



KfW



Environmental and Social Management Framework

for

Promotion of Solar Energy in Rural and Semi-urban Regions of Nepal

(A project financed by Federal Government of Germany through KfW Development Bank)

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Ministry of Energy, Water Resources and Irrigation

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Executive Summary

The Environmental and Social Management Framework (ESMF) has been prepared for the Project, “Promotion of Solar Energy in Rural and Semi-urban Regions of Nepal”. This ESMF has been prepared in-line with the legal framework of the Government of Nepal for environmental and social assessment of development projects, the Sustainability Guideline of the KfW Development Bank (28 February 2022), and the Environmental Social Framework (ESF) as well as Environmental Health and Safety Guidelines of the World Bank. It provides guidance on procedures for assessment and management of environmental, social and climate aspects, during the preparation and implementation of the Project.

The ESMF provides a general overview of the potential project’s impacts without site-specific details of each subproject and provides guidance on the Environmental and Social (E&S) risk management in all subprojects to address the E&S impacts associated with the implementation of the subprojects of each component. Energy generation from renewable source of energy, improvement of living conditions and economic development, employment generation during the construction and operation phases, reduction in dependency on fossil fuel and imported fuels, reduction in greenhouse gas emission, combating air pollution are some of the beneficial impacts of the Project. Increased carbon footprint, water consumption and waste generation (during construction, operation and dismantling), use of thermal energy, environmental release (on air, water and land) and climate induced disasters are some of the adverse impacts envisaged for all 3 Project Components.

This ESMF provides guidance for the incorporation of E&S safeguards in the planning, execution and operation stages of each subproject under Component 1 and Component 2A & 2B. A set of eligibility criteria defined for 3 components shall be used for screening of the demands that comes from the applicant during the project preparatory phase separately. The screening leads to identify the type and scale of potential key environmental and social impacts and determine the risk category of the subprojects. A proposed subproject is classified as **High Risk** (Category A), **Substantial Risk** (Category B⁺), **Moderate Risk** (Category B) divided into the 2 subcategories Moderate and Lower Risks, or **Low Risk** (Category C) based on the *type* and *scale* of the subproject, its *location*, *sensitivity* of environmental issues, and the *nature* and *magnitude* of potential risks and impacts.

The High Risk and Substantial Risk subprojects (Categories A and B⁺) shall be excluded from financing under the Project. In addition, the projects enlisted in the “Exclusion List of the KfW Bank” will not be eligible, for the Project. The subprojects categorized as Moderate Risk need to conduct E&S assessment and prepare Environmental and Social Management plan (ESMP) and the subprojects categorized as Lower Risk need limited action in form of a Environmental and Social Code of Practices (ESCAP), besides E&S Screening Report. Where there are impacts on IPs or other vulnerable communities, a VCDP shall be required. Stakeholder engagement activities will be required in particular where there are affected communities, in compliance with the SEF. The ESMF is a living document and will be updated and revised as and when required.

Abbreviations and Acronyms

ACs	Affected Communities
AEPC	Alternative Energy Promotion Centre
AP	Affected People/Person
BoQ	Bill of Quantity
BPL	Below Poverty Line
CBO	Community Based Organization
CC	Construction Contractor
CDC	Compensation Determination Committee
CITES	Convention on International Trade of Endangered Wild Fauna and Flora
CNI	Confederation of Nepalese Industries
CO ₂	Carbon dioxide
COC	Code of Conduct
CREF	Central Renewable Energy Fund
C&I	Commercial and Industrial
CSR	Corporate Social Responsibility
CUG	Community Users' Group
D/S	Community Users' Group
DAG	Disadvantaged Group
DCC	District Coordination Committee
DD	Detail Design
DFS	Detailed Feasibility Study
DPR	Detail Project Report
DKTI	The German Climate and Technology Initiative
DRE	Distributed Renewable Energy
EA	Environmental Assessment
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EPA	Environment Protection Act 2019
EPC	Engineering Procurement and Construction
EPR	Environment Protection Rule 2020
ESAP	Environmental and Social Action Plan
E&S	Environmental and Social
E&SA	Environmental and Social Assessment
ESCO	Energy Service Company
ESCOPE	Environmental and Social Code of Practices
ESF	Environmental and Social Framework
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Safeguard
EUR	Euro
FC	Financial Cooperation
FG	Federal Government

FGD	Focus Group Discussion
FIs	Financial Institutions
FM	Financial Management
FNCCI	Federation of Nepalese Chamber of Commerce and Industries
FS	Feasibility Study
GAP	Gender Action Plan
GDF	Gender Development Framework
GESI	Gender and Social Inclusion
GHG	Green House Gases
GIS	Geographic Information System
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GoN	Government of Nepal
IFC	International Finance Corporation
Ips	Indigenous Peoples
KfW	Kreditanstalt für Wiederaufbau
KII	Key Informants Interview
kW	Kilo Watt
kWp	Kilo Watt peak
LG	Local Government
MoEWRI	Ministry of Energy, Water Resources and Irrigation
MW	Megawatt
NPR	Nepalese Rupees (Nepalese Currency)
NEPQA	Nepal Photovoltaic Quality Assurance
O&M	Operations & Maintenance
PAFs	Project Affected Families
PEA	Project Executing Agency
PG	Provincial Government
POSTED	Promotion of Solar Technologies for Economic Development
PV	Photovoltaic
RE	Renewable Energy
RECON	Renewable Energy Confederation of Nepal
RM	Rural Municipality
RVTs	Reservoir Tanks
SEF	Stakeholder Engagement Framework
SEMAN	Solar Electric Manufacturers Association Nepal
SEP	Stakeholder Engagement Plan
SIP	Solar Irrigation Pumping
SMG	Solar Mini grid
UG	Users Group
WB	The World Bank

Chapter 1: Project Overview

1.1 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 rural/renewable energy technology to meet the energy needs in Nepal. The Environmental and Social Management Framework (ESMF) has been prepared for the Project, “Promotion of Solar Energy in Rural and Semi-urban Regions of Nepal”.

1.2 Background of the Project

Table 1: Project key information

Project at a Glance	
Country	Nepal
Project Title	“Promotion of Solar Energy in Rural and Semi-urban Regions of Nepal”
Funding Agency	BMZ/KfW
Project Executing Agency (PEA)	Alternative Energy Promotion Centre (AEPC), Nepal
Project Implementation Consultant (PIC)	Tractebel Engineering GmbH, Germany
Policy Guidance	-GoN/ Alternative Energy Promotion Centre (AEPC) -Nepal Electricity Authority (NEA) -Public Procurement Monitoring Office (PPMO)
Local Stakeholders	Provincial Government, Local Government (LGs), FIs, CBOs, Beneficiary Groups (Component 1: C&I, ESCO; Component 2A: Individual farmers, LGs, UGs; Component 2B: LGs, community, entrepreneurs, HH)
Suppliers & Installers	Solar Companies
Project Target	Project Component-1: On-grid Solar PV System Component-1A: Solar PV Rooftop for Commercial & Industrial (C&I) Target Value: 12.5 MW Beneficiaries: Commercial and Industrial (C&I) Users and ESCOs Targeted areas: Nationwide Component-1B: Distributed Renewable Energy (DRE) up to 1 MWp. It is proposed as an additional project component but not finalized yet. Component 2A: Solar Irrigation Pumps subprojects Target Value: 0.59 MW Beneficiaries: Farmers and Agro-entrepreneurs Targeted areas: Nationwide Component 2B: Solar Mini-grid Subprojects Target Value: 0.9 MW Beneficiaries: Remote rural communities Targeted areas: Provinces 6 and 7 (last mile electrification)

	Component 3: Capacity Building Strengthening AEPC project implementation capacities Training for beneficiaries' groups, competent solar companies, LGs and other relevant stakeholders
Project Implementation Period	42 months (including 6 months of inception phase)
Date of Project Start	01 April, 2022

1.3 Project Description

During the inception phase, an additional option for promoting PV grid connected systems has been explored. The distributed renewable energy (DRE) system will enhance electrical parameters of the existing long distance travelling feeders from the Nepal Electricity Authority (NEA) in the rural areas. The DRE system upto 1 MWp has been discussed among the stakeholders including NEA. The prevailing Renewable Energy Subsidy Policy has no provision to grant upfront or interest rate or other type of subsidy incentives to DRE-systems that will go into the PPA with NEA. Therefore, the DRE subprojects are yet to be finalized.

Similarly, to Component-2A (solar irrigation pumps) it is proposed to redefine into three sub-components as Component 2A.1: Individual Farmer SIP- Small SIPs, Component 2A.2: Community based SIP - Medium SIPs, and Component 2A.3: Community based SIP - Large SIPs. Although large SIPs were not part of the initial proposal, it has been estimated that setting up of large community owned SIPs will be more efficient and economical and in line with the strategy of the GoN to promote irrigated crop cultivation nationwide.

Both sub-components, distributed renewable energy (DRE) as well as large irrigation pumps (SIP-L) will be introduced as pilot projects. Pilot projects are not subject to ceiling of the government RE subsidy amount share of the total investment amount. Direction of the application and evaluation procedure shall be under the auspices of AEPC. The following table highlight the project components and its target numbers.

Table 2: Overview of the Project Components

Component 1A	Component 1B	Component 2A.1	Component 2A.2	Component 2A.3	Component 2B	Component 3
Solar PV rooftop for C&I Tentative number : 24	Distributed Renewable Energy (on-grid) DRE-Pilot Tentative number: 1	SIP-S: Solar Irrigation Pumps- Individually owned small SIP system) Tentative number: 70 (lot tendering)	SIP-M: Solar Irrigation Pumps-medium (community type) Tentative number: 18	SIP-L: Solar Irrigation Pumps large pilot) Tentative number: 4	SMG : Solar Mini Grid Tentative number: 9	Capacity-building

The project will be financing the following activities:

1.3.1 On-grid solar systems (Project component 1)

Component 1A : Solar PV Rooftop for Commercial & Industrial (C&I) Users

The first project component intends to invest in on-grid solar roof systems for commercial & industrial (C&I) users. Though the financed solar systems will mostly be on roofs, they can also be mounted elsewhere in the compounds of C&I users. The estimated average generation capacity of the planned solar roof systems is 500 kW with estimated average costs of Euro 400,000.00 (NPR 100,000/kWh installed). The solar roof systems is open to C&I users across the country. Approximately 3000 sqm roof/land area is required for installing 500 kW solar array including space between the different mounting structure segments. The generated electricity will be connected to the NEA grid through 0.4 kV/11 kV/33 kV line. The connection will be done at the substation of C&I within their premises. Usually, the connection will be done to the existing transformer, which do not use Sulphur hexafluoride (SF₆) or any other toxic chemicals such as Polychlorinated biphenyl (PCBs).

Component 1B : Distributed Renewable Energy (DRE) systems

The DRE considers the construction of a PV system for the purpose of injecting the energy into the grid, i.e. injection of all energy produced and no combination with self-consumption. It is already in place in Nepal, hence the regulatory frame as well as the processes exist, including contractual agreement for the off take of the energy and the regulatory conditions for grid connection (e.g. NEA grid code). The proposed DRE sub-projects are defined as pilot projects, for which a grant support of 50% on the CAPEX (upfront investment) will be provided alone by KfW. The direct involvement of the local or provincial government in the planned DRE sub-project is a prerequisite for its implementation. As this subproject has not yet been validated as being part of the project, it is not considered in this document.

1.3.2 Off-grid solar irrigation pumps (Project component 2A)

The first subcomponent of the second component intends to invest in off-grid Solar Irrigation Pumps (SIPs), which will be promoted nationwide. There will be 3 different approaches for SIP:

Subcomponent 2A1: These are small pumps for individual farmers, farms and Users Group (UGs), for which size is not specified and must be in the subsidy regulation frame , maximum NPR 2,000,000.

Subcomponent 2A2: These are midsize pumps for UGs and firms and size must be under NPR 2.000.000 with estimated size 10-15kW array.

Subcomponent 2A3: These are large pumps that are defined as pilot projects, for which all grant support will be provided alone by KfW, since the total system amount ranges outside of the subsidy range of NPR 2,000,000 limit.

Affected land area depends on the size of the system and following options.

Option 1 : Water stream: which includes collection tank , reservoir tank, solar panels, pump and distribution channel (distribution pipes)

Option 2 : Borewell: which includes well (existing or to be drilled), reservoir tank, solar panels, pump and distribution channel (distribution pipes)

1.3.3 Off-grid solar mini-grids (Project component 2B)

The second subcomponent of the second component intends to invest in Solar Mini Grids (SMGs) for remote communities, which are not connected to the national grid. The estimated average generation capacity of the solar mini-grids will be around 100 kW but could be up to 250 kW maximum. The promotion of SMGs will be especially in Provinces 6 and 7, which exhibit far below average grid connection rates.

Affected land area depends on the size of the system that includes Solar plant, Powerhouse and distribution lines from powerhouse to the beneficiaries.

1.4 Project Development Objective

The major objective of the project is to promote solar energy in rural and semi-urban regions of Nepal. The project aims to increase the supply of solar electricity and reduce carbon dioxide emissions through investment in on-grid (solar roof system) and off-grid (solar irrigation pumps, solar mini grid) Photovoltaic (PV) systems. This will contribute in inclusive growth, poverty reduction and improved living conditions in Nepal. The project was designed based on the scoping study and several rounds of consultation of the KfW with the Alternative Energy Promotion Centre (AEPC), the Project Executing Agency (PEA).

1.5 Project Beneficiaries

The beneficiaries of the project are as follows for each component:

1.5.1 On-grid solar roof systems

The Commercial and Industrial Entities, which will gain energy access in semi-urban region through solar energy and ESCOs, who gets financial support to develop the subproject.

1.5.2 Off-grid solar irrigation pumps

The farmers and communities, which will gain water access in rural areas through solar energy and will replace consumption of diesel pump.

1.5.3 Off-grid solar mini-grids

The residential, commercial, and industrial customers, which will gain energy access in rural areas, through renewable energy-based mini-grid and whose use of electricity will replace consumption of diesel, kerosene, batteries as well as other energy sources.

Thus, the project beneficiaries include (a) C&I entities or Energy Service Companies (ESCOs); (b) farmers, who will gain access to finance for replacing the diesel pumps, and LGs or UGs, who will get support to build new and community-based SIPs; and (c) mini-grid developers which are Local Government (LG).

1.6 Objective of the Environmental and Social Management Framework

The overall purpose of an ESMF is to provide:

- general overview of the risks and impacts when a project consists of series of subprojects without being aware of the site-specific details of each subproject;
- outline the standards, guidelines, and procedures to assess the E&S risks and impacts associated with the implementation of each subproject;
- guidance on the E&S risk and impact management for each subproject;
- provide estimations of budgets for measures proposed to reduce and offset adverse risks and impacts.

1.7 Approach and Methodology for the preparation of ESMF

The ESMF covers the following: (i) procedures for environmental and social screening of subprojects to be supported under the project; (ii) legal and institutional framework; (iii) guidance for identification of potential risks and impacts; (iv) mitigation measures for identified potential risks and impacts of subprojects to be supported by the project; (v) requirements for monitoring and supervision of implementing ESMPs/ESCOPs ¹, implementation arrangements; and (vi) tentative budget required for mitigating potential environmental and social risks. The ESMF also specifies that the proposed institutional strengthening and capacity building activities should include special training on identifying and addressing environmental and social issues and integrating environmental requirements in feasibility studies.

1.8 Revision and Modification of the ESMF

This Environment and Social Management Framework (ESMF) will be a ‘live document’ enabling update and revision, when and where necessary. Any unprecedented situations and/or

¹ The standard templates of ESMP and ESCOP developed by KfW is available which shall be customized based on the subprojects.

changes in the project or component will be assessed and the ESMF will be revised incorporating applicable management measures. The revisions will also cover and update any changes/modifications introduced in the legal/regulatory framework of the country. In addition, the provisions and procedures will be updated based on the experience of application and implementation of this framework, in agreement with the KfW and the PEA.

Chapter 2: Overview of the Project Area

2.1 Location and Size

Nepal is a landlocked mountainous country nestled between the People's Republic of China to the north and the Democratic Republic of India to the south, east and west. The total area of the country is 147,516 km² (93th World rank) with land area of 92.94 per cent and water area of only 7.06 per cent. It is positioned in-between 80°4' to 88°12' eastern longitudes and 26°22' to 30°27' northern latitudes. Nepal is 5:45 hours ahead of Greenwich Mean Time (GMT). It is popularly known as the birthplace of Lord Buddha, Lumbini and also the land of Mt. Everest, the highest peak of the world. Nepal occupies 0.03 per cent and 0.3 per cent of land area of the World and the Asia respectively. It has a diverse topography and climate, including fertile plains, sub-alpine forest and eight peaks higher than 8,000 meters. It has an average length of 885 kilometers from east to west, and an average breadth of 193 kilometers from north to south.

The proposed subprojects under component 1 and 2 will be implemented in different locations of Nepal, preferably as mentioned in **Table 3**. However, the subprojects are not identified yet, thus the exact location is not known. The proposed subprojects will not be located within or adjacent to any wetlands, protected areas, conservation areas, buffer zones, or ecologically sensitive areas, and their scope does not violate any provision of the *Environment Protection Act of 2019* or the *Environment Protection Regulations of 2020*. The following are the proposed locations for subprojects;

Table 3: Proposed Location for Subprojects

Components	Subprojects Category	Proposed locations (tentative)
Component 1	Component 1A: Solar PV Rooftop for C&I (Up to 500 kWp) Component 1B: Distributed Renewable Energy (DRE) System	Nationwide
Component 2A	Solar Irrigation Pumps (SIP): 2A1, 2A2 & 2A3	Nationwide
Component 2 B	Solar Mini Grid (SMG)	Karnali Province, Sudurpashchim Province

2.2 Physical Environment

2.2.1 Topography

Nepal is divided into three distinct ecological regions; Mountains, Hills and Terai. The altitude of mountain region, also known as Himalaya region, ranges from approx. 4800 m to 8839 m above sea level and covers 51,817 km² land area, whereas the altitude of hill region, consisting of the Mahabharat range and the Churia Hills, ranges from approx. 610 m to 4800 m above sea level with 61,345 km² land cover. The Terai region is an extension of flat Gangetic plains in the southern part of the country and covers 34,019 km² land.

2.2.2 Climate

The climate of Nepal varies considerably both seasonally and with altitude. The country can be divided into different climatic zones based on the altitude, ranging from less than 500 m above sea level of Terai region in the south and over 5000 m of mountain region in the north.

- Tropical and subtropical zone (altitude below 1200 m)
- Cool, temperate zone (altitude between 1200 to 2400 m)
- Cold zone (altitude of 2400 to 3600 m)
- Sub-arctic climatic zone (altitude 3600 to 4400 m)
- Arctic zone (altitude above 4400 m)

The average temperatures of over 24 °C in the south decreases to sub-zero temperatures in the highest mountains. Some central and northerly pockets of the country receives more than 3,000 mm of precipitation, the central and southern plains receives 1,500 to 2,000 mm and some high altitude areas in the north receives less than 1,000 mm rain.

Nepal has four major seasons - winter (December to February), spring (March to May), summer (June to August), autumn (September to November). Monsoons become active from June to mid September, which brings about 80 per cent of the rainfall and rest of the seasons usually becomes dry. Spring and autumn are the most pleasant seasons in Nepal.

2.2.3 Hydrology

Nepal's river system comprises of nine major rivers with a watershed area of approx. 194,471 km² and water storage capacity of approx. 202,000 million m³. The annual runoff contribution of the river system is approx. 170 billion m³ (FAO). The three major drainage basin in Nepal are Karnali, Gandaki and Koshi rivers, from west to east. Tributaries join before each river crosses the Lesser Himalayas and drains into the Ganges River in India (Regmi, 2019).

2.3 Biological Environment

Nepal is a home to diverse flora and fauna as well as natural ecosystem, favored by the diverse climatic and topographic conditions. Nepal is one of the rich countries in terms of biodiversity, stands 25th position in the world, 10th in Asia and 2nd in South Asia. Though the country only occupies only about 0.1 per cent of the global area, it harbors about 3.2 per cent of the world's known flora and 1.1 per cent of fauna.

2.3.1 Protected areas

Nepal has a very good network of established protected areas extending from Terai to high mountains, with 12 National Parks, 1 Wildlife Reserve, 1 Hunting Reserve, 6 Conservation Areas and 13 Buffer Zones, as depicted in **Figure 1**. These protected areas contribute to in-situ conservation of ecosystem and biodiversity of Nepal. The protected area covers 23.39 % i.e., 34,419.75 km² of the total land of the country. The subprojects will not be eligible in these areas.

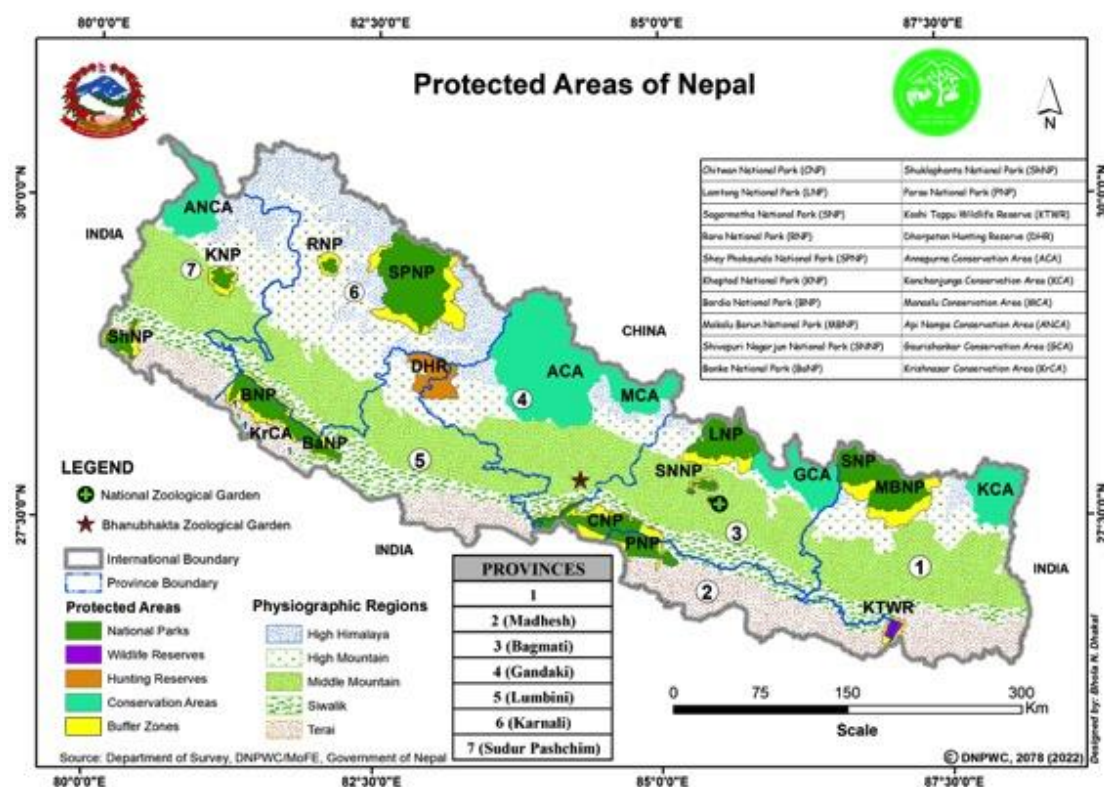


Figure 1: Protected areas of Nepal

2.3.2 Vegetation

The country's altitudinal variation and monsoon climate provides a wide array of habitat for plants; from lowland tropical forests in Terai, through warm temperate evergreen, cool temperate deciduous forests and then coniferous forest to the tree line. Dobremez et al. 1972 have identified 118 ecosystems and classified Nepal into 4 domains and 11 sub-levels with the six vegetation categories based on an altitude (flora of Nepal).

Tropical (below 1000 m altitude)

- Sub-tropical (1000 to 2000 m altitude)
- Temperate (2000 to 3000 m altitude)
- Sub-alpine (3000 to 4000 m altitude)
- Alpine (4000 to 5000 m altitude)
- Nival (above 5000 m altitude)

There are over 6,973 species of flowering plants, over 1,822 species of fungi, over 465 species of lichen, 1001 species of algae, 1,150 species of bryophytes, 534 species of pteridophytes. Of total, about 370 species are considered as endemic to Nepal, which are considered as the most unique plants in the world, and about 700 are known to have medicinal value. Nepal has 1,950 species of medicinal plants, which includes 1,614 native species, of which 143 species has trade value. In Nepal, more than 600 species of food crops are consumed, of which 374 are wild food crops. In addition, more than 1000 species of plants are used as fodder and forage crops that is the main source of food for the domestic livestock and wild animals. 61 species of the plants are listed as threatened species for Nepal due to anthropogenic activities (FAO).

2.2.3 Fauna

According to Nepal's biodiversity profile 2014, there are 208 species of mammals, 867 species of birds, 123 species of reptiles, 55 species of amphibians, 230 species of fishes, 3958 species of moths, 651 species of butterflies and 5,052 species of beetles and other insects. This makes 9.3 percent birds, 4.5 percent mammals, 4 percent butterflies, 1.6 percent reptiles, 1 percent amphibians and 1 percent fresh water fishes in Nepal's share in global biodiversity. The rich biodiversity is due to the country's unique geography and variation in the physiographic and climatic condition. Many species are threatened with habitat loss, poaching and trade, human animal conflict and climate change (NTC, 2022).

2.3 Natural disasters

Nepal is one of the most disaster-prone countries in the world due to its topography and climatic condition, being located in the central of the Himalaya range. The major causes of disaster events are earthquakes, landslides, floods, fire, thunderbolts that caused major damages in the past, weakening the fragile ecosystem of the country. These disasters cause loss of lives and properties, as well as pose severe threats to physical infrastructure, and disrupt economic development. The frequently occurring natural disasters and likely zones presented in the **Table 4**.

Table 4: Frequently Occurring Natural Disasters

Natural disaster	Causes	Likely Zone
Landslide	• Steep slopes, fragile geology, high intensity of rainfall, deforestation etc. • Anthropogenic activities such as improper land use, encroachment • Unplanned development such as construction of roads and irrigation canals without protection measures	The hilly districts of Nepal located in the Siwalik, Mahabharat range, Mid land, fore and higher Himalayas
Floods	Natural hazard that occurs in rainy season in Nepal (June – September)	<u>Historical data of major flood</u> Tinao basin (1978), Koshi river (1980), Tadi river Basin (1985), Sunkoshi Basin (1987), Kulekhani area (1993), Melamchi area (2021)
Glacial Lake Outburst Floods (GLOFs)	Huge volume of water melting of glaciers	The high-altitude areas in the foothill of mountain
Earthquake	The country lies in active seismic zone	Entire region of Nepal
Fire	Houses made of earthen wire, stone and wood	Mid hill areas and Terai region during dry season
Drought	Uneven and irregular low monsoon rainfall	Western hilly and Terai region
Avalanche	Natural factors such as slopes, thickness of snow,	The high mountainous region with the rugged and steep slopes

(Source: GoN, 2022)

2.4 Socio-economic Background

The Preliminary Census Report 2022 estimates a total population of 29.19 million. Female population is estimated at 14.90 million whereas male population stands at 14.29 millions. As of 2022, Gender Development Index (GDI) for Nepal is 0.886. In the last decade, the population has grown by 10.18 percent, on average 0.93 percent year which is the lowest in 80 years. The average family size revealed by the census report is 4.32 persons per household. Nepal is also multilingual and multiethnic country as 123 languages are spoken in the country as a first language and 126 ethnic groups are noted.

Nepal is a country with a lower-middle income, and its gross domestic product (GDP) is \$36.29 billions (The World Bank, 2021). Nepal's economic and human development have steadily improved during the last decade. According to the Global Human Development Report 2020, Nepal's Human Development Index (HDI) value for 2019 is 0.602 which put the country in the medium human development positioning it at 142 out of 189 countries. It is noteworthy that Nepal's HDI value increased by 55.6 percent, from 0.387 to 0.602, between 1990 and 2019.

The constitution of Nepal has marked a political turn in the country's development process and introduced federalism and decentralized governance. It has introduced a three-tier structure of federal government (federal, province and local) and all three levels have the constitutional power to enact laws, prepare budgets and mobilize their resources. There are seven provinces and 753 local levels including 460 Rural Municipalities, 276 Municipalities, 11 Sub-metropolitan Cities and 6 Metropolitan Cities. There are 77 administrative districts in Nepal.

Chapter 3: Legal and Institutional Framework

3.1 National Regulatory Framework

The Government of Nepal (GoN) has a well-established legal framework for environmental and social assessment of development projects. The most relevant national policies, acts and guidelines of the GoN concerning environmental and social management, which are relevant to the proposed project, and the subprojects should comply with during its implementation, are discussed briefly as follows.

3.1.1 Constitution of Nepal

Constitution	Relevant Details
Constitution of Nepal	The Article 30 of the Constitution of Nepal has provisioned every citizen's right to live in a clean and healthy environment. Necessary legal provisions can be made for a proper balance between the environment and development, in development works of the nation. The Article 51 (f) 3 of the constitution of Nepal states "ensuring reliable and affordable energy supply and proper utilization of energy by generation and development of renewable energy for the fulfilment of citizen's basic needs". In addition, the Article 51(g) has provisioned the requirement to protect, promote and make environmental friendly and sustainable use of forests, wildlife, birds, vegetation and biodiversity. <i>Relevance to the Project, since it emphasises in the promotion of Renewable Energy and protection of environment. In addition, the constitution is the fundamental law of Nepal.</i>

3.1.2 Plans

Plans	Relevant Details
Fifteenth Plan (FY 2076/77-2080/81)	Plans to ensure access to clean energy for all and to contribute to energy security by increasing energy efficiency in the production and utilization of alternative/renewable energy and aims to generate 125.4 MW energy from the solar power system. Energy <i>Strategy:</i> To make the distribution system effective and reliable to increase energy efficiency and increase power consumption by expanding access to electricity. <i>Working policy:</i> Under the concept of "Every Home, Energy Home", energy efficiency programs and programs to connect rooftop solar energy plants to the grid based on net metering and net payment will be promoted as a campaign. Irrigation <i>Strategy:</i> To develop irrigation systems based on new technologies and to increase irrigation efficiency,

Plans	Relevant Details
	<i>Working policy:</i> To develop underground and lift irrigation systems based on solar energy in collaboration with the provinces to promote commercial agriculture in arable lands. Alternative Energy Strategy: To promote the development and multipurpose use of energy as an important part of the energy supply system by expanding alternative/ renewable energy. Working Policies: Promote solar mini-grid systems in collaboration with the local level to endure basic energy supply for hospitals, schools, touristic places, and trekking routes where the national electricity system is not accessible or is not regular. Connect the electricity generated from solar to the national transmission line in areas where the national transmission line has reached, and priority will be given to the solar rooftop program. <i>Provisions for promoting solar energy in collaboration with LGs and develop irrigation system based on solar system. Umbrella document that guides environmental and social management.</i>
Nepal Biodiversity Strategy and Action Plan 2071-2077 BS (2014-2020 AD)	The overall goal of the strategy and action plan is to enhance the integrity of ecological systems by 2020, thereby contributing to human well-being and sustainable development of the country. It considers that haphazard development activity is becoming a major threat to the biodiversity. It has prioritized for the promotion of renewable energy, including solar energy to reduce the demand of firewood to protect forest. It also urges for the effective implementation of EIA for conservation of biodiversity. <i>Promotes the development of solar energy for protecting biodiversity.</i>

3.1.3 Policies

Policies	Relevant Details
National Occupational Safety and Health Policy, 2076 (2019)	The policy provisions for ensuring the safety of workers through reduction of risks at workplace through better working condition and appropriate occupational health safety gears. <i>During project implementation, all workers shall comply with the provision of this act for workers safety and well-being.</i>
National Environmental Policy 2076 (2019)	The main aim of the National Environment Policy, 2019 is to stop, control and mitigate all types of pollutions such as water, air, soil, noise, electromagnetic wave, chemical and radioactive hazard, management of wastes from the household, institution, service area and all other sources, expansion of park and greenery in urban and municipal areas, ensure environmental Justice for pollution affected victims, ensure participation in sustainable management and protection of environment and natural resource, enhance research and capacity building for environmental protection and management, reuse and recycle the available resource as far as possible and use of land according to Land use plan.

Policies	Relevant Details
	<i>Provides guidance for policy makers to prepare plans and strategies for sustainable environmental management.</i>
Renewable Energy Subsidy Policy, 2078 (2022)	The GoN has formulated the policy to contribute to rural poverty reduction and environmental conservation by ensuring access to clean, reliable and appropriate energy in the rural areas. It has taken strategy to encourage local groups and private sector to distribute the electricity by producing the power up to 1000 kW in rural areas. Provisioned special subsidy for vulnerable groups, which is mentioned as Targeted Beneficiaries and defined as Female headed households, earthquake affected, economically and socially downtrodden, indigenous and Dalit identified by the GoN. <i>The main aim of the project is to promote solar energy, a form of renewable energy.</i>
Climate Change Policy, 2011	The policy aims to reduce GHG emissions by promoting the use of clean energy, adopt a low-carbon development path by pursuing climate-resilient socio-economic development and develop capacity for identifying and quantifying present and future impacts of climate change, adapting to climate risks and adverse impacts of climate change. <i>The project targets to replace the use of diesel energy with solar energy, thus reducing GHG emission.</i>
AEPC Gender Equality and Social Inclusion Policy, 2075 (2018)	The policy came to the existence for the mainstreaming of rural women, poor, marginalized and vulnerable population, and excluded groups in utilization of various technologies of renewable energy to support for the livelihood enhancement. <i>Both men and women as well as all vulnerable groups must be benefitted from the project.</i>
Land Acquisition, Resettlement and Rehabilitation Policy, 2071 (2015)	The policy provisions for the need of looking at alternative measures to have minimum impacts of land loss, need of resettlement and rehabilitation works to ensure livelihoods of the affected persons and family is improved or at least restored at pre-project level. It deals with procedure to identify impacts on affected people, community and vulnerable group, land acquisition and ownership transfer. <i>Though the project avoids involuntary resettlement, it is essential to ensure that people are not adversely affected due to land acquisition process.</i>
Rural Energy Policy 2063 (2006)	The GoN formulated the policy is to contribute to rural poverty reduction and environmental conservation by ensuring access to clean, reliable and appropriate energy in the rural areas. It has taken strategy to encourage local groups and private sector to distribute the electricity by producing the power up to 1000 kW in rural areas.
Environmental and Social Safeguard Policy of AEPC, 2018	AEPC has developed its environmental and social safeguard principles to align with the International Finance Corporation's (IFC) Performance Standards (2012) with 7 policy principles (PP) as follows: ESS PP1: Assessment and management of environmental and social risks and impacts ESS PP2: Biodiversity conservation and sustainable management of living natural resources ESS PP3: Human Rights ESS PP4: Labour and working conditions

Policies	Relevant Details
	ESS PP5: Community Health Safety and Security ESS PP6: Land acquisition and involuntary resettlement ESS PP7: Resource efficiency and pollution prevention It has also provided Environmental and Social Management Framework to categorize the project into A, B or C based on potential impact on environment and society. <i>This is the guiding document of AEPC related to environmental and social safeguard which shall be followed by all projects of AEPC.</i>

3.1.4 Strategies

Strategies	Relevant Details
National Energy Efficiency Strategy, 2075	One of the strategies is to maintain environmental balance and bring positive improvements in health by efficient use of energy through the strategic intervention of establishment of policy, legal and institutional frameworks for resources management, resources mobilization, infrastructure development and human resources development required for energy efficiency and develop national standards for energy efficiency based on established international and regional standards as well as to develop equipment and means for measuring energy efficiency. <i>Promotes energy efficiency</i>
Water Resource Strategy, 2058 (2002)	The Government of Nepal has adopted National Water Resource Strategy taking a holistic and systematic approach to develop and manage water resources for sustainable use of resources ensuring conservation and protection of the environment. This strategy underscores the interdependencies between water resource development and environment conservation, and has adopted environment principles related, inter alia, to the integration of ecological aspects at every level of project development process, conserve biodiversity, watersheds and adopt ecosystem approach. The NWRS has a target of providing 90% of all irrigable land with year-round irrigation and increase irrigation system efficiency to 60% by 2027. The NWRS also has a target to maintain country's food security throughout the 25-year strategy period. <i>The project supports to meet the target of irrigation.</i>

3.1.5 Acts

Acts	Relevant Details
Environment Protection Act, 2076 (2019)	The EPA has mandatory provision to conduct environmental study. The proponent should carry out Brief Environmental Studies (BES), Initial Environmental Examination (IEE), and Environmental Impact Assessment (EIA) and get approval from the concerned GoN authorities prior the implementation of development project. No proposal shall be implemented without conducting Environmental Study.

Acts	Relevant Details
	<i>Provides basis on conducting environmental study for the subprojects as per GoN requirement.</i>
Local Government Operation Act, 2074 (2017)	It has been formulated to assist the local governments to make clarification about their working area demarcation. Similarly, Local Government Operation Act, 2074 BS has provided authority for policy, law, standards, planning, implementation, monitoring and regulatory works. <i>Provides guidance to local government to participate in the project.</i>
Act to Regulate and Control on International Trade in Endangered Species of Wild Fauna and Flora Act, 2074 (2016)	This act provisions the regulation and control of international trade of endangered flora and fauna species. The species are protected by CITES against over exploitation and they are listed in three CITES Appendices - I, II, and III for different levels or types of protection. <i>The project activities shall not have any adverse impact on endangered species, and this act provides regulatory basis to control it.</i>
Solid Waste Management Act, 2068 (2011)	The Act clearly envisages about management of solid waste and provision of licensing for management. In such case, the article (7) on discharge of solid waste entails about the person, organization that produces hazardous waste or chemical waste shall have to manage such waste as prescribed (sub article 2). It is restricted that nobody shall do or cause to do the work relating to the solid waste management without obtaining license from the Local Body as prescribed by article 13 of chapter, miscellaneous sub article 1. <i>The project shall comply with the act by proper management of solid waste generated during the implementation of the project.</i>
Pesticides Management Act 2019	Any person, institution or body shall register any pesticide and its active element with the Plant Quarantine and Pesticides Management Centre, prior to making its production, synthesis, export, import, commercial use, storage, sale, distribution, transportation, packaging or re-packaging. The Pesticides Management Committee may impose restriction on the production, synthesis, import, export, commercial use, storage, sale, distribution and transportation of the pesticides that cause adverse impact on human and animal health and the environment. The GON shall publish a notice relating to the name of the pesticides restricted in the Nepal Gazette. <i>The users of subprojects related to Component 2A (SIP) shall be made aware of the appropriate use of pesticides and the one that are restricted in the country.</i>
Labor Act, 2017	“No employer shall discriminate any labour on the ground of religion, colour, sex, caste, tribe, origin, language, ideological conviction or other similar ground”. “No discrimination shall be made between the labours in remuneration for equal value of work on the ground of sex”. <i>The hiring of workers and their involvement in the subprojects shall be in accordance with the act.</i>
Child Labor (Prohibition and regularization) Act, 2056 (2000)	The Act has made the provision of prohibition of engagement of child in factory, mining and similar other risky work and to make necessary provision for health. Child's safety and services and facilities while engaging them in other work.

Acts	Relevant Details
	<i>The project has zero tolerance for child labour.</i>
Electricity Act, 2049 (1992)	It requires any person or corporate bodies to obtain license prior to survey, generation, transmission or distribution of electricity of more than 1000 KW. In article 24 of the Act, it states that “While carrying out electricity generation, transmission or distribution, it shall be carried out in such manner that no substantial adverse effect be made on environment by way of soil erosion, flood, landslide, air pollution etc.” Article 33 provisions for land acquisition. Licensed individuals can apply the government to acquire land for the purpose of electricity generation, transmission and distribution. The government shall acquire the land for the stated objectives under existing regulations. The compensation incurred to acquire land and other property shall be paid by the applicant. <i>The project being the energy related project shall comply with this act.</i>
Water Resources Act, 2049 (1992)	Water Resource Act, 1992 is the umbrella Act governing water resource management, which declares the order of priority of water use, vests ownership of water in the State, provides for the formation of water user associations, establishes a system of licensing and prohibits water pollution. Article 19 (1) of the act mentions that the government through notification in the Nepal Gazette prescribe pollution tolerance limits for the water resources. Similarly, article 19 (2) requires any person to abide by the act not to pollute water resources beyond specified limit. Article 20 states that while utilizing water resources, there should not be significant adverse impact on the environment with regard to soil erosion, flood, landslide and other similar cases. Articles 16, 19, 20 of the Act are also related to land acquisition. According to article 16 (3), the government shall, according to existing laws, acquire land for the licensed person or institution and any compensation in this regard shall be paid by the licensed person. <i>Provides guidance on taking approval for water use and prohibits the subprojects to pollute water sources.</i>
National Foundation for Development of Indigenous Nationalities Act, 2002	This act is made to provide for the establishment and operation of National Foundation for upliftment of Aadibasi/Janjati for social, economic and cultural development and for their equal participation in the mainstream of national development. The act has further defined the Aadibasi/Janjati in section 2 clause a as “a tribe or community as mentioned in the Schedule having its own mother language and traditional rites and customs, distinct cultural identity, distinct social structure and written or unwritten history”. The act also intends to formulate, implement or cause to be implemented the programme necessary for promotion and preservation of the language, script, literature, history, arts, culture, traditional skill and technology of the Aadibasi/Janjati. Whilst 126 ethnic groups are reported in the 2011 Census, only 59 ethnic groups are officially listed as indigenous peoples or indigenous nationalities by the 2002 Act (referred to as Adivasi Janajati). The Nepal Federation of Indigenous Nationalities (NEFIN) classified these groups into five

Acts	Relevant Details
	categories, based on socio-economic indicators: ‘Endangered’, ‘Highly marginalized’, ‘Marginalized’, ‘Disadvantaged’ and ‘Advantaged’. <i>Disadvantaged and Vulnerable communities, including Indigenous people shall not be adversely impacted by the project and get benefits. The act provides basis for their equal participation the in the project.</i>
Land Acquisition Act, 2034 (1977)	The Government may acquire any land at any place for any public purpose, if it so deems necessary, according to the procedure set out by this Act. To this end it regulates the nomination of an officer responsible for preliminary action in charge of the determination of the land area to be acquired (through a survey, collection of samples of soil, demarcation of land, installation of equipment), the determination of the compensation and the submission of a report to the local officer regarding the findings of preliminary action. After having received the report, the local officer shall issue a notification containing all the particulars required (e.g. purpose of acquisition, location of the land, terms of acquisition, plot number or boundaries of the land, land area). Further provisions concern the publication of said notice, the decision by the Zonal Commissioner of complaints filed by the landowner, the occupation of the land by the local officer, the criteria for the determination of the compensation which shall be paid either in cash or by allotment of other lands in exchange, if so, required by the landowner.
National Parks and Wildlife Conservation Act, 2029 (1973)	This act governs the various activities inside the protected areas. Schedule 1 relating to section 10 of this act provides the list of protected wildlife, which is prohibited for hunting. According to section 11, no person shall be permitted to hunt wildlife without obtaining license. There will be punishment in terms of fine or imprisonment or both if any person illegally kills or injures wildlife within protected areas. This project will not have any subprojects in National parks, wildlife reserves and hunting reserve. <i>Provides guidance on activities that shall not be conducted inside national parks.</i>

3.1.6 Rules/Regulations

Rules/Regulations	Relevant Details
Environment Protection Regulation, 2077 (2020)	The EPR and its schedules clearly provide various step-wise requirements to be followed while conducting the BES/EIA/IEE study. The list of projects under schedule 1, 2 and 3 requires BES, IEE and EIA study respectively. Provision and procedure for dealing with pollution control, and conservation of national heritage are also detailed in the EPR. This project will not have any subprojects requiring to conduct environmental studies under this regulation. <i>Provides guidance on the level of environmental studies based on magnitude, extent and threshold of the subprojects.</i>
Labor Rules, 2075 (2018)	This regulation is intended to provide the rights, interests and benefits of workers, to develop good labour relations by clearly

Rules/Regulations	Relevant Details
	defining the rights and duties of workers and employers, and to increase the productivity ending all forms of labour exploitation. <i>The project shall comply with the rules while hiring workers and involving them in the subprojects.</i>
Child Labor (Prohibition and Regulation) Rules, 2063 (2006)	The rule details out various conditional arrangements for child labour use and other legal provisions related with child labour. <i>The project has zero tolerance for child labour.</i>
Solid Waste Management Regulation, 2070	The Rules provisions the requirement of the segregation and management of the solid waste, at least organic and inorganic solid waste at its source. In addition, harmful and chemical waste have to be managed separately. The generator is responsible of managing chemical and harmful solid waste. According to Rule 4, transportation, processing and final disposal of solid waste shall be done in comfortable manner without having adverse effect on the public health and environment. <i>Waste generated during project implementation shall be managed in accordance to this regulation.</i>
Forest Regulations, 2051 (1995)	The Rule 65 of the Forest Regulation stipulates that the proponents of the project itself shall bear the amount of compensation to be paid in case the execution of any project having national priority in any forest area causes any loss or harm to any local, individual, or community. In addition, the entire expenses required for the harvesting, logging and transportation of the forest products in a forest area should be borne by the proponents of the project. This project will not have any subprojects in forest area and will not utilise any the forest land. <i>Provides guidance to the project to avoid forest area/land.</i>
Water Resources Regulations, 1993	Rule 17 obliges the proponents to analyze environmental impacts of the proposed action and include impact mitigation measures and environment protection measures including arrangements for the settlement of displaced people. The report should be a part of the application for the water resources utilization permits. Rule 28 states that in a process of resolving any conflict, the Water Resources Utilization Investigation Committee should consider environmental impacts likely to occur from the proposal. It should also collect site-specific information on likely environmental impacts of the concerned project. This project will not have any subprojects (SIP) with the community having conflict on water use. <i>Provides guidance on getting approval for water use in Component 2A (SIP).</i>
Electricity Regulatory Commission Rules, 2075	The GoN has prepared the rules as per Electricity Regulatory Commission Act-2017 to clarify the key functions and duties of the Commission, and provide a more focused list of action points, mandatory requirements and guidance for the Commission on distribution lines, tariff management and electricity quality.

Rules/Regulations	Relevant Details
	<i>The project gets support in tariff fixation.</i>
Electricity Rules, 2050 (1993)	The Rules 66 states that GoN has full rights to prohibit use of land or places of generation, transmission or distribution infrastructures or, other structures, for other specific purposes in and around them through publication of public notice in GoN gazette from time to time. It further states that no building construction or tree plantation is allowed within the specified limit in and around the electricity transmission and distribution lines. <i>Provides guidance to the project for T&D in case of Component 2B (SMG).</i>
National Parks and Wildlife Conservation Rules, 2030 (1974)	This rules prohibits any activities inside the protected area without taking permission from the authorized persons including hunting, damaging any form of wildlife, building or occupying any form of shelter, hut or house, occupying, clearing or cultivating land, pasturing domesticated livestock, damaging, felling or removing any trees, shrubs of forest products and setting of forest fire, mining and removing stone, minerals, creating earth works using explosives, using immunization or poisons, block, diverting river or streams. <i>Supports to avoid subprojects in national parks and ecologically sensitive areas defined under this rule.</i>
Himali National Park Rule, 2036	The rule discusses the requirement of the protection and conservation of National Park located in the Himalayan region of Nepal. It defines the activities that are allowed or restricted inside National Parks. There is restriction on harming any wildlife animals, birds or fishes as well as trees/plants, however feeding birds and fishing after permission of the national park is allowed. Any kind of pollution such as solid waste, liquid waste as well as noise pollution is restricted in park area. The GoN is the concerned authority to provide permission to conduct development works inside the park area. <i>Supports to avoid subprojects in national parks and ecologically sensitive areas defined under this rule.</i>

3.1.7 Guidelines/Manuals/Directives

Directives/Guidelines	Relevant Details
Directive Relating to Licensing of Power Projects 2075	The directive has sets various provisions on survey license of electricity generation, transmission and distribution as well as issuing license of generation, transmission or distribution or license amendment and its cancellation. <i>The directive provides guidance on obtaining license for its subprojects, as the project being energy related.</i>
National EIA Guidelines, 2050 BS (1993 AD)	The guideline provides procedures for integrating environmental and social aspects to development projects, including objectives, criteria for project screening, IEE, scoping, preparation of TORs, EIA format, impact identification, mitigation measures, review,

	monitoring, evaluation and auditing, community participation, and schedules and annexes to the IEE and EIA. <i>Guides the project to prepare ESMF and SEF.</i>
Guideline on Environmental & Social Risk Management (ESRM) for Banks and Financial Institutions, 2018	This guideline is prepared by the Nepal Rastra Bank and is for banks and financial institutions that provide loans for development activities. The guideline helps to assess environmental and social risks and their management. The guideline includes the exclusion lists of activities, which is not eligible for loan. <i>Guides the project to comply with E&S requirement of FIs.</i>

3.1.8 Working Procedures/Work Plan

Acts/Regulations/Guidelines	Relevant Details
Prevailing Renewable Energy Subsidy Delivery Mechanism	AEPC has prepared the mechanism as per mandate given by Renewable Energy Subsidy Policy 2078 BS. It has spell out the detail mechanism of subsidy delivery mechanism in context of renewable energy provided by GoN. As the proposed proposal is also a program of AEPC under renewable energy, it is certainly relevant to the proposed project. <i>The subsidy provided by AEPC is governed by this mechanism.</i>

3.1.9 Standards

Standards	Relevant Details
National Ambient Air Quality Standard, 2012	The standard sets maximum concentration limit for 9 air quality parameters, which include total suspended particles (TSP), particulate matter (PM₁₀), sulphur dioxide, nitrogen dioxide, carbon mono-oxide, lead, benzene, PM_{2.5} and Ozone. The standards have also prescribed the test methods for these parameters. <i>The project during its construction and operation will have to comply with the set standards for the ambient air quality.</i>
National Noise Quality Standard, 2012	National Standard for Sound Quality is established as per Rule 15 of Environment Protection Rules, 2054. The maximum limit of sound for city and residential area is 55 decibels for daytime and 50 decibels for night hours. Whereas for the industrial area, the maximum limit of sound is 75 decibels for daytime and 70 decibels for night hours. Further, for the peace zone, the maximum limit of sound is 50 decibels for daytime and 40 decibels for night hours. <i>To be complied with during construction and operation.</i>
Standards for Emission from in-use and Imported Diesel Generators, 2012	The MoSTE (now MoFE) introduced in October 2012 the National Diesel Generator Emission Standard (NDGES) for new and in-use diesel generators with a capacity of 8 kW-560 kW (under the 1997 Environment Protection Act). In doing so they followed the Indian standards for construction equipment rather than for diesel gensets. Hence, the Nepal emission standards for new and in-use diesel gensets are less stringent than in India. The emissions standards set for new diesel generator imports is equivalent to Bharat Stage III standards and, for in-use diesel generators, is equivalent to Bharat Stage II. The emissions limits are set for four major pollutants: CO, HC, NOx, and PM. The emissions limit for PM for new DG sets less

	than 19 kW is 0.80 g/kWh; for 19 to <37 kW, the emissions limit is 0.60 g/kWh; for 37 to <75, it is 0.40 g/kWh; for 75 to <130 kW, it is 0.30 g/kWh; and for 130 to <560 kW, it is 0.20 g/kWh. The MoFE has not yet been able to monitor the compliance of emissions standards for new and in-use DG sets. <i>To be complied with during construction (mainly) and operation (if DG are needed).</i>
Tolerance Limits for Industrial Effluents to be Discharged into Inland Surface Waters, 2003	The Ministry of Environment has set tolerance limits for the industrial effluents to be discharged into the inland surface water. <i>Since the project is considered as an industry it will have to comply with the tolerance limits set in the standard prior to the discharge of the effluents into the inland surface water during the construction and operation period.</i>

3.2 International Instruments

International Instruments	Relevant Details
The United Nations Declaration on the Rights of Indigenous Peoples, UNDRIP, 2007	In 2007, the UN Declaration on the Rights of Indigenous Peoples was adopted by the General Assembly. It has established a universal framework of minimum standards for the survival, dignity and well-being of the indigenous peoples of the world and it elaborates on existing human rights standards and fundamental freedoms as they apply to the specific situation of indigenous peoples. Significantly, in Article 3 the UNDRIP recognizes Indigenous peoples' right to self-determination, which includes the right "to freely determine their political status and freely pursue their economic, social and cultural development." Article 4 affirms Indigenous peoples' right "to autonomy or self-government in matters relating to their internal and local affairs," and Article 5 protects their right "to maintain and strengthen their distinct political, legal, economic, social and cultural institutions." Article 26 states that "Indigenous peoples have the right to the lands, territories and resources which they have traditionally owned, occupied or otherwise used or acquired," and it directs states to give legal recognition to these territories. <i>This is relevant to the project due to the need of the project to ensure the equitable participation of indigenous peoples.</i>
International Labour Organization Convention, 1998	The General Conference of the International Labor Organization (ILO) adopted the Convention No. 169 in 1989 at its seventy-sixth session, which was ratified by the Legislative Parliament of Nepal in 2007. Convention No. 169 aimed at the protection of indigenous and tribal peoples and their rights. It is the foremost international legal instrument which deals specifically with the rights of indigenous and tribal peoples, and whose influence extends beyond the number of actual ratifications. The convention has 40 Articles. Some of them related to our study are given below: Article 4.1: Special measures shall be adopted as appropriate for safeguarding the persons, institutions, property, labour, cultures and environment of the peoples concerned. Article 6.1: In applying the provisions of this Convention, governments shall:

	(a) Consult the peoples concerned, through appropriate procedures and in particular through their representative institutions, whenever consideration is being given to legislative or administrative measures which may affect them directly; Article 6.2: The consultations carried out in application of this Convention shall be undertaken, in good faith and in a form appropriate to the circumstances, with the objective of achieving agreement or consent to the proposed measures. Article 7.1: The peoples concerned shall have the right to decide their own priorities for the process of development as it affects their lives, beliefs, institutions and spiritual well-being and the lands they occupy or otherwise use, and to exercise control, to the extent possible, over their own economic, social and cultural development. Article 7.3: Governments shall ensure that, whenever appropriate, studies are carried out, in co-operation with the peoples concerned, to assess the social, spiritual, cultural and environmental impact on them of planned development activities. The results of these studies shall be considered as fundamental criteria for the implementation of these activities. <i>This is relevant, as the project needs to ensure the right of labour are safeguarded.</i>
Convention on Biological Diversity (CBD), 1992	The Parliament of Nepal ratified the International Convention on Biodiversity in 1993 to become its party. The convention was enforced in Nepal on 21 February 1994. Article 14 of the Convention urges Parties to introduce appropriate procedures requiring IEE of the proposed project that are likely to have significant adverse effects on biological diversity with a view to avoiding or minimizing such effects and, where appropriate, allow for public participation in such procedures. The convention also focuses on reducing trans boundary impacts on biodiversity. <i>The project activities may lead to the vegetation destruction and the stripping of soil (use of quarry for the construction of works).</i>
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1975	Nepal became party to Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 1975 to control the trade of endangered wild flora and fauna to further endangering of their survival. The Convention urges Parties not to allow trade in specimen of species included in the CITES Appendices I, II, and III except in accordance with the provisions of the Convention. Pursuant to Section 10 of the <i>National Park and Wildlife Conservation Act 1973</i>, the hunting of animal protected under Schedule 1 is prohibited throughout Nepal. Most of these species are also listed in CITES appendices. Under the Act, it is illegal to collect, obtain or keep any part of a dead animal protected under Schedule1 without a certificate, and such goods are prohibited for sale, purchase or disposal. Pursuant to Section 26, any person

	illegally killing, wounding, purchasing, selling or transferring a protected animal, or keeping as a trophy, selling or purchasing any part thereof, will incur a fine or imprisonment or both. This project will not have any subprojects in National parks, wildlife reserves and hunting reserve, conservation areas, buffer zones and other ecologically sensitive areas. Thus, envisions to have negligible impact on endangered species. <i>Provides guidance on categorizing flora and fauna present in the subproject areas to avoid endangered species.</i>
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3.3 KfW Development Bank Sustainability Guideline

KfW Development Bank finances investments and related advisory services in developing and emerging countries on behalf of the German Federal Government, which are implemented by local partners as the executing agency. The priority areas of KfW's activities in developing countries include social development, environmental and climate protection, adaptation to climate change, and the conservation of natural resources. The projects enlisted in the “Exclusion List of the KfW Bank” will not be eligible to support.

The Sustainability Guideline of the KfW Development Bank, published on 28 February 2022, describes principles and procedures for assessment and management of environmental, social and climate aspects, during the preparation and implementation of Financial Cooperation (FC)-measures financed by the Bank. The main objective of the guideline is to promote sustainability and avoid adverse environmental, social and climate impacts and risks. The Bank aligns its FC measures with the following principles:

- to avoid, reduce or limit environmental pollution and environmental damage including climate-damaging emissions and pollution;
- to preserve and protect biodiversity and tropical rainforests and to sustainably manage natural resources;
- to consider probable and foreseeable impacts of climate change including utilising the potential to adapt to climate change. In this context climate change is understood as climate variability and long-term climate change;
- to avoid adverse impacts on the living conditions of communities, in particular indigenous peoples and other vulnerable groups, as well as to ensure the rights, living conditions and values of indigenous peoples;
- to avoid and minimise involuntary resettlement and forced eviction of people and their living space as well as to mitigate adverse social and economic impacts through changes in land use by reinstating the previous living conditions of the affected population;
- to ensure and support occupational health and safety as well as health protection in the workplace;
- to condemn forced labour and child labour, ban discrimination in respect of employment and occupation, and support the freedom of association and the right to

- collective bargaining;
- to avoid all forms of discrimination; to avoid negatively influencing existing conflict dynamics; to protect and preserve cultural heritage; and/or
- to support the executing agency in the management and monitoring of possible adverse environmental, social and climate impacts and risks associated with the implementation of the FC-measure.

The Environmental and Social Due Diligence (ESDD) is the Bank's management tool to steer and shape FC-measures over the project's life cycle. The first step of the ESDD is screening and categorization of the project to evaluate the E&S risk. The screening process is designed to identify and appraise the type and scale of any adverse environmental and social impacts or risks that may arise from the planned FC-measure. All FC-measures are classified into one of the following four categories: "A" (high risk), "B+" (substantial risk), "B" (moderate risk) or "C" (low risk), according to the relevance of their potentially adverse environmental and social impacts and risks. All projects that use water resources such as pumped-storage systems/power stations, irrigation and drainage projects, deep well, that involves the infrastructures such transmission lines, pipelines, and energy generation such as extensive solar parks can be assigned to Category A and B+ or B, as listed under the illustrative list of FC-measures of the guideline. The next step is to conduct scoping to identify and assess the E&S impacts and risks more accurately, leading to the in-depth ESDD process that will determine the level of assessment required.

For **Category A** FC-measures, it is mandatory to analyse and appraise any adverse environmental and social effects as part of an independent Environmental and Social Impact Assessment (ESIA) study including an Environmental and Social Management Plan (ESMP). For **Category B+** FC-measures, an ESIA and an ESMP adapted to the impacts and risks are required, as described under Category A. For **Category B** FC-measures, the need for and the scope, the priorities and depth of an ESIA are determined through a case-by-case evaluation. This category B has been divided into two subcategories for Moderate Risks and for Lower Risks². **Category C** FC-measures are expected to have no or only minor adverse environmental and social impacts or risks. They usually do not require any additional analysis within the scope of this Guideline or any further ESDD procedures. Category C FC-measures should, however, be monitored for any relevant changes over their life cycle.

If there is a considerable loss of livelihood due to land taking, a stand-alone Livelihood Restoration Plan (LRP) must be developed. This plan must be available at the time of the assessment of the FC-measure.

The **KfW Development Bank assessment standards for public agencies are the Environmental and Social Standards of the World Bank Group** as well as relevant Operational Policies of the World Bank, General and sector-specific Environmental, Health and Safety (EHS) Guidelines as well as the Core Labour Standards of the International Labour

² KfW Guidance 1.0: Guidance for Environmental and Social Management Plan (ESMP) and Environmental and Social Code of Practices (ESCAP) Package for Category B Projects with Moderate or Lower Risks

Organization (ILO).

Furthermore, the assessment takes into account the requirements of the human rights guidelines of the BMZ (Federal Ministry for Economic Cooperation and Development). This includes the acknowledged principle of free, prior, informed consent (FPIC) if an FC-measure affects the rights of indigenous peoples, the Voluntary guidelines on the responsible governance of tenure of land (VGGT), and the UN Basic Principles and Guidelines on Development-based Evictions and Displacements.

3.4 World Bank Environmental and Social Framework

The World Bank Environmental and Social Framework sets out the Bank's commitment to sustainable development, through a Bank Policy and a set of Environmental and Social Standards that are designed to support Borrowers' projects, with the aim of ending extreme poverty and promoting shared prosperity. The Environmental and Social Standards set out the requirements for Borrowers relating to the identification and assessment of environmental and social risks and impacts associated with projects supported by the Bank through Investment Project Financing. The ten Environmental and Social Standards establish the standards that the Borrower and the project need to meet through the project life cycle, which is discussed briefly as follows:

ESS 1 : Assessment and Management of Environmental and Social Risks and Impacts

ESS1 sets out the Borrower's responsibilities for assessing, managing and monitoring environmental and social risks and impacts associated with each stage of a project supported by the Bank through Investment Project Financing, in order to achieve environmental and social outcomes consistent with the Environmental and Social Standards (ESSs). ESS1 applies to all projects supported by the Bank through Investment Project Financing. The objectives of the ESS1 are:

- To identify, evaluate and manage the environment and social risks and impacts of the project manner consistent with the ESSs;
- To adopt a mitigation hierarchy approach;
- To adopt differentiated measures so that adverse impacts do not fall disproportionately on the disadvantaged or vulnerable;
- To utilize national environmental and social institutions, systems, laws, regulations and procedures in the assessment, development and implementation of projects, whenever appropriate; and
- To promote improved environmental and social performance, in ways which recognize and enhance Borrower capacity.

The Borrower of the Project is required to conduct an environmental and social assessment of the proposed project, including stakeholder engagement, disclose appropriate information, develop and implement all measures and actions set out in the legal agreement including the

Environmental and Social Commitment Plan (ESCP); and conduct monitoring and reporting on the environmental and social performance of the project against the ESSs.

The assessment will evaluate the project's potential environmental and social risks and impacts; examine project alternatives; identify ways of improving project selection, siting, planning, design and implementation in order to apply the mitigation hierarchy for adverse environmental and social impacts and seek opportunities to enhance the positive impacts of the project.

The Borrower needs to ensure that the environmental and social assessment takes into account in an appropriate manner all issues relevant to the project, including: (a) the country's applicable policy framework, national laws and regulations, and institutional capabilities (including implementation) relating to environment and social issues; variations in country conditions and project context; country environmental or social studies; national environmental or social action plans; and obligations of the country directly applicable to the project under relevant international treaties and agreements; (b) applicable requirements under the ESSs; and (c) the Environmental, Health and Safety Guidelines (EHSGs), and other relevant Good International Industry Practice (GIIP).

The Environmental and Social risk classification shall be done as 'High Risk', 'Substantial Risk', 'Moderate Risk' or 'Low Risk' based on the type, location, sensitivity and scale of the Project, the nature and magnitude of the potential E&S risks and impacts, the capacity and commitment of the Borrower to manage such risk and impacts in a manner consistent with the ESSs and other areas of risk that may be relevant to the delivery of E&S mitigation measures and outcomes.

For projects involving multiple small subprojects, that are identified, prepared and implemented during the course of the project, the Borrower shall carry out appropriate environmental and social assessment of subprojects, and prepare and implement such subprojects, as follows: (a) **High Risk subprojects, in accordance with the ESSs;** (b) **Substantial Risk, Moderate Risk and Low Risk subprojects, in accordance with national law and any requirements of the ESSs that the Bank deems relevant to such subprojects.**

Environmental and Social Management Framework (ESMF) examines the risks and impacts when a project consists of a program and/or series of subprojects, and the risks and impacts cannot be determined until the program or subproject details have been identified. The ESMF sets out the principles, rules, guidelines and procedures to assess the environmental and social risks and impacts. It contains measures and plans to reduce, mitigate and/or offset adverse risks and impacts, provisions for estimating and budgeting the costs of such measures, and information on the agency or agencies responsible for addressing project risks and impacts, including on its capacity to manage environmental and social risks and impacts. It includes adequate information on the area in which subprojects are expected to be sited, including any potential environmental and social vulnerabilities of the area; and on the potential impacts that may occur and mitigation measures that might be expected to be used.

ESS 2: Labor and Working Conditions

ESS2 recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. Borrowers can promote sound worker management relationships and enhance the development benefits of a project by treating workers in the project fairly and providing safe and healthy working conditions.

The objectives of ESS2 are to promote safety and health at workplace, promote fair treatment, nondiscrimination and equal opportunity of project workers and protect them, prevent the use of all forms of forced labor and child labor. The standard is applicable to the projects depending on the type of employment relationship between the Borrower and the project workers.

ESS2 requires the Borrowers to develop and implement written labor management procedures which set out the working conditions and management of worker relationships through setting the terms and conditions of employment, non- discrimination and equal opportunity and OHS. It also includes the requirement of protecting the work force by setting the provision of contracted workers, grievance redress mechanism and worker's organization.

ESS 3: Resource Efficiency and Pollution Prevention and Management

ESS3 recognizes that economic activity and urbanization often generate pollution to air, water, and land, and consume finite resources that may threaten people, ecosystem services and the environment at the local, regional, and global levels. The current and projected atmospheric concentration of greenhouse gases (GHG) threatens the welfare of current and future generations. At the same time, more efficient and effective resource use, pollution prevention and GHG emission avoidance, and mitigation technologies and practices have become more accessible and achievable.

The main objective of this standard is to avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities, to avoid or minimize project-related emissions of short and long-lived climate pollutants, to avoid or minimize generation of hazardous and non-hazardous waste to minimize and manage the risks and impacts associated with pesticide use.

The Borrower is required to consider ambient conditions and apply technically and financially feasible resource efficiency and pollution prevention measures in accordance with the mitigation hierarchy. Which includes, the use of energy, eater and raw materials, and management of air pollution, management of hazardous and nonhazardous wastes, management of chemicals and hazardous along with pesticides.

ESS 4: Community Health and Safety

ESS4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration or intensification of impacts due to

project activities.

The main objectives of this standard is to anticipate and avoid adverse impacts on the health and safety of project-affected communities during the project life cycle from both routine and non-routine circumstance, to promote quality and safety, and considerations relating to climate change, in the design and construction of infrastructure ,including dams, to avoid or minimize community exposure to project-related traffic and road safety risks, diseases and hazardous materials, to have in place effective measures to address emergency events, to ensure that the safeguarding of personnel and property is carried out in a manner that avoids or minimizes risks to the project-affected communities.

The Borrower of the project is required to evaluate risks and impacts of the project on the health and safety of the affected communities during the project life cycle. The community health and safety should include infrastructure and equipment design and safety, safety of services, traffic and road safety, ecosystem services, community exposure to health issues, management and safety of hazardous materials, emergency preparedness and response. In addition, it should address the security risks and impacts on project-affected communities.

ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement

ESS5 recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons. Project-related land acquisition or restrictions on land use may cause physical displacement (relocation, loss of residential land or loss of shelter), economic displacement (loss of land, assets or access to assets, leading to loss of income sources or other means of livelihood), or both. The term “involuntary resettlement refers to these impacts. Resettlement is considered involuntary when affected persons or communities do not have the right to refuse land acquisition or restrictions on land use that result in displacement.

The main objective of the standard is to avoid involuntary resettlement or, when unavoidable, minimize involuntary resettlement by exploring project design, to avoid forced eviction, to improve living conditions of poor or vulnerable persons who are physically displaced and ensure that resettlement activities are planned and implemented with appropriate disclosure of information, meaningful consultation and informed participation of those affected.

The Borrower is required to consider feasible alternative project designs to avoid or minimize land acquisition or restriction on land use by identifying eligibility classifications, providing compensation and benefits for affected persons, engaging community, and setting grievance redress mechanism.

ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

ESS6 recognizes that protecting and conserving biodiversity and sustainably managing living natural resources are fundamental to sustainable development. Biodiversity is defined as the

variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part. This includes diversity within species, between species, and of ecosystems. Biodiversity often underpins ecosystem services valued by humans. Impacts on biodiversity can therefore often adversely affect the delivery of ecosystem services. The main objective of this standard is to protect and conserve biodiversity and habitats, to apply the mitigation hierarchy and the precautionary approach in the design and implementation of projects that could have an impact on biodiversity, to promote the sustainable management of living natural resources, to support livelihoods of local communities, including Indigenous Peoples, and inclusive economic development, through the adoption of practices that integrate conservation needs and development priorities. This standard shall be applied to all projects that potentially affect biodiversity or habitats, either positively or negatively, directly or indirectly, or that depend upon biodiversity for their success. The Borrower is required to avoid adverse impacts on biodiversity and habitats and shall conserve biodiversity and habitat, and sustainable management of living natural resources.

ESS 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities

This ESS applies to a distinct social and cultural group identified in accordance with paragraphs 8 and 9 of this ESS.

Paragraph 8: The term “Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities” (or as they may be referred to in the national context using an alternative terminology) refers exclusively to a distinct social and cultural group possessing the following characteristics in varying degrees:

- (a) Self-identification as members of a distinct indigenous social and cultural group and recognition of this identity by others; and
- (b) Collective attachment to geographically distinct habitats, ancestral territories, or areas of seasonal use or occupation, as well as to the natural resources in these areas; and
- (c) Customary cultural, economic, social, or political institutions that are distinct or separate from those of the mainstream society or culture; and
- (d) A distinct language or dialect, often different from the official language or languages of the country or region in which they reside.

ESS7 uses the term “*Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities*,” recognizing that groups identified under paragraphs 8 and 9 may be referred to in different countries by different terms. Such terms include “Sub-Saharan African historically underserved traditional local communities,” “indigenous ethnic minorities,” “aboriginals,” “hill tribes,” “vulnerable and marginalized groups,” “minority nationalities,” “scheduled tribes,” “first nations” or “tribal groups.” ESS7 applies to all such

groups, providing they meet the criteria set out in paragraphs 8 and 9. .

The main objectives of this standard are to ensure that the development process fosters full respect for the human rights, dignity, aspirations, identity, culture, and natural resource based livelihoods of Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities and to avoid adverse impacts of projects on them, or when avoidance is not possible, to minimize, mitigate and/or compensate for such impacts. Their **Free Prior and Informed Consent (FPIC)** will be sought.

The ESS7 is applied to all projects whenever indigenous people are present in, or have collective attachment to a proposed project area.

The Borrower will ensure that a grievance mechanism is established for the project, as described in ESS10, which is culturally appropriate and accessible to affected Indigenous Peoples.

ESS 8: Cultural Heritage

ESS8 recognizes that cultural heritage provides continuity in tangible and intangible forms between the past, present and future. People identify with cultural heritage as a reflection and expression of their constantly evolving values, beliefs, knowledge and traditions. Cultural heritage, in its many manifestations, is important as a source of valuable scientific and historical information, as an economic and social asset for development, and as an integral part of people's cultural identity and practice. It also sets out measures designed to protect cultural heritage throughout the project life cycle. The main objective of this standard is to protect cultural heritage from the adverse impacts of project activities and support its preservation, to address cultural heritage as an integral aspect of sustainable development, to promote meaningful engagement with stakeholders regarding cultural heritage, to promote the equitable sharing of benefits from the use of cultural heritage. This ESS is applicable to all projects that are likely to have risks or impacts on cultural heritage. The Borrower is required to avoid impacts on cultural heritage and if its not possible, identify and implement measures to address impacts in accordance with the mitigation hierarchy.

ESS 9: Financial Intermediaries

ESS9 recognizes that strong domestic capital and financial markets and access to finance are important for economic development, growth and poverty reduction. The Bank is committed to supporting sustainable financial sector development and enhancing the role of domestic capital and financial markets. The main objectives are to set out the process to assess and manage environmental and social risks and impacts associated with the subprojects it finances, promote good environmental and social management practices and sound human resources management within the institution. This ESS applies to Financial Intermediaries that receive financial support from the World Bank. The FIs are required to put in place and maintain an ESMS to identify, assess, manage, and monitor the environmental and social risks and impacts of FI subprojects.

ESS 10: Stakeholder Engagement and Information Disclosure

This ESS recognizes the importance of open and transparent engagement between the Borrower and project stakeholders as an essential element of good international practice. Effective stakeholder engagement can improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation.

The main objectives of this standard are to establish a systematic approach to stakeholder engagement that will help Borrowers identify stakeholders and build and maintain a constructive relationship with them, in particular project-affected parties, to assess the level of stakeholder interest and support for the project and to enable stakeholders views to be taken into account in project design and environmental and social performance, to promote and provide means for effective and inclusive engagement with project-affected parties throughout the project life cycle on issues that could potentially affect them and to ensure that appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner and format.

ESS10 applies to all projects supported by the Bank through investment project financing. For ESS10, Stakeholder refers to ‘project affected parties’ (individuals or groups who are affected or likely to be affected by the project) and ‘other interested parties’ (individuals or groups who may have an interest in the project). The Borrower is required to identify and analysis stakeholder, prepare stakeholder engagement plan, conduct meaningful engagement, information disclosure and establish grievance mechanism.

3.5 Environmental Health and Safety Guidelines

The EHS Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP) and are referred to in the World Bank’s Environmental and Social Framework and in IFC’s Performance Standards.

The General EHS Guidelines contain the performance levels and measures that are normally acceptable to the World Bank Group, and that are generally considered to be achievable in new facilities at reasonable costs by existing technology. The General EHS Guidelines contain information on cross-cutting environmental, health, and safety issues potentially applicable to all industry sectors. The developer is required to apply the relevant levels or measures of the EHS Guidelines in the project.

Specific EHS guidelines have been developed for some industrial activities. No guideline has been published for solar projects. The guideline on Electric Power Transmission and Distribution will be applied for all the new power line.

3.6 Gap between the GoN Legislative Framework and the WB ESF

WB ESSs	GoN Legislative Framework	Gap between GoN Legislative Framework and WB ESSs
ESS 1: Assessment and Management of Environmental and Social Risks and Impacts	Constitution of Nepal National Environment Policy 2019 Environment Protection Act 2019 Environment Protection Rule 2020	- Though EPA includes mandatory requirement of different level of environmental studies, its majorly based on threshold rather than scale and magnitude of risks and impacts. - EPA/EPR does not consider mitigation hierarchy (safeguard principle) in risk management process. - EPA/EPR does not allow use of other type/forms of assessments such as RAP, VCDP, LRP other than BES, IEE and EIA. - The scope of BES, IEE and EIA may not cover all WB ESS.
ESS 2: Labor and Working Conditions	Constitution of Nepal Labor Act 2017 Labor rule 2018 Child Labor (Prohibition and Regularization) Act 2000 National Occupational Safety and Health Policy, 2076 (2019) Nepal has already ratified 11 Core Labour Conventions, including the following seven of the ten fundamental conventions; - C029 - Forced Labour Convention, 1930 (No. 29) - C098 - Right to Organise and Collective Bargaining Convention, 1949 (No. 98) - C100 - Equal Remuneration Convention, 1951 (No. 100) - C105 - Abolition of Forced Labour Convention, 1957 (No. 105)	- There is no explicit requirement in the Labor Act or Rules on the content of a general human resources policy. - The following ILO Core Labour Standards (fundamental instrument) are also to be ratified in a gradual basis; - C087 - Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87) - C155 - Occupational Safety and Health Convention, 1981 (No. 155) - C187 - Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187) - P029 - Protocol of 2014 to the Forced Labour Convention, 1930 - Though the Occupational Health and Safety (OSH) policy has been formulated, there is not any act/rule on OSH. - There is no adequate industry specific standards (only directives for Brick industry is available) - No provision for GRM for workers - Migrant workers are not included in non-discrimination principles - Labor Act provision on retrenchment is not applicable to companies with less than 10 employees. - Lack of requirements on information to be provided to employees/workers on access to grievance redress mechanism.

WB ESSs	GoN Legislative Framework	Gap between GoN Legislative Framework and WB ESSs
	• C111 - Discrimination (Employment and Occupation) Convention, 1958 (No. 111) • C138 - Minimum Age Convention, 1973 (No. 138) <i>Minimum age specified: 14 years</i> • C182 - Worst Forms of Child Labour Convention, 1999 (No. 182) Each of these ILO Conventions is crucial for advancing fundamental principle and work-related rights in Nepal.	• Children above 16 and under 18 may still be engaged in risky jobs. • There is no requirement of risk assessment. • Silent on Forced labour
ESS 3: Resource Efficiency and Pollution Prevention and Management	Environment Protection Act 2019 Environment Protection Rules 2020 National Ambient Air Quality Standards (2003) National Ambient Sound Quality Standard (2012), Standard on Emission of Smoke in Air by New and Existing Diesel Generator (2012), National Water Quality Standard (2008) Tolerance Limits for Industrial Effluents discharged into Inland Surface Waters (2003) The Solid Waste Management Act (2011) Solid Waste Management Rule (2013) Water Resources Act (1992) Water Resources Rules (1993)	• There is no specific legislation with minimum requirements on resource use efficiency. • No law which compels or encourages by way of incentives, project proponents to implement measures for energy or water consumption efficiency. • There is no defined requirement at project level to reduce GHG emissions.

WB ESSs	GoN Legislative Framework	Gap between GoN Legislative Framework and WB ESSs
	Water Quality Guidelines for the Protection of Aquatic Ecosystem National Climate Change Policy 2019	
ESS 4: Community Health and Safety	Environment Protection Act 2019 Environment Protection Regulation 2020 Infectious Diseases Act 1964 Solid Waste Management Act 2011 Solid Waste Management Rule 2013	There are only limited provisions regulating private security guard services. Public health legislations do not specifically impose requirements for development and infrastructure projects.
ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Land Acquisition Act 1977 Land Use Policy 2015 National Agro-forest Policy 2076 Land Use Act 2019 Forest Act, 2019 Forest Regulation, 2020 The National Policy on Land Acquisition, Compensation and Resettlement in Development Projects, 2015	• Land Acquisition Act is out dated and not clear on the required studies for undertaking land acquisition. • Limited clarity on rights holders / measures to duly compensate them and offering assistance in resettling and restoring their livelihoods. • Replacement cost principle not included. • Grievance period too short for meaningful input from project affected people. • Only cash compensation is considered for payment. • The Act has limited time window to submit grievances/not ongoing prior to notice or during implementation. No details on how this will be made accessible especially to vulnerable/low literacy groups, or other requirements for stakeholder participation throughout the process. • In general, the development projects have been compensating the owners for their land. There is no specific policy to compensate farmers who have been farming on leased land. • Compensation shall be paid for losses resulting from clearing of crops and trees. The GoN officer responsible for preliminary Action shall determine the amount of compensation payable and pay the same to the concerned person. In case the concerned person is not satisfied with the amount of compensation determined then he/she

WB ESSs	GoN Legislative Framework	Gap between GoN Legislative Framework and WB ESSs
		may file a complaint with the Chief District Officer (CDO) on which he/she receives information thereof, and in such cases the decision of the CDO shall be final. • As per the Land Use Act 2019, if agricultural land is left barren for up to three years without informing the concerned local government with valid reasons, an amount of up to NPR 100,000 may be levied as a fine. • The Act includes requirements for collection of census and cadastral data, but no clear requirement for Resettlement Action Plan (RAP). • Definition of Vulnerable people is different: women, indigenous communities (including Dalits, Madhesis) Muslims, endangered minorities and marginalized citizens as the groups who are deprived of economic, social and political opportunities.
ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	National Park and Wildlife Conservation Act (1973) National Park and Wildlife Conservation Regulations (1974), Soil and Watershed Conservation Act (1982), Himalayan National Park Regulation (1979) National Trust for Nature Conservation Act (1983), Forest Act (2019) Forest Regulation (1995) Conservation Area Management Rules (1996), Buffer Zone Management Rules (1996) National Biosafety Framework Nepal (2006) Forest policy (2000)	• Though most of the Policies, Acts and Rules aim the protection of biodiversity, they do not require mitigation hierarchy and biodiversity offset schemes. • Many Acts and Rules were promulgated a long time back (as far back as the 1960s), which should be amended or repealed with new one with time. • Natural habitats are not specifically required to be assessed in the EIA nor require Biodiversity Management Plan even where biodiversity impact is found significant in the EIA • No national requirement limiting forestry project to unforested land / land already converted. • No national legislation putting obligation on businesses to conduct due diligence on their supply chain on biodiversity and deforestation issues.

WB ESSs	GoN Legislative Framework	Gap between GoN Legislative Framework and WB ESSs
ESS 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	National Foundation for the Development of Indigenous Nationalities Act, 2002 Local Self-Governance Act, 1999 ILO Convention 169, 2007 Forest Act, 1993 and Forest Regulation, 1995	- About half of Nepal's ethnic groups are officially recognized as indigenous people by the GoN; hence certain ethnic groups may self-identify as such according to WB criteria but still lack official status. - Constitution includes clause that calls for engaging indigenous people in decision making processes that concern them. However, the requirement falls short of the definition of FPIC (Free, Prior and Informed Consent) - The GoN doesnot require FPIC for projects in communities with IP - Apart from the Guthi system, no legal recognition of Indigenous Peoples land rights. No need to develop Vulnerable Community Development Framework for projects envisaged to have adverse impacts on vulnerable people (as defined in Chapter 6)
ESS 8: Cultural Heritage	Environment Protection Act 2019 Environment Protection Regulation 2020	- No clear definition or legal recognition of intangible cultural heritage. - No requirement for chance find procedures - No defined procedure for consultation with affected communities on cultural heritage.
ESS 9: Financial Intermediaries		
ESS 10: Stakeholder Engagement and Information Disclosure	Environment Protection Act 2019 Environment Protection Regulation 2020	- There is no requirement to conduct stakeholder analysis and preparation of Stakeholder Engagement Plan. - The Act/Rule does not provision for a continuous stakeholder engagement/consultations beyond EIA process during construction and operation phase. - No need to develop GRM, including IPs

3.6 Institutional Framework

The institutional framework relevant to the Project is presented in **Table 5**.

Table 5: Institutional Framework for the Project

S.N.	Institutions	Roles and Responsibilities
1	Government/Public Sector	
	Ministry of Energy, Water Resources and Irrigation (MoEWRI)	Policy guidance, supervision and monitoring tasks at different stages of project implementation
	Electricity Regulatory Commission (ERC)	Facilitate in tariff fixation or setting
	Nepal Electricity Authority (NEA)	Net metering and grid interconnection arrangements.
	Department of Water Resources and Irrigation (DoWRI)	Coordination and collaboration as per need
	Ground Water Resource Development Board (GWRDB)	- Provide monitoring data of groundwater table - Coordination and support in potential sites identification
	Prime Minister Agriculture Modernization Project (PMAMP)	Coordination and collaboration if necessary
	Department of National Parks and Wildlife Conservation (DNPWC)	Coordination and collaboration as per need
	Provincial Government (PGs) and Local Government (LGs), DCCs	- Provide co-financing for the development of subprojects, if necessary - Facilitate registration and renewals of sub-projects - Facilitate for tariff fixation - Facilitate to resolve grievances and issues - Coordinate with pertinent stakeholders for the development and implementation of subprojects - Facilitate Periodic monitoring and evaluation of subprojects - Develop a handover mechanism and implement as per the agreement between the parties. - Facilitate for long term operation - Facilitate registration of cooperative or other management model if necessary - Other obligations as provisioned in constitution and laws.
	Central Renewable Energy Fund (CREF)	Provide services that enable the successful delivery of subsidies and credits to the sub-projects in accordance with existing rules and standards.
	Renewable Energy Test Station- RETS Nepal	Prepare Technical Standards and Quality Assurance
2	Financial Sector	
	Class-A commercial banks of Nepal working in Renewable Energy Sector particularly with AEPC” as handling and partner banks.	- Provide loans or credit facilities to the selected ESCOs. - Responsible for evaluation and approval of loan applications for subprojects if necessary
	Micro-finance Institutions (MFIs)	Provide loans or credit facilities to the farmers or ESCO (for SIPs).
3	Installer Companies /Consulting firms	

S.N.	Institutions	Roles and Responsibilities
	ESCOs ³ or EPC companies/solar companies	- Perform the FS, EA, and document/report review as agreed (if ESCO). - Supply, installation, O&M works - Ensure legal compliance in all areas, including environmental, social, GESI, and CSR. - Assemble an adequate human resource team for the subproject's successful implementation and management. - Oversees the subproject's periodic monitoring and timely reporting. - Prepare and submit all subproject implementation reports as per the specified format or structure
	Consulting firms/Individual consultants	Carry out the FS, ESMP/ESCAP, monitoring and evaluation of document/reports as per need.
4	Civil Societies/NGOs	
	- Renewable Energy Confederation of Nepal (RECON) - National Association of Rural Municipality in Nepal (NARMIN) - Municipal Association of Nepal (MuAN) - National Federation of Irrigation Water Users' Association Nepal (NFIWUAN)	Coordination and collaboration as per need
5	Private Sector/Association	
	FNCCI, SEMAN, CNI, FNCSI, PABSON, N-PABSON, HAN, REBAN, HISSAN, FAN, Private entities (medical college, hospital, schools/college, hotels, beverage industries, EV Charging station, shopping malls etc.)	- Coordination and collaboration as per need. - Support in demand collection and successful project implementation.
6	Development Partners and program	
	ICIMOD, IWMI, DFID/NREP, UNDP/RERL, World Bank/MGEAP, WWF Nepal, ADB, WI-Nepal	- Knowledge sharing partners - Support in project implementation
	GIZ/POSTED	Provides technical support to DKTI
7	Research Institutions	
	- Centre for Energy Studies (CES), Institute of Engineering, TU - Renewable and Sustainable Energy Laboratory (RSEL), KU	- Knowledge sharing or idea exchange - Support in project implementation
8	Local beneficiaries (UGs, Cooperatives, Farmers, Entrepreneurs etc)	Support in project identification, implementation, operation and management

³ **Energy Service Company (ESCO)** is defined as a private commercial entity legally registered to carry out energy service businesses (generation, transmission and distribution).

3.7 Eligibility Criteria

The eligibility criteria shall be used as screening of the demands that comes from the applicant during the project preparatory phase. In order to access the demand received from potential beneficiaries or energy service companies (ESCO), sets of defined selection criteria shall be applied for the selection of subprojects.

3.7.1 On-grid Solar Roof System

The eligibility criteria for rooftop PV for C&I systems are as follows.

C&I Entity Owned

- C&I must obtain all relevant approvals and permits from the GoN, which must be up-to-date
- C&I must have capacity and commitment⁴ for carrying out environmental and social management measures
- C&I must have clean track record in terms of compliance with any relevant environmental and social regulations of Nepal
- C&I owned by vulnerable group defined in Section 6.3 of this ESMF will be given priority
- Products, projects, investments listed in Exclusion List of KfW⁵ will not be eligible
- Roofs with asbestos will not be eligible
- Roofs needing reinforcement to support panels will not be eligible⁶
- If solar panels have to be built on the ground, greenfield sites⁷ will not be eligible.
- Subproject specific Environmental and Social Management Plan (ESMP) must be included in the Detailed Feasibility Study report
- Subprojects in disputed property will not be eligible, ownership must be proven and access rights must be clearly agreed upon.
- Subproject involving involuntary resettlement or economic displacement of more than 15 households will not be eligible
- Subprojects in ecologically sensitive areas such as the National Park, Wildlife Reserve, Hunting Reserve will only be eligible with permission from concerned authority.
- Must comply with the Environmental and Social Management Framework (ESMF) of AEPC-DKTI Project

ESCO Owned

- ESCO must obtain all relevant approvals and permits from the GoN, which must be up-to-date

⁴ Determination of adequate capacity will include: (i) commitment to timely engagement of environmental & social risk management expertise; (ii) sufficient budget allocated to environmental and social assessment and monitoring

⁵ https://www.kfw.de/PDF/Download-Center/Konzernthemen/Nachhaltigkeit/Ausschlussliste_EN.pdf, **Appendix 4**

⁶ KfW 1.0 - Guidance Document for ESMP and ESCOP Package for Category B Projects with Moderate or Lower Risks

⁷ Green field sites: undeveloped land in an urban or rural area

- ESCO must have the capacity and commitment for carrying out environmental and social management measures
- ESCO must have clean track record in terms of compliance with any relevant environmental and social regulations of Nepal
- ESCO owned by vulnerable group defined in Section 6.3 of this ESMF will be given priority
- Products, projects, investments listed in Exclusion List of KfW⁸ will not be eligible
- Roofs with asbestos will not be eligible
- Roofs needing reinforcement to support panels will not be eligible
- If solar panels must be built on the ground, greenfield sites will not be eligible.
- Subproject specific ESMP must be included in the Detailed Feasibility Study report
- Subprojects in disputed property will not be eligible ownership and access rights must be clearly defined
- Subproject involving resettlement or economic displacement of more than 15 households will not be eligible
- Subprojects in ecologically sensitive areas such as the National Park, Wildlife Reserve, Hunting Reserve will only be eligible with permission from concerned authority.
- Must comply with the ESMF of AEPC-DKTI Project

3.7.2 Off-grid Solar Irrigation System

The eligibility criteria for solar irrigation pump systems are as follows.

- The individual farmer and users' group must obtain all relevant approvals and permits from the GoN, which must be up-to-date.
- The users' group must have the capacity and commitment for carrying out environmental and social management measures.
- Subproject involving resettlement or economic displacement of more than 15 households will not be eligible.
- Users' groups including vulnerable group defined in Section 6.3 of this ESMF will be given priority.
- Substitution or avoidance of diesel-based irrigation pumps shall be ensured.
- Subprojects in ecologically sensitive areas such as the National Park, Wildlife Reserve, Forest Land will only be eligible with permission from concerned authority.
- Subprojects having existing and not fixable competition between water users will not be eligible.
- Subprojects with significant decreasing trend of level of ground water table or flow rate of surface water will not be eligible.

⁸ https://www.kfw.de/PDF/Download-Center/Konzernthemen/Nachhaltigkeit/Ausschlussliste_EN.pdf, **Appendix**

- The design of Solar irrigation system must assure no impact on water table of the area.
- Potential impacts and risks must be identified and mitigation measures should be implemented.
- The subproject specific ESMP for large SIPs and ESCOPs for Medium and Small SIPs shall be prepared.
- The users' group must acquire sufficient land for the installation of all infrastructures related to the SIP.
- Must comply with the ESMF of AEPC-DKTI Project.

3.7.3 Off-grid Solar Minigrid

LG Owned

- Must obtain all relevant approvals and permits from the GoN, which must be up-to-date.
- Subproject involving involuntary resettlement or economic displacement of more than 15 households will not be eligible.
- Users' groups including vulnerable group defined in Section 6.3 of this ESMF will be given priority.
- Subproject specific ESMP must be included in the DFS report.
- Subprojects in ecologically sensitive areas such as the National Park, Wildlife Reserve, Forest Land will only be eligible with permission from concerned authority.
- Subprojects in brownfield areas will be given priority.
- The battery management process or guideline should be included.
- Must comply with the Environmental and Social Management Framework (ESMF) of AEPC-DKTI Project.

Chapter 4: Potential Environmental and Social Impact Identification and Mitigation Measures

4.1 Introduction

This chapter identifies the potential environmental and social impacts associated with Solar C&I systems, Solar Irrigation and Solar Mini-grid subprojects. The exact locations and associated risks and impacts of subprojects to be financed under AEPC/DKTI Project are not known at this stage. However, nature, magnitude, extent or duration of the environmental and social impacts of a project depends largely upon the global project's characteristics (sector, size) as well as the nature, size, physical and biological settings and socio-economic and cultural settings of the area where the project is going to be implemented. Therefore, the overall purpose of this ESMF is to provide a general overview of the potential project's impacts without site-specific details of each subproject and provide guidance on the E&S risk management in all subprojects to address the E&S impacts associated with the implementation of the subprojects of each component. All the elements provided in this chapter will have to be updated and detailed in the following studies, when the exact characteristics of the sub-projects will be known and defined

As the subprojects involving high and substantial risk will not be eligible for financing under this project, subprojects in ecologically sensitive areas such as national parks, wildlife reserves and hunting reserves, subprojects that might have significant impact on biodiversity and cultural heritage will be excluded. Moreover, subprojects involving involuntary resettlement, having risk of physical or economic displacement and that might have significant impacts on Indigenous people will not be qualified.

Some of the beneficial impacts that are envisaged for the project are decrease of the expenses related to the energy consumption, increased energy resilience by diversification, increase in agricultural productivity, local employment opportunity, improvement of living conditions (lightning, energy for local consumption), infrastructure development, increased mobility, access to the information and modern technologies that helps student to optimize their study timing during evening and general public to carry out other productive activities during evening or night time apart from their regular daytime activities, reduction of impacts to climate change. However, only a limited adverse impact is anticipated on the existing environment, which are temporary in nature, for all components of this project. Landslide, soil erosion, safety hazards, construction disturbances, disposal of debris, and irritation from dust and noise in the subproject site are some of the impacts likely to occur during the construction stage with short-term adverse impacts. Key risks and impacts can be mitigated to an acceptable level by implementation of recommended safeguards measures and environmental and social practices.

The potential beneficial and adverse impacts on biological, physical, socio-economic and

cultural environment associated with pre-construction, construction and operation phases that are envisaged for all components are discussed under general heading and for specific components are discussed under Solar C&I, Solar Irrigation Pump and Solar Minigrid subprojects headings as follows.

4.2 Specificity of each sub-component

It is undeniable that photovoltaic projects, in general, have a positive impact on the environment (including social aspects). In the current project, each of the subcomponents has its own specificities. These may imply significantly different effects (positive and negative) in some cases.

The on-grid solar roof top systems are mainly intended for industrial and commercial use. The implementation of this component is mainly intended to support the development of medium to large-scale industrial and commercial economic activities. Due to its location, high up on unoccupied roofs and in an urban area, this component risks creating relatively few interactions with its environment (physical, biological and social). Potential negative impacts of this component such as communal and OHS risks due to use of heavy machinery, traffic, inflow of migrant workers and potential air, water, soil pollution, vibrations etc might be limited.

The sub-component related to off-grid solar irrigation pumps is proposed for a completely different purpose. Indeed, it intervenes in a rural and agricultural context, which is often complex and can present specific issues related to the environment (biological and physical, exploited by local communities) and the social and economic components that will benefit from the project. Community and OHS risks due to use of heavy machinery, vibration and inflow of migrant workers as well as air, water and soil pollution are some of the potential adverse impacts, which will be limited. Even if the positive impacts of this component are obvious, it is necessary to identify the direct impacts of the project and the possible indirect impacts (on the medium-long term for example for water resources).

The component related to the development of solar mini grids obviously brings significant positive impacts to the beneficiary communities, which did not have electrical resources until now. The development of such a project may completely change the host environment (including social) and it will be necessary, as for the previous component, to identify all the impacts (direct, indirect and residual).

4.3 Beneficial Impacts

Overall, photovoltaic projects bring many benefits (more than the negative impacts discussed in the next chapter). The environmental and social main positive impacts of the project are discussed as follows:

General (common to all sub-components)

- Energy generation from renewable source of energy
- Energy diversification
- Improvement of living conditions and economic development
- Employment generation during the construction and operation phases
- Reduction in dependency on fossil fuel and imported fuels
- Reduction in greenhouse gas emission, combating air pollution

On-grid Solar Roof Systems

- Energy generation providing reliable electricity supply to commercial and industrial entities
- Avoidance of using productive land and greenfield sites
- Enhance performance of commercial and industrial entities
- Employment generation in manufacturing, installation as well as production/service sector
- Opportunity to participate in net metering

Off-grid Solar Irrigation pumps

- Increased area of irrigated productive land
- Enhanced agricultural productivity, crop diversification and production
- Replace diesel pumps reducing greenhouse gas emission
- Minimize the import of diesel from neighbouring country
- Improved living standard of farmers and of potential vulnerable farmers
- Strengthen community consciousness and integrity

Off-grid Solar Mini-grids

- Energy generation providing reliable electricity supply to communities and houses
- Provides support for business development
- Improve the knowledge, practice and acculturation of using household amenities and appliances
- Opportunity to link with outer world through using mass media
- Improve health and sanitation through enhancement of good practices through linking with outer world
- Improve women and vulnerable groups' capacity
- Strengthen community consciousness and integrity
- Improved child education as they can study in the evening and night with availability of electricity

4.4 Adverse Impacts

The proposed subprojects based on the solar energy will involve the activities that might result changes in the physical, biological, socio-economic and cultural environment. Generally, increased carbon footprint, water consumption and waste generation (during construction, operation and dismantling), use of thermal energy, environmental release (on air, water and land) and climate induced disasters are some of the adverse impacts envisaged for all 3 Project Components, which are discussed further with mitigation measures as follows.

Table 6: Potential Environmental and Social Adverse Impacts and Mitigation Measures Common for all 3 Components

Key E&S risks/impacts	Proposed Mitigation Measures
Pre-construction phase	
<u>Increased Carbon footprint of solar panel, Impact on natural resources and pollution prevention</u> during manufacturing and transportation	• Recycling used or defective panels • Choose means of shipping with less carbon footprint • Introduce carbon offset programs such as tree plantation
Construction Phase	
<u>Impact on Air Quality</u> The construction activities such as excavation, site clearance, and emission from the equipment and machinery might generate dust, particular matters and other gases.	• Suppression of dust generated from vehicle movement and construction activities will be controlled by water sprinkling • Prohibition of open storage and spillage of loose soil sands and aggregates in and around construction site near the settlement areas • Covering of the stock piled construction materials and spoils • Regular maintenance of the equipment and machinery to minimize emissions
<u>Impact on Noise</u> The construction activities such as drilling and movement of vehicles might generate sound that is over the tolerance limit of national standard (National Ambient Sound Quality Standard, 2012).	• All equipment and machinery will be maintained to manufacturer's specification to limit noise generation. • Contractor must provide hearing protection devices such as earmuffs and earplug to the c workers, depending on the nature of work • Construction activities shall be strictly prohibited during night time to avoid disturbance to nearby settlements
<u>Impact on Water Quality</u> The disposal of solid waste and discharge of wastewater might pollute the receiving	• Direct disposal of waste and discharge of any kinds of waste and wastewaters in the receiving water bodies will be strictly

Key E&S risks/impacts	Proposed Mitigation Measures
surface water, which can adversely impact human health in the surrounding area.	prohibited. The oils and lubricant will be stored properly and disposed in adequate and authorized disposal/ valorization site in line with national regulations and IFC general EHS guidelines.
<u>Impact on Soil Quality</u> Impact on soil as spills and unclassified disposal of waste can adversely impact the soil.	The oils and lubricant will be stored properly and disposed in adequate and authorized disposal/ valorization site.
Construction and Operation	
<u>Water Consumption</u>	Train beneficiaries on water resources management

Table 7 presents some climate induced disaster including weather related risks and mitigation measures suggested for all 3 components.

Table 7: Climate Induced Disaster and Weather-Related Risks

Weather-related Risks	Proposed Mitigation Measures
<u>Wind</u> The wind load over a rooftop can cause problem if they are not installed properly.	- Ensure that tall trees are not in surrounding to prevent the modules from damage. - Ensure that the modules are installed intactly by designing the racks of the solar panels and the roof framing made for supporting them according to the wind loads experienced in the respective area. - Build retaining all around the solar PV module, if required.
<u>Snow and Ice Load</u> Snow can accumulate on the modules and layers of ice can be formed obstructing its working if placed or structured inappropriately.	Solar modules to be installed in inclined roof , which will help in reducing snow load due to their heating and thermal absorption properties.
<u>Gravity load</u> Solar modules have a weight of 2-4 pounds for every square foot. They are thin structures that need support. For the solar roof component, if they are not installed correctly, the gravity load can affect the structure, which might be dangerous for the solar panels and the building.	The solar PV modules will be uniformly distributed across the roof to balance the load minimizing the impact in structures.
<u>Water intrusion</u>	Ensure to regularly check the sealing of the modules and upgrade if it is wearing off.

Weather-related Risks	Proposed Mitigation Measures
There may be chances of water leakage through the connections made for solar energy to reach the households. Rainwater can be accumulated between the modules of the panels, and the drainage system of the rooftop might get disturbed consequently.	Well seal the anchor holes drilled in the roof to prevent water draining.
<u>Lightening strike</u>	- Install rods or discharge paths for smooth discharge of lightning from the roof - Provide good Earthing - Install sufficient Lightening arresters
<u>Flood</u> The installed PV modules and other infrastructure might be flushed away by flood	- Avoid the installation of modules and construction of well on the bank of river - Conduct flood analysis with 50 years of return period if the modules are to be installed and well to be constructed on the bank of river - Consultation with the community people to get the information about the flood pattern - If the subproject site is located in the flood prone area, ensure that modules and structures are kept intact

The potential adverse impacts for each of three components and mitigation measures proposed for the identified impacts are discussed briefly as follows:

On-grid Solar Roof Systems

Rooftops are the most prevalent place to install solar PV modules, as they are exposed to sunlight allowing the panel to collect solar energy directly and transport it into usable electricity.

Table 8: Potential Environmental and Social Adverse Impacts and Mitigation Measures for On-grid Solar Roof Systems

Key E&S risks/impacts	Proposed Mitigation Measures
Pre-construction Phase	
Greenfield land take	Avoid green lands in case of ground mounted panels
Construction and Operation Phases	
Occupational Health and safety risks for workers at height (fall, injury, death), use of heavy machinery, electrical works, welding, etc	Site specific Occupational Health and Safety (OHS) plan aligned with the ESMP will be prepared and implemented effectively .

Key E&S risks/impacts	Proposed Mitigation Measures
	- Implementation of strict Occupational Health and Safety procedures. following predefined good practices including administrative control, engineering control and use of collective and Personal Protective Equipment (PPE) such as boots, helmet, safety harness, gloves, face mask - The solar panel must be installed properly by avoiding any mistakes that could be hazardous (use of incorrect tools for crimping, use of connectors of different brand, improper management of wires, iinstallation done by untrained persons). - The training of personnel as well as the provision of health and safety equipment is essential to limit this risk to a minimum - Fencing of construction site and erect caution signs (in Nepali/local language)
Potential exposure to asbestos poisoning	Avoid roofs with asbestos while screening for the subproject through questions to the building owner
Community Health and Safety risks for populations (for example risks due to falling objects, traffic, construction works such as air pollution, noise, heavy machinery, influx of workers etc.)	- Prepare Community Health and Safety plan aligned with ESMP and its effective implementation - Implementation of strict health and safety procedures following predefined good practices including administrative control, engineering control and use of PPE
Operation Phase	
Fire hazard (related to the electrical equipment associated with the panels)	- Use of recent equipment : All photovoltaic installations must be equipped with a system to quickly switch off the electricity production. - Regular monitoring and maintenance of the installations must be established. - Implement emergency procedures
Risk of electrocution (human and wildlife) related to electrical installations	- Implementation of strict health and safety procedures following predefined good practices. - Regular monitoring of the installations must be established. - Implement emergency procedures
Dismantling	
Waste generation	- Solar panels and other recyclable equipment shall be recycled. - Developers will be encouraged to establish Take-back-system with the supplier for dismantled or defective panels.

Off-grid Solar Irrigation pumps

The impacts have been identified considering small (individual) as well as medium (community based) and large irrigation pump systems⁹. They will likely be negligible to low for small pumps and low to moderate for medium and large pumps.

Table 9: Potential Environmental and Social Adverse Impacts and Mitigation Measures for Off-grid Solar Irrigation Pumps

Potential Risks and Impacts	Proposed Mitigation Measures
Pre-construction Phase	
<u>Change in land use</u> Farmers with limited parcel of land might be reluctant to use the productive land for the installation of solar PV modules and pump	• Provide engineering control solution such as install modules on rooftop or raise the height of trust >5 ft. so that they can use land for cultivation • Prefer brown field and not cultivated area for the solar PV modules
<u>Land acquisition</u> Government owned land might be required to acquire (lease) for the installation solar PV modules and construct other infrastructure Or Private land	• Avoid the use of government land as possible • Use barren land without any use by third part stakeholder (Non-title holders) • Adopt best available practices of land acquisition considering the requirement of only the nominal parcel of land
Construction Phase	
Occupational Health and safety risks for workers with drilling wells, use of heavy machinery, electrical works, welding, trenching, etc	• Site specific Occupational Health and Safety (OHS) plan aligned with the ESMP will be prepared and implemented effectively . • Implementation of strict Occupational Health and Safety procedures. following predefined good practices including administrative control, engineering control and use of collective and Personal Protective Equipment (PPE) such as boots, helmet, safety harness, gloves, face mask • The solar panel must be installed properly by avoiding any mistakes that could be hazardous (use of incorrect tools for crimping, use of connectors of different brand, improper management of wires, iinstallation done by untrained persons). • The training of personnel as well as the provision of health and safety equipment is essential to limit this risk to a minimum • Fencing of construction site and erect caution signs (in Nepali/local language)

⁹ Potential risks and impacts with proposed mitigation measures for SMG presented in Table 7 applies to Community based SIPs as well.

Potential Risks and Impacts	Proposed Mitigation Measures
Community Health and Safety risks for populations (for example risks due to traffic, construction works such as air pollution, noise, heavy machinery, influx of workers etc.)	• Prepare Community Health and Safety plan aligned with ESMP and its effective implementation • Implementation of strict health and safety procedures following predefined good practices including administrative control, engineering control and use of PPE
Operation Phase	
<u>Changes in farming and economic practices</u> The modification of a productive equipment may change the practices, which could have various consequences on the socio-economic environment	• Make future beneficiaries aware of the potential risks of the project (through focus groups with the beneficiaries and their neighbours) • Organize training to optimize water consumption practices • Organize monitoring of practices
<u>Risk of increase in water consumption and decrease in available water resources</u> Water table can drop due to excessive pumping of water	• Avoid the sites with significant decrease of groundwater table and / or flow rate of surface water • Set up a procedure for monitoring water consumption and water table at the site and at the neighbouring sites. • Train beneficiaries on water resource management • Establish a procedure for monitoring aquatic biodiversity in surface water
<u>Land stability</u> Soil erosion and landslide at the subproject site might damage the modules and block bore well	• Geological study shall be performed if required. • Engineering control must be suggested to make the site stable (to keep modules and structures intact)
<u>Conflict in water distribution pipeline alignment</u> Community people might be reluctant to let the pipeline through their land	• Give priority to projects in which pipelines will not have to be installed • Provide incentive to the landowner for the use of their land / easement to negotiate • Establish and implement a Stakeholder Engagement Plan
<u>Safety of water distribution pipeline</u> Water distribution pipeline passed through the farm might be damaged with the use of tractor	• Provide engineering solution such as bury pipeline below 1 m • Place flags through the alignment

Potential Risks and Impacts	Proposed Mitigation Measures
Cross contamination of aquifers If a new well has to be drilled, drilling should avoid connecting different groundwater tables and should also avoid any contamination of groundwater by hydrocarbons. Well completion and head should be watertight to any intrusion of a pollutant.	- Have the well drilled by an authorized drilling company working under best available drilling practices - Well completions should be safed and well heads shall be safed and watertight.
<u>Water intrusion</u> There may be chances of water leakage through the distribution pipeline to irrigate the farms.	- Regular monitoring and maintenance - Keep the pipelines above ground to allow regular monitoring and maintenance
<u>Justice in water distribution / Conflict within the communities</u> All potential beneficiaries might not get water while required/equitably, which can cause significant inequality and conflict Potential water drop may induce conflicts.	- Avoid the subproject site with existing conflict in water use - Preference shall be given to vulnerable people (as defined in Section 6.3 of thids ESMF) - Water to be distributed equitably based on the area of plots and other criteria such as vulnerability of the household if deemed necessary/ useful (water meters to be installed at each beneficiary) - Distribution chamber to be used to control water distribution so that demand of one farmer can be fulfilled, then move to another
<u>Theft Issue</u> Due to small size of solar PV modules and pump, someone else can steal them away.	- Provide engineering control solution such as keep them intact with some heavy structure, use of potable system etc - Provide administrative control such as carry them home when they are not in use
<u>Runoff of chemical fertilizer and pesticides to surface water</u> If fertilizer is used in excess, it can be discharged in surface water affecting water quality of surface and ground water	- Limit the use of chemical fertilizer and pesticide - Promote the use of compost and organic pesticide - Promote wise use of water for irrigation (avoid excess use of water resulting runoff)
<u>Dismantling</u>	
<u>Waste generation</u>	- Recycle solar panels and other specific equipment where recycling solutions exist – even if not in Nepal. - Developers will be encouraged to establish Take-back-system with the supplier for dismantled or defective panels.

Note: Land required to install for 1 kW solar PV module = 6m²

Off-grid Solar Mini-grids

The main impacts have been identified for Off-grid Solar Mini-grid subprojects, which can be common for large (community based) irrigation pump systems as well.

Table 10: Potential Environmental and Social Adverse Impacts and Mitigation Measures for Off-grid Solar Mini-grids

Potential Environmental and Social Impacts	Proposed Mitigation Measures
Design/Pre-construction Phase	
Loss of land/other physical assets	Prohibit involuntary resettlement
Loss of livelihood	- Prohibit subprojects impacting more than 15 households for economic displacement - Priority to be given to Affected Peoples for employment - Explore alternative livelihood opportunities - Provide skill enhancement training - Undertake CSR activities to provide livelihood opportunities
Impact on ecologically sensitive area and cultural heritage	- Avoid greenfield and productive sites and in particular ecologically sensitive areas such as national parks, wildlife reserves, hunting reserve, forest areas, conservation areas, buffer zone, as possible. - Avoid cultural heritage sites
Loss of access rights	Conduct alternative analysis and provide alternate access
Loss of common property resources	- Avoid to the extent possible - if not avoidable, replace by the project
Distribution line alignment and Right of Way	- Exclude crossing productive agriculture land, settlement area as well as land with cultural and historical importance - Align with the public street to the extent possible (to use its easement / Right of Way)
Construction Phase	
Physical Environment	
<u>Land disturbance</u> Soil erosion and alteration of natural drainage during site preparation	- Ensure that the natural way is not blocked - Ensure that the existing slope and natural drainage pattern on the site is not altered - Minimize cut and fill activities as possible - Implementation of appropriate slope protection structure - Construction of adequate and appropriate drainage systems, and - Revegetation of the disturbed slopes and application

Potential Environmental and Social Impacts	Proposed Mitigation Measures
	of the proper bio engineering measures
<u>Change in land use</u> The use of land for construction of infrastructures such as installation of solar PV modules, powerhouse, transmission line etc can change land use.	• Use of unproductive and barren land • Temporarily used land will be rehabilitated to its original or even better form after completion of the work and before handing over to the landowner.
<u>Impact on Air Quality</u> The construction activities such as excavation, site clearance, and emission from the equipment and machinery might generate dust, particular matters and other gases.	• Suppression of dust generated from vehicle movement and construction activities will be controlled by water sprinkling • Prohibition of open storage and spillage of loose soil sands and aggregates in and around construction site near the settlement areas • Covering of the stock piled construction materials and spoils • Regular maintenance of the equipment and machinery to minimize emissions
<u>Impact on Noise</u> The construction activities such as drilling and movement of vehicles might generate sound that is over the tolerance limit of national standard (National Ambient Sound Quality Standard, 2012).	• All equipment and machinery will be maintained to manufacturer's specification to limit noise generation. • Contractor must provide hearing protection devices such as earmuffs and earplug to the c workers, depending on the nature of work • Construction activities shall be strictly prohibited during night time to avoid disturbance to nearby settlements
<u>Impact on Water Quality</u> The disposal of solid waste and discharge of wastewater generated from the labor camp might pollute the receiving surface water, which can adversely impact aquatic flora and fauna as well as human health in the surrounding area.	• Direct discharge of any kinds of wastes in the river will be strictly prohibited. • The oils and lubricant will be stored properly and disposed in adequate and authorized disposal/ valorization sites. • Toilet with septic tank will be constructed in labor camp area to avoid disposal of sewage directly in to river. • Outside labor force including labors of the Petty Contractor shall be mandatorily accommodated in the designated labor camp. • Open defecation by the labor will be strictly prohibited.
<u>Impact on Soil Quality</u> Impact on soil as spills and unclassified disposal of waste can adversely impact the soil.	• The oils and lubricant will be stored properly and disposed in adequate and authorized disposal/ valorization site in line with national regulations and IFC general EHS guidelines.

Potential Environmental and Social Impacts	Proposed Mitigation Measures
<u>Waste generation</u> Usually domestic and construction waste will be generated during construction. The amount of domestic waste depends on the number of workers involved in construction. The latter consists of excavated materials, cement bags, iron bars, packaging material etc., which might have adverse impact on the environment.	• Waste management plan will be prepared and implemented • The scrap materials generated from erection of structures and other recyclable waste will be collected and stored separately and sold to scavengers • Domestic organic waste (biodegradable) will be managed by using it as animal stock feed and/or composting. This waste must not be contaminated by other waste.
Biological Environment	
<u>Forest and vegetation</u> The labor force might collect firewood from the nearby forest area for cooking and heating.	• The use of firewood will be discouraged. • The labor force will be encouraged to use an alternative source for cooking and heating.
<u>Hunting and poaching</u> The labor force might involve in illegal hunting and poaching activities, which might have adverse impact on mammalian and avian fauna of the surrounding area.	• Awareness among the workers will be conducted on the significance of the conservation of wildlife. • Hunting and poaching is strictly forbidden. This has to be part of the Code of Conduct of contractors.
Disturbance of the fauna and flora The installation of the network could disturb biodiversity in certain areas (loss of vegetation, risk of mortality/injury to fauna and disturbance during construction)	• Identification of biodiversity issues. • Avoid greenfield sites and sensitive areas • Prefer work during less sensitive periods
Socio-economic and Cultural Environment	
<u>Labor influx management</u> Labor influx from outer communities might have adverse impact on the receiving communities, which may include social conflicts within and between communities, increased risk of spread of communicable diseases, increased rates of illicit behaviour and crime, gender-based violence (GBV), sexual exploitation and abuse/sexual harassment (SEA/SH), child labor, increased demand for goods and services that can lead to price hikes and crowding out of local consumers, increased volume of traffic and higher risk of accidents, increased demands on ecosystem and natural resources.	• Priority will be given to local workforce to reduce labor influx • Transparent local community engagement and participation throughout the project life • Develop code of conduct in line with KfW requirement, which will be signed by contractors and labors, to maintain good manners with the community and avoid GBV and SEA/SH. • Awareness raising program will be conducted for community, contractors and labors on the risk of labor influx • Establish an operational project and subproject level Grievance Redress Mechanism (GRM)

Potential Environmental and Social Impacts	Proposed Mitigation Measures
<u>Occupational Health and Safety</u> Working in height, slippery area and steep slopes, use of heavy machinery, electric equipment, welding, etc may cause accident and injuries to workers .	• Site specific Occupational Health and Safety (OHS) plan aligned with the ESMP will be prepared and implemented effectively. • Construction activity specific hazards will be identified and control hierarchy will be formulated, which includes engineering control, administrative control and use of collective and personal protective equipment (PPE) • Ensure the appropriate use of PPE based on the nature of work, as required • Fencing of construction site and erect caution signs (in Nepali/local language) • Induction training on OHS plan for contractors and workers
<u>Community Health and Safety</u> The construction activities might pose health, safety and security risks and impacts on project affected communities such as traffic and road safety, community exposure to health issues, electrocution, GBV, SEA/SH etc.	• Prepare Community Health and Safety plan aligned with ESMP and its effective implementation • Barricade the construction site with prohibiting entry to unauthorized personnel • Place precautionary signages in Nepali/local language at appropriate places • Ensure the installation of sufficient light in the area • Educate and train contractors and workers on basic health and hygiene practices • Prepare code of conduct in line with KfW requirement and provide orientation to contractors and workers
Operation Phase	
<u>Cleaning of solar panel</u> Use of water and management of wastewater generated from the cleaning of solar panel might have impact on land and nearby water body.	• Ensure the minimized use of water for cleaning • Store the used water in the settling tank by channelizing through drain so that it can be reused
<u>Green House Gas generation</u> If SF₆ gas is used in the transformers, leakage would lead to high GHG emissions as this gas is 23,000 times more effective than CO₂.	• Prefer an alternative to SF₆ • Specific procedure to be implemented for SF₆ refilling operations.
<u>Occupational Health and Safety</u> Fall from height while cleaning solar panel, electrocution etc are some of the risks of operational phase.	• Site specific Occupational Health and Safety (OHS) plan will be prepared and implemented effectively. • Ensure the appropriate use of PPE based on the nature of work, as required • The subproject site will be fenced and caution signs in Nepali/local language will be used • Induction training on OHS plan and Emergency Preparedness and Response Plan for operators and

Potential Environmental and Social Impacts	Proposed Mitigation Measures
	employees • Ensure that the Operational Manual and Material Safety Data Sheet are available • Ensure that the Emergency contact numbers are available with operators and employees, and pasted at visible spot
<u>Community Health and Safety</u> Electric shock are some of the hazards	• The permanent fencing of the subproject site will be done to protect the solar PV modules • Access to the site will be restricted for unauthorised persons • Place appropriate signages at appropriate place • Awareness raising program on electrical safety in subproject areas
<u>Visual Impact</u> Landscape modification (signs and electrical installations)	• Infrastructure will be designed in aesthetically pleasant way such as landscaping and plantation. • Avoid the sites with touristic values
<u>Distribution line and electric equipment</u> Exposure to safety related risks – electric clearance to be complied with	• Designed in accordance with permitted level of power frequency • Electrical clearance of equipment will be calculated • A maintenance procedure will be prepared and consider this electrical clearance
Dismantling	
<u>Waste generation</u>	• Solar panels and other equipment will have to be recycled. • Developers will be encouraged to establish Take-back-system with the supplier for dismantled or defective panels, batteries and other equipment including electronic waste.

Chapter 5 : Description of key steps in ESHS due diligence process

The ESMF provides guidance for the incorporation of Environmental, Social, Health and Safety (ESHS) safeguards in the planning, execution and operation stages of each subproject under Component 1 and Components 2A & 2B. Steps of the due diligence process is discussed which must be followed along with technical interventions required for the subprojects.

5.1 ESHS Screening

The private developer/ESCOs or AEPC/DKTI shall undertake ESHS screening of each proposed subproject to determine the appropriate extent and type of ESHS assessment needed. ESHS screening has to be carried out for all subprojects during the pre-feasibility of the subprojects. The purpose of the screening process is to:

- Determine whether the proposed subprojects are likely to have potential major/critical environmental and social impacts that can be crucial for the project's implementation;
- Determine eligibility of subprojects based on ESHS criteria;
- Identify and define key legislation and international standards to be complied with and regulatory processes to be followed;
- Establish the level of environmental/social assessment required regarding national regulation and international standards;
- Advise project decision-makers (private developers/ESCOs, LGs, PBs/MFIs) on understanding environmental issues related to the subprojects .

The screening process will involve review of the available ESHS information about the subprojects and its surrounding areas. It would help to identify key issues to be verified during site visits and also provide a preliminary idea regarding the nature, extent, and timing of environmental issues that would need to be addressed during the subsequent stages. In a preliminary way, it will also help to identify opportunities for avoidance and/or minimization early in the project cycle so that the design process can be informed appropriately.

The steps to be followed include the following:

- i. Obtain information on the presence of environmentally and socially sensitive areas from secondary sources (national and international databases, literature, aerial imageries). More generally, this desktop study also aims to identify key E&S issues to be considered for the preliminary assessment. It is then completed with preliminary site visit and observations that helps to validate, invalidate or complete information;
- ii. Verify the extent of applicability of GoN and the World Bank Environment and

- Social Framework in subproject activities.
- iii. Understanding the applicability of the AEPC ESS policy principles and KfW environmental and social guidelines;
 - iv. Identify potential major adverse and beneficial impacts; provide clarity on which issues need to be investigated more comprehensively during preparation of Environmental and Social Management Plan (ESMP) that will be carried out during the detailed feasibility or detailed design stage.
 - v. This should help with sequencing of subprojects, and factoring in timelines like those associated with regulatory clearance processes into project implementation.
 - vi. The process of preparing the ESHS checklist shall cover:
 - The need for the subproject, i.e. the issues or problems to be addressed.
 - Description of the proposed subproject or alternatives.
 - The potential key environmental and social impacts of the subprojects or alternatives.
 - A preliminary evaluation of the potential ESHS impacts of the subproject or alternatives.
 - Consultation with local officials on the project description, alternatives, and the potential impacts. This consultation also aims to collect information on their concerns.
 - The preliminary consultation with relevant agencies and local community in line with Stakeholder Engagement Framework/Plan. The focus of these consultations would be informing the C&I entities, local communities and other relevant stakeholders the likely issues and problems.
 - The appraisal of the available Pre-feasibility/Feasibility study reports with an E&S perspective.
 - Identifying the planning approvals, which are likely to be required from the GoN regulatory agencies.
 - Determining the type and scope of assessment required.

5.2 Environmental and social risk categorization

The environmental and social (E&S) screening leads to identify the type and scale of potential key environmental and social impacts and determine the risk category of the subprojects. Generally, the significance of impacts and risks, contributing to Environmental and Social Assessment (ESA) categorization will depend on the *type* and *scale* of the subproject, its *location*, *sensitivity* of environmental issues, and the *nature* and *magnitude* of potential risks and impacts.

The following proposed categorizations are based on combined requirements from GoN's *Environmental Protection Rules 2020*, KfW sustainability guidelines, KfW Guidance for Environmental and Social Management Plan (ESMP) and Environmental and Social

Code of Practices (ESCAP) Package for Category B Projects with Moderate or Lower Risks, the WB Environmental Social Framework and AEP's ESS Policy¹⁰.

In line with WB ESF and KfW sustainability guidelines, a proposed subproject is classified as **High Risk (Category A)** if it is likely to have **significant adverse environmental and/or social impacts** in line with the scale of impacts, the sensitivity of the receptors, and if impacts and risks being unprecedented and irreversible. These impacts may affect an area broader than the sites or facilities subject to physical works. And any subproject that needs Environmental Impact Assessment (EIA) according to the *Environment Protection Rule 2020* (EPR 2020) shall be classified as high risk.

The subprojects with High Risk rating generally would entail one of the following:

- (a) Ecologically sensitive areas such as national parks, wildlife reserves and hunting reserves¹¹;
- (b) Utilization of more than 5 Ha forest land located in the forest, conservation area, buffer zone and environmentally protected areas;
- (c) Alter environmentally important areas, including wetlands, native forests, grasslands, and other "critical" natural habitats and ecosystem services;
- (d) Involve extraction, consumption or conversion of substantial amounts of forest and other important natural habitats, including above and below ground and water-based ecosystems;
- (e) Have significant impact on human health or safety, including settlements and local communities (e.g., industry or traffic facilities located adjacent to residential areas with considerable noise pollution and harmful emissions during construction and/or operation or handling hazardous substances);
- (f) High consumption of resources, in particular soil, land or water;
- (g) Adverse impacts on cultural heritage;
- (h) Disputed areas;
- (i) Significant adverse impacts on Indigenous Peoples in terms of customary rights of use and access to land and natural resources, socio-economic status, cultural and communal integrity, health, education, livelihood, and social security status and the level of vulnerability of the affected group ;
- (j) Subprojects that will affect more than 100 people as a result of physical displacement due to involuntarily land taking or loss of their productive (income-generating) assets;
- (k) Number of factors outside the control of the Project that could have a significant impact on the E&S performance and outcomes of the Project; and
- (l) Significant concerns related to the capacity and commitment for, and track record of relevant Project parties, in relation to stakeholder engagement.

¹⁰ The AEP's Environmental and Social Safeguard Policy 2018 has been updated to reflect the EPR2020 and WB ESF.

¹¹ If there are human settlements inside these areas, it is essential to fulfill the basic needs such as energy, water supply, education and health services. Therefore, the Environmental and Social Impact Assessment (ESIA) shall be conducted for such subprojects and can be implemented only if the impacts and risks are found to be insignificant and reversible.

Category B projects: According to KfW sustainability guidelines, the impacts and risks tend to be less significant than those of Category A and can usually be mitigated through standard, best available mitigation approaches. Typically, the potential impacts and risks of Category B are **limited to a local area**, are in most cases **reversible and easier to mitigate** through appropriate measures.

The B category includes 3 risk levels projects according to KfW sustainability guidelines.

A proposed subproject is classified as **Substantial Risk (Category B⁺)** if there is single significantly adverse environmental or social impact or risk when its other potential adverse environmental or social impacts on human populations or environmentally important areas-including wetlands, forests, grasslands, and other natural habitats are less adverse. These impacts are site-specific, reversible; and in most cases mitigation measures can be designed more readily than for high risk subprojects. Any subproject that needs Initial Environmental Examination (IEE) according to the *EPR 2020* be classified as substantial risky.

The subprojects with Substantial Risk rating generally would entail one of the following:

- (a) Utilizing 1 Ha to 5 Ha Forest land located in the forest area, conservation area, buffer zone;
- (b) Generates 1 MW to 10 MW electricity from solar energy;
- (c) Lift irrigation in more than 100 Ha land;
- (d) Sub-projects that will affect between 25 and 100 people as a result of physical displacement due to involuntarily land taking or lose of their productive (income-generating) assets
- (e) Medium to low impact or probability of serious adverse effects to humans and/or the environment, which can be prevented or minimized with reliable mechanism;
- (f) Medium impacts on Indigenous Peoples considering customary rights of use and access to land and natural resources, socio-economic status, cultural and communal integrity, health, education, livelihood, and social security status and the level of vulnerability of the affected group ; and
- (g) Having some concerns related to the capacity and commitment for, and track record of relevant Project parties, in relation to stakeholder engagement.

A proposed subproject is classified as **Moderate Risk (Category B)** if all its potential adverse environmental or social impacts on human populations or environmentally important areas are predictable, temporary and/or reversible, and can be easily mitigated by applying standard methodologies and good international practice. Any subproject that needs Brief Environmental Study (BES) according to the *EPR 2020* shall be classified as moderate risk.

The subprojects with Moderate Risk rating generally would entail one of the following:

Criteria defined by EPR, 2020:

- (a) Utilizing less than 1 Ha forest land located in the forest area, conservation area, buffer zone;
- (b) Lift irrigation up to 100 Ha land;

Criteria defined by the KfW Guidance Document for Category B Projects with Moderate or Lower Risks:

- (c) Site-specific, temporary and reversible impacts and risks which can be mitigated by standard measures and good practices;
- (d) No physical displacement and limited economic displacement (not more than 15 households),
- (e) No project associated facilities¹²;
- (f) No manipulation of asbestos is required or no asbestos is presumed to be present.

In addition to these criteria, the subprojects with **Lower Risks (Category B)** should include the following as defined in the KfW Guidance Document for ESMP and ESCOP:

- no use of heavy machinery (except vehicles for transportation of workers and material)
- no demolition works are required, no dismantling of a structure or part of a load-bearing structure is required
- no earthmoving works are required (except for small trenches as specified below)
- no scaffolding required (work at height limited to the use of ladders),
- no trenches deeper than 120 cm, or in unstable, loose, soft or wet soil types ,
- no work in confined spaces,
- no roofing works or rehabilitation of roof protection required,
- no prolonged use of vibratory power tools required,
- no lifting equipment for material handling, such as cranes, required no work with hazardous substances in significant quantities,
- no more than fifty (50) workers mobilized for individual intervention,
- no on-site material manufacturing, such as production of brick or concrete blocks, manufacturing of windows and doors, and production of gravel and stones, is required.

A proposed subproject is classified as **Low Risk (Category C)** if it is likely to have minimal or no adverse environmental and social impacts (Sources: KfW sustainability guidelines). Beyond screening, no further environmental action is required. Stakeholder engagement activities will also be required where there are affected communities. For

¹² WB ESF Page 5 Article 11: “For the purpose of this Policy, the term “**Associated Facilities**” means facilities or activities **that are not funded as part of the project** and, in the judgment of the Bank, are: (a) directly and significantly related to the project; and (b) carried out, or planned to be carried out, contemporaneously with the project; and (c) necessary for the project to be viable and would not have been constructed, expanded or conducted if the project did not exist.”

Category C subprojects, FC measures should be monitored for any relevant changes over their life cycle. This C category will not apply in the context of this project.

The High Risk and Substantial Risk subprojects (Categories A and B+) shall be excluded from financing under the Project due to the eligibility criteria which have been defined for each subcomponent.

5.3 Determination of required level of E&S assessment

For this project, the subprojects categorized as **High Risk** (Category A) and **Substantial Risk** (Category B⁺) will be excluded¹³. The required level of assessment for the eligible subprojects i.e, categorized as **Moderate Risk** (Category B) and **Lower Risk** (Category B) are discussed as follows.

5.3.1 Moderate risk subprojects (Category B)

The subprojects categorized as Moderate Risk need to conduct BES in line with the *Environment Protection Rules 2020* utilizing the templates provided in the Rule, if required. However, the subprojects that do not require any assessment based on the *EPR 2020*, still need to conduct Environmental and Social Assessment and prepare Environmental and Social Management plan (ESMP). The KfW Environmental and Social Site Assessment Tool and the KfW generic ESMP table template are likely to be used for this purpose. Where there are impacts on IPs or other vulnerable communities, a VCDP shall be required. In compliance with the SEP, Stakeholder engagement activities will be required for all subprojects where there are affected communities.

ESMPs may not be all project specific but some of them could target different subprojects. The decision on their association in one ESMP will depend on the type of projects and of the different environmental and social conditions prevailing.

It is envisioned that some C&I subprojects, large SIPs and SMGs might fall under this category.

5.3.2 Lower risk subprojects (Category B)

For the subprojects categorized as Lower Risk, the provisions of the KfW Environmental and Social Code of Practices (ESCAP) shall be used. This document constitutes a simplified ESMP, mainly comprising standard measures of good housekeeping, occupational health and safety and public health and safety. Stakeholder engagement

¹³ If there are human settlements inside the ecologically sensitive areas, the subprojects can be implemented if the ESIA shows the impacts and risks are insignificant and reversible. In addition, the permission must be obtained from the concerned authority.

activities will be required where there are affected communities, in compliance with the SEF.

It is envisioned that some C&I subprojects, and individual and medium SIPs might fall under this category.

5.4 Environmental and Social Instrument to be prepared

5.4.1 Environmental and Social Impact Assessment (ESIA)

The ESIA shall be prepared for the subprojects in ecologically sensitive areas such as national parks, wildlife reserve, hunting reserve and forest land.

5.4.2 Environmental and Social Management Plans (ESMP)

The ESMP shall contain all the required mitigation and monitoring measures (including indicators to measure performance) to be implemented during construction, operation and maintenance phases. The ESMP shall specify the institutional responsibilities for carrying out each measure or action, as well as management arrangements, timelines, budget, and required capacity building measures for their implementation. The ESMP shall contain sub plans as appropriate to cover specific issues. ESMP shall be prepared for Category B moderate risk subprojects.

5.4.3 Environmental and Social Code of Practices (ESCOP)

The ESCOP shall be prepared for Category B lower risk subprojects.

5.4.4 Vulnerable Community Development Plan (VCDP)

It is anticipated that subproject areas might be inhabited by indigenous communities, classified and officially recognized by the GoN. A social assessment shall be carried out and based on which a VCDP shall be prepared, if needed. It will contain measures to avoid or minimize adverse impacts and maximize positive impacts on these communities. This will also include modalities to obtain the free, prior and informed consent (FPIC), in compliance with international standards, if applicable.

5.5 Legal Covenants for ESHS Compliance

Environmental, Social, Health and Safety (ESHS) mitigation measures must be included in the following documents. Moreover, mitigation measures should be integrated in the design of the subproject itself. Such approach will enhance the mitigation measures in terms of specific mitigation design, cost estimation of the mitigation measures, and specific implementation criteria. Integration of mitigation measures in the design phase will also help in strengthening the benefits and sustainability of the subprojects.

5.5.1 ESHS Conditions in Agreements between Different Stakeholders

Legal covenants (with ESCOs, Banks, MFIs) should include at least the following commitments:

- Design, construct, operate, maintain and monitor the subprojects in compliance with the specified applicable ESHS requirements.
- Implement the environmental and social mitigation measures specified in the Environmental and Social Management Plan (ESMP) with time-bound targets, including all conditions stipulated in the ESMP and other relevant plans that shall be prepared by project sponsor based on the process of identification of ESHS risks.
- Use all reasonable efforts to ensure the ESHS performance of the subproject is in compliance with the applicable ESHS requirements during implementation, including ESHS monitoring.
- Provide periodic (at least semi-annually) ESHS performance reporting to AEPC/DKTI according to an agreed template within a specified timeframe.

5.5.2 Project Work Contracts

The project contractor, though the subprojects are in ESCO or EPC model, should be bound by the parameters of contractual clauses identified in the Environmental and Social Management Plan (ESMP) pertaining to specific mitigation measures in the contract. It needs to be ensured that the contractor is aware and understand the respective contractual clauses and obligations. The final acceptance of the completed works should not occur until the ESHS clauses have been satisfactorily implemented.

5.5.3 Bill of Quantities (BoQ)

The tender instruction to bidders should explicitly mention the site-specific mitigation measures to be performed according to the ESMPs and ESHS clauses in the conditions of contract amongst others, the materials to be used, the specified and excluded sites for material retrieval, labor camp specifications, arrangements, labor influx management and waste management and disposal areas, as well other site-specific environmental requirements. The items in BOQ may vary based on the Project Components and subproject implementation modalities. Such a definition would clearly exhibit the cost requirement to undertake mitigation measures, which otherwise might be lost as the bidders in an attempt to be more competitive may not include the price realistic enough to fund mitigation measures and other protection measures.

5.6 Supervision

The purpose of supervision is to ensure that specific mitigation parameters identified in the ESMP / ESCOP and as bound by the contract is satisfactorily implemented. Likewise, monitoring is necessary such that the mitigation measures are actually put into practice.

5.7 Management of Subproject Contractors

If any sub contractors will be hired for the implementation of the subproject, it will be the responsibility of LGs/ESCOs/contractors to ensure compliance with ESMP, based on the Project Components and subproject implementation modalities. There should be legal contract between contractors and subcontractors to adhere to ESMP. Zero tolerance for child/forced labour, gender based violence, SEA/SH, community H&S, equal wages, labour camp standards for contractors/subcontractors should be well defined.

5.8 Subproject Monitoring

Monitoring is a major part of the ESMF to ensure its goals and objectives are adequately met. The ESHS implementation will be monitored internally. The safeguards staffs (ESHS) within AEPC/DKTI and LGs/ESCOs will monitor the project site in the initial, construction, post construction and operational phase of subproject to ensure that all ESHS issues related to each subprojects are well addressed and comply with the requirements mentioned in the ESMF. LGs/ESCOs will prepare quarterly progress reports and submit them to AEPC/DKTI. The AEPC/DKTI will prepare semi-annual monitoring reports and submit to the KfW. The reports will cover ESMP implementation, focusing on compliance with KPIs and any needed corrective actions. Public consultation will be conducted as necessary throughout the project period in compliance with the SEF and the SEP when available. The KfW will conduct periodic review missions, which will include a review of safeguards implementation issues. The ESHS compliance monitoring indicators will be developed based on subproject specific ESMP.

5.9 Compliance Audit

To ensure the implementation of the mitigation measures for the ESHS risks in compliance with the ESMP and national law, periodic audit shall be conducted. The exact criteria used for the audit shall be based on the content of the ESMP that will be prepared by AEPC/DKTI as a result of E&S impact assessment process.

An ESHS compliance audit shall be done in sampling basis for all Project Components through an external independent agency. The audit shall be conducted by a qualified E&S auditor/inspector/firm with in-depth technical knowledge of the solar technology based electricity supply and irrigation system.

Chapter 6: Vulnerable Community Development Framework

6.1 Introduction

This Vulnerable Community Development Framework (VCDF) for the Project is developed as the subproject sites are not known at the moment and it is anticipated that the subprojects will be in areas where the majority of the beneficiaries might be underserved, vulnerable, and marginalized. It is also expected that there would be Indigenous Peoples (IP) communities present in the proposed subproject areas, especially the subprojects of Component 2A and Component 2B. This VCDF has been prepared in line with national regulatory framework, KfW's Sustainability Guideline and ESS7 of the World Bank ESF to ensure adverse impacts on these communities are reduced and benefits are enhanced.

This VCDF will be applicable to all subprojects under the Project, which may possibly affect vulnerable communities. It will take the following categories of people into account:

- Indigenous Peoples community
- Muslims
- Poorest of the poor, irrespective of class, caste, gender and ethnicity (based on the local wealth ranking)
- Women, widow, separated, divorced, Female headed households
- Landless, Marginal land holders
- All *Dalit* and Madhesis, endangered minorities/ marginalised citizens as categorized by the GoN being vulnerable

6.2 Objectives

The principle objectives of this VCDF are as follows:

- to ensure that the project engages in free, prior, and informed consultation with affected communities, leading to broader community support for the project, with particular attention to indigenous peoples;
- to ensure that the project benefits are accessible to all vulnerable communities living in subproject areas;
- to ensure that any kind of adverse impacts on vulnerable people are avoided to the extent possible, if unavoidable, ensure that the adverse impacts are minimized and mitigated;
- to ensure the vulnerable communities' participation in the entire process of preparation with opportunities to participate in project design and project implementation arrangements, implementation and monitoring of the subproject activities;
- to minimize further social and economic imbalances within communities.

6.3 Potential Vulnerable Communities

6.3.1 Potential Vulnerable Communities in Nepal according to the GON

The Fifteenth Plan 2019/20 – 2023/24 of the country recognizes women, indigenous communities (including Dalits, Madhesi) Muslims, endangered minorities and marginalized citizens (refer to Table 1 below) as the groups who are deprived of economic, social and political opportunities and aims to ensure proportional and inclusive access to resources and facilities available in the country for them. Amongst all, women in all social groups and regions have been proven as more disadvantaged than their male counterpart and even among women, widows, separated, divorced and female headed households are particularly disadvantaged. In addition, vulnerable community could be the communities living in a remote location who are commonly landless, marginal farmers living below subsistence level and often *ex-kamaiyas* (bonded labourers). Moreover, these groups have no or limited access to public resources, and they almost never participate in national planning, policy, and do not participate in decision making processes or in development initiatives. As a result, their risk of falling below the income poverty line is extraordinarily high.

In Nepal, the term indigenous people (*Adhibasi*) equates with ethnic groups (*Janajati*). The National Foundation for Upliftment/Development of *Adhibasi/Janajati* has defined indigenous people as ‘those ethnic groups or communities who have their own mother tongue and traditional customs, distinct cultural identity, distinct social structure and written or oral history of their own’ and has identified 59 groups as ethnic indigenous groups or nationalities. In addition, the Nepal Federation of Indigenous Nationalities (NEFIN) 2004 has classified the *Adhibasi* indigenous groups in Nepal into five different categories, (i) endangered, ii) highly marginalized, iii) marginalized, iv) disadvantaged and v) advantaged groups, as shown in **Table 11**. The first and second category of the ethnic groups seems more delicate from the involuntary resettlement point of view in Nepal. *Adhibasi/Janajati* among themselves are a diverse group who do not all come under one economic system.

Table 11: Classification of Vulnerable Groups/Janajati in Nepal

Endangered Groups	Bankariya, Kusunda, Kushbadia, Raute, Surel, Hayu, Raji, Kisan, Lepcha, Meche (10 groups)
Highly Marginalized Groups	Santhal, Jhangad, Chepang, Thami, Majhi, Bote, Dhanuk (Rajbansi), Lhomi (Singsawa), Thudamba, Siyar (Chumba), Baramu, Danuwar (12 groups)
Marginalized Groups	Sunuwar, Tharu, Tamang, Bhujel, Kumal, Rajbansi (Koch), Gangai, Dhimal, Bhote, Darai, Tajpuria, Pahari, Dhokpya (Topkegola), Dolpo, Free, Magal, Larke (Nupriba), Lhopa, Dura, Walung (20 groups)
Disadvantaged Groups	Jirel, Tangbe (Tangbetani), Hyolmo, Limbu, Yakkha, Rai, Chhantyal, Magar, Chhairotan, Tingaunle Thakali, Bahragaunle, Byansi, Gurung, Marphali Thakali, Sherpa. (15 groups)
Advanced Groups	Newar, Thakali (2 groups)

Source: Nepal Federation of Indigenous Nationalities (NEFIN) 2004

Small farmers, landless, ex-Kamayias, squatters and encroachers due to their limited access to the economic resources and livelihood are equally classified as highly vulnerable group which is at permanent risk of facing severe poverty in Nepal. Elderly people, children and the individuals, less able to care themselves within the communities are also persons who are any time prone to vulnerability. This group of population is also highly vulnerable to any kind of adverse effects that may originate directly or indirectly from the subprojects interventions. Therefore, they should be given due attention during implementation of the Project.

6.3.2 Potential Vulnerable Communities in Nepal according to the WB ESF

According to the ESS1 and ESS5 of the WB ESF, “Disadvantaged or vulnerable” refers to those who may be more likely to be adversely affected by the project impacts and/or more limited than others in their ability to take advantage of a project’s benefits. Such an individual/group is also more likely to be excluded from/unable to participate fully in the mainstream consultation process and as such may require specific measures and/or assistance to do so. This will take into account considerations relating to age, including the elderly and minors, and including in circumstances where they may be separated from their family, the community or other individuals upon which they depend.

The ESS7 of the WB ESF defines the term “Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities” (or as they may be referred to in the national context using an alternative terminology) a distinct social and cultural group possessing the following characteristics in varying degrees:

- (a) Self-identification as members of a distinct indigenous social and cultural group and recognition of this identity by others;
- (b) Collective attachment¹⁴ to geographically distinct habitats, ancestral territories, or areas of seasonal use or occupation, as well as to the natural resources in these areas;
- (c) Customary cultural, economic, social, or political institutions that are distinct or separate from those of the mainstream society or culture; and
- (d) A distinct language or dialect, often different from the official language or languages of the country or region in which they reside.

The vulnerable communities defined in Section 6.1 above will be considered for this project.

6.4 Legal Framework and Policies focusing on vulnerable groups

The Indigenous Nationalities Commission has formulated five years Strategic Plan in

¹⁴ “Collective attachment” means that for generations there has been a physical presence in and economic ties to land and territories traditionally owned, or customarily used or occupied, by the group concerned, including areas that hold special significance for it, such as sacred sites.

2021 with an objective to assess overall condition of indigenous nationalities including economic, social and cultural, and prepare strategic activities to address the identified issues and implement those activities. However, there is lack of comprehensive and inclusive national policy & regulations on vulnerable and indigenous communities for development projects. Therefore, safeguard related issues in Nepal are being addressed through project specific guidelines prepared in accordance with donors' safeguard policies. Additionally, the provisions articulated in the various legal policies and acts are taken as a basis for assessment. The Constitution of Nepal, National Foundation for Upliftment/Development of Indigenous Nationalities Act 2002, Local Level Operation Act 2017, Forest Act 2019 and Forest Regulation 2022, and periodic Plans have placed significant emphasis on delivering basic services to the disadvantaged and indigenous people, occupational castes, women, disabled and other vulnerable groups.

6.5 Preparation of VCDP for the Subprojects

An Environmental and Social screening conducted during the feasibility study phase of the subproject will determine whether :

- (i) IPs and VCs are present in the subproject area;
- (ii) if they will be affected by the activities;
- (iii) And if they could be interested to apply on the project

If the screening indicates their presence, a socio-economic survey, focused group discussion and social mapping etc. will be undertaken in the subproject area

- (i) to determine the magnitude of impact and prospective losses, identify vulnerable groups among affected people, ascertain losses other than land acquisition such as temporary impacts, severity of impacts etc.
- (ii) to identify the potential interest of vulnerable groups to become beneficiaries of the project.

Information will be collected from separate group meetings within the vulnerable communities. A free, prior and informed consultation will be carried out with Indigenous Peoples.

The significance of impacts of subproject on vulnerable community will be determined by assessing (i) the magnitude of impact in terms of (a) customary rights of use and access to land and natural resources; (b) socio-economic status; (c) cultural and communal integrity; (d) health, education, livelihood, and social security status; and (ii) the level of vulnerability of the affected group.

The VCDP shall include mitigation measures of potential adverse impacts through modification of subproject design and development assistance to enhance distribution of subproject benefits. The subproject shall ensure that their rights will not be violated and that they will be compensated for the use of any part of their land or property in a manner that is socially and culturally acceptable to them, if land acquisition or structural losses involve in vulnerable communities.

The VCDP shall include measures to accompany vulnerable communities to become eligible to the project.

6.6 Vulnerable Community Development Strategies

The following strategies could be adopted during project design and implementation to address the concerns of IPs and VCs in the subproject areas and enhance benefits to these communities.

Table 12: Possible Strategies and Activities for the Development of Vulnerable Communities

Social Issue	Strategies	Proposed activities
Social inequity within and between different groups	Facilitate intra-social group interaction to lessen the effect of rigid class, gender and caste hierarchies	Initiate special effort to reach the poor including men and women from disadvantaged ethnic groups and castes through a social mobilization process Organize awareness-raising campaigns by involving all types of IPs and VCs for public awareness to share development benefits equitably.
Lack of inclusion and equitable participation in planning and implementation of subprojects	Encourage the participation of these groups in UGs and traditional decision making structures. Incorporate a mechanism for regular consultation with IPs and VCs Increase awareness regarding the consequences of discriminatory rules Ensure that the members of IPs and VCs granted employment opportunities on a preferential basis	Include a social mobilization component in the project design to ensure the inclusion and participation Engage the vulnerable groups in a process of free, prior, and informed consultation throughout the subproject cycle Work with the UGs to adopt a quota system and ensure adequate representation of these groups among project beneficiaries Reserve certain number or percentage of employment opportunities to these groups during the construction period. Conduct capacity development trainings for semi-skilled jobs, identified in consultation with them In terms of in kind support from the members of IPs and VCs, they should be provided a certain percentage of their daily wage, based on participatory basis.
Lack of awareness on potential livelihood improvement	Awareness raising/training on local resources and their commercialization through promoting	Design specific programs on technical and vocation training to the groups based

Social Issue	Strategies	Proposed activities
measures/skill training based on local resources	indigenous skills and knowledge	on traditional indigenous skills, knowledge and local resources Linkage development with market and financing institutions

6.7 Consultation and Information Disclosure Mechanism for the VCDP

The IPs and VCs shall be informed, consulted and mobilized to participate in the proposed subproject in culturally appropriate way to make collective decisions. The VCDPs prepared for the subproject shall be disclosed through the project/AEPC's website. In addition, summary of VCDPs in Nepali language shall be made available to the concerned communities, local level NGOs/CBOs and the others concerned authorities at the subproject sites.

6.8 VCDP Budget

Each subproject VCDP shall have, as applicable, its own budget. A detailed budget shall be prepared taking into account of all activities associated with the formulation and implementation of the VCDP. The budget shall include cost associated with recommended program activities, human resources cost, monitoring and other associated cost. Such budgets should be an integral part of the subproject cost, to be included in the cost item for Environmental and Social Management costs.

Chapter 7: Budget

The Environmental and Social Management Plan (ESMP) prepared for each individual subproject shall have specified budget for implementing the suggested mitigation measures for potential impacts and risks, which shall be included in Bill of Quantity (BoQ) of the Detailed Feasibility Study (DFS) of subprojects.

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Appendix 1: Screening Checklist for C&I Solar Rooftop

Environmental and Social Screening Checklist Solar Rooftop/ground mounted (Commercial and Industrial)

The purpose of this checklist is to identify potential environment and social issues related to subproject development, construction and operation. Remember that the project may not only impact the roof but also, especially during the work, the activities of the building or the nearby areas.

	Date of investigation	
	Data collector's name	

(A) Subproject Background

1.	Name of proposed subproject	
2.	Location	Ward No.: RM/M: District: Province:
3.	Geographical coordinates	
4.	Ground level	
5.	Building height	
6.	Subproject objectives	
7.	Name of subproject developer (Industrial or commercial entity or ESCO)	
8.	Capacity (kWp) of the subproject	
9.	Current energy use (type and quantity)	
10.	GoN approval requirements	

11.	Number of companies in the building	
12.	Type of activities conducted in the building	
13.	Type of roof/land procurement • Leased roof/Land • Developer's own roof/land	

Subproject selection criteria

S. N	Screening Questions	Yes	No	Comments (In the case select "yes", provide detailed information)
14.	Is there sufficient space to mount solar PV modules on rooftop or ground?			
	a. Type of rooftop			
	b. Age of the building >50 years 20-50 years 10 – 20 years <10 years			
	c. Building status/condition (new, medium damage, degraded)			
	d. Available area on rooftop or ground (in m ²)			
15.	Is the structure strong enough to install solar PV models?			
16.	Can Asbestos be present in or below the roof?			
17.	Is the roof sloped? (high slope/medium/no slope)			
18.	Is the ownership status of the building known? If so, precise (public, private, other)			

(B) Environmental and Social Screening

S. N	Screening Questions	Yes	No	Comments (In the case select "yes", provide detailed information)
Subproject's site				
19.	Define subproject's boundaries (direction: East, West , North & South) – vacant area or other structures within the compound			
20.	Describe nearby neighborhood structure/s in the surrounding and approximate distance			
21.	Is the subproject area fully or partly located within or in immediate vicinity of any of the following sensitive receptors?			
	i. National or international recognized natural and/ or legally protected areas?			
	ii. high-density vegetation?			
	iii. Cultural heritage site (e.g. temple, monastery, mosque)?			
	iv. Is the site located on Aesthetically Important Viewpoints ¹⁵ ?			
	v. Is the site located near main settlement and trade centres? Description (approximate distance)			
	vi. Is the site located near airport? (approximate distance)			
22.	Is the site exposed with no structures to provide shade or wind protection?			
23.	Is the project area located within an area that is frequented by public?			
24.	Is the project located near an area with availability of sufficient quantity of water for construction and cleaning and the available water resource/s is capable to provide the amounts needed without			

¹⁵Aesthetically Important Viewpoints are the places with natural beauty and well known for touristic destination.

S. N	Screening Questions	Yes	No	Comments (In the case select "yes", provide detailed information)
	causing depletion and/or causing competition in using this water resource/s.			
Potential Environmental Impacts				
25.	Shall the subproject require Environmental Studies as per EPR2020?			
26.	Will the subproject cause increase in waste generation? Describe types and expected amount of waste.			
27.	Is there any storage of dangerous products/hazardous materials near or within the site (including flammable products and explosives)			
28.	Is the site located in the vicinity of water bodies (e.g. rivers, ponds, lakes) that are reachable by effluent generated by the Subproject (effluents such as non-treated wastewaters, chemicals, etc.)? (approx. distance?)			
29.	Are any groundwater or drinking water resources known to be present within the Subproject area?			
Labour and working conditions				
30.	Is there availability of labour force (skill & unskilled) in local level for the construction of subproject?			
31.	Will there be substantial migrant labour (skill & unskilled) required?			
32.	Does the subproject plan to provide residential facilities to the workers? (If “yes”, does it plan to construct a labor camp or manage their residency in the host community)			
33.	Does the subproject have plan to provide orientation to migrant workers about Code of Conduct, local tradition, culture, costumes, norms, and values?			

S. N	Screening Questions	Yes	No	Comments (In the case select "yes", provide detailed information)
34.	Does the subproject have plan to provide orientation in form of trainings to workers about the national laws, project policies and Code of Conduct on GBV & SEA/SH?			
Potential Community and Occupational Health and Safety Impacts				
35.	Are there community health and safety risks due to the transport, storage, and use and/or disposal of materials likely to create physical, chemical and biological hazards?			
36.	Will the construction works disturb other commercial/community/residential activities?			
37.	Will the subproject create major noise/vibration?			
38.	Will it create dust problem around the sites?			
39.	Will it impact on the water supply and sanitation system?			
Potential Social Impacts				
40.	Type of roof/land Commercial Industrial			
41.	Is the ownership status of land clear and land free of incumbrance? Is acquisition of land required?			
42.	Loss of productive land (for ground mounted) Or Loss of greenfield non productive land (low or high vegetation? Density?) Or Loss of brownfield land			
43.	Are there especially vulnerable groups of people who could be affected by theSubproject, e.g. a) People/Parties affected by the subproject (PAPs), vulnerable groups (people below poverty line, widows,			

S. N	Screening Questions	Yes	No	Comments (In the case select "yes", provide detailed information)
	orphans, disabled, ethnic minorities, displaced persons etc.) b) environments c) Hospital, schools, religious places or other sensitive receptors			
Climate Benefits				
44.	Will subproject activities contribute in the reduction of GHG emissions? Description on the activities that contributes for the reduction of GHG emission			
Environmental Management systems				
45.	Is there any established Environmental Management System/Policy of the entity?			
46.	Resources available for ESHS Management			
Stakeholder Engagement				
47.	Potential concerns raised by stakeholder			

Annex: Meeting minutes, Pictures

Appendix 2: Screening Checklist for SIP

Environmental and Social Screening Checklist Large Solar Irrigation Pump

The purpose of this checklist is to identify potential environment and social issues related to subproject development, construction and operation. Remember that the project may not only impact the location of Solar Irrigation Project but also, for example, the water resources and socioeconomic activities of beneficiaries.

	Date of investigation	
	Data collector's name	

(A) Subproject Background

1.	Name of proposed subproject	
2.	Location of potential implantation	
3.	Geographical coordinates of potential implantation	
4.	Altitude of potential implantation	
5.	Subproject objectives	
6.	Name of subproject developer	
7.	Potential source of water for pumping (borewell or surface water body)	
8.	Is this source also used for drinking water ?	
9.	Is this source also used for economic activities (e.g fishing)	
10.	Is pumping practiced in the water source which will be used for the subproject?	

11	What types of crops are / will be irrigated (trees, grains, vegetables)?	
12	If relevant, local name of the source of water	
13	Water table level (for borewell) in meters below ground surface	
14	Is the borewell already present and used? Which depth and which diameter?	
15	Number of beneficiary households of the subproject	
16	Area of land to irrigate (Ha)	
17	Capacity (kWp) of the subproject	
18	Length of irrigation canal for distribution of water (meter) to build	
19	Location of the nearest national water supply system and approximate distance	
20	GoN approval requirement	
21	Does the area ever suffer from fires, floods and drought (or other natural disasters)?	
22	Is the subproject area prone to be impacted by climate change such as drought, heat?	

(B) Subproject selection criteria

S. N	Screening Questions	Yes	No	Comments (In the case select "yes", provide detailed information)
23.	Is there indication of: e. Significant adverse impacts on ecologically sensitive areas ¹⁶			
	ii. Significant adverse impacts on cultural heritage			
	iii. Subproject in disputed area or territory ¹⁷			
24.	If yes, can these impacts be eliminated or reduced to acceptable levels through adequate application of mitigation measures?			
25.	Are there potentially unsafe elements present at the Site or planned to be constructed, such as pits, ponds, ditches, trenches, holes, scaffolds, etc?			

(C) Environmental and Social Screening

S. N	Screening Questions	Yes	No	Comments (In the case select "yes", provide detailed information)
Subproject's site				
26.	Define subproject's boundaries (direction, East, West, North & South) and area of influence			
27.	Is the subproject site adjacent to or within any of the following sensitive receptors?			
	i- Natural habitats and/ or legally protected areas (national park, wildlife reserve, hunting reserve, wetland, forest, buffer zone)?			

¹⁶Significant adverse impacts on ecologically sensitive areas will be determined using international best practice and tools, as well as based on the outcomes of relevant studies within the ESIA.

¹⁷ Disputed Territory is a disagreement over the possession/control over natural resources such as land, rivers between two or more individuals, communities, RM/Municipalities, Provinces and Nations.

S. N	Screening Questions	Yes	No	Comments (In the case select "yes", provide detailed information)
	ii. Cultural heritage site (e.g., temple, monastery, mosque)?			
	iii. Is the site located on Aesthetically Important Viewpoints ¹⁸ ?			
	iv. Is the site located at immediate vicinity (less than 50 m?) of residential houses, public building such as medical center, school / educational infrastructures or other sensitive building that is likely to be impacted through construction activities (noise, dust, odor, traffic) or site access patterns?			
	v. Any existing canals and irrigation systems present in the subproject site?			
	vi. Are there any other water sources or springs near or within site besides the source identified for the subproject?			
	vii. Are there socio-cultural groups present within the subproject Area who may be considered as "indigenous", "tribes" (hill tribes, scheduled tribes, tribal peoples), "minorities" (ethnic or national minorities), or "indigenous communities"?			
	viii. Is the subproject area important for local communities from the point of view of communal right and customary practices & beliefs?			
	ix. Is there any expectation of vulnerable or indigenous people affected from subproject? (Beneficial or adverse impacts)			
Potential Environmental Impacts				

¹⁸Aesthetically Important Viewpoints are the places with natural beauty and well known for touristic destination.

S. N	Screening Questions	Yes	No	Comments (In the case select "yes", provide detailed information)
28	Shall the subproject require Environmental Studies as per EPR2020?			
29	Impacts on natural resources that constitute livelihoods of community (e.g., water resources, fishing, grazing or hunting grounds)?			
30	Is there potential for landslide and soil erosion impacts? If yes, please provide following information: - Past and present conditions and values (including tentative area to be affected, risky areas) What are challenges and opportunities associated with landslides and erosion (if any)			
31	Will the subproject cause increase in waste generation? Describe types and expected amount of waste.			
32	Current use of water source to be used for the subproject; Has a decrease trend been observed of the water level in the area over the last 5 years? Is it possible the subproject affects the current use?			
33	Any traditional practice to recharge groundwater in the community?			
34	Type of fertilizer and pesticides used by farmers; level of knowledge on its use			
35	Is vegetation present in the subproject area that will need to be cleared/removed for the purpose of the Project?			
36	Will there be forest loss in terms of area (if yes, type of forest)? Will it lead to loss of forest species (provide details of the loss of listed species according to national and international – specifically IUCN - classifications)?			

S. N	Screening Questions	Yes	No	Comments (In the case select "yes", provide detailed information)
37.	Is loss of non-forest species possible? If so, are these listed species?			
38.	Other potential biodiversity impacts (specify)?			
39.	Availability of local construction materials a) Stone b) Sand c) Others			
40.	Will the project use hazardous or dangerous materials?			
Labour and working conditions				
41.	Is there availability of labour force (skill & unskilled) in local level for the construction of subproject?			
42.	Will there be substantial migrant labour (skill & unskilled) required?			
43.	Does the subproject plan to provide residential facilities to the workers? (If “yes”, does it plan to construct a labor camp or manage their residency in the host community)			
44.	Does the subproject have plan to provide orientation to migrant workers about Conduct of Conduct, local tradition, culture, costumes, norms, and values?			
45.	Does the subproject have plan to provide orientation trainings to workers about the national laws, project policies and Code of Conduct on GBV & SEA/SH?			
Potential Community and Occupational Health and Safety Impacts				
46.	Are there community health and safety risks due to the transport, storage, and use and/or disposal of materials likely to create physical, chemical and biological hazards?			
47.	Will the construction works disturb other commercial/community/residential activities?			

S. N	Screening Questions	Yes	No	Comments (In the case select "yes", provide detailed information)	
48.	Will the subproject create major noise/vibration?				
49.	Will it create dust problem around the sites?				
50.	Will it impact on the water supply and sanitation system?				
51.	Any potential impacts to public health via potential water logging and degradation of land and water quality, increasing the risk of disease?				
52.	Will heavy machinery (e.g., excavators, cranes, trucks, jackhammers) be used for construction activities?				
Potential Social Impacts					
53.	Type of land	Solar array	Pump	Intake	RVTs?
	Private land	☐	☐	☐	☐
	Government land	☐	☐	☐	☐
	Forest land	☐	☐	☐	☐
54.	Type of land procurement Voluntary donation Leased Land Negotiation (Willing buyer & willing seller)				
55.	Loss of productive land				
56.	Land taking resulting in loss of income, livelihood, sources of livelihood, loss of access to common property resources and/or private residential and/or property resources				
57.	Is there any household needed to be relocated?				
58.	Will subproject activities have adverse impact on sensitive receptors such as schoolshospitals, religious places, drinking water supply system, and other facilities?				

S. N	Screening Questions	Yes	No	Comments (In the case select "yes", provide detailed information)
59	Will subproject's construction cause any damage to the existing local roads system?			
60	Adverse impact to women including economic and safety concerns (Could the subproject increase the inequity between men and woman ?)			
61	Possible conflicts with and/or disruption to local communities			
62	Is there any existing conflict that could be increased due to the subproject implementation, in particular for water sharing among the beneficiaries?			
Climate Benefits				
63	Will subproject activities contribute to in the reduction of GHG emissions? Description on the activities that contributes for the reduction of GHG emission			
64	Tentative saving of diesel or number of diesel pump to be replaced			
65	Is there any other development sectors (NGO/INGO/CBO) working on environment/climate action related activities			
Stakeholders Engagement				
66	Significant issues raised by the stakeholders during consultation			

Annex: Meeting minutes, Pictures

Appendix 3: Screening Checklist for SMG

Environmental and Social Screening Checklist Solar Mini Grid

The purpose of this checklist is to identify potential environment and social issues related to subproject development, construction and operation. Remember that the project may not only impact the location of solar PV plant but also, the community and the surrounding ecosystem.

	Date of investigation	
	Data collector's name	

(A) Subproject Background

1.	Name of proposed subproject	
2.	Location	
3.	Geographical coordinates (for powerhouse area)	
4.	Subproject objectives	
5.	Name of subproject developer	
6.	Number of beneficiary households of the subproject	
7.	Capacity (kWp) of the subproject	
8.	Powerhouse estimated area, m ²	
9.	Approx. length of Transmission and Distribution line (meter)	
10.	Nearest national grid and approximate distance	
11.	GoN approval requirements	

(B) Subproject selection criteria

S. N	Screening Questions	Yes	No	Comments (In the case select "yes", provide detailed information)
12.	Is there indication of: f. Significant adverse impacts on ecologically sensitive areas			
	g. Significant adverse impacts on cultural heritage			
	h. Subproject in disputed area or territory ¹⁹			
13.	If yes, can these impacts be eliminated or reduced to acceptable levels through adequate application of mitigation measures?			
14.	Is the ownership status of land for powerhouse, PV array and distribution line known? If so, precisely explain the nature of the land (private, government or forest, others)?			

(C) Environmental and Social Screening

S. N	Screening Questions	Yes	No	Comments (In the case select "yes", provide detailed information)
Subproject's site				
15.	Define subproject's boundaries (direction, East, West, North & South) and area of influence			
16.	Is the subproject site adjacent to or within any of the following sensitive receptors?			
	i. Natural habitats and/ or legally protected areas (national park, wildlife reserve, hunting reserve, wetland, forest, buffer zone)?			

¹⁹ Disputed Territory is a disagreement over the possession/control over natural resources such as land, rivers between two or more individuals, communities, RM/Municipalities, Provinces and Nations.

S. N	Screening Questions	Yes	No	Comments (In the case select "yes", provide detailed information)
	ii. high-density vegetation?			
	iii. Cultural heritage site (e.g. temple, monastery, mosque)?			
	iv. Is the site located on Aesthetically Important Viewpoints ²⁰ ?			
	v. Is the site located at immediate vicinity (less than 50 m?) of residential houses, or other sensitive receptors such as hospitals, schools, religious places, that is likely to be impacted through construction activities (noise, dust, odor, traffic) or site access patterns?			
	vi. Is the site located near main settlement and trade centres? Description (approximate distance, no. of HH and population, nature and special feature /importance / significance)			
	vii. Are there any flood prone / river cutting / low lying / areas near or within site (PV array location, powerhouse, T & D line)? What are challenges and opportunities associated flood/river cutting/low lying areas (if any)?			
	viii. Are canals and irrigation systems present in direct proximity to subproject site?			
	ix. Are there any water sources or springs near or within site?			
	x. Is the proposed site located on agricultural land?			
	xi. Is subproject site accessible round the year or only in dry season? Description of condition of road/track (black top, fair weather			

²⁰Aesthetically Important Viewpoints are the places with natural beauty and well known for touristic destination.

S. N	Screening Questions	Yes	No	Comments (In the case select "yes", provide detailed information)
	etc.) or need to construct new road, total length, nearest road head etc.			
	xii. Is the proposed site located on area used by Indigenous people			
	xiii. Is the subproject area important for indigenous people from the point of view of communal right and customary practices & beliefs?			
	xiv. Is there any expectation of vulnerable or indigenous people from subproject? (To benefit and/or to be impacted adversely by the project)			
	xv. Will natural resources (e.g. timber; water, sand, quarries) within the Project Area be used for construction activities in a significant quantity?			
	xvi. Does the Project include works underground (trenches, pit digging or similar) below 1m deep? If yes, please mention the tentative depth.			
	xvii. Does the Project include works in height (above 1m such as construction of roofs, pylons, trees cutting, use of scaffoldings, etc.?) If yes, please mention the tentative height.			
Potential Environmental Impacts				
17.	Shall the subproject require Environmental Studies as per EPR2020?			
18.	Impacts on natural resources that constitute livelihoods of community (e.g. water resources, fishing, grazing or hunting grounds)?			
19.	Is there potential for landslide and soil erosion impacts?			

S. N	Screening Questions	Yes	No	Comments (In the case select "yes", provide detailed information)
	If yes, please provide following information: - Past and present conditions and values (including tentative area to be affected, risky areas) What are challenges and opportunities associated with landslides and erosion (if any)			
20.	Will the subproject cause increase in waste generation? Describe types and expected amount of waste.			
21.	Will there be vegetation loss or restrictions of use in the project area?			
22.	Will there be forest loss in terms of area (if yes, type of forest)? Will it lead to loss of forest species (provide details of the loss of listed species according to national and international – specifically IUCN - classifications)?			
23.	Is loss of non-forest species possible? If so, are these listed species (as above)?			
24.	Creation of barrier for migratory animals			
25.	Other potential biodiversity impacts (specify)?			
26.	Loss or destruction of unique or aesthetically valuable land			
27.	Disturbance of large areas due to material quarrying			
28.	Is the project located near an available and sufficient quantity of water for construction and cleaning			
29.	Is the site located in the vicinity (<100 m) of water bodies (e.g. rivers, ponds, lakes) that are reachable by effluent generated by the Project (effluents such as non-treated waste waters, chemicals, etc.)?			
30.	Availability of local construction materials d) Stone			

S. N	Screening Questions	Yes	No	Comments (In the case select "yes", provide detailed information)
	e) Sand f) Wood (For door, window and roofing etc.) g) Wood for Pole			
Labour and working conditions				
31.	Is there availability of labour force (skill & unskilled) in local level for the construction of subproject?			
32.	Will there be substantial migrant labour (skill & unskilled) required?			
33.	Does the subproject plan to provide residential facilities to the workers? (If “yes”, does it plan to construct a labor camp or manage their residency in the host community)			
34.	Does the developer have plans to provide orientation to migrant workers about local tradition, culture, costumes, norms, and values?			
35.	Does the developer (LG) have plan to provide orientation such as trainings, Code of Conduct to workers about the national laws and project policies on GBV & SEA/SH?			
Potential Community and Occupational Health and Safety Impacts				
36.	Are there community health and safety risks due to the transport, storage, and use and/or disposal of materials likely to create physical, chemical and biological hazards?			
37.	Will the construction works disturb other commercial/community/residential activities?			
38.	Will the subproject create major noise/vibration?			
39.	Will it create dust problem around the sites?			

S. N	Screening Questions	Yes	No	Comments (In the case select "yes", provide detailed information)
40.	Will it impact on the water supply and sanitation system?			
41.	Any potential impacts to public health via potential water logging and degradation of land and water quality			
42.	Will subproject's construction cause disturbance to the transportation in the subproject's site?			
Potential Social Impacts				
43.	Type of land procurement Voluntary donation Leased Land Negotiation (Willing buyer & willing seller)			
44.	Loss of productive land			
45.	Land taking resulting in loss of income, livelihood, sources of livelihood, loss of access to common property resources and/or private residential and/or property resources How many affected households for economic loss?			
46.	Is there any storage of dangerous products/hazardous materials near or within the site (including flammable products and explosives)? Does the implementation of the project risk to significantly impact the activities in progress in the building or in the surroundings (power cut, noise, other)?			
47.	Adverse impact on non-title holders including loss of shelter and livelihood			
48.	Is there any household needed to be relocated?			
49.	Will subproject activities have adverse impact on sensitive receptors such as school, drinking water supply system, and other facilities?			

S. N	Screening Questions	Yes	No	Comments (In the case select "yes", provide detailed information)
50.	Will subproject need to use existing or open new access roads? What will be the impacts of increased traffic on communities?			
51.	Will the subproject benefit to IPs? Will the subproject benefit to VPs?			
52.	Adverse impact to women including economic and safety concerns			
53.	Possible conflicts with and/or disruption to local communities			
54.	Are there especially vulnerable groups of people who could be affected by the Project, e.g. hospital patients, the elderly?			
Climate Benefits				
55.	Will subproject activities contribute in the reduction of GHG emissions? Description on the activities that contributes for the reduction of GHG emission			
56.	Is there any other development sectors (NGO/INGO/CBO) working on environment/climate action related activities			
	Stakeholder Engagement			
57.	Concerns raised by stakeholders			

Annex: Meeting minutes and pictures

Appendix 4: Exclusion List of KfW Group

Bank aus Verantwortung



»» Exclusion List of KfW Group

I. Exclusions

In the following areas KfW Group does not offer financing for new projects or purposes: *

1. Production or trade in any product or activity subject to national or international phase-out or prohibition regulations or to an international ban, for example
 - i) certain pharmaceuticals, pesticides, herbicides and other toxic substances (under the Rotterdam Convention, Stockholm Convention and WHO "Pharmaceuticals: Restrictions in Use and Availability"),
 - ii) ozone depleting substances (under the Montreal Protocol),
 - iii) protected wildlife or wildlife products (under CITES / Washington Convention)
 - iv) prohibited transboundary trade in waste (under the Basel Convention).
2. Investments which could be associated with the destruction ** or significant impairment of areas particularly worthy of protection (without adequate compensation in accordance with international standards).
3. Production or trade in controversial weapons or critical components thereof (nuclear weapons and radioactive ammunition, biological and chemical weapons of mass destruction, cluster bombs, anti-personnel mines, enriched uranium).
4. Production or trade in radioactive material. This does not apply to the procurement of medical equipment, quality control equipment or other application for which the radioactive source is insignificant and/or adequately shielded.
5. Production or trade in unbound asbestos. This does not apply to the purchase or use of cement linings with bound asbestos and an asbestos content of less than 20%.
6. Destructive fishing methods or drift net fishing in the marine environment using nets in excess of 2.5 km.
7. Nuclear power plants (apart from measures that reduce environmental hazards of existing assets) and mines with uranium as an essential source of extraction.
8. Prospection, exploration and mining of coal; land-based means of transport and related infrastructure essentially used for coal; power plants, heating stations and cogeneration facilities essentially fired with coal, as well as associated stub lines. ***
9. Non-conventional prospection, exploration and extraction of oil from bituminous shale, tar sands or oil sands.

II. Supplementary Requirements

In selected sectors, KfW Group ties its direct financial commitment for concrete new projects to the following qualitative conditions: *

1. Outside the EU and the OECD high income countries, large agricultural or forestry enterprises producing palm oil or wood must either comply with recognised international certification systems (RSPO or FSC) or equivalent regulations to ensure sustainable cultivation conditions, or must be in the process of achieving compliance.
2. Large dam and hydropower projects use the recommendations of the World Commission on Dams (WCD) as orientation. ****
3. Projects for non-conventional prospection, exploration and extraction of gas will disclose in accordance with international standards,
 - that no material groundwater drawdown or contamination is to be expected,
 - that measures for resource protection (in particular water) and recycling are taken,
 - that suitable technology is used for safe drilling, which includes integrated bore piping and pressure testing.

* Deviations can result from mandated transactions (Zuweisungsgeschäft) in accordance with § 2 (4) of the Law Concerning KfW, or from instructions of the relevant federal ministries.

** "Destruction" means (i) the destruction or severe deterioration of the integrity of an area caused by a major and prolonged change in the use of land or water, or (ii) the alteration of a habitat which leads to the inability of the affected area to perform its function.

*** Investments in power transmission grids with significant coal-based power feed-in will only be pursued in countries and regions with an ambitious national climate protection policy or strategy (NDC), or where the investments are targeted at reducing the share of coal-based power in the relevant grid.

In developing countries, heating stations and cogeneration facilities (CHP) essentially fired with coal can be co-financed in individual cases based on a rigid assessment, if there is a particularly high sustainability contribution, major environmental hazards are reduced, and if there demonstrably is no more climate-friendly alternative.

**** Dams with a height of at least 15 meters measured from the foundation or dams with a height between 5 and 15 meters with a reservoir volume of more than 3 million cubic meters.