contractor and submit the disposal plan for AEPC/ESCO approval.
- Adequate compaction of spoils at disposal site
- Landscaping of the disposal site after completion of works to be approved by AEPC/ESCO.

6.1.7 Stockpiling of Construction Materials

Construction materials will be procured from local vendoers having license from the GoN and need to be stockpiled before their application at the site. If large amounts of construction materials such as earthen materials, gravel, aggregates, sand etc. are stored for a long period near the construction site, they may become the source of escaping dust pollution and also the adjacent land may get damaged. Stockpiling of the construction material will have direct, site-specific and short-term impact.

Specific Mitigation

- Less productive land (eg barren land) will be used for stockpiling of construction materials
- The roof of storage house shall be covered with Corrugated Galvanized Iron (CGI) sheet and truss roof

6.1.8 Impacts on Flora, Fauna and Aquatic Life

The proposed area lies in Birat Community forest. But the subproject installation site is barren land. So, there will not be any trees cutting due to subproject installation. Moreover, the overhead T&D line of approx. 5.46 km will pass through the public land along the roadside. The necessary approval will be taken from the local government to use of the public/GoN land for T&D before the start of construction. There will not be any tree cutting for subproject installation and T&D line.Construction noise, dust and likely hunting by the construction workers may create temporal adverse impacts on fauna in the area but there are more suitable habitats around the subproject site as the subproject site is barren land.

Since, the Hima River does not flow adjacent to the subproject site, impact on fish and other aquatic creatures are expected out of direct subproject activities. However, illegal fishing practices by the construction workers during their leisure period in the River may pose threat to aquatic life.

Specific mitigation

- Construction work will be schedule at day time only
- Prohibition of hunting and poaching of wild species
- Awareness program about importance of wild flora and fauna
- Prohibition of cutting of protected tree species
- Tree cutting should be avoided to the extent possible.
- Proposed tree cutting by the contractor should be reviewed and approved by AEPC/ESCO.
- All the approvals/permits should be obtained for tree cutting
- Proper consultation should be carried out and consent from the relevant community should be given regarding the potential impacts on community forest around the subproject area.
- Pre-construction survey should be conducted to ensure potential impacts on fauna and flora and proper mitigation measures are planned.
- Compensatory plantation will be carried out at the rate of 5 new trees for each tree cut. The plantation site should be identified by the contractor and approved by AEPC/ESCO.

6.1.9 Occupational Health and Safety

The construction work involves activities that can lead to accident causing injuries and even fatalities. The workers may be exposed to health and safety risks posed by haphazardly disposed sharps, chemicals, pollution etc. Health and safety impact are considered to be direct, low to high magnitude, site-specific and short term to long term in duration.

Specific Mitigation:

- Provide adequate PPE such as hard hat, googles, safety belt, safety boot, gloves, ear plugs
- Provide training on safety health and safety hazards associated with construction and suggested prevention measures
- Conduct a regular toolbox talk
- Provide First Aid Box and drinking water for workers
- Record and report accidents including near miss, lost time injuries and fatality
- ESCO shall implement OHS plan strictly
- ESCO shall prepare an Emergency response plan defining possible risks, emergency handling procedures, responsible persons, emergency contacts etc and placed in active construction area

An Emergency Response Plan defining possible risks, emergency handling procedures, responsible persons, emergency contacts etc. shall be prepared by the ESCO and placed in active construction areas.

6.1.10 Community Health and Safety

The presence of work force in the subproject site may affect the health and sanitation situation of community. There may also be the problems of sewage disposal. Sanitation problems due to open defecation may arise which may lead to contamination of water. Such contamination may lead to outbreak of the communicable diseases. Gathering and contacting local people may lead to

transmission of infectious/communicable diseases. If proper sanitary conditions are not maintained in the construction site, it may create pool of waters and pile of waste which will attract vermin and vector diseases. Such vectors and new diseases may spread to local population, who are not immune to such diseases. Increased movements of people (from or to outside) may introduce new diseases to the area (particularly, communicable diseases like Tuberculosis, cholera, COVID-19). Moreover, spread of COVID-19, HIV/AIDS, STDs and SEA/SH are of major concern with influx of migrant labor in the subproject area. Hence, the envisaged impact is considered to be moderate, local in extent and short term duration.

Specific Mitigations

- The subproject/ESCO will conduct awareness programme for the labourers and other staff as well as community people about the potential diseases that may spread in subproject area SEA/SH related to community and subproject related works force.
- Health and Safety Plan will be developed to provide guidance to ESCO on minimizing and managing the risk of spread of transmissible diseases at the construction sites.
- Code of Conduct regarding to SEA/SH will be developed and implemented
- Standard Operating Procedure (SOP) will be prepared and implemented.

6.1.11 Labor Influx

ESCO will execute all the construction works in environmentally and socially friendly manner without undermining the issues and mitigation measures identified and mentioned in the ESMP. Human resources (skilled, semiskilled & unskilled) available in the subproject area will be given priority for the construction of the subproject as labor force. The ESCO should make camp for construction labors and maintain the sanitary condition of the construction site. Thus, the ESCO should take into consideration for the construction of toilets for male and female workers separately and biodegradable wastes generated by workers should be managed only in suggested disposal sites. There will be around 30 numbers of labors (skilled, semiskilled & unskilled) employed for the construction of the subproject. Out of 30 around, 10 workers (5 skilled and 5 semiskilled) will be hired from nearby the subproject area. Increased movements of people (from or to outside) may introduce new diseases to the area (particularly, communicable diseases like COVID-19, Tuberculosis, cholera etc). Spread of COVID-19, HIV/AIDS, STDs and GBV are of major concern with influx of migrant labor in the subproject area. As labours hired from outside will remain in the subproject area for a very short period (around 2-3 months). Labor influx as an impact is considered to be direct, low in magnitude, local in extent and short term in duration.

6.2 Operation Phase

6.2.1 Air Quality

The operation of proposed subproject will not cause degradation of air quality of the surrounding area.

6.2.2 Noise Quality

During operation phase, the subproject will not cause any noise pollution.

6.2.3 Waste management

Solar PV modules have a product warranty of 10 years and power output warrantee of 25 years therefore they will not produce waste for a considerable period of time unless they are physically damaged. The main waste that will be produced during operation is domestic waste. The other types of waste produed during construction are Cardboards, Wooden boxes, Cement bags, Plastic products, Metal scarps, Glasses, Nails, Sharp materials and Rubbers. Waste as an impact is considered as low in magnitude, site specific and long term in duration.For the waste battery and other solar equipment which may be generated during operation phase, Battery management Plan and Waste Management Plan are prepared and presented in **Annex 10** and **Annex 11** respectively.

6.2.4 Light Reflection

The panel of solar PV are designed to maximize absorption and minimize reflection to increase electricity production efficiency. To limit reflection, solar PV panels are constructed of dark, light-absorbing materials and covered with an anti-reflective coating. The light reflecting percentage of solar PV is as little as 1% of the incoming sunlight. Thus, there will not be reflection of light from solar panels. So, no mitigation measure is required during operation phase.

6.2.5 Occupational and Community Health and Safety

Solar mini-grids can be related to a range of health and safety hazards if necessary precautions to be taken are overlooked such as emergency fire hazard, electrocution of workers and public due to faulty electrical equipment, electric short circuits and exposed electrical wires may be the chief sources of electrocution. Damaged PV modules with exposed high voltage conductor also present high risk of electrocution. Glare effect caused due to reflection of incident solar beams on the reflective surface of the laid PV modules can pose threat to safety to nearby residents and pedestrians. Health and safety impact can be considered as direct low to high magnitude, site-specific and short term to long term in duration.

<u>Specific Mitigations</u>

1. Installation of appropriate number of Earthing as per requirement
2. Installation of appropriate number of Lightning Protection System as per requirement

6.2.6 Labor Influx

After testing and commissioning of subproject, ESCO is liable to operate the subproject for at least 10 years. During the operation phase only few human resources like operator and few support staff may needed for the subproject and these labour force will be mobilised from the people of subproject based on availability and their interest. So, it can be said that there will be no major labour influx in the subproject area during operation phase and ESCO is responsible to adhere all environmental and social safeguard measures specified in ESMP during the operational phase. All the relevant local stakeholders will also ensure the effectiveness of environmental and social measures to be implemented by ESCO for the subproject. Therefore, not any labor influx impact is anticipated during operation phase.

6.3 Benefit Sharing Mechanism

For the benefit sharing of the subproject, an inclusive committee will be formed in consultation with community people of subproject area to ensure the Benefit Sharing Activities and implementation for the community as part of social responsibility of ESCO. The committee will have at least five members with 33% representation from women and social excluded group. ESCO will prepare an action plan for sharing the benefits with local communities both in monetary and non-monetary terms during the construction and operation periods. Committee will be responsible in benefit sharing management and governance. An agreement will be made wherein a fair and equitable sharing of benefits arising from the use of genetic resources for this subproject will be laid out. The ESCO has proposed the Environmental Enhancement, Community Development & Local Infrastructure, Educational & Health Support and Livelihood (Employment & Training) activities as a part of corporate social responsibility and benefit sharing during the construction and operational phases of the subproject.

7 Environmental and Social Mitigation Plan

Table 5: Environmental and Social Mitigation Plan

S No.	Issues	Impacts	Mitigation Measures	Location	Time of Action	Estimated Cost	Responsibility
A. Construction Phase							
1.	Land Use and Land Take	In total approx. 1,500m^2 (2 ropanies) public land will be used by the subproject, which will be leased by the ESCO	The land will be leased in long term from the concerned authority before the subproject agreement done between AEPC and ESCO. The minutes and letter from the Birat Community Forest Users Committee agreening to provide land for the use of Kankasundari SMG is presented in **Annex 1** and a letter from the Birat Community Forest Users Committee is presented in **Annex 2**.	Construction Site	Construction and Operational	As provisioned in POM, cost related to land will be excluded from subproject cost	ESCO/contractor
2.	Air Quality	Construction activities such as levelling, grading, excavation works, and site clearance will generate dust Gaseous emission from movement of vehicles will decrease air quality of the surrounding area	Water spraying in heaps of temporarily stored spoils and in active excavated areas Construction workers will be provided with adequate personal protection equipment (PPE) such as breathing masks and safety goggles to protect them from exposure to dust and other pollutants Vehicles and machines used for construction shall be maintained regularly	Construction Site	Construction	100,000/-	ESCO/contractor
3.	Water Quality	Contamination of surface water is expected due to accidental spillage of spoils and construction materials such as cement slurries in nearby water sources Construction workers can practice open urination and defecation which may lead	Construction workers will be strictly instructed to avoid open urination and defecation, sanitary toilets will be provided in the construction area Spoils and construction materials will be stored at least 50m away from the water sources to avoid the contamination by spillage Hazardous material storage sites shall be	Construction Site	Construction	NA	ESCO/contractor

S No.	Issues	Impacts	Mitigation Measures	Location	Time of Action	Estimated Cost	Responsibility
		to pollution of water sources.	covered and runoff from refuelling and work sites shall be treated before being disposed of. Install temporary sediment basins, where appropriate, to capture sediment –laden run-off from site Install temporary drainage works (channels and bunds) in areas required for sediment and erosion control and around storage areas for construction materials. Stockpile materials away from drainage lines Prevent all solid and liquid wastes entering waterways				
4.	Noise Quality	Noise will be generated during earthworks and excavation Construction workers will be in direct exposure to the generated noise and continuous exposure to high dB noise can impair their hearing and psychological health	Construction activities will be restricted to daytime only Construction workers will be provided with appropriate and adequate hearing protection devices such as ear muffs and ear plugs. Maintenance of all vehicles and construction machinery	Construction Site	Construction	25,000/-	ESCO/contractor
5.	Waste Management	Improper management of construction and domestic wastes will cause soil pollution, water pollution, visual impacts, impacts on health and safety of workers and general public.	Construction wastes will be stored out and kept separates instead of throwing haphazardly Domestic wastes will be managed by burying in pit Recycling and reuse mechanism will be applied for minimization of waste volume	Construction Site	Construction	25,000/-	ESCO/contractor
6.	Muck and Spoil Disposal	Spoil will be generated by the construction work such	Reuse of spoil in construction activities such as filling materials and construction	Construction Site	Construction	25,000/-	ESCO/contractor

S No.	Issues	Impacts	Mitigation Measures	Location	Time of Action	Estimated Cost	Responsibility
		as digging, quarrying, slope cutting, excavation. Improper disposal of spoil materials, may cause destruction of productive land and vegetation	aggregates Spoil disposal site should be identified by the contractor and submit the disposal plan for AEPC/ESCO approval. Transport and disposal of spoils at designated disposal sites identified Proper dumping and adequate compaction of spoils at disposal site Landscaping of the disposal site after completion of works to be approved by AEPC/ESCO Re-vegitation and compensatation for the loss of crops and vegetation				
7.	Stockpiling of Construction Materials	Construction materials such as earthen materials, gravel, aggregates, sand, cement etc. need to be stockpiled before their application at the site. Improper handling may become the source of escaping dust and also the adjacent land may get damaged.	Barren land adjacent to installation site will be used for stockpiling of construction materials Construction of storage house with Zinc plates and truss roof Stockpiling of construction materials along existing road side and highly productive land will be strictly prohibited Remaining construction debris will be disposed at designated disposal site only, far away from water resources and precaution will be made on minimization of such waste as far as possible through environment friendly concepts (reuse, reduction and recycling) The area will be cleaned promptly after completion of the construction work	Construction Site	Construction	100,000/-	ESCO/contractor
8.	Impacts on	Construction noise, dust and	Tree cutting should be avoided to the extent	Construction Site	Construction	NA	ESCO/co

S No.	Issues	Impacts	Mitigation Measures	Location	Time of Action	Estimated Cost	Responsibility
	Flora, Fauna and Aquatic Life	likely hunting by the construction workers may adversely impact flora and fauna in the area Illegal fishing practices by construction workers during their leisure period in Hima River can pose threat to aquatic life of this River stream	possible. Prohibition of cutting of protected tree species Proposed tree cutting by the contractor should be reviewed and approved by AEPC/ESCO. Compensatory plantation will be carried out at the rate of 5 new trees for each tree cut. The plantation site should be identified by the contractor and approved by AEPC/ESCO. All the approvals/permits should be obtained for tree cutting Awareness raising and training to the workers regarding importance of wild life and vegetation Construction work will be schedule at day time only Prohibition of hunting and poaching of wild species and illegal fishing practices in nearby River.Proper consultation should be carried out and consent from the relevant community should be given regarding the potential impacts on community forest around the project area. Pre-construction survey should be conducted to ensure potential impacts on fauna and flora and proper mitigation measures are planned.				ntractor
9.	Occupational Health and	Construction activities may cause accidents and injury	Contractor will be required to implement Occupational health and safety plan as in	Construction Site and Nearby	Construction	300,000/-	ESCO/contractor

S No.	Issues	Impacts	Mitigation Measures	Location	Time of Action	Estimated Cost	Responsibility
	Safety	Health and safety risks are also to the construction workers and general public	**Annex 6**. Adequate and appropriate safety signs shall be placed at construction site in Nepali language. Local public shall not be allowed trespass into active construction areas. Emergency first aid supplies at active construction areas. Construction workers shall be provided with adequate Personal Protecting Equipment (PPEs) such as safety helmet, safety boots, face & dust masks, safety goggles, gloves, high visibility clothing, etc depending upon specificity of the job. Construction safety harness shall be provided for construction workers working on height. All electrical equipment, power lines and cables will be insulated in accordance with standard Nepal safety requirements. Fire-fighting equipment such as fire extinguisher and sand bucket shall be placed in active construction areas. An Emergency response plan defining possible risks, emergency handling procedures, responsible persons, emergency contacts etc. shall be prepared and placed in active construction areas before the start of the constuation Recording and reporting of accidents and efficient response to it. Subproject staff/workers will be briefed about COVID-19 and other infectious	Settlement Area			

S No.	Issues	Impacts	Mitigation Measures	Location	Time of Action	Estimated Cost	Responsibility
			diseases related responsible hygienic behaviour and practices, which will be done periodically and records of such activities will be maintained and shared. All possible precautionary measures will be adopted to minimize transmission of highly communicable disease such as COVID-19. An Emergency response plan defining possible risks, emergency handling procedures, responsible persons, emergency contacts etc. shall be prepared by the contractor and placed in active construction areas.				
10.	Community Health and Safety	Nuisance to community people due to vehicular movement Accident due to vehicular movement Transmission of communicable diseases	Ensure an effective implementation of Transport Management Plan Waste generated during the construction phases of subproject will be well managed and disposed by segregated as degradable and non-degradable instead of throwing haphazardly elsewhere in subproject surrounding and community. Subproject workers as well as the local community shall be provided periodic awareness program on health and sanitation to control open defecation and communicable diseases like COVID-19.	Construction Site and Nearby Settlement Area	Construction		ESCO/contractor
11.	Labor Influx	Social conflict due to influx of workforce	Reduce labor influx by tapping into local workforce (Skill, Semi skill & Unskilled to the possible extent). Construction of labor camp with sanitary facility and other basic for the migrant workers Awareness programmes for labours about local culture and practices and the different	Construction Site and Nearby Settlement Area	Construction	50,000/-	ESCO/contractor

S No.	Issues	Impacts	Mitigation Measures	Location	Time of Action	Estimated Cost	Responsibility
			types of communicable diseases, COVID-19, HIV/AIDs and STDs etc. Preparation of Labor management plan before the start of the construction of the subproject Maintian and regularly update labor registration. Subproject staff/workers will be briefed about COVID-19, CoC of SEA/SH & GBV and cultural behaviour and practices of subproject area All possible precautionary measures will be adopted to minimize transmission of highly communicable disease such as COVID-19 as per GoN and WHO standards.				
12.	Use of forced labor	There is a risk of forced labor being used in relation to the supply chain of solar panels The sub-project level activities might engage forced labor	• The issue related to the possible use of forced labor in supply chain of solar panels will be made aware to the contractors and ESCOs. • Required awareness trainings and materials will be developed and provided. The use of forced labor in the sub-project level activities will be barred as per the existing laws of the country	Construction site	Constrruction and operation	Included in subproject cost	ESCO
13.	Benefit Sharing Mechanisms	Benefit Sharing action plan will be prepared in consultation with community people for sharing the benefits with local communities as a part of corporate social responsibility (monetary and non-monetary)	Strengthen the community's awareness on environment protection activity. Educational and Health related activities for community of subproject. Employment opportunities for local communities (During construction and post construction). Provide support to improve infrastructure or transfer revenue community development	Construction Site and Nearby Settlement Area	Construction & Operational	Included in Subproject Cost	ESCO

S No.	Issues	Impacts	Mitigation Measures	Location	Time of Action	Estimated Cost	Responsibility
			fund. Support in Livelihood trainings				
14.	GRM and Sexual Exploitation, Sexual Abuse and Sexual Harassment (SEA/SH)	Grievance/concerns/complaints of locals on subproject activities and Sexual Exploitation, Sexual Abuse and Sexual Harassment (SEAH) to the subproject related personnel	ESCO/AEPC • Put in place a functioning GRM system along with required logistics and record keeping system. • Formation of Grievance Redress Committee (GRC) in subproject level and make GRC functional with orientation on procedure of handling the grievances • The Subproject level GRC focal person's and contact number displayed at the entrance of subproject and around the subproject area. • Well maintained register to lodge grievances via any means (Phone, Verbal & written) • Periodic updates to the grievant regarding the status and actions taken to resolve the Grievances • A manual for the operation and management of GRM and SEA/SH will be developed and implemented. • Ensure a safe environment, free from discrimination on any ground and from sexual harassment, abuse and exploitation for all subproject related activities in construction and operation phases. • Code of conduct related to SEA/SH developed will be implemented • Personnel related subprojects found involved in any type of misconduct to	Construction Site and Nearby Settlement Area	Construction & Operational	N/A	AEPC/ESCO/contractor

S No.	Issues	Impacts	Mitigation Measures	Location	Time of Action	Estimated Cost	Responsibility
			SEA/SH is subject to punish disciplinary measures as appropriate and can be declared not eligible to work further in MGEAP related work • Gender Action Plan of ESMF will be strictly implemented to address the issues related the gender equality and social inclusion • Procedure/mechanism to register complaints of SEA/SH or GBV will be developed and implemented.				
15.	Stakeholder engagement and information disclosure	Local people and other relevant stakeholders may have grievances related to subproject development activities	ESCO/AEPC • Ensure periodic consultation meetings with stakeholders, including the representatives of local level and project beneficiaries and vulnerable people such as Dalits and religious minorities • Disclosure/ dissemination of subproject information through local Mass media (local newspaper, Website FM/Radio & TV) and by organizing meetings/Workshops and the grievances readdress mechanism established for the subproject • All the stakehilders will be informed about the ESMP prepared for this subproject and potential positive and adverse impacts related to subproject	Construction Site and Nearby Settlement Area	Construction & Operational	N/A	AEPC/ESCO
B. Operation Phase							
16.	Waste Management	The main waste that will be produced during operation is domestic waste. The other	Degradable waste will be disposed by burying in pit	Mini Grid Installation Area	Operation	25,000/-	ESCO

S No.	Issues	Impacts	Mitigation Measures	Location	Time of Action	Estimated Cost	Responsibility
		type of waste includes metallic and stationary waste from office works which can accumulate over a period of time	Recyclable waste such as plastic, paper, glass, etc will be collected and sent for recycling				
17.	Health and Safety	Emergency fire hazard, electrocution of workers and public due to faulty electrical equipment, electric short circuits and exposed electrical wires may be the chief sources of electrocution. Damaged PV modules with exposed high voltage conductor also present high risk of electrocution. Glare effect caused due to reflection of incident solar beams on the reflective surface of the laid PV panels can pose threat to safety to nearby residents and pedestrians.	PPE such as hard hat, leather gloves, arc-rated pants, long sleeved shirt, face shield, safety boot, shall be provided to the workers in order to protect them from electrocution. Fire Extinguishers will be placed at appropriate spots General awareness program on electrical safety will be conducted for local residents Distribution of safety pamphlet to villagers specifying hazards and prohibited activities Subproject area will be properly fenced to check unauthorized access in to the area Appropriate safety signs shall be placed at applicable locations in Nepali language PV modules should be placed in such a way to avoid glare exposure to sensitive locations such as roads and houses in and around the subproject site Installation of appropriate number of Earthing Use of lightning arrester to protect from lightning strikes Ensure an effective implementation of Occupational Health and Safety Plan and Emergency Response Plan Community and Project staff/workers will	Mini Grid Installation Area, Settlement Area	Operation	150,000	ESCO

S No.	Issues	Impacts	Mitigation Measures	Location	Time of Action	Estimated Cost	Responsibility
			be briefed about COVID-19 related responsible hygienic behaviour and practices All possible precautionary measures will be adopted to minimize transmission of highly communicable disease such as COVID-19.				
18.	GRC and SEA/SH, stakeholder consultations	Local stakeholder will be informed and make them aware about subproject activities on a regular basis	• The GRC will continue to operate and the subproject will conduct consultations with the local stakeholders and local levels periodically.	Mini Grid Installation Area, Settlement Area	Operation		ESCO

8 Stakeholder Engagement and Grievance Redress Mechanism (GRM)

The major objectives of Stakeholder Engagement are to keep all stakeholders informed on potential beneficial & adverse impacts related to subproject activities and to ensure that stakeholders actively participate in all levels of the subproject cycles, come up with mitigation plans to minimize the potential negative impacts of the subproject. These will ultimately contribute towards narrowing down the gaps between the subproject officials & beneficiaries and to gain broad support from community to implement subproject activities smoothly. It involves interactions between identified groups of people and provides stakeholders with an opportunity to raise their concerns and opinions (e.g. by way of meetings, consultation, interviews and focused group discussion) and ensures that their concerns and opinions are taken into consideration when making subproject decisions. The following mechanisms will be followed for stakeholders' engagement during the construction and operational phases of subproject.

i. Leaflets & brochures regarding to subproject information will be distributed to all the stakeholders (Language of leaflet and brochures will be Nepali and Local language)
ii. Periodic public meetings in the subproject area regarding the environmental and social safeguard impacts & measures
iii. Information/ awareness campaigns through engaged locally formed Clubs, Groups and NGOs (some of the clubs and NGO working in the subproject area are Human Right and Environment Development Centre (HURENDEC), Danphe Yuba Club & Samiti Yuba Club)
iv. Formation of committees and/or groups including stakeholders at various stages of the subproject.
v. Development of grievance redresses mechanism in the subproject premises.
vi. Disclosure/ dissemination of subproject information by mobilizing local media (local newspaper, FM/Radio & TV) and by organizing meeting /Workshops on decision making process and how the grievances of subproject affected people will be addressed.

While conducting stakeholders' engagement it will be taken in to consideration that all the consultations will be two-way dialogues between PMT, ESCO and its stakeholders. The subproject-affected communities will be continually consulted to identify upcoming needs, constraints, priorities and kind of social and environmental corrective measures needed to be pursued during the construction and operational phases of the subproject through periodic consultations. The mechanism of meaningful consultation will include;

- Free, prior and informed consultation with all stakeholders including venerable groups of people
- Appropriate timing and venue of consultation for different groups
- Use of local language, sign languages and local facilitators including women
- Information dissemination in collaboration with local NGOs and CBOs
- Direct contact with stakeholders through mobile phones to understand their perception about the subproject and organizing small FGDs maintaining social distance
- Well targeted and inclusive engagement with stakeholder
- Focused group discussion and interviews with stakeholders
- Consultation will be continued throughout the project life cycle

8.1 Stakeholder Consultation

For Kankasundari Solar Mini Grid Subproject, Datheokhar Tole (65HHs including 62 HHs of Dalit), Rokayabada (35HHs), Pachaibada (17HHs), Jachauribada (55HHs), Lharja Tole (108 HHs including 80 HHs of Dalit), Goruchaur (15 HHs), Rural Municipality, Health Post, Forest User Group and School are some of the stakeholders identified during the field visit.

The major stakeholders met and discussed during the field visit are Local Representatives of Kankasundari Rural Municipality, representatives of Birat Community Forest User's group, entrepreneurs and community people.

There were two consultations conducted to get the perception of local representatives and people around the subproject area regarding the development of solar mini grid. Among the 156 participants in consultations, 44 (28%) were women and 112 (72%) were men. Similarly, 123(79%) of the participants in the consultation were from Dalit community and 33 (21%) represention from Bhramin/Chhetri.

Moreover, community people were informally consulted to get their individual opinion and information on the proposed subproject. Minute of consultation is presented in **Annex 2**.

The first consultation was conducted on 10 November 2021 with the representatives of Ward No. 6. Similarly, consultation with the representatives of local government, members of Birat Community Forest, entrepreneurs and local community was conducted on 11 November 2021 in Kankasundari Rural Municipality.

During the consultation, all participants were informed about subproject modality and potential beneficial and adverse impacts associated with solar mini grid subproject. The significant issues raised by participants in consultation are:

- People use the piece of wood as the source of light, which is one of the major sources of air pollution and pose fire hazard of the house. In adition to it, people of subproject area are heavily depending on small solar home systems for lighting their homes which is not even sufficient to charge mobile phones so the community people are willing to have reliable source of electricity supply at their homes and offices.
- Chairperson of Ward No. 6 and other representatives of local government, members of local community and Birat Community Forest User's Group were optimatic about the subproject that will support to provide a reliable source of energy and open new prospect of economic opportunity in their area.
- When Community people were informed that private land could be used for Transmission & Distribution lines, they were found keen to contribute for it.
- Community people were also informed about the subproject GRM and GRC that need to establish at subproject level as well as GRC that is functional at project level to lodge, if there are any grievances related to the subproject.
- They requested ESCO to initiate the process for construction of subproject as early as possible and they assured ESCO to provide necessary support that needed from the community during the construction and operational phases of the subproject.

During the consultations AEPC has responded to the participants that AEPC will facilitate and support to ESCO and other relevant stakeholders regarding the overall implementation of subproject and capacity enhancement of all the stakeholers in terms of imlementaion of environmental and social safeguard measures.

8.2 Grievance Redress Mechanism

An accessible and responsive complaint management process is important part of any stakeholder engagement strategy. Therefore, a Grievances Redress Mechanism has been formulated for all the subprojects going to implement under AEPC/MGEAP as provisioned in the ESMF, in which all the stakeholders and community people are given a venue to lodge complaints and grievances regarding to any & SEA/SH, environmental and social issues related to the subproject and allows subproject authority to respond to & resolve the issues in an appropriate manner.

The **Grievance Redress Mechanism** includes the following:

- At the subproject level (Level 1), a focal person (or, Member Secretary of Subproject Level GRC) will be appointed to receive/handle any kind of grievance related to the subproject including SEA/SH. His/her name and contact number will be displayed at the entrance of the subproject site, so that affected people can have direct access to him/her.
- A register will be maintained (electronically also) including the name of grievant, date and time of grievance recorded, assigned a tracking number, acknowledge to claimant, issue raised, and time frame to redress the received grievance (a template is presented in **Annex 5**).
- A suggestion box will be place at the entrance of the suproject site for collecting grievances, in addition to it another suggestion box will be placed in the subproject site premises to collect grievances from employees. Anonymous complaints or allegations also will be given all due and appropriate consideration and investigate & take appropriate actions.
- The subproject level will provide periodic updates ESS Team of AEPC/MGEAP regarding the status and actions taken to resolve the Grievances.
- At subproject level, ESS focal person is responsible to resolve the received grievances within 10 days. If it is not resolved at the subproject level, the focal person will forward it to the Project Level.
- Grievances can be registered via AEPC website http://www.aepc.gov.np and via phone to AEPC/MGEAP's ESS focal person.
- If the subproject level GRC remains unable to redress the grievance, it will be forwarded/ escalated to the project level GRC (Level 2).
- Affected persons have the option of accessing the court of law in case of dissatisfaction with the decision of the project level GRC.

The project level (Level 2) **Grievance Redress Committee** (GRC) has been formed, which consist of the following members:

1) Project Manager - Chairperson, AEPC/MGEAP
2) Representative of beneficiary -Member
3) Representative of ESCO-Member
4) Technical Expert of MGEAP-Member
5) Social Safeguard Expert of MGEAP-Member Secretary

Apart from project level GRC, a Grievance Redress Committee (GRC) will be formed at subproject level where subproject affected people can file complaints verbally and in written from. The project affected persons will have access to all level of grievance redress procedure established under MGEAP without any cost. ESCO will be responsible to record all the grievances received at subproject level and submit AEPC/MGEAP the details of issues/grievances resolved.

The GRC that will be formed at subproject level will have structure as follows;

Subproject Level (Level 1) Grievance Redress Committee (GRC)

1) Chairperson/Subproject Manager of ESCO – Chairperson
2) Representative of local body, Ward level – Member (1)
3) Representative of lo community (beneficiaries)– Member (1)
4) Representative of local community (beneficiaries) – Members (1)
5) Safeguard Expert of the ESCO – Member Secretary


Public consultation and Stakeholder meeting conducted on 11 November,2021 at Kankasundari RM

9 Monitoring and Reporting Mechanism

As provisioned in the ESMF, the social and environmental safeguard implementation will be monitored internally. The team comprises of the representatives of stakeholders and ESCO will monitor the suproject site in the initial, construction, post construction and operation phase of subproject to ensure that all environmental and social issues related to the subproject are well addressed and comply with the requirements mentioned in this ESMP. In addition to it, if requires, an independent third party monitoring will be carried out during the construction and operational phases. The ESCO will prepare quarterly progress report including the status of ESMP implementation and E&S performance and submit them to the AEPC. During construction period, the AEPC will prepare a quarterly report on the implementation of the EMSP based on the progress report provided by ESCO and share it with the World Bank within one month of the end of each calender quarter in an agreed format. During operation period, AEPC will prepare semi-annual monitoring report and submit it to the WB and these reports will be made available to all the stakeholders.

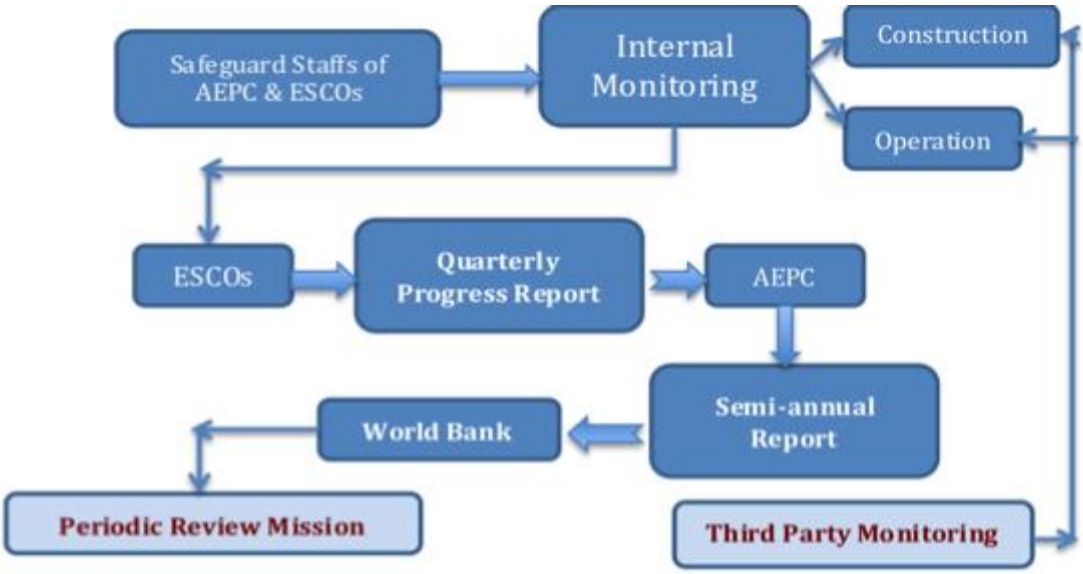

Figure 7: Monitoring and Reporting Mechanism of the Project

Table 6: Compliance monitoring, Construction and Operation Phase

S.N	Provisions of compliance	Responsibility	Methods	Frequency /Time	Monitoring authority	Place	Cost (NRs.)
Construction Phase							
1	<u>Land Use and Land Take</u> • Long term land lease Agreement will be done between ESCO and Birat Community Forest Users' Committee before the subproject agreement done between AEPC and ESCO	ESCO	Observation	Once before construction period	AEPC		-
2	<u>Air Quality</u> • Water spraying in heaps of temporarily stored spoils and in active excavated areas • Construction workers will be provided with adequate personal protection equipment (PPE) such as breathing masks and safety goggles to protect them from exposure to dust and other pollutants • Vehicles and machines used for construction shall be maintained regularly	Contractor/ ESCO	Site Observation/ Record	Monthly	ESCO/AEPC	Subproject Site	-
3	<u>Water Quality</u> • Good construction practices will be adopted to prevent accidental spillage of construction chemical and materials • Construction workers will be strictly instructed to avoid open urination and defecation, sanitary toilets will be provided in the construction area • Storage areas for the chemicals, oils and other substances will be located far from the water sources to avoid the contamination by spillage • All reasonable measures will be taken to	Contractor/ ESCO	Site Observation/ Record	Monthly	ESCO/AEPC	Subproject Site	-

S.N	Provisions of compliance	Responsibility	Methods	Frequency /Time	Monitoring authority	Place	Cost (NRs.)
	prevent the waste water produced in construction from entering into the nearby seasonal stream						
4	Noise Quality • Construction activities will be restricted to daytime only • Construction workers will be provided with appropriate and adequate hearing protection devices such as ear muffs and ear plugs. • Maintenance of all vehicles and construction machinery	Contractor/ ESCO	Site Observation/ Record	Monthly	ESCO/AEPC	Subproject Site	-
5	Waste Management • Construction wastes will be stored out and kept separates instead of throwing haphazardly • Domestic wastes will be managed by burying in pit • Recycling and reuse mechanism will be applied for minimization of waste volume	Contractor/ ESCO	Site Observation/ Record	Monthly	ESCO/AEPC	Subproject Site	-
6	Muck and Spoil Disposal • Reuse of spoil in construction activities such as filling materials and construction aggregates • Re-vegetation of the area • Disposal of spoil in identified disposal sites • Construction workers will be instructed for proper storage and handling procedures of construction waste and other solid wastes.	Contractor/ ESCO	Site Observation/ Record	Monthly	ESCO/AEPC	Subproject Site	-

S.N	Provisions of compliance	Responsibility	Methods	Frequency /Time	Monitoring authority	Place	Cost (NRs.)
7	<u>Stockpiling of Construction Materials</u> • Less productive land will be used for stockpiling of construction materials • Construction of storage house with Zinc plates and truss roof • Stockpiling of construction materials along existing road side and highly productive land will be strictly prohibited • Remaining construction debris will be disposed at designated disposal site only, far away from water resources and precaution will be made on minimization of such waste as far as possible through environment friendly concepts (reuse, reduction and recycling) • The area will be cleaned promptly after completion of the construction work	Contractor/ ESCO	Site Observation/Records	Once during pre-construction and once during construction period	ESCO/AEPC	Subproject Site	
8	<u>Impacts on Flora, Fauna and Aquatic Life</u> • Pollution of water sources will be minimized to the extent possible • Proper management measures to prevent damage to the natural vegetation of the site will be implemented such as establishing and enforcing a proper code of conduct and awareness raising/training • Prohibition of hunting and poaching of wild species and illegal fishing practices in nearby Tila Karnali River	Contractor/ ESCO	Site Observation/Records	Daily by ESCO and Monthly reporting to AEPC	ESCO/AEPC	Subproject Site/ surrounding area/River	

S.N	Provisions of compliance	Responsibility	Methods	Frequency /Time	Monitoring authority	Place	Cost (NRs.)
	• Proper storage, collection, and disposal of generated waste						
9	Occupational Health and Safety • Project staff/workers will be briefed about COVID-19 related responsible hygienic behaviour and practices • All possible precautionary measures will be adopted to minimize transmission of highly communicable disease such as COVID-19, including implementation of WHO and government guidelines for civil construction. • Local public shall not be allowed trespass into active construction areas • Emergency first aid supplies at active construction areas • Construction workers shall be provided with adequate and appropriate Personal Protecting Equipment (PPEs) such as safety helmet, safety boots, , face and dust masks, safety goggles, gloves etc depending upon specificity of the job • Safety belt shall be provided for construction workers working on height • Ensure an effective implementation of Labor Management Plan, Occupational Health and Safety Plan and Emergency Response Plan	Contractor/ ESCO	Site Observation/Records/Interview with workers and staffs	Daily by ESCO and Monthly reporting to AEPC	ESCO/AEPC	Subproject Site/T&D	
10	Community Health and Safety • Nuisance to community people due to	Contractor/ ESCO	Site Observation/Rec	Daily by ESCO and	ESCO/AEPC	Subproject Site/surround	

S.N	Provisions of compliance	Responsibility	Methods	Frequency /Time	Monitoring authority	Place	Cost (NRs.)
	vehicular movement • Accident due to vehicular movement • Subproject workers as well as the community people shall be provided periodic awareness program on health and sanitation to control open defecation and communicable diseases like COVID-19		ords/Interview with community people	Monthly reporting to AEPC		ing area	
11	<u>Labor Influx</u> • Reduce labor influx by tapping into local workforce (Skilled, Semi-skilled & Unskilled to the possible extent) • Awareness programmed for labours about different types of communicable diseases, such as COVID-19, HIV/AIDs and STDs and CoC of SEA/SH. • Precautionary measures adopted to minimize transmission of highly communicable disease such as COVID-19 as per GoN and WHO standards.	Contractor/ ESCO	Site Observation/Records/Interview with community people	Daily by ESCO and Monthly reporting to AEPC	ESCO/AEPC	Subproject Site	
12	<u>Grievance Redress Mechanism (GRC)</u> • Formation of Grievance Redress Committee in subproject level • The Subproject level GRC focal person and contact number displayed at the entrance of subproject. • Well maintained register to record grievances via any means (Phone, Verbal & written) • Periodic updates to the grievant regarding the status and actions taken to resolve the	ESCO	Site Observation/Records/Interview with community people	Periodically in operational and construction phase	AEPC/ESCO	Subproject Site	

S.N	Provisions of compliance	Responsibility	Methods	Frequency /Time	Monitoring authority	Place	Cost (NRs.)
	Grievances						
13	Benefit Sharing Mechanisms • Strengthen the community's awareness of the environment • Reforestation and vegetation of ccommunity forest • Conservation of water sources • Employment opportunities for local communities (During construction and post construction) • Provide support to improve infrastructure or transfer revenue community development fund • Provide livelihood trainings	ESCO	Observation/Records/Interview with community people	Once in construction period and twice in operation period	ESCO/AEPC	Subproject Site/Community	
14	Sexual Exploitation, Sexual Abuse and Sexual Harassment (SEA/SH) • Ensure a safe environment, free from discrimination on any ground and from sexual harassment, abuse and exploitation for all subproject related activities in construction and operation phases. • The code of conduct related to SEA/SH will be implemented. • Personnel related subprojects found involved in any type of misconduct to SEA/SH or GBV is subject to punish disciplinary measures as appropriate and can be declared not eligible to work further	ESCO/AEPC	Observation/Records/Interview with community people	Periodically in operational and construction phase	ESCO/AEPC	Subproject Site/Community	

S.N	Provisions of compliance	Responsibility	Methods	Frequency /Time	Monitoring authority	Place	Cost (NRs.)
	in AEPC/MGEAP related work • Gender Action Plan of ESMF will be strictly implemented to address the issues related the gender equality and social inclusion • Procedure/mechanism to register complaints of SEA/SH will be developed and implemented.						
15	<u>Periodic consultations with stakeholders and information disclosure</u>	ESCO	Observation/Records/Interview with community people	Periodically in operational and construction phase	ESCO/AEPC	Subproject Site/Community	
Operation Phase							
1	<u>Waste Management</u> • Degradable waste will be disposed by burying in pit • Recyclable waste such as plastic, paper, glass, etc will be collected and sent for recycling	ESCO	Site Observation	Monthly by ESCO	ESCO/AEPC	Subproject Site/Community	-
2	<u>Health and Safety</u> • Proper personal protective equipment shall be provided to the workers in order to protect them from electrocution • General awareness program on electrical safety will be conducted for local residents • Distribution of safety pamphlet to villagers specifying hazards and prohibited activities • Mini grid installation area will be properly fenced to check unauthorized access in to the area	ESCO	Observation/Interview with workers and community people	Weekly by ESCO and report to AEPC	ESCO/AEPC	Subproject Site/Community	-

S.N	Provisions of compliance	Responsibility	Methods	Frequency /Time	Monitoring authority	Place	Cost (NRs.)
	• Appropriate safety signs shall be placed at applicable locations in Nepali language • PV modules should be placed in such a way to avoid glare exposure to sensitive locations such as roads and houses in and around the subproject site. • Use of lightning arrester to protect from lightning strikes • Ensure an effective implementation of Occupational Health and Safety Plan and Emergency Response Plan • Community and Project staff/workers will be briefed about COVID-19 related responsible hygienic behavior and practices • Precautionary measures adopted to minimize transmission of highly communicable disease such as COVID-19 as per GoN and WHO standards.						

10 Environmental and Social Safeguard Plans

It is essential to provide a safe working environment and avoid accidents involving workers, staffs, visitors, or the surrounding settlements, while performing any activities during construction and operation phase of the subproject. Therefore, it is very necessary to be fully aware of the required safety measures for the successful implementation of the subproject. These provisions are prepared based on mitigation measures suggested in the event of probable impacts. The following plans are formulated to ensure safeguarding of the workers, staffs, visitors, or the surrounding settlements of the Kankasundari Solar Mini Grid subproject.

10.1 Occupational Health and Safety Plan

The Occupational Health and Safety plan is a plan of action designed to prevent accidents and occupational diseases. The workers and staff are prone to accidents, injuries, and diseases while performing activities during the construction and operation phase of the subproject. It is the responsibility of the ESCO to provide a safe working environment for workers and staff. A template of the Occupational Health and Safety Plan for Kankasundari Solar Mini Grid subproject is presented in **Annex 6**.

10.2 Emergency Preparedness and Response Plan

The Emergency Preparedness and Response Plan is prepared in order to take immediate action to minimize losses. The Plan provides onsight on protective measures to follow in case any emergency events occur in the subproject site. A template of the Emergency Response Plan for Kankasundari Solar Mini Grid subproject is presented in **Annex 7**.

10.3 Traffic Management Plan

The Traffic Management Plan is prepared to keep workers safe from vehicles and equipment both outside and within worksites. The plan helps to provide safe traffic and work zone during construction phase. A template of the Traffic Management Plan for Kankasundari Solar Mini Grid subproject is presented in **Annex 8**.

10.4 Labor Management Plan

The Labor Management Plan provides guidance on protecting the worker's right, health, safety and security during the subproject construction and operation phase. The plan outlines the actions necessary for assuring the effective health, safety and security measures are considered by the contractor, all their employees and the employees of their sub-contractors. A template of the Labor Management Plan for Kankasundari Solar Mini Grid subproject is presented in **Annex 9.**

10.5 Battery Management Plan

Battery is a storage medium that contains single or multiple electro-chemical cells that converts chemical energy to electrical energy. Kankasundari Solar Mini Grid subproject is planning to Lead Acid Battery during its operation phase. Therefore, the Battery Management Plan provides guidance on managing used battery after its life. The plan for Kankasundari Solar Mini Grid subproject is presented in **Annex 10.**

10.6 Waste Management Plan

Some packaging waste such as cardboard, platic sheet, small plastic pieces etc. are supposed to be generated during the construction phase, which will be in the packages of solar PV supply and other equipment. A template of the waste management plan for Kankasundari Solar Mini Grid subproject is presented in **Annex 11.**

10.7 Gender Equality and Social Inclusion (GESI) Action Plan

A gender equality and social inclusion action plan is developed for Kankasundari Solar Mini Grid subproject to ensure the participation of women, poor, dalit, and other excluded groups of subproject area in planning, construction, operational and implementation processes and promote equal access to resources and benefit. The GESI Action Plan for Kankasundari Solar Mini Grid subproject is presented in **Annex 11.**

11 Implementation of ESMP

The ESMP is the part of the Detiled Feasibility Study report of Kankasundari Solar Mini Grid Subproject. It is the responsibility of ESCO to ensure that this ESMP is approved from the AEPC/MGEAP. The ESCO shall ensure that this ESMP is well implemented by the Contractors during the construction phase. For that purpose, a qualified E&S focal person will be recruited/appointed in ESCO. The contractor is obliged to recruit/assign a qualified E&S specialist and to implement the mitigation measures prescribed for each identified impacts as well as for those impacts which comes up during the construction phase, and not anticipated during the preparation of this ESMP.

The role of Contractor during subproject construction are as follow:

- To carry out construction activities in environmentally and socially sound manner as per ESMP and other E&S Safeguard Plans proposed in Section 10.
- To manage construction team and reduce the environmental and social impacts
- To coordinate with ESCO, AEPC/MGEAP to resolve any environmental and social issues during construction
- To implement Environmental and Social Management Plan (Occupational Health and Safety Plan, Emergency Preparedness and Response Plan, Traffic Management Plan, Labor Management Plan, Battery Management Plan, Waste Management Plan and GESI Action Plan) prepared by AEPC/MGEAP.
- To carry out self E&S monitoring by the qualified E&S specialist in charge and provide necessary information to ESCO for preparation of quarterly progress report including the status of ESMP implementation
- To report major accidents/incidents and significant non-compliance issues/grievance at/around subproject sites as soon as its identification to ESCO and AEPC.

The following diagram shows the environmental and social institutional arrangement to implement ESMP.

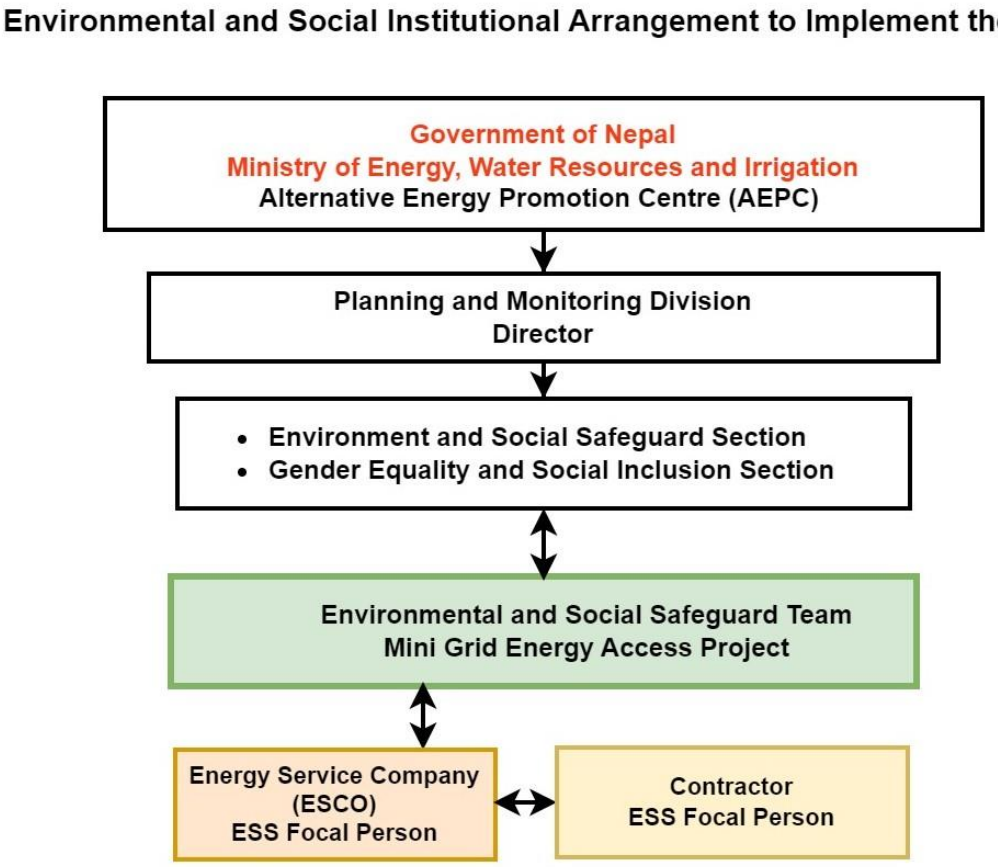

Figure 8: Institutional Arrangement to implement ESMP at AEPC

Environmental and Social Safeguard Study Team

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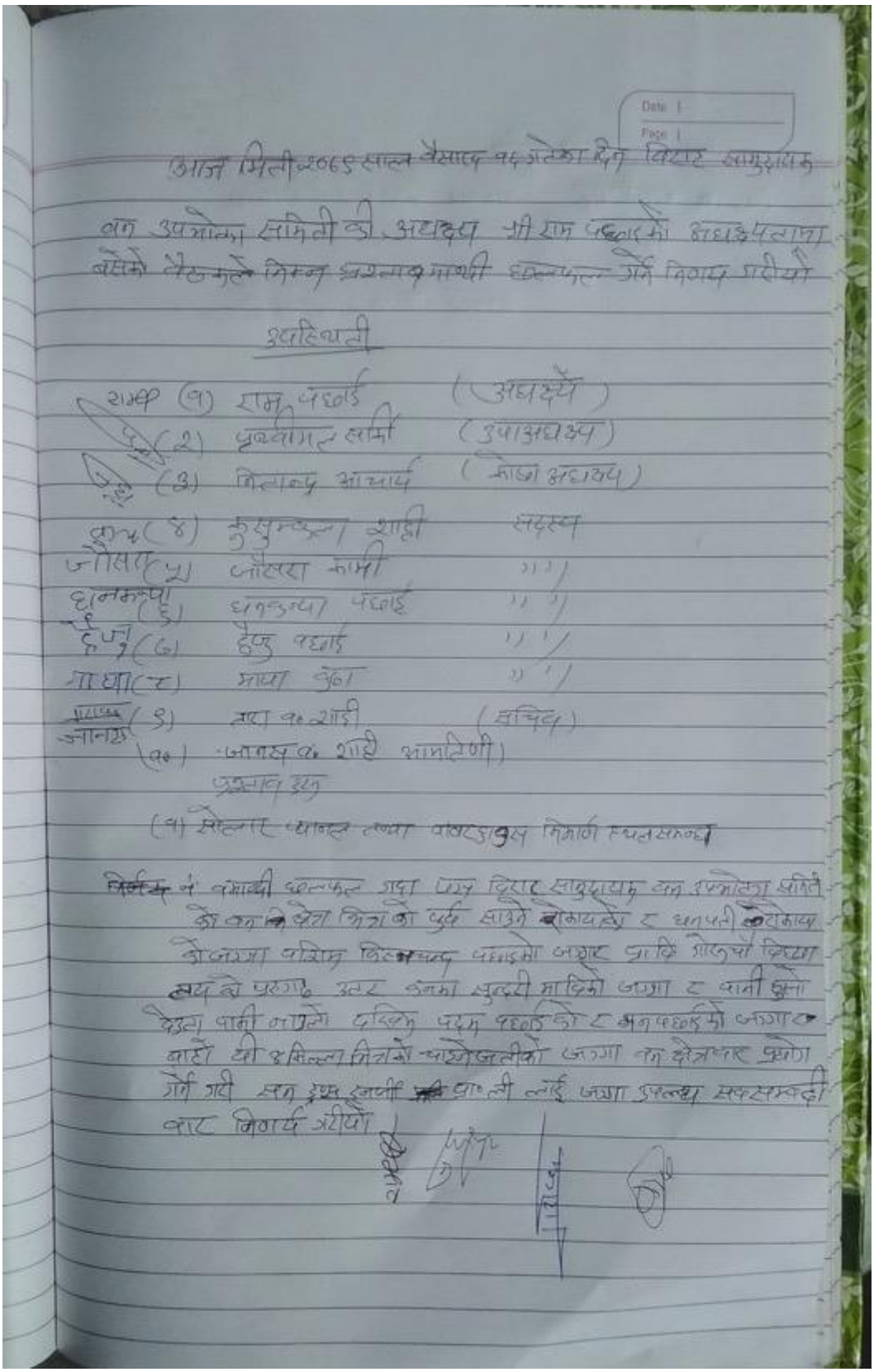
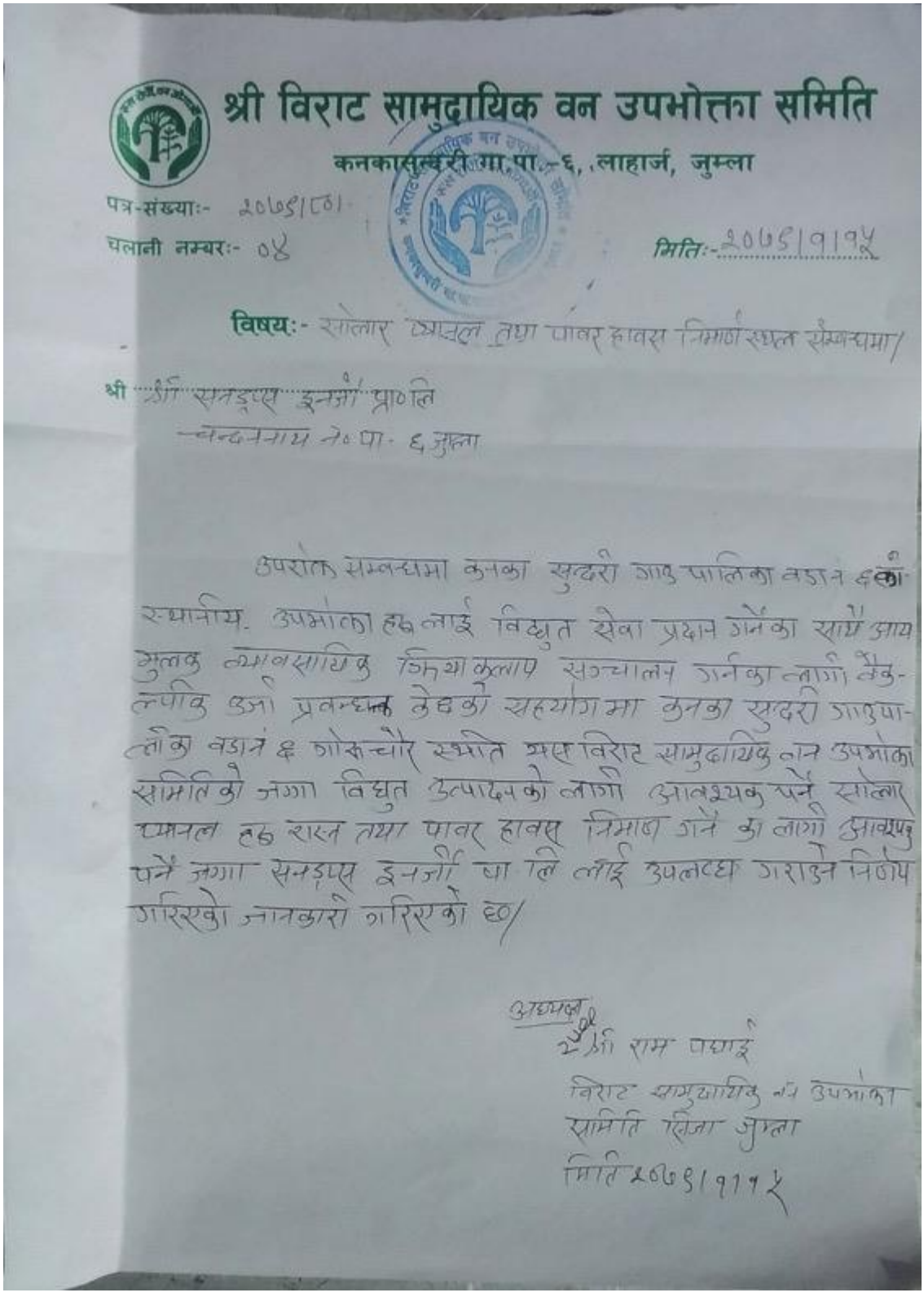
Annex 1: Minute of Birat Community Forest Users Group for Land



Annex 2: Letter from Birat Community Forest Users Group for Land



श्री विराट सामुदायिक वन उपभोक्ता समिति

कनकासुन्दरी गा.पा.-६, लाहार्ज, जुम्ला

पत्र-संख्याः- २०७९।८०।

चलानी नम्बरः- ०४

मितिः- २०७९।९।१५

विषयः- सोलार प्यानल तथा पावर हाउस निर्माण सम्बन्धमा।

श्री ऊर्जा सनड्रप्स इनर्जी प्रा०लि

चन्दननाथ न०पा- ६ जुम्ला

उपरोक्त सम्बन्धमा कनका सुन्दरी गाउपालिका वडा नं ६ को स्थानीय उपभोक्ता ६७ लाई विद्युत सेवा प्रदान गर्नेका साथै आय मुलक व्यवसायिक क्रियाकलाप सञ्चालन गर्नका लागी केन्द्रीय ऊर्जा प्रवन्धन केन्द्रको सहयोगमा कनका सुन्दरी गाउपालिका वडा नं ६ गोरुचौर स्थित यस विराट सामुदायिक वन उपभोक्ता समिति को जग्गा विद्युत उत्पादन को लागी आवश्यक पर्ने सोलार प्यानल ६७ सेट तथा पावर हाउस निर्माण गर्ने को लागी आवश्यक पर्ने जग्गा सनड्रप्स इनर्जी प्रा लि लाई उपलब्ध गराउने निर्णय गरिएको जानकारी गरिएको छ।

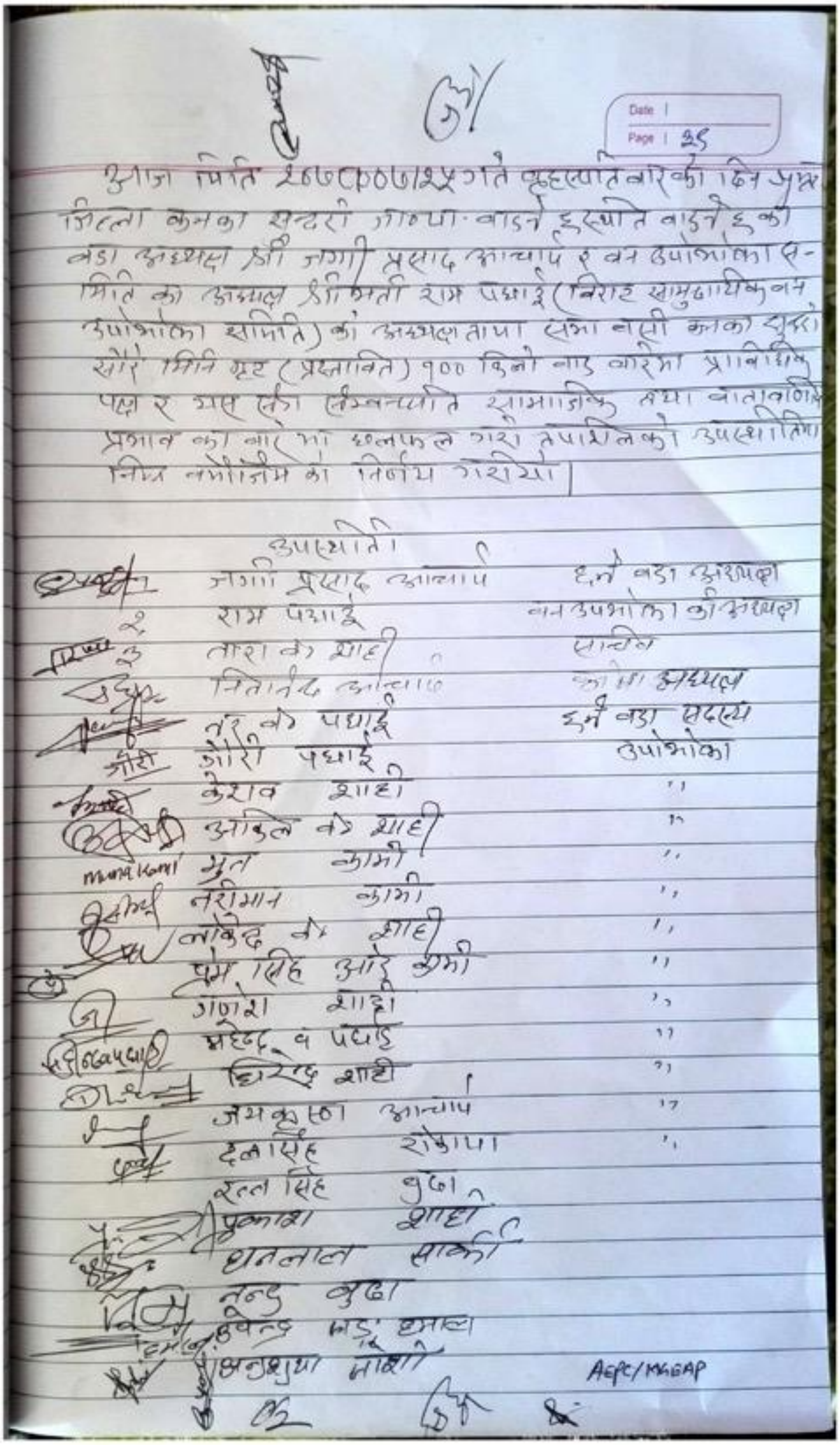
अध्यक्ष

श्री राम पधाई

विराट सामुदायिक वन उपभोक्ता समिति लिजा जुम्ला

मिति २०७९।९।१५

Annex 3: Meeting Minutes of Consultations



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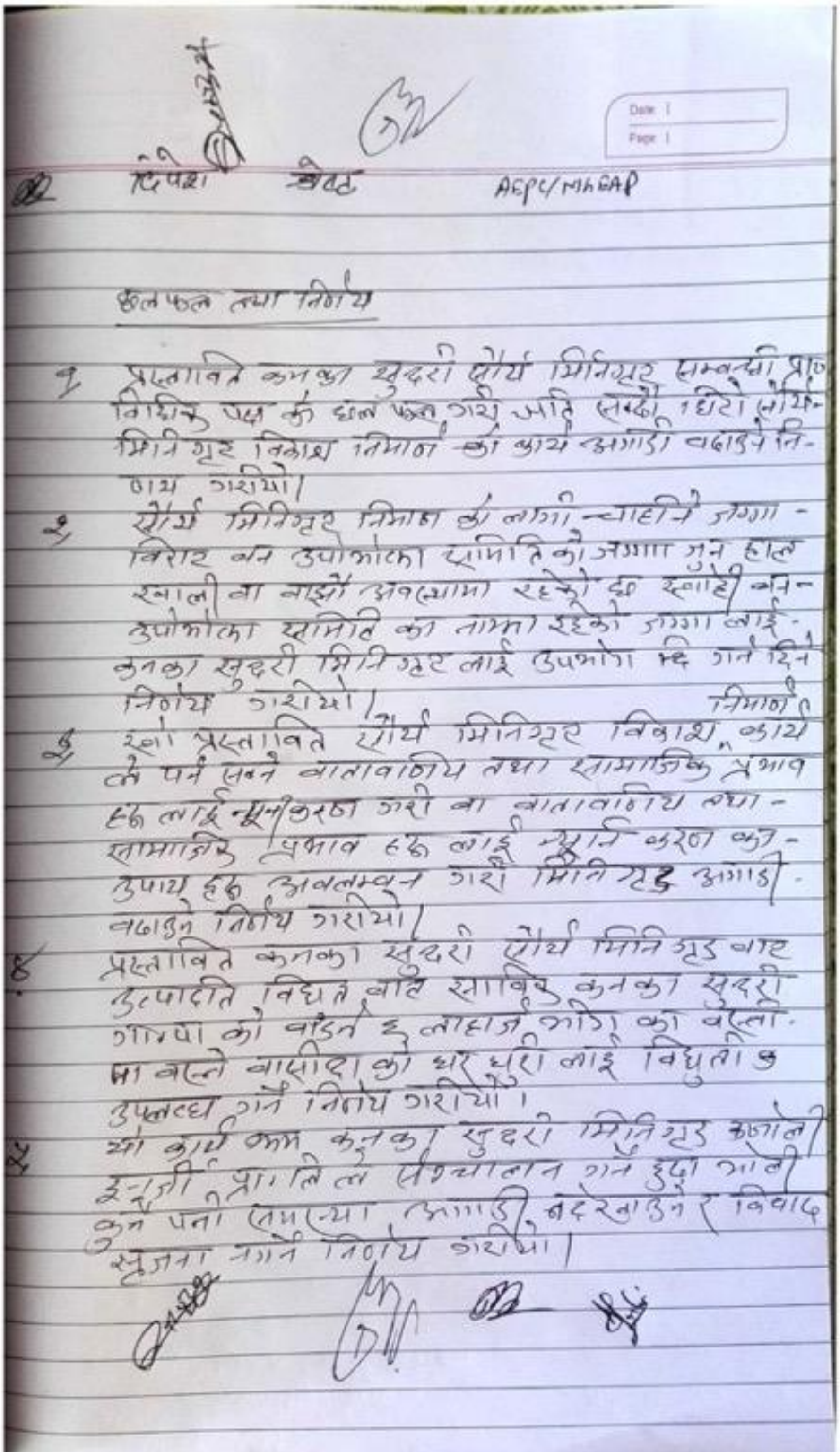
आज मिति २०७८।०७।१५ गते बृहस्पतिवारका दिन जुम्ला जिल्ला कनका सुन्दरी गा.पा. वडा नं ३ स्थित वडा नं ३ को वडा अध्यक्ष श्री जोगी प्रसाद आचार्य र वन उपभोक्ता समिति का अध्यक्ष श्रीमती राम पधाई (विराट सामुदायिक वन उपभोक्ता समिति) को अध्यक्षतामा सभा बसी कनका सुन्दरी सौर्य मिनि ग्रिड (प्रस्तावित) १०० किलो वाट बारेमा प्राविधिक पक्ष र यस सँग सम्बन्धित सामाजिक तथा वातावरणीय प्रभाव को बारेमा छलफल गरी तपसिलको उपस्थितिमा निम्न बमोजिम को निर्णय गरियो।

उपस्थिति

१	जोगी प्रसाद आचार्य	३ नं वडा अध्यक्ष
२	राम पधाई	वन उपभोक्ता को अध्यक्ष
३	तारा बं शाही	सचिव
	नितानन्द आचार्य	कोषा अध्यक्ष
	नर बं पधाई	३ नं वडा सदस्य
	गौरी पधाई	उपभोक्ता
	केशव शाही	"
	आँकिल बं शाही	"
	मुन कामी	"
	नरीमान कामी	"
	लोकेन्द्र बं शाही	"
	प्रेम सिंह आउँ कामी	"
	गणेश शाही	"
	महेन्द्र ब पधाई	"
	धिरेन्द्र शाही	"
	जयकृष्ण आचार्य	"
	देवसिंह रोकाया	"
	रतन सिंह बुढा	
	प्रकाश शाही	
	धनलाल सार्की	
	नन्द बुढा	
	उपेन्द्र लड्‌ हमाल	
	अनसुया जोशी	

AEPC/MGEAP



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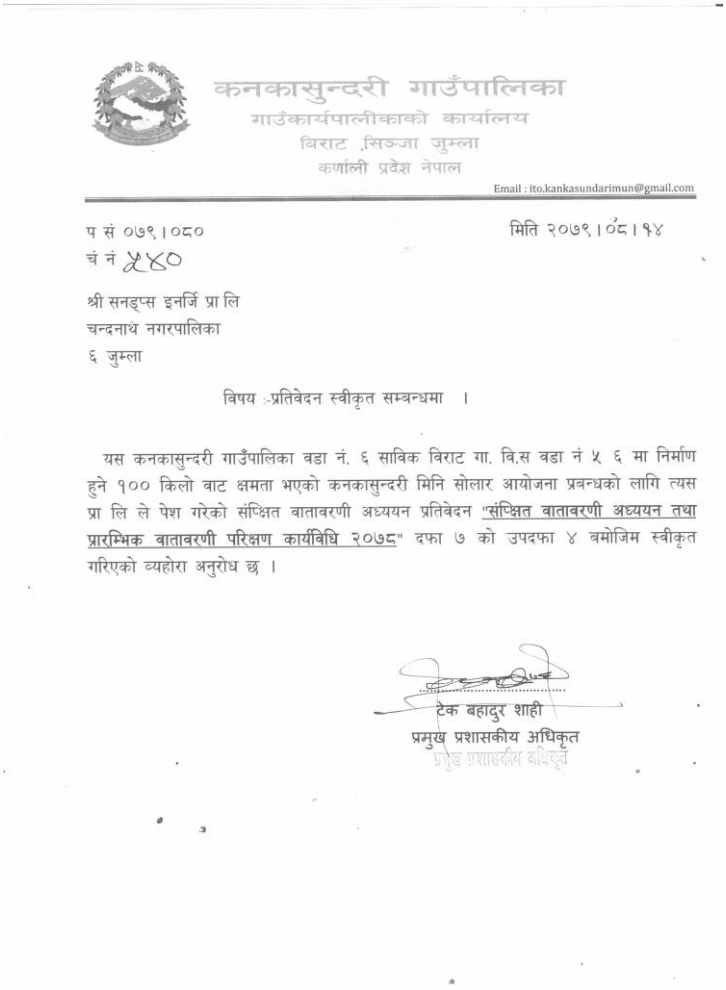
टिपेन्द्र   शेखर   AEPC/MHGAP

छलफल तथा निर्णय

१. प्रस्तावित कनका सुन्दरी सौर्य मिनिग्रिड सम्बन्धी प्राविधिक पक्ष को छलफल गरी अति सक्दो छिटो सौर्य मिनि ग्रिड विकास निर्माण को कार्य अगाडी बढाउने निर्णय गरियो।
२. सौर्य मिनिग्रिड निर्माण को लागी चाहिने जग्गा विराट वन उपभोक्ता समिति को जग्गा जुन हाल खाली वा बाझो अवस्थामा रहेको छ त्यो नै वन उपभोक्ता समिति का नाममा रहेको जग्गा लाई कनका सुन्दरी मिनि ग्रिड लाई उपभोग गर्न दिने निर्णय गरियो।
३. यो प्रस्तावित सौर्य मिनिग्रिड विकास निर्माण कार्य ले पर्न सक्ने वातावरणीय तथा सामाजिक प्रभाव हरु लाई न्यूनीकरण गरी वा वातावरणीय तथा सामाजिक प्रभाव हरु लाई न्यूनी करण का उपाय हरु अवलम्बन गरी मिनि ग्रिड अगाडी बढाउने निर्णय गरियो।
४. प्रस्तावित कनका सुन्दरी सौर्य मिनि ग्रिड बाट उत्पादित विद्युत बाट साविक कनका सुन्दरी गाउँपालिका को वडा नं ६ लाहाज गाउँ का बस्ती मा बस्ने बासीन्दा को घर धुरी लाई विद्युत उपलब्ध गर्ने निर्णय गरियो।
५. यो कार्य कम कनका सुन्दरी मिनिग्रिड कम्पनी इनर्जी प्रा. लि. ले सञ्चालन गर्ने हुँदा आउने कुनै पनि समस्या अगाडी बढेर आउने र विवाद सृजना नगर्ने निर्णय गरियो।

Meeting Minute of community consultation

Annex 4: BES Approval Letter & BES Report Cover Page



कनकासुन्दरी गाउँपालिका
गाउँकार्यपालीकाको कार्यालय
बिराट ,सिञ्जा जुम्ला
कर्णाली प्रदेश नेपाल
Email : ito.kankasundarimun@gmail.com

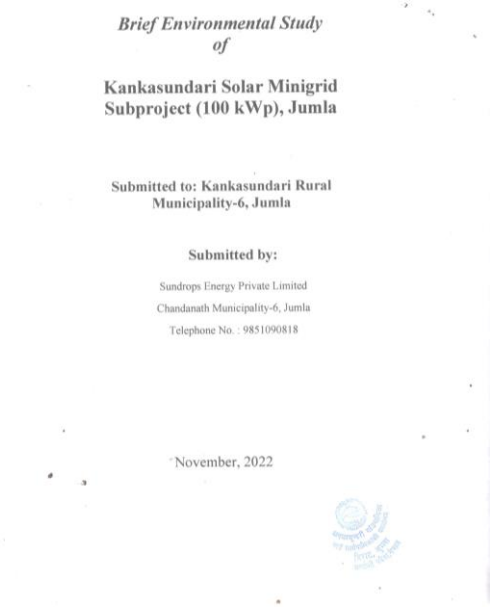
प सं ०७९।०८० मिति २०७९।०८।१४
च नं ५४०

श्री सनड्प्स इनर्जि प्रा लि
चन्दनाथ नगरपालिका
६ जुम्ला

विषय :-प्रतिवेदन स्वीकृत सम्बन्धमा ।

यस कनकासुन्दरी गाउँपालिका वडा नं. ६ साविक विराट गा. वि.स वडा नं ५ ६ मा निर्माण हुने १०० किलो वाट क्षमता भएको कनकासुन्दरी मिनि सोलार आयोजना प्रबन्धको लागि त्यस प्रा लि ले पेश गरेको संक्षिप्त वातावरणी अध्ययन प्रतिवेदन "संक्षिप्त वातावरणी अध्ययन तथा प्रारम्भिक वातावरणी परिक्षण कार्यविधि २०७८" दफा ७ को उपदफा ४ बमोजिम स्वीकृत गरिएको व्यहोरा अनुरोध छ ।

टेक बहादुर शाही
प्रमुख प्रशासकीय अधिकृत



Brief Environmental Study
of

Kankasundari Solar Minigrid Subproject (100 kWp), Jumla

Submitted to: Kankasundari Rural Municipality-6, Jumla

Submitted by:

Sundrops Energy Private Limited
Chandanath Municipality-6, Jumla
Telephone No. : 9851090818

November, 2022

Annex 5: Policy Gap between GoN and WB

Category	Government of Nepal (GoN) Policy	World Bank (WB) Policy	Gaps between GoN & WB policy	Recommendations to Bridge the Gaps
A. Environment (Natural Habitat , & Forest including terrestrial and aquatic) (OP/BP-4.01, 4.04 & 4.36)	Development Project under EPR 2020 criteria should be subjected to Brief Environmental Study (BES)/ Initial Environmental Study (IEE)/ Environmental Impact Study (EIA), Schedule 1, 2 & 3 pertaining to Rule-3. (for example operation of electricity generation from 1 to 50 MW requires IEE. However any proposal irrespective of the capacity is to be implemented in the following areas requires EIA: Historical, cultural and archaeological sites; • Environmentally weak and wet areas; • National Parks, wild life sanctuaries and conservation areas; • Semi-arid, mountainous and Himalayan regions; • Flood prone and dangerous	• Environment Assessment shall be carried out for identifying potential risks and adverse impacts, along with mitigation measures; • Detail Environmental Management Plan (EMP) shall be prepared to address all the policies triggered related with natural habitat and physical, cultural resources. The EMP shall adequately address the relevant issues.	• Activities listed in EPR 2020 Schedule 1 requires BES, Schedule 2 requires IEE and those listed in Schedule 3 requires EIA. The Schedule 1, 2 and 3 are based on activity type, threshold/size, as well as location. The Potential risks associated with the project are omitted in GoN policy. • Hence, Environmental & Social (E&S) Screening exercise shall be carried out to assess the potential risk associated with the project before selection of the project proposal.	• Detailed E&S Screening shall be carried out followed by detailed ESMP in parallel with the Detail Engineering Design to bridge the gap between WB and GoN requirements/approach. The ESMP aims to address all the adverse environmental impacts arise during execution and operation of the project. • The ESMP so prepared shall be made integral part of bidding document so that the Contractor shall adhere to the provisions prescribed in the ESMP during execution of the project.

	areas; • Residential, school and hospital areas; and • Areas with main sources of public water supply. This approach often ignores potential risks and impacts and risks are site specific and depending on site condition. • Forest regulation requires permission from related authorities (Conservation Authorities, DFO, CFUG etc.) for any intervention in forested area. • National Park and Wildlife Conservation (NPWC) Act, demands permission from Ministry of Forests and Environment (MoFE).			
B. Physical-Cultural Resources (OP/BP- 4.11)	The EPR 2020 Rule 32 & 33 states that physical and cultural resources shall not be disturbed or damaged without the prior approval of concerned authority.	Environmental Assessment needs to carried out incase such resources are found to be affected by the implementation of the subproject	"Chance find' is not covered by the EPR requirements	ESMP shall address such issues following GON and WB Policy with the addition of "Chance Find" provisions and requirements.
C. Involuntary Resettlement and Loss of Land/Structure Crop/Income Source	• Clause 3 of the Land Acquisition Act states that any asset that is required for public purposes shall be acquired by providing compensation.	• Full compensation at replacement cost for lost assets shall be provided according to asset types and location.	• The Land Acquisition Act of Nepal only has a provision for cash compensation based on degree of loss. It does not take into account vulnerability of the affected person upon losing	• The project shall be required to prepare vulnerability assessment and mitigation plan for the affected people that have a impacts on their livelihood after losing the

(OP/BP-4.12)	• Compensation Fixation Committee shall establish the Compensation rates. • Guthi Corporation Act, 2033 (1976). Section 42 of this Act states that Guthi land (religious trust land) acquired for the purpose of the development shall be replaced with other land, than compensated in cash • The LRA 1964 establishes the tiller's right on the land, which s/he is tilling. It additionally specifies the compensation entitlements rights of registered tenants on the sold land by the owner. • Compensation shall be provided for loss of crop damaged and income source.	• Resettlement and Rehabilitation assistance to affected people shall be provided by the project to enable them to improve their living standard. • As per OP 4.12 community assets needs to be replaced in consultation with the community. • As per OP 4.12, all those who are affected needs to be assisted including tenants and sharecroppers. • Full compensation for loss of land/crop/ asset/income source shall be provided.	the land.	land. The project shall assist those who have impacts on their livelihood due to land acquisition by the project including tenants. • The community assets need to be replaced following the Build Back Better Philosophy. • Pragmatic livelihood assistance program shall be designed by the project
D. Indigenous People & Community (IP&C) (OP/BP-4.10)	• The GoN encourages to include and consider IP&C's concerns in each and every development and infrastructure programs and formulate a plan or	• The WB policy ensures Free, Prior, and Informed Consultation (FPIC) with the affected indigenous people to obtain broad community support for the project.	• The GoN encourages development programs to incorporate income generation schemes for IP&C, the provision of FPIC and broad consent from the IP&C is	• The Project shall carry out FPIC with the indigenous community and other vulnerable communities to obtain broad consent on the project.

	mechanism to incorporate income generation program targeted to IP&C. • NFDIN Act 2002, Local Self-Governance Act, 1999 and Tenth Plan (2007-10) and Three Year Interim Plan (2011-13)	• Details Social Impact Assessment (SIA) shall be carried out to identity potential impacts and prepare plans to ensure that indigenous peoples receive social and economic benefits that are culturally appropriate.	absent. Nonetheless, the GoN has ratified ILO 169 and United Nations Declaration of Rights of Indigenous People (UNDRIP). • The GoN is in the process of preparing National Action Plan to implement the international commitments. • GoN does not have a standalone policy on Indigenous Peoples and other vulnerable communities which otherwise would have been put significant emphasis on delivering basic services to the disadvantaged and indigenous people, Dalits, women, disabled and other vulnerable groups. The Policy, Acts and Plans shall facilitate to embrace the Adivasi/Janajati and other disadvantaged groups in the main stream of development process by: • creating an environment for social inclusion; • participation of disadvantaged groups in policy and decision making; • developing special programs for disadvantaged groups; • positive discrimination or	• Project shall prepare Vulnerable Community Development Plan (VCDP) based on community need assessment.

			providing equal opportunity in education, employment, etc.; • protection of their culture, language and knowledge; • proportional representation in development process; and • making the country's entire economic framework socially inclusive.	

Annex 5: A Template of Grievance Record Form

Name of Grievant:	**Contact detail** **Work Phone:** **Home Phone:** **Mobile No.:**
Home Mailing Address:	**Work Mailing Address:**
Date, time and place of grievance recorded:	
Detailed description of grievance:	
Proposed solution to grievance:	
_____ Signature of Grievant	_____ Signature of Grievance Receiver

Annex 6: Occupational Health and Safety Plan

Kankasundari Solar Mini Grid Subproject, Jumla

Occupational Health and Safety Plan

A. Management Commitment to Occupational Health Safety (OHS)

1. Goals for OHS Plan:

- Develop, implement, and maintain a safe workplace for our employees consistent with all applicable national regulations
- Consistently improve the safety program to minimize incidents, therefore ensuring employees' long-term safety and wellness.

Person responsible for implementing and monitoring the Safety Program: *Prakash Shahi*

Managing Director: *Prakash Shahi*

Date:

2. Employer Responsibilities

To provide employees with a workplace free of hazards that may cause illness or serious physical harm.

To comply with standards, rules, and regulations

- Allow employees free access to tools and equipment necessary to do a job safely.
- Provide employees with training/orientation on specific safety issues and equipment.
- Conduct regular inspections.
- Following up after safety incidents with thorough accident investigations, correcting problems and post-accident employee training.
- Recognize employees with the best OHS practices.

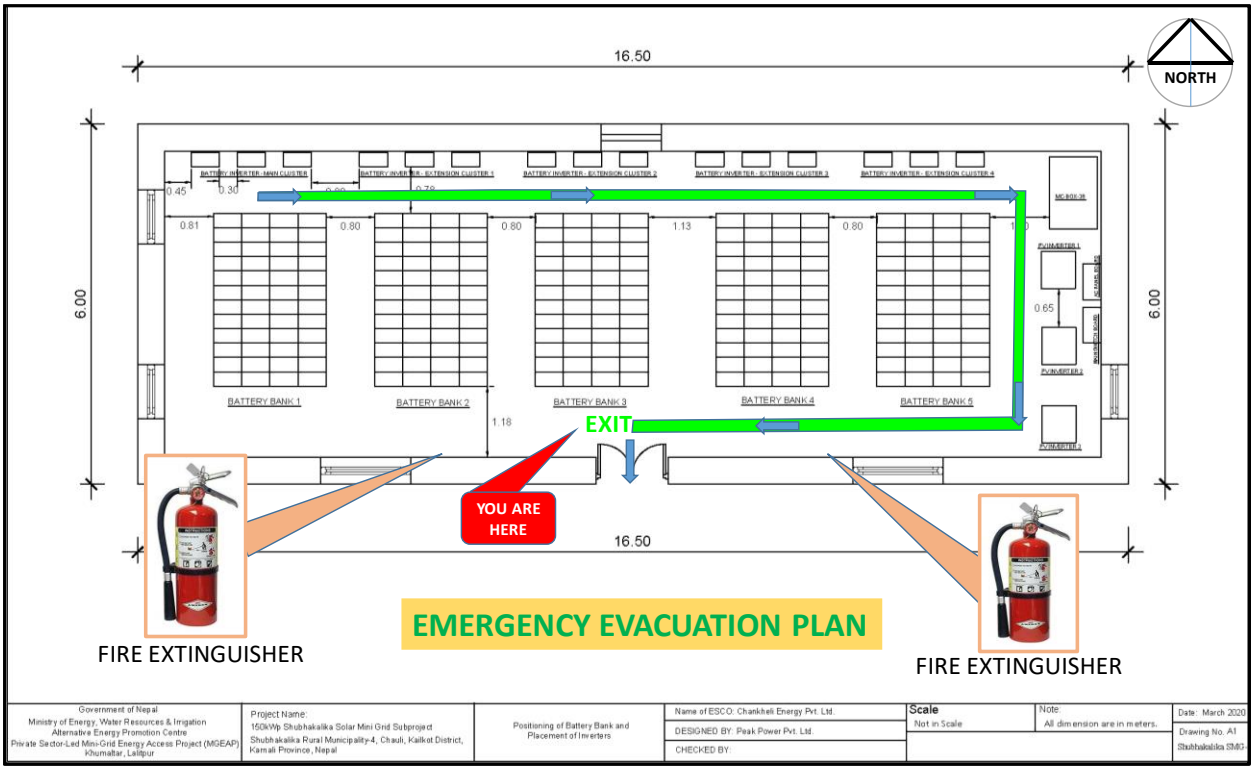
3. Employee Responsibilities

- Handle equipment and work processes in accordance with established procedures and documented protocols.
- Report any unsafe conditions, defects in equipment, or injuries to management immediately.
- Complying with all management instructions for safe conduct.
- Attend OHS related trainings/orientations and practice drills.
- Obtain permission to operate equipment.
- Never participate in horseplay, scuffling, and other acts that endanger the safety or well-being of the team.
- Not report to work under the influence of alcohol and/or drugs or during illness.

4. Employee Injury and Illness Reporting

All injuries must be reported to the immediate supervisor or Emergency Response Team.

- Location of First-aid box and fire extinguisher : Within the premises of Solar PV location area/Powerhouse
- Emergency contact number:Prakash Shahi, 9851090818
- Emergency health centre location: Health Post Center, Kankasundari RM,Jumla
- Evacuation location: Ward No. 6, Kankasundari RM



Report any hazard to:

Supervisor's Name: Prakash Shahi

Contact No.: 9851090818

After hours/weekends:

5. Incident Investigation

In an emergency situation, **dial 100** immediately

- All injuries and illnesses should be reported, no matter how large or small.
- Fill up incident reporting form.
- Document the injury/illness completely while doing a thorough root cause analysis of the incident so that corrective action can be determined to prevent future incidents.
- Part of the safety corrections may include employee orientation and counselling to correct unsafe behaviours, prevent injuries, and improve safety.

B. Hazard Identification and Assessment

1. Information available in the workplace may include:

- Equipment and machinery operating manuals.
- Material Safety Data Sheets (MSDS)
- Records of previous injuries and illnesses
- Patterns/trends of frequently occurring injuries and illnesses
- Existing safety and health programs, such as tag out, confined spaces, process safety management, personal protective equipment etc.
- Input from workers

2. General Safety Programs

- Confined space entry
- Driving safety
- Electrical safety (wiring methods, components and equipment, electrical system design)
- Emergency Action Plan
- Ergonomics (scientific study of people and their working environment)
- Fall protection
- Fire safety

3. Personal Protective Equipment

All personal protective equipment (PPE) and tools to safely perform the work will be provided to employees and properly maintained in accordance with manufacturer guidelines.

Organization's PPE Plan – use of appropriate PPE

All employees will be trained on the personal protective equipment that is required to do their jobs effectively. The Company will review any employee feedback on the use of this equipment and potential improvements that can be made.

All employees will be provided with safety vests and safety hard hats. The employees will also be wearing steel-toe boots within the construction premises. Safety harnesses will also be provided for work above the ground and in elevated areas. Safety gloves and glasses will be worn at all times.

4. Hazard Prevention and Control

Using the following standard methods:

- Safe Work Practices
- Engineering Control
- Training
- Enforcement
- Personal Protective Equipment
- Administrative Control
- Preventive Maintenance

5. Work Place Environment

- Light
- Temperature
- Ventilation
- Sound
- Working space Cleanliness
- Garbage Management
- Provision of Drinking Water
- Canteen
- Toilet Facility
- Resting time and resting place
- Safety provision in workplace

6. Communication

Standard methods for the communication with employees:

- Group orientation/individual induction
- Posters/signage/forms/formats
- Regular Meetings on OHS
- Safety suggestion box
- Online forms
- Hotline

C. Training and Education

Safety training will be provided for employees:

- During new hire on boarding.
- When beginning new job assignments.
- When cross training on new types of machinery/equipment.

- When new substances, processes, procedures, or equipment are introduced to the workplace and represent a new hazard.
- Periodically, in the form of refresher training (this may be following a near miss or incident, which can be required).

The purpose of our training program is to provide employees with:

- Knowledge and skills needed to do their work safely and avoid creating hazards that could place themselves or others at risk.
- Provide awareness and understanding of workplace hazards and how to identify, report, and control them.
- Specialized training, when their work involves unique hazards.

D. Program Evaluation and Improvement

- Verify that the core elements of the program have been fully implemented.
- Ensure that the following key processes are in place and operating :
    - Reporting injuries, illnesses, incidents, hazards, and concerns.
    - Conducting workplace inspections and incident investigations.
    - Tracking progress in controlling identified hazards and ensuring that hazard control measures remain effective and is completed promptly.
    - Collecting and reporting any data needed to monitor progress and performance.
- Review the results of any compliance audits to confirm that any program shortcomings are being identified and that actions are being taken that will prevent recurrence.
- Review and update plans/processes based on the company's loss history.
- The person tasked with the overall responsibility to evaluate the Company's safety program and processes is:

Name: Mr. Prakash Shahi

Contact Information: 9851090818

Annex 7: Emergency Preparedness and Response Plan

Kankasundari Solar Mini Grid Subproject, Jumla

Emergency Preparedness and Response Plan

Types of Incident, Severity and Level of Response

Types of Incident	Severity	Level of Response
Serious injury or medical emergency	Level 1 – Minor: e.g, localized fire Level 2 – Serious: e.g, containable fire Level 3 – Severe: e.g, serious fire	**Level 1** ● can be dealt with by the person identifying the problem ● supervisor should be informed and the incident formally logged ● do not involve plant evacuation or Emergency Response Team (ERT) **Level 2** ● Immediate action should be taken ● the person identifying the problem call Security to summon ERT assistance ● ERT takes necessary emergency actions ● May involve plant evacuation **Level 3** ● Immediate action should be taken ● the person identifying the problem call Security to summon ERT assistance ● ERT takes necessary emergency actions ● Must involve plant evacuation and Emergency Response Team
Fire or explosion		
Chemical spill		
Vandalism and other threats		
Others		

ERT – Emergency Response Team

1. The Emergency Organization

Operating Personnel	ERT	External Services	Others
Problem Identifier Supervisor	Incident controller First Aiders Fire checkers Others, as required	Ambulance Fire Medical Health & Safety Security	ESS specialist Site in charge

2. **Emergency Response Equipment**

Emergency Response Equipment	**Location**	**Capability functions**	**Inspection frequency**
Smoke Purge Generator	Utilities	To Extract Smoke To power in emergency	Monthly and quarterly
Fire alarm	Reception and plant rooms	To audibly alert all personnel of the presences of a Fire or Smoke	Weekly
Spill kits	Security	To contain potential local leaks	Monthly
Radio	Individually held and Reception	To ensure clear open communication in event of emergency	Weekly
Fire Extinguishers	Plant wide	To provide local, portable extinguishers for the suppression of a small fire	Annual
First Aid Kits	Security	To Supply Dressing/Burn Material	Weekly

3. **Training**

To	**On what**
Employees	Emergency response and evacuation
Contractors	Emergency response and evacuation
Visitors	Emergency response and evacuation
Emergency Response Team	Emergency response procedure Basic fire response procedure Chemical Spill
First aiders	First aid
Security	Call response and dealing with external threat
Incident controller	Incident control

4. **Drill and communication –** *should be taken annually*

5. **Incident Response**

Personal Injury/Medical Emergency			
Instructions for all employees and contractors	**Instruction for First Aid Personnel**	**Instruction for Supervisors**	**Instructions for Security**

If incident involves personal injury - remove the hazard if safe to do so	On instruction from Security or Incident Controller, proceed to scene of injured personnel	Liaise with First Aider and find out what further medical intervention is required.	Ask caller to **Remain Calm**
General Site Evacuation			
should make safe any equipment you are using if safe to do so and immediately leave the building by the nearest emergency exit Proceed to your designated Assembly Point			
Fire			
If trapped - Close as many doors as possible between you and the fire In case of smoke - Stay as low as possible			Receive emergency call Fire alarm activation Sprinkler water flow alarm
Chemical spill			
Others:			
Instructions for ● Emergency Response Team ● Others			

6. Incident Report Checklist

A. Attendance		
	Present	**Signature**
Fire checker		
B. Notification		
	Notified	**Response**
Ambulance	Yes/No	Yes/No
Fire brigade		
C. Responsibilities		

Security	Security guard	Ensured no authorized entry

7. Directory of Emergency Contacts

Name	Organization	Contact Address	Contact No.
…….	Security	Jumla, Kankasundari RM-6	
…….	Physician	Jumla Hospital, Khalanga	
Jumla	Hospital	Khalanga	
N/A	Fire Brigade	N/A	
	Ambulance	Jumla Hospital	
……	1. Kankasundari Rural Municipality	Kankasundari-6	
…… ……..	Ward Office – Ward No. 6, Kankasundari Rural Municipality	Kankasundari-6	
…….	ESS Focal Person of the subproject	Jumla, Kankasundari RM	
……	Team Leader, ERT	Jumla, Kankasundari RM	
Peak Power Company	Contractor	Kathmandu	

Annex 8: Transportation Management Plan

Kankasundari Solar Mini Grid Subproject, Jumla

Transportation Management Plan

Name of the Subproject: Kankasundari Solar Minigrid

Capacity of the Subproject: 100 kWp

Address: Kankasundari, Jumla

Detail of vehicle	Types of vehicle: Excavator No. of vehicle: 1
Designated staff (who implements TMP) Equipment/vehicle operators	Name: Contact No. Contact Address: Surkhet
Work time (for vehicle movement)	10 AM to 5 PM
Transportation route	Inform traffic police Co-ordination with traffic police Kathmandu to Surkhet Surkhet to Manma Kalikot to Kankasundari RM
Use of signage Number and type of signs to be placed Condition of signs (clean, legible, and reflective)	Do not enter – 2 (Reflective) Construction work is in progress – 2 (Reflective) Battery explosion sign Battery safety sign Shutdown sign
Flagging	Use of flag Use of illuminating flag for night time Training for flaggers Provide high visibility vest for flaggers

	(especially for night time) Drivers to be warned in advance
Work Zone protection	Speed limit to 10km/hr Communication between worker on ground and equipment operator Communication between equipment operators
Traffic control devices	Use of Barricade, Cones Signals, Message boards
Lightening	Illuminated for night time at least 5 foot candle (1 ft)
Training	Training on Traffic Management Plan - Route of construction vehicle movement For those who are directly/indirectly involved

Annex 9: Labor Management Plan

Potential Issue	Strategy	Proposed Activities	Responsibility	Timeline
Health and Safety Condition of Workers	• A **safe and healthy work environment** taking into account inherent risks and hazards. • **Awareness raising** activities to prevent accidents, injury and disease. • **Proper record of Accidents, injury and disease.**	• Regular Orientation and Training regarding Occupational Health and Safety. • Provision of preventative and protective measures (PPE use). • Documentation and reporting of accidents, diseases and incidents. • Emergency prevention, preparedness and response arrangements.	ESCO (to be verified by AEPC)	Project preparation phase to end of sub-project.
Non-Discrimination and Equal Opportunity	• **Ensure equal opportunity and fair treatment** with respect of hiring, working conditions access to training and promotion.	• **Promote fair and equitable labor practices** for the fair treatment, non-discrimination and equal opportunity to workers. • Maximize the **local employment opportunity.**	ESCO (to be verified by AEPC)	Project preparation phase to end of sub-project.
Protecting the Workforce (Child labor, Forced labor and labor influx)	• **Will not employ children** in any manner. • **Will not employ forced labor**, which consists of any work. • **Hire skilled and unskilled workers from affected communities.** • Incoming workers, their living arrangements should be **discussed and agreed with communities** in advance.	• Follow National Laws as applicable (Children below the age of 18). • Working hours for women must be between 6 AM to 6 PM and prohibits night working hours. • Labor Registration Sheet must be filled with mentioned details. **During construction phase**, it must be reported **monthly** and in **operation phase, it should be semi-annually.**	ESCO (to be verified by AEPC)	Project preparation phase to end of sub-project.
Implementation of Workers Code of Conduct	• **Preparation and implementation** of Workers Code of Conduct (CoC) and CoC of SEA/SH	• Do's and Don'ts for the workers/labors • Regular Orientation regarding the code of conducts.	ESCO	Project preparation phase to end of sub-project.

Potential Issue	Strategy	Proposed Activities	Responsibility	Timeline
Lack of social and cultural awareness	**Awareness training** about different type harassment and gender-based violence.	• Orientation on GBV and SEA/SH • Social and cultural awareness training especially on gender norms and other norms and values of the community. • Implementation of sub-project GRM and ensuring accessibility of female members of community.	ESCO	Project preparation phase to end of each sub project.
Labor Camp Management	Follow **Occupational Health and Safety Plan, National rule and regulation/ policies for labor**.	As per **Occupational Health and Safety Directive of Brick Industry, 2074 (ईटा उद्योग)** • Room size 10ft /8ft and 8ft height • Beside family members, separate room for male and female workers. • Kitchen and room must be separate. • Keep 100 m distance between work station and labor camp • Availability of First Aid Kit • Sufficient Water Supply (including drinking)	ESCO (to be verified by AEPC)	Project preparation phase.

Annex 10: Battery Management Plan

Kankasundari Solar Mini Grid Subproject, Jumla

1. **Product Name and Type**

   Sacred Sun OPzV series, Valve Regulated Sealed Lead Acid Battery (VRLA) 15 OPzV 1500 2V1500Ah (OPzV Series)

2. **Supplier of the product**

   Sacred Sun Power Sources Co., ltd.

3. **Composition/information on ingredients**

   Sacred Sun OPzV series are valve regulated lead-acid cells which use a combination of tubular positive plate woven gauntlets, pasted negative plate design and gel electrolyte using advanced filling techniques in production which assure superior service life and excellent battery reliability. GEL state electrolyte prevents leakage and layering. Low resistance PVC or PF micro-porous separator ensures low self-discharge rate.

4. **Properties (Stability and Reactivity)**
   - 1500+ cycles at 80% DOD
   - High rate discharge performance
   - High gas recombination efficiency
   - Maximum charge efficiency
   - GEL state electrolyte prevents leakage and layering
   - Low resistance PVC or PF micro-porous separator ensures low self-discharge rate
   -

5. **Regulatory Framework**
   - IEC 60896-21/22
   - IEC 61427
   - DIN 43539-T5
   - DIN 40742
   - EUROBAT guide

6. **Hazards and Response**

	Hazard	Response
Inhalation	Sulfuric acid's hazard increases as a fume, causing significant damage to internal tissues. Lead can replace metallic atoms in biological processes which is a major component of red blood cells, or the calcium in bones.	In VRLA battery there is less likelihood of spillage and inhalation. Battery will be sent to recycle after its life so that it do not contaminate other components. Power house design and built with well ventilation.
Ingestion	Neurotoxin, as electrodes causing significant damage to internal tissues.	In VRLA battery there is less likelihood of spillage and ingestion. Battery will be sent to recycle after its life so that it do not contaminate other components. Power house

	Hazard	Response
		design and built with well ventilation.
Skin contact	a highly acidic acid, as a electrolyte, cause damage - particular to bodily tissue	In VRLA battery there is less likelihood of spillage and skin contact. Battery will be sent to recycle after its life so that it do not contaminate other components. Power house design and built with well ventilation.
Eye contact	Sulfuric acid's hazard increases as it can come in contact with eyes, causing significant damage to internal tissues.	In VRLA battery there is less likelihood of spillage and eye contact. Battery will be sent to recycle after its life so that it do not contaminate other components. Power house design and built with well ventilation.

7. Protection Measures

i. First Aid measures

Measure	Capability functions	Inspection frequency
First Aid Kits	To Supply Dressing/Burn Material	Weekly
Training on first aid	Basic emergency response procedure	Biannual

ii. Firefighting Measures

Measure	Capability functions	Inspection frequency
Fire alarm	To audibly alert all personnel of the presences of a Fire or Smoke	weekly
Fire Extinguishers	To provide local, portable extinguishers for the suppression of a small fire	annual

iii. **Accidental Release Measures**:

Serious injury or medical emergency	**Level 1 (minor)** • can be dealt with by the person identifying the problem • supervisor should be informed and the incident formally logged • do not involve plant evacuation or Emergency Response Team (ERT) **Level 2 (serious)** • Immediate action should be taken • the person identifying the problem call
Fire or explosion	
Chemical spill	
Vandalism and other threats	
Others	

	Security to summon ERT assistance • ERT takes necessary emergency actions • May involve plant evacuation **Level 3 (severe)** • Immediate action should be taken • the person identifying the problem call Security to summon ERT assistance • ERT takes necessary emergency actions • Must involve plant evacuation and Emergency Response Team

iv. Exposure Controls/Personal Protection

Instructions for all employees and contractors	**Instruction for First Aid Personnel**	**Instruction for Supervisors**	**Instructions for Security**
If incident involves personal injury - remove the hazard if safe to do so	On instruction from Security or Incident Controller, proceed to scene of injured personnel	Liaise with First Aider and find out what further medical intervention is required.	Ask caller to Remain Calm
Evacuation		Proceed to your designated Assembly Point	immediately leave the building by the nearest emergency exit
If trapped			Close as many doors as possible between you and the fire
In case of smoke -		Receive emergency call Fire alarm activation	Stay as low as possible Sprinkler water flow alarm

8. Toxicological Information

	Toxicity	Hazard
Sulphuric acid	Use of sulphuric acid - a highly acidic acid, as a electrolyte	Sulfuric acid's hazard increases as a fume, causing significant damage to internal tissues.
Lead	Neurotoxin, as electrodes causing significant damage to internal tissues.	Lead can replace metallic atoms in biological processes which is a major component of red blood cells, or the calcium in bones.
Explosive gas	Production of explosive gas when overcharged	Acid may become airborne in the form of fumes. As a fume, as it can come in contact with eyes or be

		inhaled, causing significant damage to internal tissues.

9. Ecological Information

	Ecological Information
Sulphuric acid	Sulphuric acid is subsequently known as a dangerous chemical for the environment.
Lead	Lead is a significant problem in the fishing industry, in which the lead content in fish can be passed on to humans. As the lead passes from animal to animal through the food chain, more and more lead content will accumulate and become increasingly poisonous towards the end of the food chain, which in many cases is the human population.
Explosive gas	If a lead acid battery is overcharged, it can causes hydrogen gas to vent out of the battery. Hydrogen gas is highly flammable, and will combust if exposed to a spark or flame.

10. Transport Information (from the manufacturer to the subproject site)

Germany to Kathmandu

China to Kathmandu

Kathmandu to Surkhet

Surkhet to Manma Kalikot

Manma Kalikot to Kankasundari RM-6

- Shipping name: Valve Regulated Sealed Lead Acid Battery CAS NO: 7439-92-1
- The product has been undergone the testings including Vibration test, Pressure differential test and Leakage test at 55° C according to the SP-238 all the test resulted are passed.

11. Disposal Considerations

The aged VRLA batteries will send to recycling plant. Valve regulated sealed lead acid battery are restricted land disposal objects. All spent batteries should be properly recycled to a permitted Secondary Lead Smelter. All battery parts should be properly recycled. No whole spent battery should be landfilled or placed in house hold garbage.

12. Name and Contact detail of person responsible for battery management

Mr. Prakash Shahi,

Managing Director,

Sundrops Energy Ltd. Ltd.

Mobile: 9851090818

Annex 11: Waste Management Plan

Construction Waste Management Plan of Kankasundari Solar Mini Grid

This Construction Waste Management Plan is prepared by AEPC/MGEAP to manage construction waste generated during construction of solar mini grid subproject under AEPC/MGEAP.

This plan will be adhered to by all contractor, sub-contractors, ESCO along with construction workers during the construction of solar mini grid subproject.

Types of Waste Generated:

- Cardboards
- Wooden boxes
- Cement bags
- Plastic products
- Metal scarps
- Glasses
- Nails
- Sharp materials
- Rubbers

Management of Waste at Project Sites

a) Follow 3 R (Reduce, Reuse and Recycle) principle
b) To the extent possible, the project shall reuse of second products, repairing broken items instead of buying new item, etc.
c) Follow prevention (avoid) of waste generation at source
d) Project should proposed waste mitigation measures

Management of Construction Waste Generated at Construction Site

S. No.	Types of Waste	Method of Management
1.	Cardboards	Recycle
2.	Wooden boxes	Recycle and Reuse
3.	Cement bags	Reuse
4.	Plastic products	Recycle and Reuse

5.	Metal scarps, Nails	Recycle
6.	Broken glasses	Recycle

Annex 12: Gender Equality and Social Inclusion Action Plan

Gender Issues	Strategy	Proposed Activities	Responsibility	Timeline
Lack of awareness	Awareness campaign about the project for the communities focusing on the vulnerable groups including women and socially excluded groups.	• Ensure representation of women and socially excluded people in the grievance redress committee, benefit sharing scheme committees as well as in other committees formed under the subproject, ensuring women take up one of the three key roles. Share information about the subproject benefits in Nepali language (if possible in local language). • Information/ awareness campaigns through coordinating with locally formed Clubs and Groups and NGOs.	ESCOs (to be verified by AEPC)	Preparation, construction and operational phases of sub project.
Excluded from Opportunities and low level of participation in decision making and leadership process because of social/cultural	Gender sensitization to all stakeholders including subproject entities. Gender inclusive consultation and social mobilization	• Carry out consultation, focus group discussion, interviews, meetings and interaction program with and orientation especially to women in the subproject area, at time and venue convenient for them.	ESCOs (to be verified by AEPC)	Throughout the subproject period
Disparity in Wages	• Accord priority employment to women and people of vulnerable groups in construction activities under the project. • Promote equal wages for equal work	• Identify women and vulnerable people interested to work; assess their skills and provide them employment as per their capabilities. • Nondiscriminatory approaches will be taken in employment on the basis of sex, caste, religion and ethnicity as per the mandate of labor law. • Ensure women's wage rate and do the needful to guarantee wage equality for similar nature of works.	ESCOs (to be verified by AEPC)	

Lack of trained women in mini grid sector	Promote need based technical, administrative and support services.	• Conduct training on newly introduced technologies and its health and safety usages • Skill training to women in vocational fields and to establish enterprises/business after electrifying the subproject area.	ESCOs (to be verified by AEPC)	

Annex 13: Photographs

Proposed Land for Solar PV Installation and Construction of Powerhouse

Community Consultation

Consultation with the Ward Chairperson, Kankasundari RM

Load Centre (Lharja)

Load Centre (Datheokhar)

Load Centre (Goruchaur)