# Environmental and Social Assessment and Review Framework

**PUBLIC**

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# Bhutan: Solar Farm Expansion Project

CURRENCY EQUIVALENTS

(as of December 2025)

| | | |
|---|---|---|
| Currency Unit | – | Ngultrum (Nu) |
| Nu1.00 | = | $ 0.012315 |
| $1.00 | = | Nu 89.2 |

**ABBREVIATIONS**

| | |
|---|---|
| ADB | Asian Development Bank |
| AEOs | Assistant Environment Officers |
| BOD | Biological Oxygen Demand |
| BPC | Bhutan Power Corporation Limited |
| BSR | Bhutan Schedule Rate |
| CEMP | Construction Environmental Management Plan |
| CR | Critically Endangered (CR) |
| CHSMP | Construction Health and Safety Management Plan |
| C&PD | Construction and Procurement Department |
| CMS | Contract Management Section |
| COD | Chemical Oxygen Demand |
| COP15 | 15th Conference of the Parties |
| COVID | Coronavirus Disease |
| CPOs | Construction Project Offices |
| CS | Construction Section |
| CSO | Civil Society Organization |
| DECC | Department of Environment and Climate Change (former NEC) |
| DGPC | Druk Green Power Corporation Limited |
| DoE | Department of Energy |
| DoFPS | Department of Forests and Park Services |
| EA | Executing Agency |
| EC | Environmental Clearance |
| EGSS | Environment, GIS & Survey Section |
| EHS | Environmental, Health & Safety |
| EMoP | Environmental Monitoring Plan |
| EMP | Environmental Management Plan |
| EN | Endangered |
| EPC | Engineering, Procurement, and Construction |
| ERA | Electricity Regulatory Authority |
| ERD | Engineering and Research Division |
| ESARF | Environment and Social Review and Assessment Framework |
| EIA | Environment Impact Assessment |
| ESMR | Environment and Social Monitoring Report |
| ESS | Environment and Social Safeguards |
| EU | Environment unit |

| | |
|---|---|
| FNCA | Forest and Nature Conservation Act |
| FNCRR | Forest and Nature Conservation Rules and Regulations |
| GBV | Gender Based Violence |
| GHG | Green House Gas |
| GRC | Grievance Redressal Committee |
| GRM | Grievance Redressal Mechanism |
| H&S | Health and Safety |
| HIV | Human Immunodeficiency Virus |
| IA | Implementing Agency |
| IBAT | Integrated Biodiversity Assessment Tool |
| IEE | Initial Environmental Examination |
| IFC | International Finance Corporation |
| ILO | International Labour Organization |
| IUCN | International Union for Conservation of Nature |
| KBA | Key Biodiversity Areas |
| LC | Least Concern |
| LUC | Land Use Certificate |
| MoAL | Ministry of Agriculture and Livestock |
| MoENR | Ministry of Energy and Natural Resources |
| MPPT | Max Power Point Tracking Control |
| MPU | Milk Processing Unit |
| MW | Megawatt |
| MWp | Megawatt Peak |
| NEC | National Environment Commission |
| NEPA | National Environmental Protection Act |
| NGO | Non-Governmental Organization |
| NLCS | National Land Commission Secretariat |
| O&M | Operation and Maintenance |
| OHS | Occupational Health and Safety |
| PM10 | Particulate Matter (less than 10 microns) |
| PM2.5 | Particulate Matter (less than 2.5 microns) |
| PIAC | Project Implementation Assistance Consultant |
| PPP | Public-Private Partnership |
| PV | Photovoltaic |
| RAP | Resettlement Action Plan |
| RE | Renewable Energy |
| REA | Rapid Environmental Assessment |
| RECOP | Regulation for Environmental Clearance of Projects |
| RGOB | Royal Government of Bhutan |
| SEA/SH | Sexual Exploitation and Sexual Harassment |
| SIA | Social Impact Assessment |
| SPD | Solar Project Division |
| SPS | Safeguard Policy Statement |
| SRFL | State Reserved Forest Land |

| | |
|---|---|
| TA | Technical Assistance |
| UNCCD | United Nations Convention to Combat Desertification |
| UNDP | United Nations Development Program |
| UNFCCC | United Nations Framework Convention on Climate Change |
| WHO | World Health Organization |

## Units of Measure

| | |
|---|---|
| Ha | hectare |
| Km | kilometer |
| $km^2$ | square kilometer |
| lpcd | liter per capita per day |
| masl | meter above sea level |
| MW | megawatt |
| MWHp | Megawatt-hour peak |
| MU or GWh | Million Units of electricity or gigawatt-hour |

## Dzongkha Terminologies

| | |
|---|---|
| Chathrim | Act |
| Chorten | Stupa |
| Chuzhing | Cultivated wetland |
| Dzong | Fortress/Administrative Centre |
| Dzongkhag | District |
| Dzongkhag Tshogdu | District Council |
| Dzongdag | District Administrator |
| Gewog | Block/ |
| Gewog Tshogdu | Block Council |
| Lhakhang | Monastery |
| Kamzhing | Cultivated dryland |
| Khimsa | Residential land |
| Kidu | Benefits granted by the King |
| Thram | Certificate of land ownership |
| Thromde | Municipality |
| Tsamdro | Pasture land |
| Tsho | Lake |
| Tshogpa | Representative |

NOTE

In this report, "$" refers to United States dollar.

## Table of Contents

# 1. Introduction

## 1.1. Background

1. Bhutan has been at the forefront in clean energy generation and has been relying on hydropower generation to meet its energy demand. At the same time, it contributes to one fifth of the gross domestic product and one third of the government's revenue through export of power to India.

2. In recent years, Bhutan has been challenged by the rising electricity demand, particularly during the dry winter months. Historically a power surplus nation thanks to hydropower, Bhutan now faces a shifting dynamic due to industrial demands, which constituted 88% of total domestic electricity use by 2024[1]. From December 2023 to March 2024, Bhutan's domestic consumption has already risen by 59% compared to the same period of the previous year (December 2022–March 2023), from 1,473 gigawatt-hour (GWh) to 2,346 GWh. Further, recent projections from the finance ministry indicate a 232% increase in domestic electricity demand by 2026.

3. The anticipated growth in their demand has not been met with timely capacity additions on the supply side. Bhutan has an installed capacity of 2,460 megawatts (MW) for hydropower generation. However, during the dry season (December–March), the total generation output drops to approximately 415 MW equivalent due to low river inflows. This is because all the existing plants are run-of-the-river schemes that have no seasonal storage capacity. In addition, there have been significant delays in hydropower capacity addition.

4. In response, Bhutan is exploring solar energy to complement its hydropower reliance. With a practical solar potential of 12 GW, the government aims to achieve 20 GW of renewable capacity by 2040, including 5 GW from solar. Initiatives like the Sephu solar farm and feasibility studies are supported by regulatory measures, such as the Solar Power Plant Licensing Regulation 2024, to facilitate large-scale solar projects. This shift not only aims to strengthen energy security but also offers economic benefits, like job creation, especially for the youth. Emphasizing green job opportunities in the solar sector aligns with Bhutan's broader economic and industrial objectives, promoting gender inclusivity in the process. Through strategic investments and policy initiatives, Bhutan is set to build a resilient, sustainable energy future, reducing import reliance while promoting economic growth.

## 1.2 Overview of the Sector Loan

5. The RGoB has requested Asian Development Bank (ADB) to explore financing for utility scale solar projects. The ADB is currently evaluating a sector loan to finance a pipeline of utility scale projects aggregating to more than 500 MW with projects proposed to be developed under multiple business models including full DGPC ownership and Public-Private Partnership (PPP). The 120 MWp Wobthang project at Tang Gewog and the Transmission Line are being evaluated as the first subproject under the proposed sector loan.

6. The executing and implementing agencies for the project will be Druk Green Power Corporation Limited (DGPC) for utility solar and Bhutan Power Corporation Limited (BPC) for power evacuation. The Sector Loan project implementation schedule is from March 2026 to March 2029 with an indicative completion date by October 2028. The project is aligned with the following impact: energy security and climate resilience enhanced. The project will have the following outcome: non-hydro-clean power generation increased.

**Output 1 Subproject and Components**

7. At the project processing stage, 2 more subprojects in 2 districts are being conceptualized with capacities of 40 MWp and 170 MWp, as per Table 1. DGPC plans to develop the first two subprojects—Wobthang (120 MW) and Pedselling (40 MW) in Bumthang, while the third subproject at Dramthang (150 MW) in Lhuentse is expected to be promoted through a PPP. Transmission lines will be planned, designed, and implemented by BPC, as separate subprojects.

8. The physical implementation (construction) of each solar component subproject is expected to be between 18-36 months. For Transmission lines, the duration largely depends on the length of the transmission line, number of towers and length of tower access roads.

**Table 1. Sub-project details**

| Description | Wobthang | Pedseling | Domathang |
|---|---|---|---|
| Ownership | DGPC owned | DGPC owned | JV (PPP) |
| Land Area | 314 acres | 145 acres | 697 acres |
| Location | Tang Gewog, Bumthang | Chhoekhor Gewog, Bumthang | Tsaenkhar Gewog, Lhuentse |
| Geo-coordinates | 27°38'14.83"N, 90°51'43.06"E<br>EL 3,100 masl | 27°33'53.88"N 90°46'59.10"E<br>EL 3,500 masl | 27°29'33.39"N 91°15'4.49"E<br>EL 3,128 masl |
| Capacity (preliminary) | 120 MWp (100 MW) | 40 MWp | 170 MWp |
| Annual Energy<br>(preliminary using PVWatts) | 204 GWh | 65 MWp | 234 GWh |
| Cost Estimate | USD 62 million | USD 28 million | USD 119 million |
| Access Roads | Connected by 40 km bitumen road from Chamkhar town to Tandingang village.<br>An unpaved road extends from Tandingang village and passes through the project area. Additionally, the site can be accessed from the opposite side via a 1.39 km unpaved road, which connects to the road extending from Tandingang village.<br>Approximately 17 access roads measuring a total of 15 km need to be constructed for the | Will require construction of about 3 km road to access the Project site from the existing unpaved road.<br>Access road feasibility studies are not initiated yet for the ATS. | Will require 5 km road from the nearest available farm road at Bangtsho, Tsaenkhar Gewog.<br>Access road feasibility studies are not initiated yet for the ATS. |

| | | | |
|---|---|---|---|
| | ATS for transportation of construction materials and tower parts. | | |
| Workers' Camp Sites | For the solar project, the workers will be accommodated at the existing buildings near the project site. | The location of the worker's camp for the project site will be identified during the feasibility study. | The location of the worker's camp for the project site will be identified during the feasibility study. |
| Power Grid Connection required | To construct 20 km long 132 kV TL to the Garpang Pooling Station, Bumthang | The nearest existing power substation at Garpang is situated at about 7 km from the site. | 132 kV Kilikhar-Tangmachhu located about 4 km below the site runs above the highway. The nearest 132 kV HV line is located at about 4 km from the site |
| Subproject Status | IEE prepared for solar project.<br><br>EIA for Transmission line under preparation<br><br>RP prepared for solar project.<br><br>RP for Transmission line under preparation | Topography survey completed for solar project.<br>Design for TL yet to be undertaken | Forestry Clearance obtained and topo survey ongoing for solar project.<br><br>Design for TL yet to be undertaken |

9. The sample subproject prepared at project processing stage involves the Wobthang Solar Subproject. Since the subprojects involve civil works requiring further assessment and management planning in the form of an initial environmental examination (IEE) and Environmental Management Plan (EMP) the project overall has been categorized 'B' for environment.

10. The transmission line to evacuate power from Wobthang will likely traverse natural habitat plus require a series of access roads to access the RoW to construct towers. The project has the potential to trigger significant impacts and will require a detailed Environmental Impact Assessment (EIA). Therefore, consistent with ADB's categorization requirements, that the projects is categorized by its most environmentally sensitive component, the project has been categorized 'A' for environment.

11. The sample projects are not anticipated not to cause significant involuntary land acquisition and resettlement impacts, however, there is the possibility of impacts on private assets like water tanks, sheds, community cattle grazing area for solar plant site, and livelihoods, and land impact on right of way of the transmission lines and land required by towers foundations, access roads, and other economic impact are, as observed in the first subprojects as the Wobthang solar site and the transmission line. The subproject is categorized 'C' for indigenous peoples' safeguards because indigenous people or such groups as per SPS were not found in the subprojects' areas.

### 11.1. Environment and Social Assessment Review Framework

12. This Environment and Social Review and Assessment Framework (ESARF) provides guidance to DGPC and BPC on the environmental and social screening and categorization, assessment, institutional arrangements, and procedures to be followed for the preparation and implementation of subprojects, safeguard documents as resettlement plan (RP) and Indigenous Peoples Plan (IPP, as required), IEE, EIA, and/or due diligence reports as applicable to be prepared in compliance with the environment and social safeguard requirements specified in ADB's Safeguard Policy Statement (SPS) (2009) and relevant government laws, rules and regulations. It elaborates on the requirements to be followed by DGPC and BPC, as the implementing agencies, for environmental and social safeguard, and screening and exclusion criteria for subprojects/locations.

13. This ESARF:

- Provides description of the project, its subprojects and components.
- Explains the general anticipated environmental and social impacts of the subprojects and components to be financed under the project.
- Provides the environmental and social safeguard requirements and subproject selection/exclusion criteria that are to be used in selecting sites.
- Specifies the requirements that will be followed in relation to future subproject's environmental and social impact screening and categorization, assessment, preparing the safeguard documents, and impact management planning, including arrangements for meaningful consultation with affected people and other stakeholders and information disclosure requirements.
- Assesses the adequacy of the capacity of DGPC and BPC, as the implementing agency, to comply with ADB's SPS (2009) environmental and social requirements and applicable national laws, rules and regulations as well as applicable international agreements and identify needs for additional human resources and capacity building.
- Specifies institutional arrangements including budgeting and capacity development.
- Specifies monitoring and reporting requirements; and
- Describes the responsibilities of DGPC and BPC and its contractors in relation to the preparation, implementation, consultations and grievance redress, and progress review of safeguard aspects of subprojects.

## Assessment of Legal Framework and Institutional Capacity

### 2.1. National Environment Policies

### 2.1.1 Overarching Legislation: The Constitution of Bhutan

14. Article 5 of the Constitution of Bhutan outlines the responsibilities of government and the people to protect and conserve the pristine environment and safeguard Bhutan's wildlife. The Constitution states that it is the fundamental duty of every citizen to protect, conserve, and improve the pristine environment and safeguard the biodiversity, reduce pollution and prevent ecological degradation, and promote ecologically balanced sustainable development while also pursuing environmentally friendly economic and social development. The government stands by the policy of maintaining a minimum of 60% forest cover all the time to ensure sustainable conservation of natural resources and reduce degradation of the ecosystem. The Constitution of the Kingdom of Bhutan promotes the direct participation of the people in the development and management of their own social, economic, and environmental wellbeing.

### 2.1.2 Alternative Renewable National Energy Policy 2025

15. The Alternative Renewable Energy Policy provides direction and guidance for the promotion of alternative renewable energy options such as solar, wind, bioenergy, geo-thermal, pico (1-10 kW) / micro (10-100 kW) / mini (100–1000 kW) / small (1000 kW up to 25 MW) hydro and waste to energy, to strengthen national energy security, while contributing to sustainable development, environment conservation and climate change mitigation. The preliminary target for electricity generation from solar, wind and biomass has been set for 5MW, and 3MW for energy generation from biomass and solar thermal systems. The Department of Energy is the Nodal Agency for implementing this policy. Relevant environmental and social safeguards (ESS) sections of the policy cover water use, waste management, land acquisition and compensation, clearances, monitoring, and evaluation, but these are not detailed aside from ensuring compliance with national legislation and securing of all required clearances from relevant agencies.

16. The National Energy Policy 2025 provides Bhutan with a unified, long-term framework to secure adequate, reliable and affordable energy while enabling economic growth and sustaining its carbon-neutral commitment. It aims to achieve 25,000 MW of installed capacity by 2040 through hydropower development (15,000 MW), energy (5,000 MW), and diversification into wind, biomass, geothermal, hydrogen, storage systems and emerging technologies. It stated that DoE shall facilitate the allocation of State Reserve Forest (SRF) land and acquisition of private land for the Renewable Energy projects including for the transmission and distribution infrastructure. The Department shall also lead in framing Guidelines and Rules for obtaining Right of Way (RoW) for transmission and distribution lines. All renewable energy projects including generation, transmission and distribution shall comply with the national environmental laws and adhere to international best practices.

### 2.1.2 National Strategy and Action Plan for Low Carbon Development 2012

17. During the 15th Session of Conference of Parties (COP15) of the United Nations Framework Convention on Climate Change (UNFCCC) in Copenhagen, the Royal Government of Bhutan made a pledge to remain carbon neutral. The National Strategy and Action Plan for Low Carbon Development include interventions and action plans to fulfil commitments to remain carbon neutral through the promotion of green growth. This project will contribute to fulfilling the carbon neutral pledge.

## Applicable Environmental Legislation

### 2.2.1 Environmental Assessment Act 2000

18. The Environment Assessment Act outlines procedures for assessing the potential impact of projects on the environment and formulates policies and measures to reduce potential adverse effects on the environment. Based on the above premise, environmental clearance is required prior to the execution of any project that may entail adverse impacts on the environment. To this effect, the Department of Environment & Climate Change (DECC), previously the National Environmental Commission (NEC), is empowered to implement the Environmental Assessment Act 2000 by setting out guidelines for securing an environmental clearance for a project. The Act requires DGPC and BPC to assess the environmental impacts of its subprojects based on the activity categorization and accordingly seek environmental clearance as detailed in section 2.2.3.

### 2.2.2 National Environmental Protection Act 2007

19. The National Environmental Protection Act, 2007 (NEPA) is the umbrella act on environmental conservation in Bhutan. It established the role of the National Environment Commission (NEC) or its successors to protect Bhutan's environment. It mandates that environment conservation receives equal priority with economic development in line with the Government's Middle Path Strategy. It also established the role of the Competent Authorities within Ministries, Thromdes (municipality) or Districts to screen, review and issue or deny environmental clearance, a mandatory requirement for any development activity. The Act promotes the precautionary principle, waste management principles, polluter pays principle, participatory approach, right to information about the state of the environment, right to seek legal redress if a person's health and safety is affected and payment for environmental services.

### 2.2.3 Regulation for Environmental Clearance of Projects 2016 and its amendments 2020

32. The Regulation for Environmental Clearance of Projects, 2016 (RECOP, 2016) repeals RECOP, 2002 and outlines procedures and responsibilities for implementing and supplementing the Environmental Assessment Act, 2000 to issue environmental clearances. The Guide for environmental clearance application procedure, 2022 outlines the process for project categorization and seeking environmental clearance. Basically, approval or issuance of environmental clearance is dependent on (i) project type/activity and (ii) project location, which in turn dictates the level of environmental sensitivity and assessment required, the Competent Authority that will review, and the required clearance process to be followed.

33. Project Category. Proponents must check if the proposed activity requires environmental clearance or not by referring to the project category. The three categories are summarized in Table 2. If the activity is not listed, it is to be treated as a Blue Category.

**Table 2. Summary of Categorization and assessment requirements**

| Project category/Color coding | Environmental assessment process | Competent Authority | Remarks |
|---|---|---|---|
| GREEN | Exempted from Environmental Assessment (EA) process | Not required. | The proponent must obtain approvals/clearances/development consents from concerned agencies as required under relevant legislation |
| BLUE | Initial Environmental Examination (IEE) required | Designated Competent Authority or DECC as applicable | |
| RED | Environmental Impact Assessment (EIA) required | EIA shall be reviewed and assessed by DECC | |

Source: NEC- DECC: http://www. http://www.nec.gov.bt/services/environmental-clearance-services

34. Per the project categorization, the development of Utility Solar will fall under the Blue Category, requiring an IEE as these activities are not listed under the exclusion list. Environmental clearance for this will be required for both the solar farm and power evacuation lines.

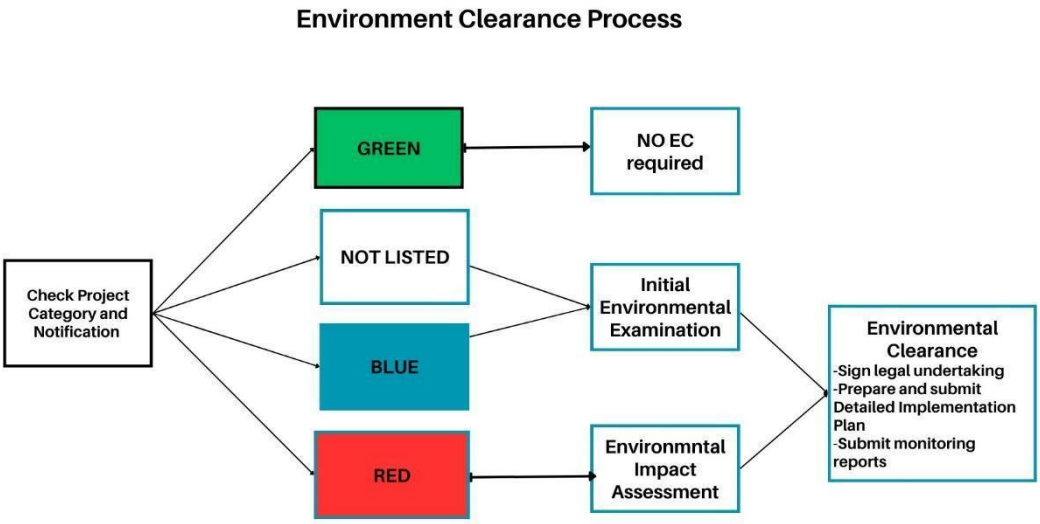



**Figure 1. Environment Clearance Process**

35. Red category projects include hydropower projects, national highways and industries such as ferroalloy, establishment of industrial estates, mining and quarries that will be in operation for more than 5 years. The EIA must be conducted in accordance with the EA Act 2000 and sections 8 and 24 of the RECOP 2016.

36. If an IEE is approved for a Blue Category project, a legal undertaking must be signed after which the environmental clearance is issued. A detailed implementation plan must be prepared in the standard format and submitted to the Department of Environment and Climate change within three months of receiving the EC. The project proponent is also required to conduct self-monitoring of the EC as per Section 59 of the RECOP, 2016 and reports are to be submitted on compliance within the given timeframe.

37. The Environmental assessment guideline for power transmission line projects (2012) provides guidance on how to conduct an EIA for TL.

### 2.2.4 Forest and Nature Conservation Act (FNCA) 2023 and the Forest and Nature Conservation Rules and Regulations (FNCRR) 2023 and its amendment 2025

38. This Act repeals the FNCA, 1995, and sections 490, 491, 492, and 493 of the Penal Code of Bhutan 2004 which covers offenses related to protected species, and sections 30 (k)(i) and (k)(ii) of the National Environment Protection Act of Bhutan, 2007. Under this act, forest cover means ‘land with tree spanning more than 0.5 ha with tree higher than 5 meter and a canopy cover of more than 10 percent’. A relevant aspect of the act to the project is the requirement for a forestry permit for any activity within State Reserved Forest Land (SRFL). This requires a permit from the Department of Forest and Park Services (DOFPS) (Section 44).

39. The Forest and Nature Conservation Rules and Regulations, 2023 is formulated to facilitate the effective implementation of the Act. This Rules and Regulations supersedes all the executive orders and circulars which are inconsistent with the Act and the Rules and Regulation.

40. Forestry clearance. Section 14 on the criteria for forestry clearance requires authorization by the DOFPS if forest is to be cleared on a slope greater than 45 degrees, if it is within 100 feet of the bank or edge of any water course/source, or, within 600 feet uphill or 300 feet downhill of a motorable road. Section 45 of the Act grants the Department authority to issue forestry clearance to the Range, Division and Park Office as follows: Range Office for activities up to 3 acres or 3 km length; Division of Park for activities 3-7 acres or 3-7km length, Head of Department for activities over 7 acres or over 7 km length. Forestry clearances are valid for the period of the project or activity.

41. Protected Areas. Protected areas have core zones, comprising habitats and species that are of high conservation value and wherein development activities are restricted. These include Key Biodiversity Areas, areas of high endemism, critical habitats and migratory routes. Transition zones are areas adjacent to core zones, with area important as wildlife habitat but where traditional and legal use-right season for a fixed time is permitted. Otherwise, this zone is equivalent to a core zone. These include areas used traditionally as grazing or pasture, historical trails, cultural heritage sites, sacred groves. Buffer zones are areas that provide cushioning for core and transition zones and are found around multiple use zones, along roads and trails, human settlement or core and transition zones. Buffer zones vary from as low as 20m (trails), 50m (centre of farm roads), 150m (from the centres of national highways), 500m (around multiple use zones, campsites, religious sites and hot springs). Multiple use zones are termed zone of cooperation between park and residents and include built up areas, settlements, resource allocation areas and farmlands, developmental activities. 'Biological corridor" is defined as an area set aside to connect one or more Protected Areas. Under the Forest and Nature Conservation Rules and Regulations of Bhutan (2017), Biological Corridors were provided with equivalent legal protection status as any other protected area. For any developmental in a state reserve forest (whether in a protected area or a biological corridor), a permit from the Department of Forest and Park Services is required.

42. National Parks protect large representative ecosystems, while wildlife sanctuaries are smaller in size and are more specific in terms of conserving particular species and their habitats e.g. Bumdeling Wildlife Sanctuary is famous for the Black-necked cranes and the Phibsoo Wildlife Sanctuary for its Spotted deer. A strict nature reserve is an area with little or no human settlement that is promoted for scientific research. Bhutan has only one strict nature reserve (Jigme Khesar Strict Nature Reserve).

43. Biodiversity. All wild flora and fauna in Bhutan are protected and restricted from being killed, injured, captured, collected, cultivated or traded irrespective of whether these are in State Reserved Forest Land, unless with a permit. This is especially so for species listed in Schedule 1 of the Act, except, for scientific research and population management including conservation breeding or plantation on the recommendation of the Scientific Authority. The cultivation, collection, or trade of wild flora listed in Schedule II and III of this Act is permitted based on the procedure prescribed in the Rules

44. Waste. Section 284 states that the Forest Department is mandated to manage waste in the State Reserved Forests by the Waste Prevention and Management Regulation, 2012.

45. Cutting of trees and compensatory afforestation. A permit is required from the DoFPS to cut trees. They must be marked by the forestry staff and only those trees that are marked can be removed. The FNCA 2023 has been revised and requires any agency taking up developmental activities to be responsible for deforestation or damage to state reserve forest land, to carry out compensatory plantation, but it does not specify whether the area replanted should be equal to the area deforested or double. The Act does not specify requirements for lopping or trimming of trees.

### 2.2.5 The Cultural Heritage Bill of Bhutan 2016

The Cultural Heritage Bill of Bhutan provides guidance for the Dzongkhag to identify and register heritage buildings, sites and landscapes and to prepare management plans for the conservation of these and their buffer zones. Development control regulations for these are to be prepared based on these plans, which will come into effect once approved by the Department of Culture and Dzongkhag Development. An entity intending to undertake development activity which may affect a cultural element identified by the Dzongkhag must obtain the consent of the local community associated with the cultural element prior to seeking a development permit from the Dzongkhag.

### 2.2.6 Water Act of Bhutan 2011 and the Water Regulation of Bhutan 2014

46. The Act recognizes that water is one of the most important natural resources in the country and needs to be economically and environmentally managed in all times to come. The Act provides comprehensive legislation to guide various water user sectors in Bhutan. It also aims to ensure that every Bhutanese has assured access to adequate, safe, and affordable water to enhance the quality of their lives. Relevant sections of the Act pertaining to this project are (a) the right of every individual to safe, affordable, and sufficient water for basic human needs. (Article 5c), (b) ensure that water resources are protected, conserved and/or managed in an economically efficient, socially equitable and environmentally sustainable manner (Article 4a) and (c) the requirement to seek approval to abstract water (Article 31). This regulation ensures the protection, conservation, and management of watersheds for sustainable water supply and minimize other environmental side effects. This regulation is relevant given that project sites may be located near rivers and streams. The Water Act restricts the discharge of effluents directly or indirectly into any water source unless it is within the effluent discharge standard. However, the Environment Standards 2020 are only applicable to industrial effluent discharge and for sewage treatment plants and not applicable for household sewage

### 2.2.1 Waste Prevention and Management Act of Bhutan 2009 and the Waste Prevention and Management Rules 2012 (Amended 2016)

47. The Waste Prevention and Management Act of Bhutan 2009 and the Waste Prevention and Management Regulation 2012 (amended 2016) provide the necessary institutional framework for coordination on waste management to reduce generation at source, promote segregation, reuse, and recycling, storage, transportation, environmentally-sound treatment, and disposal. It promotes the precautionary principle, the polluter pays principle, the 3R principle and the waste management hierarchy.

48. Waste is categorized into non-hazardous waste, hazardous waste, medical waste, e-waste, and other waste. At the household level, however, waste collection is limited to bio-degradable and non-biodegradable wastes only. Only in Thromdes such as Thimphu, there are waste drop off centers to collect dry, wet, and hazardous waste. The Rules require all businesses to provide appropriate bins for waste collection and storage of biodegradable and non-biodegradable waste (waste segregation) and to maintain cleanliness of the premises and its surroundings. At construction sites, construction and excavated waste is required to be safely stored at the site without inconveniencing the public and transported to designated sites (as identified by the local authority) without any spillage along the way.

49. Section 15 on e-waste requires the implementation agencies to establish a system for the proper collection, storage, treatment, and safe disposal of end-of-life e-waste. The nodal agency for e-waste is the GovTech Agency (previously the Department of Information Technology). Individual consumers of electrical and electronic equipment must ensure that e-waste generated by them is deposited at or channelized to the designated collection centers/drop-off sites or e-waste management entity. Bulk consumers (government agencies) must ensure that all e-waste is channelized for auction by the Department of National Properties that will auction the waste to

the designated e-waste management entity. The GovTech agency is responsible for principles of reduction, reuse, and recycle and as per procedures and conditions laid down by the Department of Information Technology and Telecom. In the Amended Regulation, Section 131.4A states that producers and importers must ensure “implementation of buy back/take back mechanisms of e-waste, as may be applicable”. Producers and importers are also required to pay an e-waste access to the Department of Revenue and Customs as per the determination by the GovTech Agency to cover the costs for environmentally sound management of the e-waste generated at the end of their useful life.

### 2.2.2 Penal Code of Bhutan 2004

50. Aside from environmental laws and regulations, the 2004 Penal Code of Bhutan also includes a provision on environmental pollution wherein Article 409 states that a defendant shall be guilty of the offense of environmental pollution if such defendant knowingly or recklessly pollutes or contaminates the environment including water.

### 2.2.1 Environmental Standards 2020

51. The Environmental Standards 2020 issued by the NEC (now the Department of Environment and Climate Change) set the permissible emission standards for ambient air quality, workplace emission, vehicular emission, and noise limits. These standards differ for Mixed Areas and Sensitive Areas. The Water Act restricts the discharge of effluents directly or indirectly into any water source unless it is within the effluent discharge standard. However, the Environment Standards 2020 are only applicable to industrial effluent discharge and for sewage treatment plants and not applicable for household sewage. The Drinking Water Quality Standards, 2016, developed in accordance with Section 13 (f) and Section 42 (a) and (b) of the Water Act of Bhutan, 2011 describe the quality parameters set for drinking water and the maximum permissible limit for each of the set parameters, to limit the level of contaminants in drinking water.

### 2.2.2 The Biodiversity Act 2022

52. This Act repeals the Biodiversity Act of Bhutan 2003 and subsidiary legislations framed and adopted thereunder, and section 73 of the NEPA 2007. The chapter 7 of the Act on Fair and Equitable Sharing of Benefits discusses on the economic, social, technical, scientific, environmental or any other benefits that are intended or may be likely to be accrued to the country and an indication of the types of short, medium- and long-term benefits to be shared with the RGoB and other relevant stakeholders as well as the proposed mechanisms and arrangements for benefit sharing.

## 2.3. Applicable Project Environmental Standards

### 2.3.1. Environmental Standards 2020

53. Following the requirements of ADB’s SPS, a project will apply pollution prevention and control technologies and practices consistent with international good practice, including, as reflected in International Finance Corporation (IFC) Environmental, Health, and Safety (EHS) General Guidelines and IFC EHS Guidelines for Electric Power Transmission and Distribution (IFC EHS Guidelines). When government regulations differ from these levels and measures, the executing agency shall achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the executing agency will provide full

and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB's SPS, 2009. In view of this, Tables 3 to 8 show the standards (in bold) to be followed by the project wherever applicable. If standards are already exceeded, then the project should ensure that it does not further exacerbate the pollution level. With reference to the IFC EHS Guidelines this means that it should not result in more than a 3 dBA increase above the already exceeded background level.

**Table 3. Ambient air quality standards**

| Parameter | Averaging Period* | Bhutan's Ambient Air Quality Standard, 2020 ($\mu g/m^3$)[1] | | | WHO 2021 Recommended Interim* Targets ($\mu g/m^3$)[2] | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | **Industrial Area** | **Mixed Area** | **Sensitive Area** | **1** | **2** | **3** | **4** | **AQG** |
| TSP | 24-hour | **500** | **200** | **100** | | | | | |
| | Annual | **360** | **140** | **70** | | | | | |
| $PM_{2.5}$ | 24-hour | 60 | 60 | 60 | 75 | 50 | 37.5 | 25 | **15** |
| | 1-year | 40 | 40 | 40 | 35 | 25 | 15 | 10 | **5** |
| $PM_{10}$ | 24-hour | 200 | 100 | 75 | 150 | 100 | 75 | 50 | **45** |
| | Annual | 120 | 60 | 50 | 70 | 50 | 30 | 20 | **15** |
| $SO_2$ | 24-hour | 120 | 80 | **30** | 125 | 50 | - | - | **40** |
| $NO_2$ | 24-hour | 120 | 80 | 30 | 120 | 50 | - | - | **25** |
| | Annual | 80 | 60 | 15 | 40 | 30 | 20 | - | **10** |
| CO | 24-hour | **-** | **-** | **-** | 7 | - | - | - | **4** |
| | 8-hour | **5,000** | **2,000** | **1,000** | - | - | - | - | **-** |
| | 1-hour | **10,000** | **4,000** | **2,000** | - | - | - | - | **-** |
| Ozone | Peak Season | **-** | **-** | **-** | 100 | 70 | - | - | **60** |
| | 8-hour | **100** | **100** | **100** | 160 | 120 | - | - | **100** |

* Due to short term duration of civil works, the short-term period will be more practical to use for monitoring purposes than an annual period. Monitoring should therefore be conducted 24 hours for TSP, PM, $SO_2$, $NO_2$ and CO (3 x 8 hr and 24 x 1 hr readings). Ozone can also be monitored for 24 hours; 3 x 8 hr readings. This will enable direct comparison with short term ambient air quality standards/guideline.

[1] Taken from Environmental Standards, National Environment Commission, Royal Government of Bhutan, 2020.

[2] World Health Organization 2021. WHO global air quality guidelines. Particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide. https://iris.who.int/bitstream/handle/10665/345329/9789240034228-eng.pdf?sequence=1

*__Interim target__. An air pollutant concentration associated with a specific decrease of health risk. Interim targets serve as incremental steps in the progressive reduction of air pollution towards the air quality guideline levels and are intended for use in areas where air pollution is high. In other words, they are air pollutant levels that are higher than the air quality guideline levels, but which authorities in highly polluted areas can use to develop pollution reduction policies that are achievable within realistic time frames. The interim targets should be regarded as steps towards ultimately achieving air quality guideline levels, rather than as end targets

**Table 4. Workplace emission standards (Environmental standards 2020)**

| Parameter | Averaging Period* | Unit | Standard |
|---|---|---|---|
| TSPM | 8-hour average | $mg/m^3$ | **10** |
| RSPM ($PM_{10}$) | 8-hour average | $mg/m^3$ | **5** |
| $PM_{2.5}$ | 24-hour average | $mg/m^3$ | **25** |
| | 1 year average | $mg/m^3$ | **10** |
| SO | 8-hour average | $mg/m^3$ | **1** |
| NO | 8-hour average | $mg/m^3$ | **1** |
| CO | 8-hour average | $mg/m^3$ | **5** |
| Pb | 1-hour average | $mg/m^3$ | **0.0005** |
| Oxone | 8-hour average | ppm | 0.08 |

**Table 5. Noise level standards**

| Receptor | Noise Level (dBA)[3] Environment standards 2020 | | Noise Level (dBA 1hr LAeq) WHO Community Noise Guidelines | |
|---|---|---|---|---|
| | **Day** | **Night** | **Day** | **Night** |
| Industrial area | 75 | **65** | **70** | 70 |
| Mixed area | 65 | 55 | **55** | **45** |
| Sensitive area | **55** | **45** | **55** | **45** |

Day time per the Environment Standards 2020 is from 0600 hours to 2200 hours (human activities); Nighttime is from 2200 hours to 0600 hours (limited human activities). The maximum value allowed in the workplace at any point in time is 75 dB (A).

**Table 6. Effluent Standards for Treated Domestic Sewage Before Discharge to Surface Water**

| Parameter | Unit | Guideline |
|---|---|---|
| pH | pH | 6-9 |
| Biological Oxygen Demand (BOD) | mg/l | 30 |
| Chemical Oxygen Demand (COD) | mg/l | 125 |
| Total nitrogen | mg/l | 10 |
| Total phosphorous | mg/l | 2 |
| Oil and grease | mg/l | 10 |

[3] Taken from Environmental Standards, National Environment Commission, Royal Government of Bhutan, 2020 (no averaging period stipulated, usually taken as 24 hours)

| Parameter | Unit | Guideline |
|---|---|---|
| Total suspended solids | mg/l | 50 |
| Total coliform bacteria | MPN/100ml (most probable number) | 400 |

Note: source is the IFC EHS Guidelines; no national effluent standards for household wastewater

**Table 7. National Drinking Water Quality Standards**

| Group | National Drinking Water Quality Standards, 2016[4] (for Urban Drinking Water Supply) | | | WHO guidelines for drinking water quality |
|---|---|---|---|---|
| | Parameter | Unit | Maximum Concentration Limits | |
| Physical | Turbidity | NTU | **5** | - |
| | pH | - | **6.5 – 8.5** | - |
| | Color (TCU) | Hazen Unit | **15** | - |
| | Taste and Odor | - | **Non- objectionable** | - |
| Chemical | Iron | mg/l | **0.3** | - |
| | Manganese | mg/l | **0.4** | 0.4 |
| | Arsenic | mg/l | **0.01** | 0.01 |
| | Fluoride^ | mg/l | **1.5** | - |
| | Lead | mg/l | **0.01** | 0.01 |
| | Nitrate | mg/l | **50** | 50 |
| | Calcium | mg/l | **75** | - |
| | Mercury | mg/l | **0.006** | 0.006 |
| | Residual Chlorine | mg/l | **0.2 - 0.5** | - |
| | Sulphate | mg/l | **250** | - |
| Microbiol ogical | E-coli | CFU/100ml | **0** | Must not be detectable in any 100ml sample |

**Table 8. Motor vehicle emission standards**

| Fuel Type | Vehicle registered prior to Jan 1, 2005 | Vehicle registered after Jan 1, 2005 | Vehicle registered prior to Jan 1, 2021 | Vehicle registered after Jan 1, 2021 (Approval type: Euro 6/BS VI) |
|---|---|---|---|---|
| Petrol (%CO) | 4.5% | 4.0% | 4.0% | 0.5% |
| Diesel (%HSU) | 75% | 70% | 70% | 50% |

Source: Environmental Standards, National Environment Commission, Royal Government of Bhutan, November 2010.

**Table 9. Vehicle noise level limits (Environmental standards 2020)**

| Sl. # | Type of Vehicle | Noise level |
|---|---|---|

[4] Taken from Bhutan Drinking Water Quality Standard, 2016, National Environment Commission, Royal Government of Bhutan, 8 March 2016.

| | | limits dB(A)[5] |
|---|---|---|
| | Two-Wheeler | |
| 1.1 | Displacement up to 80cc | 75 |
| 1.2 | Displacement more than 80cc but up to 175cc | 77 |
| 1.3 | Displacement more than 175cc | 80 |
| 2 | Vehicles used for carriage of passengers and capable of having not more than nine seats including the driver's seat | 74 |
| 3 | Vehicles used for carriage of passengers and capable of having more than nine seats, including the driver's seat and a maximum gross vehicle weight (GVW) of more than 3.5 tonnes | |
| 3.1 | With engine power less than 150 KW | 78 |
| 3.2 | With engine power more than 150 KW | 80 |
| 4 | Vehicles used for carriage of passengers and capable of having more than nine seats, including the driver's seat: vehicles used for carriage goods | |
| 4.1 | With maximum GVW not exceeding 2 tonnes | 76 |
| 4.2 | With maximum GVW greater than 3 tonnes but not exceeding 3.5 tonnes | 77 |
| 4.3 | Vehicles used for carriage of transport of goods with a maximum GVW exceeding 3.5 tonnes | |
| 5.1 | With engine power less than 75 KW | 77 |
| 5.2 | With engine power more than 75 KW or above but not less than 150 kv. | 78 |

Source: Environmental Standards, National Environment Commission, Royal Government of Bhutan, November 2010

### 2.2.3 Environmental Assessment Guideline for Power Transmission Line Projects (2012)

54. For SIA, there are provisions/clauses within the EA and NEPA addressing social impacts, and similarly, guidelines/regulations from DECC and DoFPS have provisions to address social impacts of Power Transmission and Distribution Lines. Specific regulations that address social aspects are the Land Acquisition and Compensation Rules and Regulations 2022 (LACRR 2022) which are already incorporated in this framework. Additionally, the Guideline for plot boundary realignment/reconfiguration 2021 endorsed by the National Land Commission is added below which contains specific section on land falling within transmission and distribution lines and spells out the provisions/requirements to qualify for private plot boundary realignment/reconfiguration. This guideline is used for BPC projects including TLs and Substations.

55. The first environmental assessment guideline was published in 1999 by the NECS for six sectors namely, mining, industries, hydropower, roads, forestry and power transmission lines. It was later revised in 2003 to make it more relevant to our Bhutanese context and in line with the EA Act 2000 and its regulation 2002. However, in 2012 it was proposed for revision and was

[5] Sound pressure level (SPL)

revised and updated with financial assistance from Asian Development Bank (ADB). The guideline is mainly intended to:

- Provide guidance and assistance to various stakeholders involved in the EA process;
- Assist the regulatory agency and EIA practitioners to understand the main areas of concern and use that understanding to enhance the quality of the EIA study and report;
- Inform the regulatory agency and EIA practitioners about the best environmental management practices in the transmission line sector;
- Assist the regulatory agency to better access the EIA report and arrive at a sound decision.

56. Though there is no separate guideline prepared for social impact assessment of energy projects, the Environment Guideline for Power Transmission Line 2012 includes sections on the scoping, impact assessment and mitigation of social impacts potentially attributed to transmission line development.

## 2.2.4 Applicable National Social and Involuntary Resettlement Related Legislation

### 2.4.1. Local Government Act of Bhutan

57. The Local Government Act of Bhutan (2009) promotes decentralization and devolution of power and authority to the Local Governments that represent the interests of local communities. The Dzongkhag Tshogdu and the Gewog (Block) Tshogde (Council) are the highest decision-making bodies at the dzongkhag and gewog level. As per Chapter 14 of the Local Government Act, all activities undertaken by different sectors of the government must be routed through and coordinated by Local Government offices. Section 213 requires that all national agencies conduct periodic consultations with the Local Government before any project or program is implemented in their jurisdiction, as well as involve Local Governments both in the planning and implementation of national projects.

58. The Local Government Act has provisions to undertake activities consistent with other relevant laws and policies of the country that are formulated towards conserving the environment within its jurisdiction and reducing the impact on public health and accelerating socio-economic development. Considering that subprojects are located in districts, the local government will have to be consulted and the requisite approval from the LG sought.

## 2.4.5 Land Act 2007 and Land Acquisition and Compensation Rules and Regulations 2022

59. The Land Act of 1979 provides the basis for land tenure in Bhutan. It was revised in 2007 to restructure many provisions in the Land Act. Land in Bhutan is registered as government -owned land (also called state-reserved forests), private land or owned by the clergy. Land can also be registered in the names of institutions and non-governmental organizations who are issued land use certificates for use of government-owned land. Once registered the owners or operators legally own the land for use. . All land and land rights in Bhutan is subject to formal registration, and land rights are recorded through a national cadastre and land registry. The Land Act, as such does not include provisions for traditional/customary land rights of ownership of any community. Some communities whose livelihoods are solely dependent on livestock are provided usufruct rights to grazing land and issued registration certificates. The major change under the revision of 2007 is the categorization of land use from 20 to 7 types including (i) chuzhing (wetland), (ii) kamzhing (dry land) including orchard, (iii) khimsa (residential land), (iv) industrial land, (v) commercial land, (vi) recreational, and (vii) institutional land. Under this revision, an authority on land management (resolve disputes, process land transactions, and convert land categories) has been decentralized to local governance, e.g., Geog Tshogde, Dzongkhag Tshogdu, and Thromde Tshogde.

60. Any private land which is gifted to or inherited, or purchased by a Bhutanese citizen requires to be registered as privately owned land under the Land Act. The National Land Commission Secretariat facilitates the registration of land on completion of which a land registration certificate is issued to the owner. The Act reserves the right for government to acquire private land if the land is deemed important for the country. When this happens, the affected individual, family, or community will be entitled for full compensation in the form of substitute land from the same Dzongkhag or cash compensation which will be calculated considering the class of land (soil, slope, proximity to urban centre etc.) using current land compensation rates issued by the Property Assessment & Valuation Agency (PAVA) of the Ministry of Finance.

61. The land acquisition and compensation rules and regulations cover land acquisition and compensation requirements and processes by government agencies for public interest. Private registered land must only be acquired under unavoidable circumstances, and compensation is to be provided as per the land type specified in the private persons "Thram" (land certificate). Land valuation and compensation for lands, trees and crops will be as per the prevailing Property Assessment Valuation Agency (PAVA) to be applied as applicable for impacted assets like houses, sheds.

62. For land which has to be acquired for any development purposes and for the public good, the Land Act 2007 authorises land acquisition for which the compensation (in the form of replacement land or cash compensation should be fair). Hence, any private land used for locating transmission towers can be acquired and compensated.[6] Similarly, the Act also provides for acquiring easement or access within right of way through private land to place water, sewerage or irrigation pipes and electric or telecommunications wires etc. The Act also provides for compensation of all built structures, trees and crops present on the land. The Act does not include compensatory arrangements for the loss of economic livelihoods. However, all losses due to the Project and subprojects, including livelihood loss will be compensated and mitigated according to ADB SPS for all groups of APs.

### 2.4.6 Guideline for plot boundary realignment/reconfiguration 2021

63. The Guideline for plot boundary realignment/reconfiguration 2021 outlines the procedures and criteria for plot boundary realignment and reconfiguration to address numerous land-related issues. It establishes a uniform process to ensure fair and consistent service regarding adjustments of common parcel boundaries or those involving state land, primarily in rural areas affected by challenging terrain and inadequate planning. The guideline specifies various scenarios that qualify for realignment, such as plots affected by public utilities, electric structures, high hazard zones, or irregular shapes, and sets forth the objectives, scope, delegation of power, and detailed procedures for processing these applications, including a fee calculation structure.

64. Guideline for plot boundary realignment/reconfiguration addresses two distinct criteria for qualifying for plot adjustment: Access Provision and plots affected by electric structures. The second criterion under Section 4.2 concerns plots affected by electric structures, specifically high-tension cable pylons, transmission towers, and electric substations. These plots are subject to development restrictions based on the safety regulations issued by the Electricity Regulatory Authority (ERA). Given that these electric structures serve a public use/benefit, and because there is currently no provision for exchange or satshab (land substitution) for such plots, adjustment

[6] Towers falling on private land are required by law to be acquired, while the Right of Way, although may fall over private lands, are not acquired, in the sense that it is not provided land substitute or land compensation. This was the past practice. Nevertheless, with the recent introduction of the guidelines on realignment/reconfiguration of a plot boundary 2023, the National Land Commission, which is the sole national custodian of all land related issues in the country, allow realignment/reconfiguration of a private plot boundary if it falls within a utility such as a TL but provided there is adjacent state land. This basically means shifting the boundaries of a private plot to remove the right of way from it and replace the affected land area on the state land. If land is affected, then the alternative of land exchange applies. The local government will coordinate with the AP to identify vacant available government land in the same chiwog, and if not available in the same gewog in other gewog in the same district for exchange.

from vacant state land through plot boundary reconfiguration shall be considered, provided that adjacent vacant state land is available.[7] For this specific type of realignment, applicants are required to submit a supporting letter from BPC that confirms the existence of the electric structure and specifies details concerning the voltage and the minimum setback requirements.

### 2.4.7. National Laws and Regulations on IPs

65. The Constitution of Bhutan 2008, in clause 15 under Article 7, provides that all persons are equal before the law and are entitled to equal and effective protection of the law and shall not be discriminated against on the grounds of race, sex, language, religion, politics, or other status. There is no legislation or regulation related to indigenous peoples. The term 'indigenous peoples' is also not used but the more widely used term is 'socio-cultural groups' to recognize the diversity present among people in Bhutan. There are numerous sociocultural groups among the citizens of Bhutan in the country whose rights are protected by the Constitution and other legislation in force in the country.

The applicability of Indigenous Peoples safeguards under this ESARF will be determined based on characteristics provided in the ADB SPS (2009). As per Appendix 3 of the ADB SPS (2009), for operational purposes, the term Indigenous Peoples is used in a generic sense to refer to a distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees: (i) self-identification as members of a distinct indigenous cultural group and recognition of this identity by others; (ii) collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories; (iii) customary cultural, economic, social, or political institutions that are separate from those of the dominant society and culture; and (iv) a distinct language, often different from the official language of the country or region. In considering these characteristics, national legislation, customary law, and any international conventions to which the country is a party will be considered. A group that has lost collective attachment to geographically distinct habitats or ancestral territories in the project area because of forced severance remains eligible for coverage under this policy. The Indigenous Peoples safeguards are triggered if a project directly or indirectly affects the dignity, human rights, livelihood systems, or culture of Indigenous Peoples or affects the territories or natural or cultural resources that Indigenous Peoples own, use, occupy, or claim as their ancestral domain.

For subprojects under the ESARF, screening and social impact assessment will be conducted to identify the presence of such sociocultural groups/IPs within the project area and to assess potential impacts of project on them including on livelihoods, access to natural resources, and cultural practices. Where applicable, meaningful consultation will be carried out in a culturally appropriate manner, and Indigenous Peoples Plan will be prepared by the borrower including appropriate measures to avoid, minimize, mitigate, or compensate for adverse impacts and to enhance culturally appropriate benefits to IPs. Any subproject causing significant impact and category A for IPs safeguards and requiring a broad community support as per ADB SPS or requiring consent of IPs groups as per national laws, will be excluded from the Project.

### 2.4.8. Labour and Employment Act of Bhutan 2007 and Rules pertaining to worker management and occupational health and safety

66. The Act applies to matters relating to labor and employment in Bhutan. It prohibits 'forced or compulsory' labor and 'worst forms of child' labor. Discrimination against an employee

[7] The guidelines strictly mention this. Therefore, BPC takes into account this beforehand in the planning phase during the feasibility surveys and efforts are made to ensure that there is state land adjacent to a private plot where a tower. However, there are cases where this is not possible. In this case, BPC as a SOE discusses with the National Land Commission through the District Land Registrar's Office to acquire these lands and provide land substitutes from state land.

regarding their wages and working conditions and prohibition against sexual harassment are also prohibited (Chapter-II, Sections 6, 9, 11, 12, 16, 17, 18 & 19). The Act also touches on compensation and benefits of employees (Chapter-VI) and Chapter–IX deals with Occupational Health and Safety.

67. The Rules and Regulations on Occupational Health and Safety and Welfare, 2022 contain legal requirements that must be met by all workplaces within the coverage of the Labor and Employment Act, 2007. It establishes standards to ensure safety, health, and welfare for employees from work-related risks at workplaces. Chapter 3 details the duties of employers, Chapter 4 and 5 describe the workplace health and safety requirements, Chapter 6 covers the workplace environment, Chapter 7 covers machinery and Chapter 13-18 covers fire safety, health, welfare and reporting requirements and compensation. The Schedules provide examples of safety signs and symbols and PPE requirements, permissible exposure levels, safety data sheets, minimum requirements for first aid kits and even specifics on the number of toilets required. A safety officer is required to submit to the manager/employer a monthly report on the duties carried out as the safety officer, which is to be maintained at the workplace for inspection by the Labor Inspector if desired (Section #44-45). Based on the safety report, the employer is required to undertake remedial measures. The employer is also required to report accidents or fatalities to the Chief Labor Administrator and the nearest Police Station of the accident within 5 days of the occurrence (Section #459). The types of injuries that require reporting are detailed in Section 461 of the Regulation. Dangerous occurrences and occupational diseases as specified in Schedule XI and XII of the regulation must also be reported as per the prescribed formats.

68. The Regulation on Occupational Health and Safety for the Construction Industry 2022 must be followed along with the relevant provisions in the Regulation on Occupational Health, Safety and Welfare, 2022 as applicable to construction sites. It prohibits the employment of persons under the age of 18 for any construction activity. A construction company with 12 or more construction workers must prepare a written statement of health and safety policy in accordance with relevant provisions contained in Regulation on Occupational Health, Safety and Welfare, 2012. If there are more than 50 employees, a health and safety committee must be appointed. The regulations also specify measures such as provision of appropriate personal protective equipment, measures for electrical hazards (ensure all electrical appliances and equipment are sound and adequately earthed, and temporary electrical installations at a construction sites have earth leakage circuit breakers), display of suitable warning signs, traffic management, structural stability of temporary structures, adequate illumination, access, material storage, operation of machines, worker accommodation facilities and waste disposal.

69. The provisions of this Act are applicable to this project as contractors with workers will be hired for the subprojects. The installation of the Utility solar could potentially take place on sites close to villages. It is possible that contractors may recruit students who are on vacation to work on sites. The contractors need to ensure that no students under 18 are hired. Further, contractors need to ensure that there is no differentiation in payment of wages to men and women employed at site for the same work taken up by men and women and must adhere to the principle of ‘equal pay for equal work’ irrespective of gender of the workers. The project will monitor the contractors and workers to ensure that all labour conditions are fulfilled by them.

### 2.4.9. The Regulation on Foreign Worker Management 2022

70. The regulation on Foreign Worker Management 2022 requires that prior to recruitment, all employers must obtain the approval from the Chief Labor Administrator (CLA) through the online approval system. The regulation details the eligibility criteria for recruitment, and all workers are required to have a work permit. All foreign workers must have undergone a medical examination before being employed and employers are required to comply with the “Guideline and Handbook on Foreign Workers Management” as well as the Standards for Accommodation as per the Regulation on Occupational Health and Safety for Construction Industry, 2022, the Occupational

Health and Welfare regulations and ensure that workers follow the code of conduct and ethics. This regulation will need to be adhered to by the Contractor while DGPC and BPC will monitor for compliance.

### 2.4.5 Regulation on Occupational Health, Safety, & Welfare 2022

71. The purpose of this Regulation is to establish standards on occupational health, safety and welfare on premises, instruments, equipment, appliances, apparatus, tools, devices, electrical safety and other hazardous conditions. It is to ensure health, safety and welfare for employees as well as other persons at the workplaces from work related risks as provided in Chapter IX of the Labour and Employment Act of Bhutan 2007. Chapter 8 of this regulation concerning electrical safety mandates that all electrical supply lines, switches, conductors, and apparatus must possess adequate ratings for power, insulation, and estimated fault current. Furthermore, they must be constructed, installed, protected, operated, and maintained in a manner that guarantees the safety of all employees. Additionally, it stipulates that overhead electrical conductors must maintain a minimum clearance above ground level at all times, as per the safety code issued by the Bhutan Electricity Authority.

### 2.4.6. Safety Code (Amendment) 2021

72. The Safety Code (Amendment) 2021 updates the minimum electrical safety requirements for the Bhutan Electricity Authority. This Code establishes a framework to strengthen the institutional capacity for electrical safety by Licensees and to better mainstream safety strategies into their operational procedures

73. The purpose of this Code is to provide for: (i) the establishment and strengthening of licensee-specific Safety Rules; (ii) the implementation of a Safety Management System (SMS); (iii) an integrated and coordinated safety process focusing on formal Work Permits and Test Permits; and (iv) matters incidental thereto.

74. The Code describes the composition and function of the SMS, including the mandatory designation of a Safety Officer, and prioritizes formal processes for training, compliance monitoring, and disciplining for "Serious Breaches".

75. Through this Code, licensees are required to develop safety procedures that include formal isolation and earthing protocols, requiring equipment to be locked and tagged before work commences. The safety process is expected to include special precautions for high-risk work on power cables, transformers, and current transformers. All design, construction, and work must adhere to specified technical standards, including Minimum Approach Distances, overhead conductor clearances and underground cable burial depths.

### 2.4.7. Disaster Management Act 2013

76. The Disaster Management Act, 2013 repeals the 2006 National Disaster Risk Management Framework. This Act establishes a new framework to strengthen the institutional capacity for disaster management of the country and to better mainstream disaster risk reduction strategies at relevant institutions. The purpose of this Act is to provide for: (i) the establishment and strengthening of institutional capacity for disaster management; (ii) mainstreaming of disaster risk reduction; (iii) an integrated and coordinated disaster management focusing on community participation; and (iv) matters incidental thereto. The Act describes the composition, function, and powers of the different authorities, including in relation to the private sector, and prioritizes mainstreaming disaster risk reduction into development plans, policies, programs and projects as well as ensuring agencies receive adequate budgets. Through this Act, Dzongkhag Disaster Management Planning Guidelines were issued to guide the Dzongkhags, through the Dzongkhag Disaster Management Committees, to plan, develop and implement their respective Dzongkhag

Contingency Plan. The planning process is expected to include hazard mapping to identify the most hazard-prone areas of the Dzongkhag so that future developments, interventions, and risk mitigation measures can be planned accordingly. All development projects need to be screened and disaster proofed.

### 2.4.10 Prior National Approvals and Clearance

77. The following national approvals and clearances will be required:

i. Environmental Clearance from the Department of Environment and Climate Change
ii. Forestry clearance from Department of Forest and Park Services,
iii. Clearance from the community, gewog for use of water resources, access roads, gewog roads, power evacuation and construction power depending on the site selection.8
iv. Clearance from BPC to tap construction power
v. Clearance from DOST in case access roads need to take off from an existing highway or Dzongkhag Road
vi. Clearance from the Department of Culture and Dzongkhag Development in case there are religious and cultural sites in the vicinity (30 m) of the project.
vii. Clearance from Community Forest Management Groups if the project falls within Community Forests

Clearance in written form after the public consultation from the project affected persons.[9]At the end of community consultation, all APs sign the "community clearance" document indicating their "no objection" to the project. That document is co-signed by the local administration. Gewog also issues an administrative order that the project may proceed.

## 2.5 International Agreements

78. Bhutan is not a signatory to all Multilateral Environmental Agreements r and the core labor standards of the International Labor Organization. The applicability of relevant international conventions/agreements is described in Table 9.

8 The communities who live near where the development is taking place assemble for consultations summoned by the local government. The agenda for the consultations typically involve the proponent informing people of the proposed development and the process which will be followed for the impending studies, potential impacts and means of mitigating impacts. Following this, questions are invited by the public and discussion takes place. At the end of the meeting, the community members sign the clearance prepared by the proponent, which is also cosigned by the local government officials who attend. The process is similar for the project affected persons in that PAPs attend consultations organized by the proponent during which the impacts are discussed as well as any information on any compensations to be paid (for affected land, assets or trees) or process for land exchange following which they sign the minutes and decisions reached during the consultations.

9 For subproject 1, no groups defined as Indigenous Peoples are identified no consent from IP is required. However, clearances from the community are a mandatory requirement as part of the IEE and EIA process and must be obtained from all project-affected persons and the entire community. Public consultations are conducted at the end of which the clearance of the community is elicited. If the affected persons or community does not provide clearance, the project can be stalled. This is rare however as the local government and project proponents consult with people the benefits of the project to them or the nation. At the end of community consultation, all APs sign the "community clearance" document indicating they have no objection to the project, and they support the project. That document is co-signed by the local administration. Gewog also issues an administrative order that the project may proceed.

**Table 10. Applicability of International agreements ratified by Bhutan**

| # | International convention | Date of ratification or accession | Applicability to the project |
|---|---|---|---|
| 1 | Convention on Biological Diversity (1992) | August 1995 | Applicable as the TL will have a direct impact on habitats and biodiversity. |
| 2 | Convention on International Trade in Endangered Species of Wild Fauna and Flora (Washington 1973) – also known as CITES | August 2002 | Not applicable as there will be no extraction, sale, import or export of fauna and flora |
| 3 | The Nagoya Protocol | September 2013 | |
| 4 | International Plant Protection Convention (IPPC) | June 1994 | Species that may be invasive should be assessed, monitored and managed, if necessary, according to IPPC provisions |
| 5 | Convention Concerning the Protection of the World Cultural and Natural Heritage (Paris 1972) | October 2001 | Proximity to heritage sites and maintenance of a minimum distance (50-100m) from heritage and cultural sites will be followed. As required under national processes, the clearance from the Department of Culture and Dzongkhag Development will be secured for sites of national significance and community clearance for sites of community significance |
| 6 | Convention on Safeguarding of the Intangible Cultural Heritage | October 2005 | |
| 7 | Vienna Convention for the Protection of the Ozone Layer | August 2004 | By promoting renewable energy, the project contributes to reduction in GHG emissions and protection of the ozone layer and mitigation of climate change |
| 8 | UN Framework Convention on Climate Change | August 1995 | |
| 9 | Kyoto Protocol to the United Nations Framework Convention on Climate Change | August 2002 | |
| 10 | Montreal Protocol on Substances that Deplete the Ozone Layer | April 2004 | |
| 11 | Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal | August 2002 | The export of hazardous waste is subject to the prior written consent of the country of import and is applicable to the project |
| 12 | United Nations Convention to Combat Desertification | August 2003 | The implementation of renewable energy is supported. Compensatory afforestation to mitigate forest clearance will be applied. |
| 13 | The Cartagena Protocol on Biosafety to the UN Convention on Biological Diversity | September 2002 | Not relevant to the project |

## 2.6 Institutional Capacity

79. DGPC and BPC as the implementing agencies will be responsible for the design, planning, and for implementing the provisions of the ESARF, RP, IEEs, EIAs (including EMPs) during pre-construction, construction, operation and decommissioning phases.

## 2.7 Institutional Capacity of DGPC

80. DGPC comprises four Departments (Finance and Investment; Projects and Contract; Operation and Maintenance; Corporate Services). The Projects and Contract Department is responsible for the feasibility study, procurement process, and implementation of the solar PV projects. Within the department, the Contract Section handles the procurement process, while the Alternate Renewable Energy Unit is responsible for carrying out the feasibility study. The Environment Unit prepares the IEE or EIA reports, and Solar Project Division oversees the implementation of all DGPC-owned solar PV projects.

81. The DGPC Environment Unit has a small team of 7 nationally qualified environment officers (Masters and Degree level) who have a good understanding of national requirements but are less familiar with ADB's environmental and social safeguard requirements especially during the implementation of the project. While most of the staff have undergone basic ADB SPS and World Bank ESS training, and a few have experience preparing RPs, Indigenous peoples safeguards and IPPs, IEE/EIA reports in line with ADB and EIB requirements, they lack experience in applying these standards during construction. Also, DGPC has several projects - both ongoing and in the pipeline - requiring the environmental staff to handle safeguards on multiple projects. The environmental officers will also need to take on the additional responsibilities of health and safety, social safeguards and gender, which are topics they are less familiar with, being environmentally qualified. Therefore, additional assistance in the form of PIAC consultants are proposed to support DGPC for environment and social safeguards and provide guidance to ensure compliance with the safeguard requirements throughout the project coordination.

**Table 11 Institutional Capacity of DGPC**

| No. | Description | Number of Employees |
|---|---|---|
| 1 | Human Resource Capacity (Environment Officers) | 7 |
| 1.1 | Environment Officers (with almost 9 years' experience) | 1 |
| 1.2 | Assistant Environment Officers (with less than 3 years of exp.) | 6 |
| 2 | Educational Qualifications | |
| 2.1 | Masters in relevant fields | 1 |
| 2.2 | Bachelor's degree in relevant fields | 6 |
| 3 | Experience with International Investors and ESS Requirements | |
| 3.1 | | **Feasibility study completed:** |

| | | |
|---|---|---|
| | Feasibility study including EIA of Hydropower projects using international standards in last 5 years | 1 HPP (World Bank)<br>2 HPPs (JICA)<br>1 HPP (OPEC Fund) |
| | | **Feasibility study ongoing:**<br>2 HPPs (ADB)<br>1 HPP (OPEC Fund) |
| 3.2 | Feasibility study including IEE/DDR of solar PV projects using international standards in last 3 years | **Feasibility study completed:**<br>1 RTS (ADB)<br>1 utility-scale (EIB |
| | | **Feasibility study ongoing:**<br>1 RTS (ADB)<br>1 utility-scale (ADB)- Wobthang Solar PV Project |
| 3.3 | Basic training attended on ADB safeguard policy statement 2009 | 6 |
| 3.4 | Basic training attended on World Bank Environmental and Social Standards | 7 |

## 2.8 Institutional Capacity of BPC

82. The Environment, GIS, and Survey Section (EG&SS) of BPC has 11 environment officers with national-level qualifications (Degree and Diploma), who are familiar with national environmental regulations and have some exposure to ADB'S safeguard requirements. The section manages environmental and safeguards compliance for multiple projects.

Health and safety responsibilities are assigned to the Corporate Strategy Division, while gender-related safeguards are handled by a separate gender team. Since EG&SS staff are primarily trained in environmental aspects, further capacity development may be needed to strengthen their alignment with ADB's involuntary resettlement and indigenous peoples safeguards, and broader social safeguard policies and improve cross-functional coordination.

83. EG&SS seven environment officers with national-level qualifications (Degree and Diploma), who are familiar with national environmental regulations and have some exposure to ADB'S safeguard requirements. The section manages environmental and social safeguards compliance for multiple projects. The environmental officers take on the additional responsibilities of social safeguards, which is an area they are less familiar with. Health and safety responsibilities are assigned to the Corporate Strategy Division, while gender-related safeguards are handled by a separate gender team.

**Table 12: BPC Staff**

| No. | Description | Employees |
|---|---|---|

| | | |
|---|---|---|
| 1 | Human Resource Capacity (Environment Officers) | 7 |
| 1.1 | Environment Officers (Seniors with experience 10 years + exp) | 2 |
| 1.2 | Assistant Environment Officers (Juniors with less than 3 years of exp.) | 5 |
| 2 | Educational Qualifications | |
| 2.1 | Masters in relevant fields | 0 |
| 2.2 | Bachelor's degree in relevant fields | 7 |
| 3 | Experience with International Investors and ESS Requirements | 6 |
| 3.1 | IFC, ADB, JICA, GoI | 3 |
| 3.2 | Basic trainings attended on International ESS Standards requirements | 3 |
| 4 | Other Staff under Environment, GIS and Survey Section (EGSS) | 5 |
| 4.1 | Survey Engineers (Diploma) | 4 |
| 4.2 | GIS Officer (Diploma) | 1 |
| | Total Employees | 12 |

84. Physical displacement. DGPC and BPC design all the subprojects that there will be no displacement in TL projects. There will be no physical displacement associated with the solar project. All the sub projects are identified on government-owned land. TL project and Solar farms will not be undertaken if there is physical displacement- especially as all future subprojects are already known to DGPC. For TL, one of the key criteria for BPC is to avoid physical displacement.

# 3 Project Selection Criteria

85. Potential environmental and social impacts and risks will arise from pre-construction to decommissioning phases and will result from both the location of the subprojects as well as the nature and scale of the project. To avoid and minimize environmental, involuntary resettlement, IPs and livelihood, and social impacts in the first instance the following selection /exclusions criteria will be applied to all subprojects and components for them to be eligible for inclusion in the project.

## 3.5.1 General Criteria

86. General Criteria for the Project are as follows:

- Subproject scope will only be for the preparation, design, installation, operation, and maintenance of utility solar photovoltaic (PV) systems and its transmission lines, access roads, and all auxiliary works.

- Subproject land will be leased from the Royal Government by DGPC for which a Land User Certificate will be processed for by DGPC and issued by the National Land Commission. No land will be leased for the transmission line components as the land will continue to remain as SRF.
- Apply the mitigation hierarchy to all subprojects. Avoid, and where avoidance is not possible, minimize, mitigate, and/or offset adverse impacts and enhance positive impacts by means of environmental planning and management.
- Conduct an environmental assessment for each proposed subproject to identify potential direct, indirect, cumulative, and induced impacts and risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), involuntary resettlement, IPs impact, and physical cultural resources in the context of the project's area of influence.
- Development IEEs, EIAs, RPs (or applicable social safeguards documents as social due diligence report) and EMPs as per ADB's Safeguard Policy Statement 2009, national legislation, and requirements set forth in the ESARF to be prepared and submitted by BPC and/or DGPC and cleared for disclosure by ADB prior to approval.
- ADBs Safeguard Policy Statement (2009) applies to all ADB-financed and/or ADB-administered sovereign and non-sovereign projects, and their components regardless of the source of financing
- Subprojects will comply with all national environment, health, and safety (labor) laws and regulations, obtaining environmental clearance (EC) before approval where it is required.
- Subprojects must not involve activities listed in ADB`s prohibited investment activities list given in Appendix 5 of Safeguard Policy Statement 2009 (see Appendix 2).
- Site selection for solar sites will be based on criteria such as state-owned land, gentle slope, minimal existing infrastructure, accessibility and south-facing orientation to minimize environmental and social impacts, such as avoidance of cultural sites, while maximising solar power generation.
- Route selection for associated transmission lines and access roads shall consider the following factors:
  i. Avoiding and Minimization of impact on private lands, IPs, people and community livelihood sources and assets.
  ii. Avoiding water resources or maintaining required clearance from water resources (30 meters).
  iii. Avoiding cultural/historical sites or maintaining the required clearance (30 m)
  iv. Aligning closer to existing roads for accessibility, using existing access roads as possible.
  v. Maximizing the use of the transmission line corridor for construction of access roads.
  vi. Avoid multiple access routes to one tower location
  vii. Prioritize identifying the most economical, environmentally and socially less impact route.
  viii. The Right of Way shall be maintained as per the technical specifications for each voltage level prescribed under relevant rules and regulations of Bhutan.

### 3.1.2 Environment Safeguards Criteria

87. To avoid adverse environmental impacts the following environment screening criteria will be used for all future sub-projects:

i. Compliance with ADB SPS Policy, National Laws, rules and regulations
ii. DGPC/BPC and contractors to comply with ADB's Safeguard Policy Statement 2009, the general IFC EHS Guidelines, the ESARF for the project, and all national laws and regulations for environment, health and safety (labor).

iii. DGPC/BPC and contractors to obtain all the necessary environment, health and safety (labor) approvals, clearances, and permits from the relevant authorities with contractors to share copies of those they are responsible for obtaining prior to starting works.
iv. DGPC /BPC will ensure that and contractors to ensure an IEE will be prepared for subprojects that are Category B and an EIA for all subprojects that are Category A. ll subproject sites will meet category B for environment as per ADB's Safeguard Policy Statement 2009 i.e., An IEE must be prepared for each site and approved by ADB prior to the procurement process and construction
v. DGPC/BPC and contractors to comply with the ESARF eligibility criteria and contractors will be required to immediately report any unanticipated impacts to DGPC/BPC for further instructions
vi. No subprojects will be located in or encroach upon the core zone of a legally protected area. For all sites within government reserve approval has to be sought from the DoFPS.
vii. No subprojects will be located in or encroach upon a key biodiversity area, important bird area, Ramsar site, or a protected wetland habitat.
viii. Design and selection of subprojects will input from meaningful consultations.
ix. Follow criteria such as the state-owned land, a gentle slope, and a south-facing orientation to minimize environmental and social impacts while maximizing solar power generation.
x. No subproject components in areas supporting ADB defined natural habitat are to be installed unless a site-specific natural habitat assessment has demonstrated that ADB's Safeguard Policy Statement (2009) natural habitat requirements can be complied with.
xi. No subproject components in areas supporting ADB defined critical habitat are to be installed unless a site-specific critical habitat assessment has demonstrated that ADB's Safeguard Policy Statement (2009) critical habitat requirements can be complied with. If the project is likely to affect areas of high biodiversity value, including critical habitats for Critically Endangered (CR) and Endangered (EN) species, or other areas of significant importance to restricted-range or endemic species, then a critical habitat assessment must be undertaken to manage risks and avoid, mitigate, and offset impacts to these areas, as required by PS6, according to the International Finance Corporation (IFC). The project in Critical Habitat must demonstrate no measurable negative effects or likelihood thereof on the high biodiversity value or the capacity to operate. It must also not reduce the population of any identified endangered or critically endangered species or lessen the available habitat's size such that its survival prospects may be diminished
xii. No subproject components within 50m of, involving significant damage to or requiring the removal of local physical cultural resources from their current location are to be installed.
xiii. All project related infrastructure on Solar including solar panels, buildings, laydown areas, construction worker facilities.
xiv. Project components will be located at a minimum distance of 30m from rivers, except river crossings.
xv. No subprojects near an airport that result in glint and glare causing a hazard on the flight path for pilots landing or taking off or ATC vision, which will be determined in close consultation with the Department of Air Transport during glint and glare assessment including recommendations to use anti-glare solar PV as appropriate, will be supported. Where transmission lines or towers must cross or pass near airport flight paths, BPC will ensure full compliance with aviation safety standards by obtaining necessary clearance from the Department of Air Transport during project planning.
xvi. Subproject PV panels must use an anti-reflective coating and contain no heavy metals e.g. cadmium, lead or selenium.

### 3.1.1 Social Safeguards Site Selection and Exclusion Criteria

68. To avoid and minimize involuntary resettlement and IPS impacts, the following social safeguard screening criteria will be used for all sub-projects:

i. Solar PV systems will be installed only on vacant government owned land, free from encroachers/informal users, with a lease agreement secured by DGPC.
ii. If there are privately constructed structures (like houses, water tanks, sheds, trees, crops etc.) on the site, the structures/assets will be estimated using the latest PAVA rates and the current BSR for compensation to the owner, meeting full replacement cost principle of ADB SPS.
iii. These criteria will apply for any access roads impacts needed to reach the project sites during construction and operations or other required components.
iv. The subprojects/sites that may acquire the community lands, such as cattle grazing land and/or other ecosystem and livelihood resources without possibility of providing such suitable alternative resources for affected communities.
v. Project/site that may cause significant resettlement impact and trigger Category A for IR as per ADB SPS and Operational Manual on Safeguards Policy Statement (OM Section F1/BP Issued on 1 October 2013) will be excluded from Project scope.
vi. Project/site that may cause adverse impact on IPs and trigger Category A for IPs as per ADB SPS and Operational Manual on Safeguards Policy Statement (OM Section F1/BP Issued on 1 October 2013 will be excluded from project scope.
vii. The Project/subprojects (components) will not result in any of the three circumstances under which Broad Community Support (BCS) as per ADB SPS is required, or consent of tribal community would be required under the national requirements; such subprojects/sites will be excluded from the Project.
viii. Solar PV systems will be installed only on vacant land, free from encroachers/informal users, with a lease agreement secured by DGPC.
ix. If there are privately constructed structures (like water tanks, sheds, houses, business, etc.), livelihood or other assets on the site, the structures all losses will be estimated and compensated using the latest PAVA rates and the current BSR, however adjusted to meet the full replacement cost according to ADB SPS for compensation to the structures/assets owner regardless if the structure owner has or no legal title to occupied land.
x. Projects/ sites causing involuntary land acquisition of private land and/or impact, and unavoidable impact on natural community livelihood resources will be excluded from project scope, if not possible to replace by such suitable and alternative resource.
xi. Projects/sites causing physical displacement will be excluded from the Project scope. Physical displacement. DGPC and BPC design all the subprojects that there will be no displacement in TL projects. There will be no physical displacement associated with the solar project. All the sub projects are identified on government-owned land. TL project and Solar farms will not be undertaken if there is physical displacement. For TL, one of the key criteria for BPC is to avoid physical displacement.
xii. Project/sites that causes land acquisition of IPs community's customary lands, physical cultural heritage or practice, physical relocation, or other adverse impact on IPs including (i) involuntary land acquisition including from IPs, (ii) impact on ancestral domain of IPs and their communal and livelihood resources, (ii) physical displacement of IPs, (iv) loss of livelihood on IPs that may be linked to the land to be used for the Project and land being used by IPs/tribal group that could be defined as IPs by SPS, will be excluded from project scope.
xiii. Projects/sites that will involve involuntary land acquisition from private owners, including communal lands, or will restrict their existing land use or access to legally designated parks and protected areas will be excluded from project scope if mitigations and such suitable, equivalent alternative resource for community cannot be provided.
xiv. Project/site on government land where having encumbrances such as presence of informal settlers and people's livelihood depends mainly on the land will be excluded from project scope.

Project/site to be purchased from affected person who will be at risk of becoming landless will be excluded from project scope.Project/site having legacy issues, present or past resettlement

issues, where there are on-titled landholders or disputes or unresolved land claims will be excluded from project scope.

i. Project/site with unresolved environment or social issues will be excluded from project scope.
ii. Solar PV systems will be installed only on vacant state-owned land, free from encroachers/informal users, with a lease agreement secured by DGPC.
iii. Proposed location shall not involve land acquisition, resettlement of local people, relocation of existing dwellings, nor affect the livelihood systems and culture of Indigenous Peoples as well as the territories or cultural resources they own.

72. For all subprojects, DGPC and BPC will promote and arrange employing the project affected persons for skilled and non-skilled project management and construction works, and ensure that the contractor provides equal opportunities for all, irrespective of gender, social status, and addresses potential labor risks like underage hiring, and conflicts, and discrimination.

73. Both DGPC and BPC will incorporate relevant provisions in the contractor contract. Contractor shall comply with all applicable social and labor standards under Bhutanese legislation and the Asian Development Bank's Safeguard Policy Statement (2009), including the strict prohibition of child labor and forced labor. The Contractor is responsible for restoring any temporarily affected land at least their pre-project condition upon completion of construction activities, at no cost to the affected persons. A dedicated staff member shall be assigned to manage grievance registration, documentation, and resolution at the contractor level, while also serving as a member of the project-level Grievance Redress Committee and acting as a liaison for project with local communities to ensure timely and effective communication.

74. For all sites located near communities or public roads, the Contractor shall provide adequate advance notice to the public regarding the schedule, duration, and nature of planned construction works. All activities must be carried out in full compliance with occupational and community health and safety requirements, and safety measures and protocols to protect workers and the public. Construction works, including access, material storage, and movement of machinery, shall be strictly confined to the predefined project boundaries, rights-of-way, and corridors of impact, unless prior approval is obtained. If the Contractor undertakes any activities outside the approved project impact area boundaries without such approval, the Contractor shall be fully responsible for compensating any resulting damage to land, livelihoods, or structures.

75. The Contractor will give preference to employing project-affected households, including women and individuals identified as vulnerable or disadvantaged (as per the list to be provided by the Employer) for both skilled and unskilled construction works, based on their available skills and interests.

## 3.2 Anticipated Environmental Impacts

76. As noted in Section 1, the sector investment program involves developing solar generation and associated transmission lines. Most potential negative impacts are anticipated to occur during the construction phase of any given project. In brief, construction methods for distribution lines rehabilitation will involve clearing the RoW, building tower footings, erecting new poles/towers using cranes, manual labour, and stringing of conductors using pulleys with mobile winches. During operation risks to avian species by collision with electrified transmission wires is a key concern.

77. Solar generation sites are likely to require land clearance, removal of vegetation, changes to surface drainage and geology, short term generation of dust and noise, and e-waste generation.

78. Anticipated risks and impacts associated with proposed current and future projects are discussed in Table 14 and Table 15 below. Although not included in the tables below, it is critical to note that project assessments must include **measurable indicators, implementation schedule, costs, and responsibilities** as per SPS Appendix 1.

| Table 13 Anticipated Impacts from Solar Generation (DGPC) | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| **Pre- Construction Phase** | | | |
| Feasibility Design and siting | Encroachment into ecologically sensitive areas | • During IEE or EIA preparation (based on subproject screening and categorization) determine the exact location of project site and any related facilities such as transmission lines and access roads<br>• During assessments ecologists are to conduct baseline biodiversity surveys to map the habitats beneath the project footprint, reconfirming no core areas, buffer zones, KBA or IBA, Ramsar, protected wetlands, are included, and list species encountered.<br>• Presence or absence of sensitive ecological receptors and critical habitat species must be confirmed in IEE<br>• Using desktop studies, determine whether the project area qualifies as a Critical Habitat as per IFC PSC guidelines. As necessary, conduct a Critical Habitat Assessment and include recommendations from the CHA into the assessment | PMU |
| Project Design and layout | Impacts on watercourse and ponds and stress on use of community resources | • Ensure design incorporates a minimum distance of 30m from rivers.<br>• Solar photovoltaic panels must also be designed to ensure minimum blocking or destroying or diverting natural drainage patterns [4]<br>• Detailed water volume estimation and the location of the water tank (reservoir) must be carried out during the final design of the project layout.<br>• Seek approval for sourcing water for construction and domestic purpose from local authorities/community as required.<br>• Provision to store water in case of shortage with water storage tanks or a water tanker | PMU |
| | Stress on use of community resources | • During the design phase, assess the condition and capacity of healthcare centres t<br>• The Contractor will be required to prepare a health and safety management plan that will be based on the assessment | PMU |
| Project Design and layout | Change in landform and slope | • minimized to reduce changes in topography with reuse of excavated spoil through landscaping within the allocated land plots<br>• Detailed designs must keep new impermeable surfaces to a minimum with proper drainage<br>• Provision of drains including along the site boundary and as per the topography to be provided to ensure that engineered structures are protected from waterlogging, flash rains and water flows.<br>• During the design phase, explore specialized engineering solutions to accommodate uneven topography.<br>• Whilst it is necessary to avoid shading of the solar PV panels the need for cut and fill will be also | PMU |

| Table 13 Anticipated Impacts from Solar Generation (DGPC) | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Project Design and layout | Disaster and Natural Hazard Risk | • All structures are to be designed as per seismological requirements and specifications which are to be provided in the bid documents<br>• Temporary work designs will also reflect seismological requirements (e.g., additional control measures for scaffolding to resist movement from high wind speeds, the use of chin straps when wearing head protection<br>• Incorporation of siting and safety engineering criteria to prevent failures due to natural risks posed by earthquakes, cyclone, cloud burst, flooding, landslides, and fire. To this end, all project structures should be designed in accordance with engineering and design criteria mandated by site-specific risks, including but not limited to seismic activity, slope stability, wind loading, and other dynamic loads<br>• Application of locally regulated or internationally recognized building codes to ensure structures are designed and constructed in accordance with sound architectural and engineering practice, including aspects of fire prevention and response<br>• Engineers and architects responsible for designing and constructing facilities, building, plants, and other structures should certify the applicability and appropriateness of the structural criteria employed.<br>• Prepare Emergency Preparedness and Response Plan<br>• Prepare a Construction Emergency Preparedness and Response Plan | PMU |
| Project Design and layout | Impact on private and community land and structures or on grazing land | • Fulfil safeguard requirements namely the assessment and preparation of DDR and RAP.<br>• This process will involve carrying out a socio-economic survey of a sample of community members and if there are Affected Persons, a census of all affected households<br>• Consult with all stakeholders in/near the communities with groups of people such as women, youth, elderly as well as specific consultations with APs.<br>• Seek alternatives in case the site is being used as grazing land<br>• Preparate of reports such has Due Diligence Report (DDR), Social Impact Assessment and Resettlement Action Plan (RAP)<br>• Disclose the due diligence documents in DGPC and ADB websites and also issue executive summaries of the document at gewog administration and work sites.<br>• Undertaken compensation and restoration activities. All compensation must be paid prior to the construction. survey road conditions where necessary. Surveys will be documented in a pre-project condition report, which will serve as a baseline in case any damage to property occurs.<br>• If damage to existing roads is anticipated, consider upgrades in advance of works and budget accordingly | PMU |

**Table 13 Anticipated Impacts from Solar Generation (DGPC)**

| Phase / Parameters | Impact | Mitigation Measures | Responsibility |
|---|---|---|---|
| Securing of consents | Risk of non-compliance with regulatory requirements | • Comply with all applicable government environment, health and safety (EHS) regulatory requirements, conditions of applicable national environmental and other clearances/permits, ADB's SPS 2009, and the IFC EHS General/Electric Power T&D Guidelines and the EHS Code of Practice (ECoP).<br>• If a change in project scope or design occurs during project implementation, or if unanticipated impacts are identified at any point during project implementation, the implementing leads to inform ADB and if required update the IEE for clearance and disclosure by ADB<br>• Obtain all necessary approvals and permits prior to subproject approval and issue of bidding documents including:<br>i. Environmental clearance for the National IEE from DECC and Comply with all the Terms and Conditions of the National Environmental Clearance and ensure contractor's compliance<br>ii. Forestry clearance from DoFPS and comply with the conditions of the forestry clearance<br>iii. Land Use Certificate (LUC) from National Land Commission as required.<br>iv. Clearances from the Local Government<br>v. Clearance from the local communities living proximate to the site<br>vi. Clearance for water abstraction | PMU |
| Subproject consultation, disclosure and grievances | Compliance with ADB's requirements as per the SPS | • Undertake meaningful consultation with affected persons and other stakeholders including discussions with facility operators and gewogs as well as public meetings to seek their views and inform assessment documents<br>• Disclose documents on the DGPC website with the summary in Dzongkha and make hard copies available at the site level<br>• Disclose the RAP (to be prepared in the event that properties need to be acquired or if project site is used by communities for grazing and other uses) on DGPC website with summary in Dzongkha and hard copies made available at site level<br>• Disclose the GRM process with contact details on the DGPC website and at the site level and ensure details of GRM process with contact details of nominated members are conveyed to affected persons and other stakeholders<br>• Follow the GRM process to address project related grievances within the stipulated timeframe<br>• Include provisions in the contract to ensure that the Contractor will not engage in any activities described on the ADB Prohibited Investment Activities List in Appendix 5 of ADB's SPS (2009)<br>• any changes to subproject locations or layouts will require consultation with ADB and if required update documents | PMU |

| Table 13 Anticipated Impacts from Solar Generation (DGPC) | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Project staffing for EHS aspects | EHS impacts and risk in general, Safeguard Staffing and Capacity Development | • Appoint a suitably qualified and experienced, named E&S Officer(s) for each project site.<br>• PIAC will appoint dedicated safeguard specialists based on the assessment carried out during the EIA and IEE preparation process, including at a minimum qualified and experienced Ecologists and EHS experts<br>• Contractors must appoint full-time suitably qualified and experienced dedicated national staff including an EHS Officer supported by EHS supervisors (at least one for 50 persons), a Community Liaison/GRM and Labor Officer (National) and an Ecologist.<br>• Once the Contractor is selected, the PIU will arrange to conduct awareness training for contractors on their responsibilities in EMP implementation, in compliance with ADB and RGOB requirements, self-monitoring and reporting procedures<br>• EPC must comply with the EMP and any updates following national environment clearance, detailed designs, or in response to any unanticipated impacts forms an integral and binding part of the bidding and contract documents including appropriate incentives and/or penalties for (non-compliance) related to contractor' EHS management, they will be responsible for implementing and budgeting all the mitigation measures required (the definitive IEE & EMP disclosed on ADB's website)<br>• EPC will develop a competency and training program which defines EHS training needs per position and corresponding monitoring program. EPC must conduct training and induction for their staff and workers (e.g., Daily Tool box Training - HIV/AIDS awareness trainings, first aid, regular GVBH, code of conduct and culturally acceptable practices, biodiversity conservation awareness, prohibition on firewood and NTFPs collection by workers, prohibition on fishing, hunting, or poaching by workers; chance find procedures; H&S including use of PPE etc). Records of all training activities are to be retained<br>• EPC Contractor preferably will have corporate EHS policies and corporate EHS safety management system certifications, such as ISO 14001 for environment, ISO 45001 for health and safety or equivalents.<br>• EPC Contractor will prepare the Contractor Environment Management Plan (CEMP) and ensure the approved CEMP is implemented in the process of carrying out the activities under the contract.<br>• EPC Contractor will comply with any corrective action plan required and cover the costs where corrective action is required due to non-compliance on behalf of the contractor, its subcontractor or third parties. | PMU, PIU and Contractor |

| Table 13 Anticipated Impacts from Solar Generation (DGPC) | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Procurement | Lack of awareness and compliance on safeguard measures resulting in impact | • Conduct pre bid meetings with contractors to inform them of ADB safeguard requirements and national regulations, compliance, staffing and budgeting requirements for safeguard implementation.<br>• Include safeguard measures (environmental and social) into bid documents with the required budget for implementation including OHS requirements. | PMU, PIU |
| | Power Line Reconductoring/ Associated Facility Requirements | • Ensure all associated facilities of the project comply with national laws and regulations and ADB SPS (2009) requirements by establishing an institutional arrangement to ensure BPC (and their contractor) comply with the requirements of this EMP.<br>• obtain any national environmental and other clearances for power evacuation/transmission line<br>• ensure reconductored power lines remain compliant with national electrical H&S requirements maintaining vertical and horizontal safety clearances to adjacent properties, other utilities, and roads are maintained to minimize health and safety risk.<br>• EIA prepared by BPC shall provide mitigation measures for such risks. The PMC shall update this IEE when the EIA report is finalized. | PMU, PIU |
| | Associated Facility Requirements- Road Construction | • The impact of new roads will be assessed as part of the EIA /IEE preparation and mitigation measures identified based on the assessment. Access roads will need to be developed based on the Road Classification and Network Information of Bhutan, 2020, DoR, MoWHS.<br>• Detail road design will identify gradient management needed at certain points to ensure safe and efficient transportation.<br>• Edge and cross-drainage will be provided with check dams on steeper gradients and with culvert inverts to allow a natural bed to form<br>• Design proper engineering solutions to enhance road usability and safety.[9] | PMU, PIU |

| Table 13 Anticipated Impacts from Solar Generation (DGPC) | | | |
|---|---|---|---|
| **Construction Phase** | | | |
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Worker Recruitment and Labor management | Workers may not be provided decent accommodation, drinking water or facilities | • Design worker camps based on ILO[1] or EBRD/IFC, and national standards (Temporary Living Accommodation Standards in the Bhutan Schedule of Rates 2024) to ensure adequate habitable spaces, sanitation facilities, waste management, fire protection and control and other welfare requirements.<br>• Worker and labor accommodation must be gender friendly and constructed where workers are protected against the elements (such as wind, cold, rain, heat, etc.). One room for every 4-6 employees with adequate headroom and movement space.<br>• Contractors will prepare a Worker Accommodation Plan<br>• | Worker Recruitment and Labor management |
| Worker Recruitment and Labor management | Lack of opportunities for local communities | • Promote local employment generation for unemployed youth for unskilled positions including manual labor during the construction period and for cleaning of solar panels etc. | Worker Recruitment and Labor management |
| Planning for on-site EHS management and preparation | Workers Occupational Health and Safety - Risk of illness and accidents at the workplace | • Promote adherence to core labor laws and standards by including specific provisions requiring contractors to (a) prohibit child labor as defined in national legislation for construction and maintenance activities; (b) ensure equal pay for equal work of equal value regardless of gender, ethnicity, or caste; and (c) eliminate forced labor; and disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and laborers.<br>• Contractor will develop a Construction Environmental Management Plan (CEMP) and Construction H&S Management Plan (CHSMP) reflecting the EMP requirements including the ECoP and international engineering best practice/good EHS practices and submit to DGPC/BPC for approval prior to any works commencing on site.<br>• CEMP is a live document, to be updated as necessary<br>• Contractor to undertake a H&S risk assessment through a facilitated workshop to be attended by DGP/CBPC/PMU and PIAC during the detailed design so that it can inform both the detailed design and pre-construction preparations. H&S risk assessment to consider both occupational and community H&S risks resulting from all subsequent stages of the project | Contractor |

| Table 13 Anticipated Impacts from Solar Generation (DGPC) | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| | Community awareness on project activities and GRM | • Ensure meaningful consultations and information disclosure in relation to community disruption, project risks and impacts, construction activities, electrical safety, workers code of practice etc.<br>• The project will institutionalize the Grievance Redress Mechanism and disseminate information about the GRM to both the local community as well as communities along the access route to the site.<br>• Provide a hard copy of the EIA/IEE summaries and the GRM will be available at the site offices<br>• EA contractors shall meet with communities before construction commences to present the work program, Grievance Redress Mechanism and approaches to manage community health and safety and Sexual Exploitation, Abuse, and Harassment (SEAH)/ Gender-Based Violence (GBV) risks<br>• Contractors shall nominate a GRM focal to receive grievances from both the community and workers. Any grievance received by the contractors by any route is to be immediately reported to DGPC with the action taken to address it if already quickly resolved by them.<br>• GRM will be available to all workers to address unfair treatment or unsafe living or working conditions, ensuring no coercion nor reprisal.<br>• Construction workers will be given access to register any grievances with the contractor or direct access to the DGPC, or GRM Focal. | PMU, PIU |
| Planning for on-site EHS management and preparation | Workers Occupational Health and Safety - Risk of illness and accidents at the workplace | • OHS Training<br>• Provisions to be made to provide OHS orientation training to all new workers to ensure they are apprised of the basic site rules of work at / on the site and of personal protection and preventing injury to fellow workers.<br>• Training should consist of basic hazard awareness, site-specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate.<br>• Only trained staff for all safety sensitive positions to construct, install, handle, and repair all electrical equipment to prevent any risks of electrical shocks and electrocution to both workers | Contractor |
| Planning for on-site EHS management and preparation | Risk of conflicts or grievances between workers | • Establish a staff and worker Grievance Redress Mechanism that is accessible, transparent, and fair to all<br>• Information on the GRM will be disseminated to all staff and workers | Contractor |
| Material Transportation | Damage to roads/highway due to passage of project vehicles to transport plant, materials and Equipment including through settlement areas | • Prepare a traffic management sub-plan informed by a road/traffic assessment, detailing use of public roads to transport plant, materials and equipment to the solar power plant avoiding peak travel times and school starting and leaving hours when children walk along the road.<br>• Restore any property damage that is caused by their works including damage caused by heavy construction traffic using existing access roads to at least pre-project condition at their own cost | Contractor |

| Table 13 Anticipated Impacts from Solar Generation (DGPC) | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Material transportation, excavation and construction activities | Impacts on Air quality-dust generation | • Establish speed limits based on the state of the road e.g., 20 km/h on unsurfaced roads to avoid dust generation.<br>• Trucks importing loose raw materials or removing spoil must be covered with tarpaulin<br>• Keep stockpiles of soil, aggregate and waste materials covered to avoid suspension or dispersal during windy days<br>• Locate stores/stockpiles of loose material (soil, aggregate and waste materials) away from adjacent properties, covered by tarpaulin cover | Contractor |
| Material transportation, excavation and construction activities | Impacts on Air quality-emissions | • Ensure ambient air quality Bhutan standards and WHO guidelines for TSPM, PM10 and PM2.5 are complied with. If levels are exceeded, the contractor will be required to implement additional mitigation measures<br>• Comply with the ECOP as well as the CEMP including pollution prevention sub-plan and the IFC EHS General Guidelines in relation to air quality and avoid the occurrence of pollution incidents | Contractor |
| Material transportation, excavation and construction activities | Risk of noise and vibration impacts on people and property | • Identify any adjacent properties at risk of vibration damage, undertake a through pre-construction structural survey of them, supported by photographic evidence, and determine whether such structures may require the installation of vibration monitors during construction to monitor movement.<br>• Comply with the ECOP as well as the CEMP including pollution prevention sub-plan and the IFC EHS General Guidelines in relation to air quality<br>• Limit noisy construction activity (especially soil compaction/blasting/piling works) from 7 am to 7 pm.<br>• Ensure all construction vehicles are regularly serviced<br>• Apply temporary acoustic barrier(s) around piling activities and/or the site boundaries as necessary.<br>• Carry out continuous noise monitoring at adjacent properties at risk of noise level exceedance for the duration of all such work<br>• Consult the community regarding special religious days and festivals | Contractor |
| Excavation and construction activities | Impacts on surface water | • Develop and implement Sediment management Plan<br>• Maintain a 30m and 15 buffer from all rivers and streams respectively<br>• Schedule earthworks during the dry season to minimize erosion by surface water runoff<br>• Install silt fences (semi-permeable geotextile) along permanent streams or water bodies to prevent runoff<br>• Restrict discharge of sediment laden surface water runoff directly into surface water.<br>• Construct sedimentation ponds to allow sediment to settle out of surface water runoff | PIU and Contractor |

| Table 13 Anticipated Impacts from Solar Generation (DGPC) | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Excavation and construction activities | Excavation and compaction of top and subsoils during site clearance and preparation, earthworks for foundation installation, and other civil works | • Minimize removal of existing vegetation and topsoil within the project footprint<br>• Schedule earthworks during dry season to minimize exposed areas to erosion and/or runoff.<br>• Topsoil disturbed during earthworks and foundation excavations will be stripped and stored separately and used to restore the surface of the excavated area on completion.<br>• Reuse muck generated for backfilling<br>• Employ competent and skilled persons for excavation work who has practical experience, knowledge and ability to plan | PIU and Contractor |
| Excavation | Inappropriate disposal of inert spoil in the landscape | • Developed Implement Soil Management Plan<br>• Spoil / muck generated from earthworks must be managed as per national requirements / GIP<br>• Topsoil disturbed during earthworks and foundation excavations must be separately stripped and stored and used to restore the surface of the excavated area on completion. | PIU and Contractor |
| Worker camps | Untreated effluent from project site/worker camps causing surface or groundwater pollution | • Apply GIP (EBRD Workers Accommodation: Processes and Standards (2009))<br>• Strict prohibition on open defecation and urination by construction workers;<br>• Prevent use of pit latrines<br>• Prevent disposal of untreated wastewater directly to surface water | PIU and Contractor |
| Construction Activities, | Waste generation | • Prepare a Solid and Hazardous Waste Management sub-plan in the CEMP asper per national regulations and IFC EHS General Guidelines section on Waste Management<br>• Prior to the start of work, institute an appropriate waste management collection, storage and disposal system for organic waste, domestic solid waste, construction waste and hazardous waste<br>• Conduct regular training of workers on pollution prevention sub-plan and waste management sub-plan including good housekeeping, and environmentally sound waste management<br>• Contractors shall comply with the Waste Prevention and Management Act of Bhutan, 2009 and the Waste Prevention and Management Regulation, 2012 (Amended 2016)<br>• The contractor will ensure that the waste management plan includes hazardous waste management. | PIU and Contractor |

| Table 13 Anticipated Impacts from Solar Generation (DGPC) | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Site clearance | Impacts to forest, biodiversity and habitats | • No subproject sites will be located in areas of critical habitat, unless (i) there is no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there is no reduction in the population of any recognized endangered or critically endangered species, and (iii) any lesser impacts are mitigated. The site selection process will ensure that no subproject is located within the core zone or buffer zone of any legally protected area.<br>• In an area of natural habitats, there must be no significant conversion or degradation, unless (i) alternatives are not available, (ii) the overall benefits from the project substantially outweigh the environmental costs, and (iii) any conversion or degradation is appropriately mitigated. Use a precautionary approach to the use, development, and management of renewable natural resources.<br>• Carefully design and site project layout to avoid or at least minimize the need to cut forests and disturb habitats;<br>• The design will ensure that no land requiring the cutting of trees is to be used for temporary facilities, avoid unnecessary cutting and clearance of vegetation<br>• Clearance of vegetation will only be carried out within the project footprint with the working area (allocated land parcels and ROW of access roads/power lines) clearly marked to protect habitats adjacent to the working area | PIU and Contractor |
| Site clearance (Cont..) | Impacts to forest, biodiversity and habitats | • Prevent collection of non-wood forest products, poaching or fishing.<br>• Undertake regular awareness raising activities on the Forest and Nature Conservation Rules and Regulations.<br>• Collaborate with DoFPS to monitor wildlife activity and to detect poaching activities<br>• Restore and revegetate all disturbed areas to at least original condition using native/local species<br>• Prohibit the collection of NTFPs collection, fishing, hunting, or poaching by workers and organize awareness and briefing to workers on the Forest and Nature Conservation Rules and Regulations and penalties for non-compliance | PIU and Contractor |
| Site clearance | Spread of invasive species | • Projects will not intentionally introduce any new alien species (that is, species not currently established in the country or region of the project)<br>• Under no circumstances must species known to be invasive be introduced into new environments<br>• Project must undertake assessment of the possibility of accidental or unintended introduction of such invasive alien species and identify measures to minimize the potential for release.<br>• Minimize spread of invasive plant species by training contractors and project staff and workers to identify and remove invasive species before they spread<br>• Conduct training for contractors on the Plant Quarantine Act of Bhutan 2003, Seed Act of Bhutan 2000, and Pesticides Act of Bhutan 2000<br>• Restrict the import or use of exotic species for plantation | PIU and Contractor |

| Table 13 Anticipated Impacts from Solar Generation (DGPC) | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| | Impact on bird species. | • Where works affecting habitats that could be used by nesting birds must take place during the breeding season, they will only be carried out following an on-site check for nesting birds by an experienced ornithologist. Only when this indicates that no nesting birds are likely to be harmed by the works can the works proceed.<br>• If nesting birds are found to be present, halt work in the area until birds have left the nest.<br>• Mark a protection zone around the nest site to prevent accidental disturbance or damage.<br>• Where a disturbance impact on nesting birds is a risk, schedule site ground works outside the breeding period.<br>• Use noise-reducing techniques and control pollution to minimize environmental disturbance.<br>• Collaborate with the Department of Forest and Park Services to prepare conservation plans and monitor /track the population of the Endangered, Rare and Threatened species and implement mitigation strategies as needed.<br>• | PIU and Contractor |
| Construction activities | Impacts to community health and safety | • Prepare Code of Conduct for all staff and workers and enforce this on site and impose strict penalties (e.g., immediate removal from site) for any non- compliance of workers to an agreed code of conduct<br>• Conduct induction training for all new workers- include topics HIV/AIDS awareness trainings, first aid & Emergency protocols, such as Gender Based Violence, Sexual exploitation and abuse, sexual harassment<br>• Brief workers on the local culture, heritage, traditions and customs, and on culturally acceptable practices,<br>• Install warning signs/signboards on site boundary, around open excavated areas and in risky and hazardous areas, to inform workers to be careful.<br>• Keep a log of all community health and safety incidents, near-misses and accidents.<br>• Do not leave hazardous conditions (e.g., unlit open excavations without a means of escape) overnight unless absolutely no access from the public can be ensured. | Contractor |
| Influx of foreign and non-local staff and workers | Community conflict with project workers including sexual exploitation, abuse, and harassment | • Conduct consultation with local communities within 500m to make them aware of the construction and timescale, risks due to influx of workers, inform them about the workers code of conduct<br>• Ensure the GRM will include provisions to deal with Sexual harassment, exploitation, abuse which is survivor centric and confidential | PIU and Contractor |

| Table 13 Anticipated Impacts from Solar Generation (DGPC) | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Emergencies, natural hazards and Disasters | Risk of fire, landslides, earthquakes, windstorms, excessive rainfall | • Ensure emergency procedures are posted and staff and workers are aware of protocols to be followed<br>• Ensure that at least 1-2 persons trained in first aid, firefighting, use of emergency equipment and [14] aware of emergency protocols is always at present site | PIU and Contractor |
| Excavation along access roads, tower foundation area work | Potential risk of damage to below ground resources, including undiscovered areas of paleontological or historical areas in case of chance find. | • Chance finds of social, cultural and religious importance are not anticipated but any such finds uncovered during earthworks and excavation will become the property of the Royal Government of Bhutan (RGoB) and immediate discovery is to be informed to the local/district administration. | PIU and Contractor |
| Construction and installation work | Unanticipated environmental impact | Inform ADB regarding unanticipated impact and implement corrective action | PIU and Contractor |
| **Operation Phase** | | | |
| Operation and Maintenance | Avian collision and electrocution | • Projects will adequately assess risks to key avian species, applying the mitigation hierarchy.<br>• Projects will work with key stakeholders to establish adequate management and mitigation measures to protect key bird species.<br>• Ensure project staff have the contacts of forest and protected area management and the nearest veterinary centre for treatment<br>• Collaborate with Department of Forest for emergency fauna rescue and handling<br>• As necessary, projects must purchase and install bird flight divertor.<br>• Bird flight divertors design will be robust (e.g rotates, uses contrasting colours, reflects UV light, glows in the dark) and will be applied to all sections of power lines identified in the ornithology assessment as at risk | |

| Table 13 Anticipated Impacts from Solar Generation (DGPC) | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Operation and Maintenance | Increase in human-wildlife conflict due to reduced grazing land | • Support the community in mitigation human wildlife conflict through specific activities such an improved pasture development, fencing, potential diversification of socio-economic activities. | PMU and PIU |
| | Change in land use from pastureland (modified habitat) to the solar PV power plant | • Pasture vegetation needs to be maintained within the solar power plant for which DGPC will either mow or undertake managed grazing to keep the grass (and ecology) maintained | PMU and PIU |
| Operation and Maintenance | Ambient Air Quality & Noise | • Ensure all project vehicles are regularly serviced and maintained in good working order in accordance with manufacturer instructions and have emission certificates for operating within Bhutanese standards; keep log of maintenance work undertaken | PMU and PIU |
| Operation and Maintenance | Occupational Health and Safety of Staff and Workers | • Conduct health and safety risk assessment considering occupational and community and health and safety risks during operation period.<br>• No child will be employed, and no person under the age of 18 will be engaged at a solar power plant (particularly hazardous tasks related to construction as well as operation<br>• Provide PPE for all workers (regardless formal and informal, directly contracted or subcontracted) in accordance with their jobs.<br>• Install signboards reminding of health and safety measures and procedures to follow in case of accident, including key contact details (ambulance, doctor, hospital, etc.)<br>• Post emergency contact numbers in prominent locations<br>• Any casualty or injury resulting from occupational activities should be compensated as per Bhutanese regulations.<br>• Budget for and follow Emergency Response Plan and protocols | PMU and PIU |

| Table 13 Anticipated Impacts from Solar Generation (DGPC) | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Operation and Maintenance | Risks related to electrical and fire hazards, working in remote locations. | • Electrical safety must be included in the safe systems of work (SSoW) for the project Staff must be instructed to follow all safety programs, policies, procedures and work rules.<br>• Staff working on electrical equipment must be appropriately trained, experienced, and supervised, but it is also key that others working around the equipment - for example panel cleaners - are equally aware of the potential risks and have safe methods of working around HV and LV electricity.<br>• Hazardous areas and equipment should carry appropriate markings to warn personnel of possible hazards and wiring sequence. Such markings should be clear and evident to all personnel and third parties (and intruders) entering the plant premises.<br>• Plant access control and security system must keep people away from areas of danger<br>• Ensure workers are appropriately trained, inducted and supervised for Operation and Maintenance works<br>• Electrical work shall be performed under a Lockout Tag out and only after the circuit has been tested to ensure a zero-energy state<br>• Maintain first aid kit on site at all times<br>• Provide transportation to the nearest hospital/healthcare center in case of an emergency<br>• Post emergency contact numbers in prominent locations<br>• All accidents, injuries, spills or environmental incidents and near-miss events shall be reported to the site in charge or designee as soon as possible. In all cases reports must be made within 24 hours | PMU and PIU |
| | Power Line/Associated Facility Requirements Risks | • The mitigation measures in EMP in EIA conducted by BPC, shall be followed<br>• Ensure that bird divertors are maintained in a good condition<br>• Ensure that compliance monitoring during construction and operation are carried<br>• Ensure all O&M staff have received appropriate OHS trainings for their role | PMU and PIU |
| Operation and Maintenance | Climate change | • To minimize the use of SF6 as well as its potential to leak, switchgear that has been tested and guaranteed by the supplier at less than 0.1% leakage rate will be used. DGPC will adopt good SF6 management during operation | PMU and PIU |
| Operation and Maintenance | Disaster and Natural Hazard Risks | • Prepare and follow the Emergency Preparedness and Response Plan that includes communication systems and protocols for evacuation, rescue and relief. | PMU and PIU |

| Table 13 Anticipated Impacts from Solar Generation (DGPC) | | | |
|---|---|---|---|
| **Decommissioning Phase** | | | |
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Decommissioning | EHS impacts and risks of decommissioning works in general | • Prepare decommissioning plan to schedule all activities covering the same items as per CEMP for the construction stage<br>• Use only licensed electricians allowed to work on live electricity with strict adherence to safety standards including those listed in said guidelines<br>• Provide Personal Protective Equipment for workers<br>• Use trained personnel or train workers on personal safety and how to handle equipment and machines | PMU and PIU |
| Decommissioning | Inappropriate disposal of both general and hazardous wastes generated from dismantling and decommissioning activities | • Follow the '3-Rs' of sustainable waste management - Reduce, Reuse and Recycle to all wastes generated during decommissioning.<br>• Dispose all solar PV modules after their end of life (when they become defective/non-operational/non-repairable) d in accordance with the waste management act and regulations of Government of Bhutan as amended from time to time.<br>• Define a safe SF6 retrieval arrangement, with appropriate handling, storage, disposal process for end-of-life equipment by a certified industrial waste management company who will need to remove SF6 and treat the equipment prior to disposal in accordance international good practice e.g., International Electrotechnical Commission (IEC) standard 61634 to ensure that the SF6 is not released to atmosphere. | PMU and PIU |
| Decommissioning | Completion of decommissioning works | • Upon removal of infrastructure, restore the site with plants/vegetation and fence the site to prevent grazing<br>• Close access roads and restored with appropriate bio-engineering works.<br>• Hand over the site to the NLCS upon completion of the lease agreement. | PMU and PIU |
| Feasibility Design and siting | Encroachment into ecologically sensitive areas | • During IEE or EIA [1] preparation (based on subproject screening and categorization) determine the exact location of project site and any related facilities such as transmission lines and access roads<br>• During assessments ecologists are to conduct baseline biodiversity surveys to map the habitats beneath the project footprint, reconfirming no core areas, buffer zones, KBA or IBA, Ramsar, protected wetlands, are included, and list species encountered.<br>• Presence or absence of sensitive ecological receptors and critical habitat species must be confirmed in IEE<br>• Determine whether the project area qualifies as a Critical Habitat as per IFC PSC guidelines and if so, conduct Critical Habitat Assessment and include recommendations from the CHA into the IEE | PMU |

| **Table 13 Anticipated Impacts from Solar Generation (DGPC)** | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures**<br>• | **Responsibility** |
| Project Design and layout | Impacts on watercourse and ponds and stress on use of community resources | • Ensure design incorporates a minimum distance of 30m from rivers.<br>• Seek approval for sourcing water for construction and domestic purpose from local authorities/community as required.<br>• Provision to store water in case of shortage with water storage tanks or a water tanker | PMU |

| Table 14 Anticipated Impacts from Transmission Line Components (BPC) | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| **Pre- Construction Phase** | | | |
| Project Design and layout | Stress on use of community resources | • During the design phase, assess the condition and capacity of local schools and healthcare centres to accommodate the predicted number of students and patients<br>• The Contractor will be required to prepare a health and safety management plan that will be based on the assessment | PMU |
| Project Design and layout | Change in landform and slope | • During the design phase, explore specialized engineering solutions to accommodate uneven topography.<br>• Detailed designs must keep new impermeable surfaces to a minimum with proper drainage<br>• Provision of drains including along the site boundary and as per the topography to be provided to ensure that engineered structures are protected from waterlogging, flash rains and water flows. | PMU |
| Project Design and layout | Disaster and Natural Hazard Risk | • All structures are to be designed as per seismological requirements and specifications which are to be provided in the bid documents<br>• Temporary work designs will also reflect this (e.g., additional control measures for scaffolding to resist movement from high wind speeds, the use of chin straps when wearing head protection<br>• Incorporation of siting and safety engineering criteria to prevent failures due to natural risks posed by earthquakes, cyclone, cloud burst, flooding, landslides, and fire. To this end, all project structures should be designed in accordance with engineering and design criteria mandated by site-specific risks, including but not limited to seismic activity, slope stability, wind loading, and other dynamic loads<br>• Application of locally regulated or internationally recognized building codes to ensure structures are designed and constructed in accordance with sound architectural and engineering practice, including aspects of fire prevention and response<br>• Engineers and architects responsible for designing and constructing facilities, building, plants, and other structures should certify the applicability and appropriateness of the structural criteria employed.<br>• Prepare Emergency Preparedness and Response Plan<br>• Prepare a Construction Emergency Preparedness and Response Plan | PMU |

| Table 14 Anticipated Impacts from Transmission Line Components (BPC) | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Project Design and layout | Impact on private and community land and structures or on grazing land | • Fulfil safeguard requirements namely the assessment and preparation of DDR and RAP.<br>• This process will involve carrying out a socio-economic survey of a sample of community members and if there are Affected Persons, a census of all affected households<br>• Consult with all stakeholders in/near the communities with groups of people such as women, youth, elderly as well as specific consultations with APs.<br>• Seek alternatives/consent from the communities in case the site is being used as grazing land<br>• Preparate of reports such has Due Diligence Report (DDR), Social Impact Assessment and Resettlement Action Plan (RAP)<br>• Disclose the due diligence documents across BPC and ADB websites and also issue executive summaries of the document at gewog administration and work sites.<br>• Undertaken compensation and restoration activities. All compensation must be paid prior to the construction. | PMU |
| Project Design and layout | Impact existing access roads | • If damage to existing roads is anticipated, consider upgrades in advance of works and budget accordingly.<br>• Pre-survey road conditions where necessary. Surveys will be documented in a pre-project condition report, which will serve as a baseline in case any damage to property occurs. | PMU |
| Securing of consents | Risk of non-compliance with regulatory requirements | • Comply with all applicable government environment, health and safety (EHS) regulatory requirements, conditions of applicable national environmental and other clearances/permits, ADB's SPS 2009, and the IFC EHS General/Electric Power T&D Guidelines and the EHS Code of Practice (ECoP).<br>• If a change in project scope or design occurs during project implementation, or if unanticipated impacts are identified at any point during project implementation, the implementing leads to inform ADB and if required update the IEE for clearance and disclosure by ADB<br>• Obtain all necessary approvals and permits prior to subproject approval and issue of bidding documents including:<br>vii. Environmental clearance for the National IEE from DECC and Comply with all the Terms and Conditions of the National Environmental Clearance and ensure contractor's compliance<br>viii. Forestry clearance from DoFPS and comply with the conditions of the forestry clearance<br>ix. Land Use Certificate (LUC) from National Land Commission as required.<br>x. Clearances from the Local Government<br>xi. Clearance from the local communities living proximate to the site<br>xii. Clearance for water abstraction | PMU |

| Table 14 Anticipated Impacts from Transmission Line Components (BPC) | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Subproject consultation, disclosure and grievances | Compliance with ADB's requirements as per the SPS | • Undertake meaningful consultation with affected persons and other stakeholders including discussions with facility operators and gewogs as well as public meetings to seek their views and inform assessment documents<br>• Disclose documents on the BPC website with the summary in Dzongkha and make hard copies available at the site level<br>• Disclose the RAP (to be prepared in the event that properties need to be acquired or if project site is used by communities for grazing and other uses) on BPC website with summary in Dzongkha and hard copies made available at site level<br>• Disclose the GRM process with contact details on the BPC website and at the site level and ensure details of GRM process with contact details of nominated members are conveyed to affected persons and other stakeholders<br>• Follow the GRM process to address project related grievances within the stipulated timeframe<br>• Include provisions in the contract to ensure that the Contractor will not engage in any activities described on the ADB Prohibited Investment Activities List in Appendix 5 of ADB's SPS (2009)<br>• any changes to subproject locations or layouts will require consultation with ADB and if required update documents | PMU |
| Project staffing for EHS aspects (cont…) | EHS impacts and risk in general, Safeguard Staffing and Capacity Development | • Appoint a suitably qualified and experienced, named E&S Officer(s) for each project site.<br>• PIAC will appoint dedicated safeguard specialists based on the assessment carried out during the EIA and IEE preparation process, including at a minimum qualified and experienced Ecologists and EHS experts<br>• Contractors must appoint full-time suitably qualified and experienced dedicated national staff including an EHS Officer supported by EHS supervisors (at least one for 50 persons), a Community Liaison/GRM and Labor Officer (National) and an Ecologist.<br>• Once the Contractor is selected, the PIU will arrange to conduct awareness training for contractors on their responsibilities in EMP implementation, in compliance with ADB and RGOB requirements, self-monitoring and reporting procedures<br>• EPC must comply with the EMP and any updates following national environment clearance, detailed designs, or in response to any unanticipated impacts forms an integral and binding part of the bidding and contract documents including appropriate incentives and/or penalties for (non-compliance) related to contractor' EHS management, they will be responsible for implementing and budgeting all the mitigation measures required (the definitive IEE & EMP disclosed on ADB's website) | PMU, PIU and Contractor |

| Table 14 Anticipated Impacts from Transmission Line Components (BPC) | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Project staffing for EHS aspects (cont…) | EHS impacts and risk in general, Safeguard Staffing and Capacity Development | • EPC will develop a competency and training program which defines EHS training needs per position and corresponding monitoring program. EPC must conduct training and induction for their staff and workers (e.g., Daily Tool box Training - HIV/AIDS awareness trainings, first aid, regular GVBH, code of conduct and culturally acceptable practices, biodiversity conservation awareness, prohibition on firewood and NTFPs collection by workers, prohibition on fishing, hunting, or poaching by workers; chance find procedures; H&S including use of PPE etc). Records of all training activities are to be retained<br>• EPC Contractor preferably will have corporate EHS policies and corporate EHS safety management system certifications, such as ISO 14001 for environment, ISO 45001 for health and safety or equivalents.<br>• EPC Contractor will prepare the Contractor Environment Management Plan (CEMP) and ensure the approved CEMP is implemented in the process of carrying out the activities under the contract.<br>• EPC Contractor will comply with any corrective action plan required and cover the costs where corrective action is required due to non-compliance on behalf of the contractor, its subcontractor or third parties.<br>• EPC Contractor will ensure all their subcontractor and third parties, irrespective of being formally or informally employed by them, also comply with the final EMP and any updates to it, as well as their own CEMP and that this responsibility is cascaded down any chain involved. | PMU, PIU and Contractor |
| Procurement | Lack of awareness and compliance on safeguard measures resulting in impact | • Conduct pre bid meetings with contractors to inform them of ADB safeguard requirements and national regulations, compliance, staffing and budgeting requirements for safeguard implementation.<br>• Include safeguard measures (environmental and social) into bid documents with the required budget for implementation including OHS requirements. | PMU, PIU |
| | Power Line Reconductoring/ Associated Facility Requirements | • ensure all associated facilities of the project comply with national laws and regulations and ADB SPS (2009) requirements by establishing an institutional arrangement to ensure BPC (and their contractor) comply with the requirements of this EMP.<br>• obtain any national environmental and other clearances for power evacuation/transmission line<br>• ensure reconductored power lines remain compliant with national electrical H&S requirements maintaining vertical and horizontal safety clearances to adjacent properties, other utilities, and roads are maintained to minimize health and safety risk.<br>• EIA prepared by BPC shall provide mitigation measures for such risks. The PIAC shall update this IEE when the EIA report is finalized. | PMU, PIU |

| Table 14 Anticipated Impacts from Transmission Line Components (BPC) | | | |
|---|---|---|---|
| | Associated Facility Requirements- Road Construction | • The impact of new roads will be assessed as part of the EIA /IEE preparation and mitigation measures identified based on the assessment. Access roads will need to be developed based on the Road Classification and Network Information of Bhutan, 2025, DoST, MoIT.<br>• Detail road design will identify gradient management needed at certain points to ensure safe and efficient transportation.<br>• Edge and cross-drainage will be provided with check dams on steeper gradients and with culvert inverts to allow a natural bed to form<br>• Design proper engineering solutions to enhance road usability and safety.[9] | PMU, PIU |
| **Construction Phase** | | | |
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Worker Recruitment and Labor management | Lack of opportunities for local communities | • Promote local employment generation for unemployed youth for unskilled positions including manual labor during the construction period. | PIU |
| Worker Recruitment and Labor management | Workers may not be provided with decent accommodation, drinking water or facilities | • Design worker camps based on ILO[1] or EBRD/IFC, and national standards (Temporary Living Accommodation Standards in the Bhutan Schedule of Rates 2024) to ensure adequate habitable spaces, sanitation facilities, waste management, fire protection and control and other welfare requirements.<br>• Worker and labor accommodation must be gender friendly and constructed where workers are protected against the elements (such as wind, cold, rain, heat, etc.). One room for every 4-6 employees with adequate headroom and movement space.<br>• Contractors will prepare a Worker Accommodation Plan | EPC contractor |
| Planning for on-site EHS management and preparation | Workers Occupational Health and Safety - Risk of illness and accidents at the workplace | • Promote adherence to core labor laws and standards by including specific provisions requiring contractors to (a) prohibit child labor as defined in national legislation for construction and maintenance activities; (b) ensure equal pay for equal work of equal value regardless of gender, ethnicity, or caste; and (c) eliminate forced labor; and disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and laborers.<br>• Contractor will develop a Construction Environmental Management Plan (CEMP) and Construction H&S Management Plan (CHSMP) reflecting the EMP requirements including the ECoP and international engineering best practice/good EHS practices and submit to BPC/BPC for approval prior to any works commencing on site. | Contractor |

| **Table 14 Anticipated Impacts from Transmission Line Components (BPC)** | | | |
|---|---|---|---|
| Planning for on-site EHS management and preparation | Workers Occupational Health and Safety - Risk of illness and accidents at the workplace | • CEMP is a live document, to be updated as necessary<br>• Contractor to undertake a H&S risk assessment through a facilitated workshop to be attended by DGP/CBPC/PMU and PIAC during the detailed design so that it can inform both the detailed design and pre-construction preparations. H&S risk assessment to consider both occupational and community H&S risks resulting from all subsequent stages of the project. | Contractor |
| | Community awareness on project activities and GRM | • ensure meaningful consultations and information disclosure in relation to community disruption, project risks and impacts, construction activities, electrical safety, workers code of practice etc.<br>• The project will institutionalize the Grievance Redress Mechanism and disseminate information about the GRM to both the local community as well as communities along the access route to the site.<br>• disclose the draft EIA with the draft EMP at least 120 days prior to ADB board consideration. IEEs, and monitoring reports will be disclosed once approved by ADB. Hard copies of the EIA/IEE summaries and the GRM will be available at the site offices<br>• EA contractors shall meet with communities before construction commences to present the work program, Grievance Redress Mechanism and approaches to manage community health and safety and Sexual Exploitation, Abuse, and Harassment (SEAH)/ Gender-Based Violence (GBV) risks<br>• Contractors shall nominate a GRM focal to receive grievances from both the community and workers. Any grievance received by the contractors by any route is to be immediately reported to BPC with the action taken to address it if already quickly resolved by them.<br>• GRM will be available to all workers to address unfair treatment or unsafe living or working conditions, ensuring no coercion nor reprisal.<br>• Construction workers will be given access to register any grievances with the contractor or direct access to the BPC, or GRM Focal. | PMU, PIU |
| Planning for on-site EHS management and preparation | Workers Occupational Health and Safety - Risk of illness and accidents at the workplace | • OHS Training<br>• Provisions to be made to provide OHS orientation training to all new workers to ensure they are apprised of the basic site rules of work at / on the site and of personal protection and preventing injury to fellow workers. | Contractor |

| Table 14 Anticipated Impacts from Transmission Line Components (BPC) | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Planning for on-site EHS management and preparation (cont…) | Workers Occupational Health and Safety - Risk of illness and accidents at the workplace | • Training should consist of basic hazard awareness, site- specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate.<br>• Only trained staff for all safety sensitive positions to construct, install, handle, and repair all electrical equipment to prevent any risks of electrical shocks and electrocution to both workers | Contractor |
| Planning for on-site EHS management and preparation | Risk of conflicts or grievances between workers | • Establish a staff and worker Grievance Redress Mechanism that is accessible, transparent, and fair to all<br>• Information on the GRM will be disseminated to all staff and workers | Contractor |
| Material Transportation | Damage to roads/highways due to passage of project vehicles to transport plant, materials and Equipment including through settlement areas | • Prepare a traffic management sub-plan informed by a road/traffic assessment, detailing use of public roads to transport construction materials and tower parts to the tower pads/locations avoiding peak travel times and school starting and leaving hours when children walk along the road.<br>• Restore any property damage that is caused by their works including damage caused by heavy construction traffic using existing access roads to at least pre-project condition at their own cost | Contractor |
| Material transportation, excavation and construction activities | Impacts on Air quality- dust generation | • Establish speed limits based on the state of the road e.g., 20 km/h on unsurfaced roads to avoid dust generation.<br>• Trucks importing loose raw materials or removing spoil must be covered with tarpaulin<br>• Keep stockpiles of soil, aggregate and waste materials covered to avoid suspension or dispersal during windy days<br>• Locate stores/stockpiles of loose material (soil, aggregate and waste materials) away from adjacent properties, covered by tarpaulin cover | Contractor |
| Material transportation, excavation and construction activities | Impacts on Air quality- emissions | • Ensure ambient air quality Bhutan standards and WHO guidelines for TSPM, PM10 and PM2.5 are complied with. If levels are exceeded, the contractor will be required to implement additional mitigation measures<br>• Comply with the ECOP as well as the CEMP including pollution prevention sub-plan and the IFC EHS General Guidelines in relation to air quality and avoid the occurrence of pollution incidents | Contractor |

| Table 14 Anticipated Impacts from Transmission Line Components (BPC) | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Material transportation, excavation and construction activities | Risk of noise and vibration impacts on people and property | • Identify any adjacent properties at risk of vibration damage, undertake a through pre-construction structural survey of them, supported by photographic evidence, and determine whether such structures may require the installation of vibration monitors during construction to monitor movement.<br>• Comply with the ECOP as well as the CEMP including pollution prevention sub-plan and the IFC EHS General Guidelines in relation to air quality<br>• Limit noisy construction activity (especially soil compaction/blasting/piling works) from 7 am to 7 pm.<br>• Ensure all construction vehicles are regularly serviced<br>• Apply temporary acoustic barrier(s) around piling activities and/or the site boundaries as necessary.<br>• Carry out continuous noise monitoring at adjacent properties at risk of noise level exceedance for the duration of all such work<br>• Consult the community regarding special religious days and festivals | Contractor |
| Excavation and construction activities | Impacts on surface water | • Develop and implement Sediment management Plan<br>• Maintain a 30m and 15 buffer from all rivers and streams respectively<br>• Schedule earthworks during the dry season to minimize erosion by surface water runoff<br>• Install silt fences (semi-permeable geotextile) along permanent streams or water bodies to prevent runoff<br>• Restrict discharge of sediment laden surface water runoff directly into surface water.<br>• Construct sedimentation ponds to allow sediment to settle out of surface water runoff | PIU and Contractor |
| Excavation and construction activities | Excavation and compaction of top and subsoils during site clearance and preparation, earthworks for foundation installation, and other civil works | • Minimize removal of existing vegetation and topsoil within the project footprint<br>• Schedule earthworks during dry season to minimize exposed areas to erosion and/or runoff.<br>• Topsoil disturbed during earthworks and foundation excavations will be stripped and stored separately and used to restore the surface of the excavated area on completion.<br>• Reuse muck generated for backfilling<br>• Employ competent and skilled persons for excavation work who has practical experience, knowledge and ability to plan | PIU and Contractor |
| Excavation | Inappropriate disposal of inert spoil in the landscape | • Developed Implement Soil Management Plan<br>• Spoil / muck generated from earthworks must be managed as per national requirements / GIP<br>• Topsoil disturbed during earthworks and foundation excavations must be separately stripped and stored and used to restore the surface of the excavated area on completion. | PIU and Contractor |

| Table 14 Anticipated Impacts from Transmission Line Components (BPC) | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Worker camps | Untreated effluent from project site/worker camps causing surface or groundwater pollution | • Apply GIP (EBRD Workers Accommodation: Processes and Standards (2009))<br>• Strict prohibition on open defecation and urination by construction workers;<br>• Prevent use of pit latrines<br>• Prevent disposal of untreated wastewater directly to surface water | PIU and Contractor |
| Construction Activities, | Waste generation | • Prepare a Solid and Hazardous Waste Management sub-plan in the CEMP asper per national regulations and IFC EHS General Guidelines section on Waste Management<br>• Prior to the start of work, institute an appropriate waste management collection, storage and disposal system for organic waste, domestic solid waste, construction waste and hazardous waste<br>• Conduct regular training of workers on pollution prevention sub-plan and waste management sub-plan including good housekeeping, and environmentally sound waste management<br>• Contractors shall comply with the Waste Prevention and Management Act of Bhutan, 2009 and the Waste Prevention and Management Regulation, 2012 (Amended 2016)<br>• The contractor will ensure that the waste management plan includes hazardous waste management. | PIU and Contractor |
| Site clearance | Impacts to forest, biodiversity and habitats | • No subproject sites will be located in areas of critical habitat, unless (i) there is no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there is no reduction in the population of any recognized endangered or critically endangered species, and (iii) any lesser impacts are mitigated. The site selection process will ensure that no subproject is located within the core zone or buffer zone of any legally protected area.<br>• In an area of natural habitats, there must be no significant conversion or degradation, unless (i) alternatives are not available, (ii) the overall benefits from the project substantially outweigh the environmental costs, and (iii) any conversion or degradation is appropriately mitigated. Use a precautionary approach to the use, development, and management of renewable natural resources.<br>• Carefully design and site project layout to avoid or at least minimize the need to cut forests and disturb habitats;<br>• The design will ensure that no land requiring the cutting of trees is to be used for temporary facilities, avoid unnecessary cutting and clearance of vegetation<br>• Clearance of vegetation will only be carried out within the project footprint with the working area (allocated land parcels and ROW of access roads/power lines) clearly marked to protect habitats adjacent to the working area | PIU and Contractor |

| Table 14 Anticipated Impacts from Transmission Line Components (BPC) | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Site clearance (cont…) | Impacts to forest, biodiversity and habitats | • Prevent collection non-wood forest products, poaching or fishing.<br>• Undertake regular awareness raising activities on the Forest and Nature Conservation Rules and Regulations.<br>• Collaborate with DoFPS to monitor wildlife activity and to detect poaching activities<br>• Restore and revegetate all disturbed areas to at least original condition using native/local species<br>• Prohibit the collection of NTFPs collection, fishing, hunting, or poaching by workers and organize awareness and briefing to workers on the Forest and Nature Conservation Rules and Regulations and penalties for non-compliance | PIU and Contractor |
| Site clearance | Spread of invasive species | • Projects will not intentionally introduce any new alien species (that is, species not currently established in the country or region of the project)<br>• Under no circumstances must species known to be invasive be introduced into new environments<br>• Project must undertake assessment of the possibility of accidental or unintended introduction of such invasive alien species and identify measures to minimize the potential for release.<br>• Minimize spread of invasive plant species by training contractors and project staff and workers to identify and remove invasive species before they spread<br>• Conduct training for contractors on the Plant Quarantine Act of Bhutan 2003, Seed Act of Bhutan 2000, and Pesticides Act of Bhutan 2000<br>• Restrict the import or use of exotic species for plantation | PIU and Contractor |
| | Impact on bird species. | • Where works affecting habitats that could be used by nesting birds must take place during the breeding season, they will only be carried out following an on-site check for nesting birds by an experienced ornithologist. Only when this indicates that no nesting birds are likely to be harmed by the works can the works proceed.<br>• If nesting birds are found to be present, halt work in the area until birds have left the nest.<br>• Mark a protection zone around the nest site to prevent accidental disturbance or damage.<br>• Where a disturbance impact on nesting birds is a risk, schedule site ground works outside the breeding period.<br>• Use noise-reducing techniques and control pollution to minimize environmental disturbance.<br>• Collaborate with the Department of Forest and Park Services to prepare conservation plans and monitor /track the population of the Endangered, Rare and Threatened species and implement mitigation strategies as needed. | PIU and Contractor |

| Table 14 Anticipated Impacts from Transmission Line Components (BPC) | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Construction activities | Impacts to community health and safety | • Prepare Code of Conduct for all staff and workers and enforce this on site and impose strict penalties (e.g., immediate removal from site) for any non- compliance of workers to an agreed code of conduct<br>• Conduct induction training for all new workers- include topics HIV/AIDS awareness trainings, first aid & Emergency protocols, such as Gender Based Violence, Sexual exploitation and abuse, sexual harassment<br>• Brief workers on the local culture, heritage, traditions and customs, and on culturally acceptable practices,<br>• Install warning signs/signboards on site boundary, around open excavated areas and in risky and hazardous areas, to inform workers to be careful.<br>• Keep a log of all community health and safety incidents, near-misses and accidents.<br>• Do not leave hazardous conditions (e.g., unlit open excavations without a means of escape) overnight unless absolutely no access from the public can be ensured. | Contractor |
| Influx of foreign and non-local staff and workers | Community conflict with project workers including sexual exploitation, abuse, and harassment | • Conduct consultation with local communities within 500m to make them aware of the construction and timescale, risks due to influx of workers, inform them about the workers code of conduct<br>• Ensure the GRM will include provisions to deal with Sexual harassment, exploitation, abuse which is survivor centric and confidential | PIU and Contractor |
| Emergencies, natural hazards and Disasters | Risk of fire, landslides, earthquakes, windstorms, excessive rainfall | • Ensure emergency procedures are posted and staff and workers are aware of protocols to be followed<br>• Ensure that at least 1-2 persons trained in first aid, firefighting, use of emergency equipment and [14] aware of emergency protocols is always at present site | PIU and Contractor |
| Excavation along access roads, tower foundation area work | Potential risk of damage to below ground resources, including undiscovered areas of paleontological or historical areas in case of chance find. | • Chance finds of social, cultural and religious importance are not anticipated but any such finds uncovered during earthworks and excavation will become the property of the Royal Government of Bhutan (RGoB) and immediate discovery is to be informed to the local/district administration. | PIU and Contractor |

| Table 14 Anticipated Impacts from Transmission Line Components (BPC) | | | |
|---|---|---|---|
| Construction and installation work | Unanticipated environmental impact | Inform ADB regarding unanticipated impact and implement corrective action | PIU and Contractor |
| **Operation Phase** | | | |
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Operation and Maintenance | Avian collision and electrocution | • Projects will adequately assess risks to key avian species, applying the mitigation hierarchy.<br>• Projects will work with key stakeholders to establish adequate management and mitigation measures to protect key bird species.<br>• Ensure project staff have the contacts of forest and protected area management and the nearest veterinary centre for treatment<br>• Collaborate with Department of Forest for emergency fauna rescue and handling<br>• As necessary, projects must purchase and install bird flight divertor.<br>• Bird flight divertors design will be robust (e.g rotates, uses contrasting colours, reflects UV light, glows in the dark) and will be applied to all sections of power lines identified in the ornithology assessment as at risk | |
| Operation and Maintenance | Increase in human-wildlife conflict due to reduced grazing land | • Support the community in mitigation human wildlife conflict through specific activities such an improved pasture development, fencing, potential diversification of socio-economic activities. | PMU and PIU |
| Operation and Maintenance | Inadequate storage and spills or leaks of fuel, oil, or chemicals causing soil contamination | • Proper grounding/bonding of fueling devices to prevent static discharge<br>• Undertake refilling or refuelling only on areas of hard protected soil, preferably bunded, at least 100m from surface water with all drainage directed through oil interceptors.<br>• Ensure liquids (fuel, oil, and chemicals, empty drums, old transformers, etc.) are stored in an undercover area with impermeable floor with spill containment bund of 110% capacity under lock and key. | PMU and PIU |
| Operation and Maintenance | Ambient Air Quality & Noise | • Ensure all project vehicles are regularly serviced and maintained in good working order in accordance with manufacturer instructions and have emission certificates for operating within Bhutanese standards; keep log of maintenance work undertaken | PMU and PIU |

| Table 14 Anticipated Impacts from Transmission Line Components (BPC) | | | |
|---|---|---|---|
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Operation and Maintenance | Occupational Health and Safety of Staff and Workers | • Conduct health and safety risk assessment considering occupational and community and health and safety risks during operation period.<br>• No child will be employed, and no person under the age of 18 will be engaged at a solar power plant (particularly hazardous tasks related to construction as well as operation<br>• Provide PPE for all workers (regardless formal and informal, directly contracted or subcontracted) in accordance with their jobs.<br>• Install signboards reminding of health and safety measures and procedures to follow in case of accident, including key contact details (ambulance, doctor, hospital, etc.)<br>• Post emergency contact numbers in prominent locations<br>• Any casualty or injury resulting from occupational activities should be compensated as per Bhutanese regulations.<br>• Budget for and follow Emergency Response Plan and protocols | PMU and PIU |
| Operation and Maintenance | Risks related to electrical and fire hazards, working in remote locations. | • Electrical safety must be included in the safe systems of work (SSoW) for the project Staff must be instructed to follow all safety programs, policies, procedures and work rules.<br>• Staff working on electrical equipment must be appropriately trained, experienced, and supervised, but it is also key that others working around the equipment - for example panel cleaners - are equally aware of the potential risks and have safe methods of working around HV and LV electricity.<br>• Hazardous areas and equipment should carry appropriate markings to warn personnel of possible hazards and wiring sequence. Such markings should be clear and evident to all personnel and third parties (and intruders) entering the plant premises.<br>• Plant access control and security system must keep people away from areas of danger<br>• Ensure workers are appropriately trained, inducted and supervised for Operation and Maintenance works<br>• Electrical work shall be performed under a Lockout Tag out and only after the circuit has been tested to ensure a zero-energy state<br>• Maintain first aid kit on site at all times<br>• Provide transportation to the nearest hospital/healthcare center in case of an emergency<br>• Post emergency contact numbers in prominent locations<br>• All accidents, injuries, spills or environmental incidents and near-miss events shall be reported to the site in charge or designee as soon as possible. In all cases reports must be made within 24 hours | PMU and PIU |

| Table 14 Anticipated Impacts from Transmission Line Components (BPC) | | | |
|---|---|---|---|
| | Power Line/Associated Facility Requirements Risks | • The mitigation measures in EMP in EIA conducted by BPC, shall be followed<br>• Ensure that bird divertors are maintained in a good condition<br>• Ensure that compliance monitoring during construction and operation are carried<br>• Ensure all O&M staff have received appropriate OHS trainings for their role | PMU and PIU |
| Operation and Maintenance | Climate change | • To minimize the use of SF6 as well as its potential to leak, switchgear that has been tested and guaranteed by the supplier at less than 0.1% leakage rate will be used. BPC will adopt good SF6 management during operation | PMU and PIU |
| Operation and Maintenance | Disaster and Natural Hazard Risks | • Prepare and follow the Emergency Preparedness and Response Plan that includes communication systems and protocols for evacuation, rescue and relief. | PMU and PIU |
| **Decommissioning Phase** | | | |
| **Phase / Parameters** | **Impact** | **Mitigation Measures** | **Responsibility** |
| Decommissioning | EHS impacts and risks of decommissioning works in general | • Prepare decommissioning plan to schedule all activities covering the same items as per CEMP for the construction stage<br>• Use only licensed electricians allowed to work on live electricity with strict adherence to safety standards including those listed in said guidelines<br>• Provide Personal Protective Equipment for workers<br>• Use trained personnel or train workers on personal safety and how to handle equipment and machines | PMU and PIU |
| Decommissioning | Inappropriate disposal of both general and hazardous wastes generated from dismantling and decommissioning activities | • Follow the '3-Rs' of sustainable waste management - Reduce, Reuse and Recycle to all wastes generated during decommissioning.<br>• Dispose all solar PV modules after their end of life (when they become defective/non-operational/non-repairable) d in accordance with the waste management act and regulations of Government of Bhutan as amended from time to time.<br>• Define a safe SF6 retrieval arrangement, with appropriate handling, storage, disposal process for end-of-life equipment by a certified industrial waste management company who will need to remove SF6 and treat the equipment prior to disposal in accordance international good practice e.g., International Electrotechnical Commission (IEC) standard 61634 to ensure that the SF6 is not released to atmosphere. | PMU and PIU |

| Table 14 Anticipated Impacts from Transmission Line Components (BPC) | | | |
|---|---|---|---|
| Decommissioning | Completion of decommissioning works | • Upon removal of infrastructure, restore the site with plants/vegetation and fence the site to prevent grazing<br>• Close access roads and restored with appropriate bio-engineering works. | PMU and PIU |

# 4. Environmental and Social Assessment for Subprojects and/or Components

## 4.1. ADB's Safeguard Policy Statement (2009)

### Introduction

92. ADB's Safeguard Policy Statement (2009) requires borrower/clients to meet environmental and social safeguards requirements for all projects supported by ADB. The objectives are to (i) avoid adverse impacts of projects on the environment and affected people, where possible; (ii) minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and (iii) help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks.

93. ADB's Safeguard Policy Statement (2009) sets out the objectives, scope and triggers, policy principles, and requirements for following three key safeguard areas:

- Environmental safeguards.
- Involuntary resettlement safeguards; and
- Indigenous people safeguard.

94. SPS 2009 provides for environmental and social requirements and review procedures of ADB and applies to all projects and grants they finance. SPS (2009) comprises three key safeguard areas: environment, involuntary resettlement, and indigenous peoples; and aims to avoid adverse project impacts to both the environment and the affected people; minimize, mitigate and/or compensate for adverse project impacts; and help Borrowers to strengthen their safeguard systems and to develop their capacity in managing the environmental and social risks.

## 4.2 Prohibited Investment Activities List

95. ADB's SPS (2009) contains a prohibited investment activities list (PIAL) and are not eligible for financing by ADB under the project. The prohibited list is found in Appendix 5.

## 4.3 Site Selection Criteria and Project Screening and Categorization

96. During the project identification phase, ADB uses a categorization system to indicate the significance of potential environmental and social risks and impacts. Such categorization is determined by the projects most sensitive component and includes direct, indirect, cumulative, and induced impacts within the project's area of influence. EA's must ensure that all subprojects are appraised, selected, and approved in compliance with the requirements of ADB. Any subproject which does not fully meet the environmental and social safeguards selection criteria listed in Chapter 2 and 3 must be excluded from project scope.

## 4.3 Environmental Screening and Categorization

97. At the project identification phase, ADB uses a categorization system to indicate the significance of potential environmental impacts.

98. Projects will be screened by EA's using the ADB Rapid Environmental Assessment checklist (see Appendix 1) for their expected environmental impacts. One checklist should be produced for each sub-project; as mentioned previously the most environmentally sensitive component will determine the overall subproject's categorization. The consolidated checklist will be submitted to ADB for concurrence of the categorization. In the event a categorization is borderline then further information may be requested from EA's.

99. Table 12 indicates the environmental categorization of subprojects as per ADB SPS (2009).

**Table 16. Environment Categorization of Subprojects as per ADB SPS**.

| Category | Description | ADB |
|---|---|---|
| A | Proposed project is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical | Environmental Impact Assessment, including an EMP |
| B | Proposed project's potential adverse environmental impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A. | An initial environmental examination (IEE), including an EMP |
| C | The proposed project is likely to have minimal or no adverse environmental impacts. | Environmental implications need to be reviewed and documented in DDR |

100. Sub-project EIAs and IEEs will be reviewed and cleared for disclosure by ADB and posted on the ADB website as well as local disclosure before subproject approval. Meaningful consultation will be conducted, and a three-tier grievance redress mechanism will be established by DGPC and BPC as per national environmental requirements.

101. ADB requires the avoidance of impacts and where avoidance is not possible, minimize, mitigate, and/or offset adverse impacts and enhance positive impacts by means of environmental planning and management. ADB has clear policy requirements for critical and natural habitats. SPS states: not implement project activities in areas of critical habitats, unless (i) there are no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there is no reduction in the population of any recognized endangered or critically endangered species, and (iii) any lesser impacts are mitigated. If a project is located within a legally protected area, implement additional programs to promote and enhance the conservation aims of the protected area. When the project involves activities in a critical habitat, the borrower/client will retain qualified and experienced external experts to assist in conducting the assessment.

## 4.4 Biodiversity Conservation and Sustainable Natural Resource Management

102. The assessment will focus on the major threats to biodiversity, which include destruction of habitat and introduction of invasive alien species, and on the use of natural resources in an unsustainable manner. The borrower/client will need to identify measures to avoid, minimize, or mitigate potentially adverse impacts and risks and, as a last resort, propose compensatory measures,

103. In an area of natural habitats, there must be no significant conversion or degradation, unless (i) alternatives are not available, (ii) the overall benefits from the project substantially outweigh the environmental costs, and (iii) any conversion or degradation is appropriately mitigated. Measures will be designed to achieve at least no net loss of biodiversity. They may include a combination of actions, such as post project restoration of habitats, offset of losses through the creation or effective conservation of ecologically comparable areas that are managed for biodiversity while respecting the ongoing use of such biodiversity by Indigenous Peoples or traditional communities, and compensation to direct users of biodiversity.

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

105. ADBs experience with biodiversity offsets indicates the need for the following elements to be addressed in the design of offsets:

- Measurable conservation outcomes: a flexible approach is required to design and implement biodiversity offsets to achieve clear, long-term and cost-effective conservation outcomes.
- Balancing ecological equivalence and conservation priorities: biodiversity offsets have to be commensurate to the magnitude of the impact of the development and ideally deliver outcomes that are “like for like.” Given the difficulties in measuring biodiversity, establishing equivalence between the affected and offset sites is considered a good basis for achieving no net loss.
- Location: biodiversity offsets should be located within the same general area as the development activity and have connectivity with areas of continuous vegetation/habitat if feasible.
- Additionality: biodiversity benefits from offsets have to directly result from the additional actions and would not have occurred otherwise. An action that protects an area that is not being degraded is not an offset.
- Timing and duration: biodiversity offsets have to be delivered in a timely manner and long-term. Offset implementation should commence as early as possible, ideally prior to or when the project impact commences.
- Stakeholders’ involvement: dialogue and consultation with all key stakeholders and the involvement of experts is vital for biodiversity offset design. For offset implementation, it is good practice to engage an organization with appropriate experience and qualifications to work closely with the executing agencies/project proponents and, where relevant, staff from protected areas, local NGOs and other community partners.
- Monitoring and enforcement: biodiversity offsets have to be enforceable and regularly monitored and audited. This would often require that the area of offset is secured for conservation use in perpetuity to prevent further fragmentation or development.

106. A precautionary approach is recommended for the design of biodiversity offsets to increase the likelihood of successful outcomes. For example, a 1:1 ratio of habitat area replacement may be insufficient to ensure no net loss due to edge effects (e.g., drying, fire, blow-down, etc.) and partial failure of rehabilitation or protection methods. There is no

generally accepted standard for an offset ratio, but ratios of 3:1, 10:1, and greater are considered best practice. Consultation with relevant national and local authorities, affected communities and biodiversity experts is encouraged when developing mitigation and compensatory measures. The borrower/client is encouraged to provide evidence of effectiveness.

## 4.5 Baseline studies

107. The type of baseline environment and social information and level of detail presented in the environmental assessment report have to be relevant to the likely project environmental impacts. The information gathered and provided should help to explain the project's potential impacts, covering the range of physical, biological, socioeconomic and physical cultural features that will be affected on site and in the project's area of influence. It has to provide a comprehensive picture of the conditions that may be affected by the project or influence the impacts

108. Information is usually presented for different spatial levels, depending on the area of influence of different impact issues [e.g. project sites, immediately adjoining area (e.g. within 1 km), broader affected area or spatial feature (e.g. watershed, airshed), a biological feature or resource (e.g. forest, protected area, reef system), an administrative area (regional, national, trans-boundary)]. Information on the site, adjoining area and broader affected areas is normally the most critical, with larger scale information usually of less relevance.

109. Some data may have to be collected over an extended period of time, particularly for features that are seasonally variable (e.g. river flows) or difficult to identify during some periods of the year (e.g. deciduous vegetation species). When the ideal data collection period exceeds the environmental assessment period, data collection should continue over the minimum period required to obtain reliable data. This allows comparison of the conditions prior to and during project implementation, and management measures to be refined. Data showing trends in conditions over time is useful where conditions are changing (e.g. local population increase, district forest decrease).

110. Define the values of habitats that will be affected (on project sites and in the area of influence), describing the distribution, range and status of the species and biological communities present, and the location, status and main biodiversity values of nearby protected areas or other important areas for biodiversity. Biological baseline surveys can be time-consuming because detailed ground sampling is usually required and surveys may need to be conducted during a number of seasons to account for varying conditions. Industry recognized survey methods should be applied to ensure the integrity of the collected data and avoid project delays due to problems/inadequacies in data collection. Habitat adjoining the project site may have to be surveyed to determine the connectivity with habitat on the project site and to assess the likely edge effect of the project on this adjoining area.

## 4.6 Cumulative Impact Assessment

111. Cumulative impacts [10] are the combination of multiple impacts from existing projects, the proposed project, and anticipated future projects that may result in significant adverse and/or beneficial impacts that cannot be expected in the case of a stand-alone project.

112. During the process of identifying environmental and social impacts and risks, project assessments must (a) recognize that their actions, activities, and project their developments may contribute to cumulative impacts on valued environments and social components (VECs) on which other existing or future developments may also have detrimental effects, and (b) avoid and/or minimize these impacts to the greatest extent possible.

113. In some cases, cumulative impacts may occur because a series of projects of the same type are being developed; for example, when a number of transmission lines are constructed or planned within the same flyway or region. Such projects

## 4.7 Greenhouse Gas Emissions

114. Projects will conduct quantification and monitoring of greenhouse gases emissions annually in accordance with internationally recognized methodologies and evaluate technical and financially feasible and cost-effective options to reduce or offset project related greenhouse emissions.

## 4.8 Associated Facilities

115. Associated facilities that are not funded as part of the project (funding may be provided separately by the borrower/client or by third parties), and whose viability and existence depend exclusively on the project and whose goods or services are essential for successful operation of the project

116. Examples of associated facilities are a transmission line constructed by the government for the sole purpose of connecting an ADB-supported hydropower project to the existing electricity grid.

117. Even though the impacts and mitigation measures from the development of associated facilities do not have to be analyzed in detail in the EIA/IEE of the project financed by ADB, basic information about the main design features, their location, the significance of potential impacts, the required approval process, and institutional arrangements should be described in the EIA/IEE. ADB reviews these facilities as part of its due diligence to determine if the associated level of impacts and risks to the environment and people is acceptable, recognizing that the borrower/client should address these impacts and risks in a manner that is commensurate to the borrower/client's control and influence over the associated facilities.

[10] See IFC Good Practice Handbook, "Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets" (2013)

## 4.9 Social Screening and Categorization

118. During the project/subproject selection, the DGPC and BPC will examine alternatives to avoid and minimize the IR and IP impacts. Any unavoidable impact shall be mitigated and compensated as per ADB SPS and national legislation, and following this ESARF and selection/exclusion criteria. Once the site selection and exclusion criteria are met, the DGPC and BPC will complete the environmental and social screening checklist (Appendix 3) to determine the safeguards category. After completion of the checklist and safeguard categories are reviewed by ADB, the required assessment will be prepared based on SPS 2009.

119. ADB categorization of projects' Involuntary Resettlement (IR) and Indigenous Peoples (IPs) safeguards according to the SPS (2009) and ADB Operational Manual on SPS (OM, Section F1/BP Issued on 1 October 2013) and key document requirements are in Table 17.

**Table 15 Safeguard Classification According to SPS 2009**

| Category | Impact | | Assessment and Safeguard Document Requirement | |
|---|---|---|---|---|
| | IR | IP | IR | IP |
| A | Likely to have **significant** IR impacts: a category determined by its most sensitive component; considered **significant** if 200 or more persons will experience major impacts, which are defined as (i) being physically displaced from housing, or (ii) losing 10% or more of their productive land/assets (income generating). (Category A). | Likely to have significant impacts on IP: a category determined by its most sensitive component; impacts considered significant by assessing (i) the magnitude of impact in terms of (a) customary rights of use and access to land and natural resources; (b) socioeconomic status; (c) cultural and communal integrity; (d) health, education, livelihood, and social security status; and the recognition of indigenous knowledge; and (ii) the level of vulnerability of the affected IP community (Category A). | Resettlement plan (RP) including assessment of social impacts, compensation and entitlements (entitlement matrix) and livelihood improvement or at least restoration measures (indicative outline in SPS appendix)<br><br>However, for subject Project, Category A projects will be ineligible and dropped. | Indigenous Peoples plan (IPP) including assessment of social impacts, mitigation measures (indicative outline in SPS appendix)<br><br>However, for subject Project, Category A projects will be ineligible and dropped. |
| B | A proposed project is classified as category B if it includes involuntary resettlement impacts that are not deemed significant (Category B). | A proposed project is classified as category B if it is likely to have limited impacts on Indigenous Peoples (Category B) | RP including assessment of social impacts | IPP including assessment of social impacts |
| C | No IR impacts | Not expected to have impacts on IP | No further action is required; | No further action is required. |

| Category | Impact | | Assessment and Safeguard Document Requirement | |
|---|---|---|---|---|
| | IR | IP | IR | IP |
| | | | however, social due diligence report will be prepared to confirm no impact | However, social due diligence report will be prepared to confirm no impact |
| FI | Involves the investment of ADB funds to, or through a FI | Involves the investment of ADB funds to, or through a FI | ESMS commensurate with the nature and risks of the likely future portfolio to be maintained as part of the overall management system of FI | ESMS commensurate with the nature and risks of the likely future portfolio to be maintained as part of the overall management system of FI |

120. The checklists for involuntary resettlement and indigenous people's safeguards (Appendices 3b and 3c) will be used to screen subprojects for social impacts. Based on this, subprojects will be categorized accordingly. Based on the screening process, any subproject that will be pose significant impact and Category A for both IR and IP safeguards based on ADB's SPS 2009 and ADB OM, Section F1/BP Issued on 1 October 2013, and not meeting the screening criteria above, to be excluded from the project scope and are not eligible for financing by ADB. Based on the social screening, DGPC and BPC will confirm that each subproject is category B or C.

## 4.10 Environmental and Social Assessment Process

121. The REA and IR and IP checklists must be submitted to ADB for review of each subproject. ADB will review subprojects to ensure compliance with ESARF selection criteria.

122. All subprojects will require a proportionate and tailored environmental and social assessment, and applicable safeguard documents to be undertaken. Each assessment requires the preparation of either an EIA or IEE Report and associated Environmental Management Plan and RP (and IPP as applicable). Each assessment report and safeguard document is to be prepared by an environment and social experts (DGPC, BPC or with support of consultant) and will require site visits and field surveys of physical, biological, and socioeconomic conditions to determine the baseline environmental and social conditions in addition to meaningful consultation with affected communities and persons and relevant stakeholders. The social and environment experts will assess environmental and social conditions and potential impacts of the subproject and prepare assessment and safeguard documents to be fully in accordance with ADB's environment and social safeguard requirements (Appendix 1 of ADB SPS [footnote 2]) and Safeguard Requirements (SR) 2 (IR) and Safeguard Requirement (SR) 3 (IP) of SPS. Outlines of relevant documents can be found in the appendices of SPS (2009).

123. Assessment and safeguards documents must be submitted to ADB for review and clearance for disclosure, after which they must be disclosed on the PBC and DGPC websites

in English and APs language. The same will also be disclosed by ADB on its website in English.

124. Relevant assessment documents, and Environment Management Plan must be budgeted and included in the bidding and contract document for the Contractor (for social safeguards – reference to RP and IPP as applicable, and social provisions for contractors contract to be included) to ensure adequate budget is allocated for mitigation measures during implementation. Supervision of works with respect to environment, social, health and safety is required.

125. For social, the land must be leased by DGPC and BPC as applicable for any components. The social impacts of the restrictions to land used by communities before the project must be assessed and replacement land made available before impact so that people will have continued use of land to avoid any disruption to their livelihoods. Meaningful consultations and engagement with affected persons, communities and their representatives is required and be documented, and with local government and villagers .

126. Key process in safeguards due diligence is presented in Table 18 while details of the safeguards policy principles are in Appendix 1. For IR and IP safeguards, see SR 2 and SR 3 of ADB SPS.

**Table 16 Key Process in Safeguards Due Diligence**

| No. | Project Stage | Safeguards Classification | |
|---|---|---|---|
| | | **Involuntary Resettlement** | **Indigenous Peoples** |
| 1 | Screening and Categorization | • Uses an Involuntary Resettlement Impact Categorization and Screening Checklist<br>• Assigns categories based on potential impacts<br>(i) A – RP and social impact assessment<br>(ii) B – RP and social impact assessment<br>(iii) C – no further action, social due diligence report to be prepared for ADB approval<br>(iv) FI – ESMS required | • Uses an Indigenous Peoples Impact Categorization and Screening Checklist<br>• Assigns categories based on potential impacts<br>(i) A – IPP and social impact assessment<br>(ii) B – IPP and social impact assessment<br>(i) C – no further action, social due diligence report to be prepared for ADB approval<br>(i) FI – ESMS required |
| 2 | Safeguard Assessment | Elaborates and identifies displaced persons' entitlements, income and livelihood restoration strategy, institutional arrangements for implementation of RP, monitoring and reporting framework, budget, and time-bound implementation schedule | Specifies measures that IPs receive culturally appropriate benefits, identifies measures to avoid, minimize, mitigate or compensate for any adverse impacts, monitoring and evaluation arrangements, framework for continued consultation, budget, and time-bound actions for implementation of planned measures |
| 4 | Meaningful Consultation | • Starts early and continues during implementation<br>• Undertaken in an atmosphere free of intimidation, coercion<br>• Gender inclusive and responsive<br>• Tailored to the needs of vulnerable groups<br>• Allows for the incorporation of all relevant views of stakeholders | |

| No. | Project Stage | Safeguards Classification | |
|---|---|---|---|
| | | **Involuntary Resettlement** | **Indigenous Peoples** |
| 5 | Information Disclosure | ADB will post in its website the following:<br>•Draft RP/RF endorsed by borrower prior to appraisal<br>•Final RP endorsed by the borrower after the census of affected persons has been completed<br>•New RP or updated RP, and CAP prepared during implementation<br>• Resettlement monitoring reports submitted by borrower | ADB will post in its website the following:<br>•Draft IPP and/or IP planning framework including social impact assessment endorsed by borrower prior to project appraisal<br>•Final IPP upon completion<br>•New or updated IPP, and CAP prepared during implementation<br>•Monitoring report submitted by borrower |
| 6 | Grievance Redress Mechanism | Establish a mechanism to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about physical and economic displacement and other impacts with particular attention to affected vulnerable groups | Establish a mechanism to receive and facilitate resolution of affected IP communities' concerns, complaints, and grievances |
| 7 | Use of Standards | (i) Analyzes and summarizes national laws and regulations on land acquisition, compensation payment, and relocation of affected persons in the resettlement plan.<br>(ii) Borrower required to compare such laws and regulations with requirements of SPS 2009<br>(iii) If a gap between (i) and (ii) exists, the borrower will propose a suitable gap-filling strategy in the resettlement plan in consultation with ADB. | Borrower to retain qualified and experienced experts to do full social impact assessment |
| 8 | Monitoring and Reporting | Monitor and assess resettlement outcomes, their impacts on the standards of living of displaced persons, and whether the objectives of the resettlement plan have been achieved considering the baseline conditions and the results of resettlement monitoring.<br><br>Borrower to submit semiannual monitoring reports describing the progress of the implementation of resettlement activities and any compliance issues and corrective actions; semiannual internal monitoring reports for Category B projects; external and quarterly monitoring reports for Category A projects | • Prepare periodic monitoring reports on the progress of RP, IPP implementation, highlighting compliance issues and corrective actions, if any<br>• Borrower to submit semiannual internal monitoring reports for Category B projects; external and quarterly monitoring reports for Category A projects. The costs of monitoring requirements will be reflected in project budgets. |
| 9 | Unanticipated Impacts during Project Implementation | Borrower to conduct a social impact assessment (SIA) and update the RP or formulate a RP covering all applicable requirements: | Borrower to carry out a SIA and update the IPP or formulate a new IPP covering all applicable Requirements. |

## 4.11 Unanticipated Impacts

127. If unanticipated environmental impacts become apparent after the IEE has been cleared by ADB, DPGC and BPC must inform ADB, undertake meaningful consultations, and update the environmental assessment and EMP or prepare a new environmental assessment and EMP to assess the potential impacts, evaluate the alternatives, and outline mitigation measures and resources to address those impacts. These documents need to be cleared and disclosed before the related works start or are cleared to continue work.

# 5 Consultation, Information Disclosure, and Grievance Redress Mechanism

## 5.1 National requirements

National legislation in Bhutan places a significant emphasis on public consultation as a mandatory prerequisite for environmental clearance and development projects. The IEE and EIA regulations also include mandatory socioeconomic assessment and requirements for consultations with affected communities. The framework is primarily established by the Environmental Assessment Act 2000, the National Environment Protection Act 2007, and detailed in the Regulation for Environmental Clearance of Projects 2016.

Where development activities are proposed, the community in the project area must be consulted and informed regarding the proposed interventions. This is carried out through the local government, who is given prior information regarding consultation and the same is relayed by the Local Government to the community. During the consultations, the proponents are required to present the project, discuss potential environmental and social impacts and to seek the views of the community. During such times, the participants are encouraged to express their view which must then be documented and verified by the local authority. All documented consultations are required to be submitted to the Competent Authority (in this case, DECC) for review as part of the IEE/EIA approval process. There is no separate process for approval of Resettlement Plan documents but require the proponent to address socioeconomic impacts and document consultations with affected communities and persons. The Environmental Assessment Act 2000 and the Regulation for Environmental Clearance of Projects (RECOP) 2016 mandate specific disclosure points during the project approval cycle. Copies of all environmental assessment documents must be made available to concerned people and kept open for public inspection during the consultation process. For projects subject to a full Environmental Impact Assessment (EIA), the Secretariat is legally required to upload a project summary to its official webpage for public disclosure and comments at least one month prior to making a decision.

Once a decision on environmental clearance (relevant for EIA) is taken, the DECC must make a public announcement of the decision on their respective website within one month.

Documents related to environmental clearances must be kept on record by the DECC and made available to the public upon request.

The National Environment Protection Act 2007 (NEPA) establishes that any individual whose right to a safe and healthy environment has been affected, or is likely to be affected, has the right to seek legal redress. This includes cases where requests for information have been ignored or wrongfully refused.

The national system prioritizes amicable settlement first. Concerned parties must first seek to resolve grievances through informal dialogue. Aggrieved parties can also directly approach the DECC as per the EA Act 2000, or appeal to the court of law within 30 days of the DECC commission decision. The government may also establish an Environmental Tribunal to hear specific environmental disputes.

At the community level, grievances are first amicably resolved. If this does not work, then grievances are raised at the Chiwog and Gewog levels where grievance committees are mandated to resolve such conflicts. Such committees only deal with civil cases. The process is advertised through YouTube[11]

## 5.2 Meaningful Consultation

128. Public and meaningful consultation provides a platform to inform all affected people and other concerned stakeholders about the project, discuss and incorporate relevant views of the stakeholders in subproject design, identification of implementation issues, formulation of mitigation measures, identification of benefits and opportunities and improve coordination mechanisms. All subprojects need to be prepared and implemented with the involvement of the affected people and other concerned stakeholders. Meaningful consultations per ADB's Safeguard Policy Statement, 2009 requirements will need to be documented in the RPs and IEE report, and then continue during subproject implementation with details documented in the environmental and social monitoring reports.

129. As per ADB's SPS, 2009 requirements, DGPC and BPC will ensure to carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. Meaningful consultation is a process that:

- begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle.
- provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people.
- is undertaken in an atmosphere free of intimidation or coercion.
- is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups
- enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.
- Consultation will be carried out in a manner commensurate with the impacts on affected communities. The consultation process and its results are to be documented and reflected in the environmental assessment report (Section 4, paragraph 19 of Appendix 1, p33)."and social safeguard documents

130. DGPC and BPC will conduct consultations and provide relevant environmental and social information of respective subprojects in an accessible place and in a form and language understandable to affected people and other stakeholders. A board displaying project details shall be erected at construction sites for public information in local languages.

[11] https://www.youtube.com/watch?v=jlq3aMwOr54

## 5.3 Methodology

131. Identification of Stakeholders. BPC and DGPC for respective subprojects will identify the stakeholders that need to be consulted. Primary stakeholders are those that may be directly affected or likely to be affected directly or indirectly (i.e., beneficial or adversely affected) by the project. Secondary stakeholders are individuals or groups whose interests may be affected by the project, and who may have the potential to influence project outcomes, if any.

132. Approach: Guided by SPS (2009), the following principles of consultation will be applied: (i) holistic and project cycle approach (atmosphere free of intimidation or coercion, conducted from project preparation to completion), (ii) informed participation and feedback (provides opportunities for suggestions/comments, adequate and understandable information), and (iii) gender sensitive and inclusive (equal access to information, tailored to the needs of disadvantaged and vulnerable groups).

133. Participants will be informed of the subproject and the potential environmental impacts. After the presentations, the participants will be given the opportunity to ask questions or raise any relevant concerns. Discussions will be conducted in Bhutanese or English. A subproject brief flyer in a local language will be made available during the consultations. BPC and DGPC will ensure the representation of women during consultations.

134. Record of consultations. The PMU will document the consultations by preparing an attendance of participants with name, gender, occupation or affiliated organization (if any), signature, date of consultation and location; a summary of concerns/issues raised, and suggestions provided including the responses of NEA/PMU on their questions.

135. People affected by the subprojects are those living and working near the subproject components. It includes communities, businesses, offices, health centres, schools and religious bodies.

136. The approach for the consultation is to be a combination one-on-one and community group discussions with relevant government agencies, and representatives, living and working near the subproject components, and other concerned stakeholders with the aim of engaging them in the subproject planning process and enabling a sense of involvement, co-ownership and acceptance of the project. Consultations for each sub-project must ensure a representative percentage of the community are consulted, as well as gender balance and representation of vulnerable groups. If that is not possible at a public consultation a separate gender focus group must be held to ensure the concerns of women and other identified vulnerable groups (e.g., below poverty line) are heard. Meaningful consultations will inform participants of details of the subproject and the possible environmental and social impacts, collect views and opinions from affected persons, and ensure the subproject responds to them. Consultations should also convey how DGPC/BPC will ensure community health and safety during installation.

137. The dates, attendees (by gender), details of any participants vulnerabilities, topics covered, and views and opinions raised should be recorded and included in the SIA, RP, SDDR as applicable, and IEE report, along with details of how DGPC/BPC has responded to them.

138. For all subprojects, DGPC and BPC will provide at least one-month advance notice to local communities about the schedule of, location plan, and details of planned installation works, including details of any disruption along access roads and from storage areas to be used through consultation meetings, notices at site, and gewogs. Advance notice will help manage any disruption and disturbance and potential conflicts with the local communities. During the subproject implementation, DGPC and BPC will coordinate and schedule any public consultation and gewog meetings with the contractor prior to the start of civil works.

139. DGPC and BPC will keep communities updated of progress and changes in schedule throughout installation works, especially those with properties adjacent to active installation works, access roads or storage areas to keep them fully informed of the nature of works and their schedule. DGPC will coordinate and schedule any public consultation and gewog meetings with the contractor as needed.

140. DGPC and BPC will undertake construction and electrical safety community awareness raising activities in local communities and with local schools prior to construction and again on the completion of works having greater emphasis on electrocution and other operational risks to members of the public. DGPC will coordinate and schedule community awareness raising activities with the contractor.

## 5.4 Information Disclosure

141. ADB's Safeguard Policy Statement 2009 requires the disclosure of project information, impact and mitigation plans. DGPC and BPC will ensure that key information on the project and subprojects will be disclosed at the early stage through public consultations, leaflets, individual meetings, and other media forms. The safeguard documents and assessments as project information document will be posted in its websites of ADB English version and BPC and GGPC in national languages and /local language understandable to affected persons and communities, including the following documents after cleared by the ADB.

- Final SIA, RAP, EIA and IEE reports
- Updated SIA, RP, EIA and IEE reports
- Social due diligence reports (confirming absence of IR and Ips impacts)
- Corrective action plans prepared during subproject implementation, if any;
- Semi-annual environmental and social monitoring reports during construction phase for Category B projects and quarterly environmental and social monitoring reports during construction phase for Category A projects
- Annual environmental and social monitoring reports during operation phase until ADB issues a project completion report

142. DGPC and BPC will disclose the EIA/IEE, RP, social due diligence reports, corrective action plans as applicable and environmental and social monitoring reports on their respective websites* and provide relevant environmental information, including information from the relevant documents in a timely manner, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders. In case of any changes in the design, the EIA/IEE, RPs will be updated and disclosed on EA websites upon approval by ADB.

143. For the benefit of the community, a summary of all EIA, GRM, SIA, RAP and IEE reports will also be translated in Dzongkha and made available at: (i) offices of DGPC and BPC; (ii) gewog office, and (ii) site offices of the contractors. The project contact details will be posted on the sign board at the construction site. These contact details will be updated as required. The project will seek the assistant of the gewog office to disseminate the information regarding the GRM through local representatives

144. During implementation, if there will be updates on the RP due to unanticipated environmental and social impacts or changes in the design, the updated and/or revised RP will be similarly submitted to ADB for review, clearance and disclosure to their website.

## 5.5 Grievance Redress Mechanism

145. As per SPS 2009, DGPC and BPC will establish project level grievance redress mechanism (GRM) for receiving and facilitating the resolution of concerns, complaints, and grievances of people affected by the project's environmental performance. The Project GRM required should be:

(i) Scaled to the risks and adverse impacts of the project;

(ii) Address affected people's concerns and complaints promptly using an understandable and transparent process that is gender-responsive, culturally appropriate, and readily accessible to all segments of the affected people at no costs and without retribution.

146. The mechanism should not impede access to the country's judicial or administrative remedies. The affected people will be appropriately informed about the mechanism."

147. Key elements of the GRM will include the following:

- Designate a focal person with contact details to manage the GRM
- Disclose publicly the details of the focal person, procedures (or flowchart) on filing a complaint, and the complaint form through the local office, project website and billboards at the construction site(s)
- Form a grievance redress committee (GRC) to resolve the complaints and members will ensure representation of women and/or member from local community
- Keep the records of complaints received and resolved and a summary will be included in the environmental monitoring report (EMR) submitted to ADB semi-annually during construction phase and annually post-construction phase
- Complainants can seek redress through the legal system of Nepal at any point in the GRM process.
- Should efforts to resolve the complaint through the GRM and concerned ADB operations department fail, and the complainant is still dissatisfied, the Accountability Mechanism of ADB can be accessed. [AS4.1]

148. Accordingly, BPC and DGPC will establish a responsive, readily accessible, and culturally appropriate project level GRM capable of receiving and facilitating the resolution of affected persons' concerns and grievances about the physical, social and economic impacts of the project. Local, project-based grievance redress mechanism is important in the implementation of the project and its subprojects since any complaint and concern of the affected people must be addressed promptly at no cost to the complainant and without retribution. Project GRM, structure and complain resolution process to meet national requirements and incorporate local practices.

149. Complaints about environmental, social, consultation and information disclosure, health and safety performance of projects during the construction phase will be handled by the grievance redress committee (GRM) established for the project and including the representatives of the contractor and DGPC, BPC, relevant stakeholders, government agencies, local government, affected persons and/or their representative (s), supervision staff at the local level where the subproject is located for expeditious resolution of complaints in coordination with respective implementing agencies or Environmental Units. If they cannot be resolved at this level, they will be raised to DGPC and BPC project management. Complaints during the operation phase can also be brought to the attention of the O&M team or Environmental Unit under DGPC and BPC.

## 5.6 GRM Process DGPC

150. The GRM shall be established and functional by loan effectiveness date and in advance disclosed during the projects/subprojects public consultation and gewog meetings in the subproject preparation and construction phases. DGPC and BPC (PMU) and the Contractor will designate a community engagement officers/GRM focal (PMU project level focal and Contractor site level focal). All staff of DGPC, BPC, PMU and the Contractors including the local and central government and other entities directly involved in the GRM process will receive training prior to the start of construction. Any concerned person or group of people can file a complaint through the GRM, at any time and at no cost. The complainant is not restricted to seek redress through the legal system at any point in the GRM process.

151. The focal person will receive, record, and sort complaints, forwards the complaints to the proper person, and monitors the status of the complaints. A logbook complaint registration and monitoring database will be created to ensure that complaints are resolved and acted on in a timely manner. A complaint record will include: (i) contact details of the complainant, (ii) date the complaint was received, (iii) nature and type of complaint, (iv) decisions or actions taken, and (v) date the complainant was informed of the decision. To ensure that grievances and complaints regarding any social and environmental issues, consultations and information disclosure will be addressed in a timely and satisfactory manner, the GRM will follow a three-tiered system, starting at the local level.

152. The issues raised in the GRM will be monitored monthly for the status of resolution, the actions being taken and closure out and reflected in monitoring reports ti be submitted to ADB. Complaints, their nature, resolution, action status, and close out must be reported in the progress reports and environmental and social monitoring reports. Complaints, their nature, resolution, action status, and close out must be reported in the progress reports and environmental and social monitoring reports.[12]

**First level of GRM**. Affected people can file their complaints at any level of the project management and implementation parties and entry points as accessible to APs. During construction, the contractor's GRM focal is responsible for this first formal level. Responsibility will be handed over to BPC, DGPC (for their respective subprojects) site engineer during operation. Aggrieved persons may first approach the contractor's GRM focal and/or project manager in case of complaints related to construction. The grievance/complaint must be recorded in the site register and the contractor/site engineer must provide an acknowledgement to the complaint within 2 working days. In case, the

[12] (* Link to DGPC website: https://www.drukgreen.bt/dgpc-hydropower-solar-wind/. Link to BPC website: https://www.bpc.bt/environmental/)

complaint is not resolved at this level, the aggrieved persons can then file a complaint with the second level. Aggrieved persons are entitled to lodge complaints regarding any aspect of the loss of assets, entitlements, or rates of payment as well as any other project-related environmental or social issues, and consultations and disclosure and access to information. Complaints can be made verbally or in written form. Actions to resolve the complaints made by the aggrieved person should be confirmed within 5 days and recorded in the grievance register. Complaints, their nature, and resolution should be documented and records maintained, and regularly reported (updates every two weeks) to the BPC, DGPC PMU Level GRM Focal, mentioned in the quarterly progress reports and environmental and social monitoring reports documented and records maintained.

153. **Second level of GRM**: At this level, the contractor's GRM focal and/ or project manager will coordinate with the PBC, DGPC PMU which should be in place before project implementation. It will be handed over to the DGPC plant manager during operation. The aggrieved person who filed the complaint (or representative/s from the aggrieved household/s) will be called to present his or her case and deliberation on the case will be done through proper hearing or mediation. It will be the responsibility of the PMU/DGPC, BPC plant manager to resolve the issue within 14 working days from the date the complaint is received. Minutes of the meetings will be kept, and the resolution provided will be recorded in the grievance register for purposes of project monitoring.

154. If the complaint is unresolved at this level, the PMU/DGPC plant manager will facilitate submission of the complaint by the aggrieved person to the Grievance Redressal Committee (GRC), and if required, submit the complaint to the GRC

155. **Third level of GRM.** The PMU / DGPC, BPC project manager within 14 days will bring the complaint to the Grievance Redress Committee (GRC) at the MoENR level. The Grievance Redress Committee will comprise of: (i) Secretary, MoENR (Chairman); (ii) Director, DGPC (Member Secretary); (iii) Project Director, PMU; (iv) Legal officer, MoENR; (v) Environment and Social Safeguards Officer of DGPC, BPC; (vi) Project Manager of the site concerned, affected persons and/or her/his representative and (vii) at least 2 Representatives from local NGOs. It will be the responsibility of the grievance redressal committee to resolve the issue within 15 working days from the date the complaint is received. In the event, the grievance is still not resolved; the matter may be elevated by the aggrieved person to an appropriate court of law. The court will have the final authority to approve or reject the case. Aggrieved persons may seek recourse through the legal system at any stage of the GRM process.

156. The GRM notwithstanding, an aggrieved person shall have access to the country's legal system at any stage. This can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM.

157. The aggrieved persons/communities can also use the ADB Accountability Mechanism (AM) by directly contacting (in writing) the Complaint Receiving Officer at ADB headquarters Eligibility of complaints by ADB AM will include that the complainants have first made good faith efforts to resolve the complaints at project staff at operations level. Complainants may approach the project level GRM.The complaint can be submitted in any of the official languages of ADB's Developing Member Countries. The project GRM, ADB Bhutan Residence Mission, and eligibility for complaints review by ADB Accountability Mechanism information will be included in the information pamphlets to be distributed to the aggrieved communities, as part of the project GRM awareness, consultations and disclosure activities.

158. All entries to the grievance register, whether resolved at the initial informal level on-site or at any of the three levels of the formal GRM, along with updates on ongoing or completed actions taken to address the grievance/complaint, will be included in monthly reports by the Contractor to DGPC and the monthly progress report and semi-annual environmental and social monitoring reports from DGPC, BPC to ADB.

159. PIAC will monitor the overall grievance resolution process along with DE and will recommend any improvements to increase the efficiency, timeliness, and fairness of the process.

160. GRM for Operational Phase. GRM operationalization will be handed over to BPC, DGPC following construction. DGPC upon taking up the responsibility of the operation of the solar power plant shall ensure the following:

(i) GRM as per the above requirements should continue to be operationalized,

(ii) There must be a specific GRM focal person for environmental and social grievances reporting. This is particularly important during the initial phase of the project operation where the actual impacts of the project will be known on the ground.

(iii) Proper recording of grievances and their solutions should be kept with the site office and submitted to national agencies as and when sought.

161. For the operation of the solar power plant, the operational monitoring will be supplemented by the Department of Climate Change (DECC) and Electricity Regulatory Authority (ERA)], including the licensing and Environmental Clearance Terms of Reference. It shall be the responsibility of DGPC/operating agency to adhere to these requirements

162. Budget. DGPC and the contractor, and DGPC during operation, will need to provide resources (staff and budget) for the GRM that will sufficiently cover the costs of its operations including initial awareness-raising / communication, capacity development training, support services, field inspections, meetings, documentation, supplies, etc.

**Table 17. GRM process**

| GRM Level | Composition | Maximum timeline |
|---|---|---|
| First Level of GRM (Site-level) | Responsibility: Contractor's project manager supported by contractor's GRM focal (DGPC, BPC site engineer on operation)<br>Other parties involved, as applicable: Aggrieved person or up to two representatives of aggrieved person (gender-inclusive)<br>Contractor's representative, BPC, DGPC's Project Manager | 2 days: confirmation of receipt to the complainant<br>5 days: a meeting between contractor's project manager and complainant and action plan agreed upon (or escalation to level 2)<br>Maximum 15 days: action taken, and grievance resolved, although any environment safeguard grievances that are an emergency or pose a health and safety risk to workers or community members must be resolved immediately by the contractor<br>Information and reporting to DRE GRM focal on a two-weekly basis by the contractor |

| GRM Level | Composition | Maximum timeline |
|---|---|---|
| Second Level GRM | Responsibility: DGPC's BPC project manager is supported by DGPC GRM focal (DGPC project manager on operation) | 3 days: confirmation of receipt to the complainant |
| (Project-level) | Other parties involved, as applicable: Aggrieved person or up to two representatives of aggrieved person (gender-inclusive)<br>Representative of the contractor<br>DGPC, BPC environment and social safeguards officer<br>Local rural office and community organization representative | 14 days: a meeting between the project manager and complainant and action plan agreed upon (or escalation to level 3)<br>Maximum 15 days: action taken, and grievance resolved<br>Information and reporting to DRE board and management by DGPC, BPC GRM focal. |
| Third Level of GRM (Committee level) | Responsibility: DGPC project manager as facilitator of GRC, handing over to DGPC project manager upon operation<br>Other parties involved, as applicable: Aggrieved person or up to two representatives of aggrieved person (gender-inclusive)<br>DGPC, BPC GRM focal<br>Representative of the contractor<br>Government representatives as applicable depending on environmental or social issues being resolved (e.g., land revenue, survey, forest office, agriculture office, municipality representative, etc.)<br>NGOs / CSOs representatives as required depending on environmental or social issues being resolved | 2 days: confirmation of receipt to the complainant<br>15 days: grievance redress committee meeting and the action plan agreed upon<br>Maximum 44 days: action taken, and grievance resolved<br>Information and reporting to DGPC board and management by DGPC, BPC GRM focal |

## 5.7 BPC GRM Process

163. A project-specific Grievance Redress Mechanism (GRM) will be established and managed by the Construction Project Office (CPO) to ensure accessible, transparent, and timely resolution of grievances. The Project Manager (PM) holds overall responsibility for implementation and operation of the GRM. The mechanism is designed to receive, address, and resolve complaints from affected persons regarding land acquisition, compensation, resettlement, and any other project-related concerns, aiming to resolve issues at the project level and prevent escalation to national courts or the ADB Accountability Mechanism

164. Grievances may be submitted orally or in writing, including via an online platform accessible through the BPC website (https://www.bpc.bt/environmental). A pamphlet detailing the GRM process, contact information for the CPO Grievance Focal Points, and the project's objectives will be distributed in Dzongkha during construction consultations

165. Grievance Redress Process and Timeframe: The GRM operates through multiple redressal levels:

**Step 1: Informal Resolution.** Affected persons /Community members should first attempt to resolve grievances locally with the company's local field staff or community liaison officer (CLO). All grievances or complaints received to be registered (as per details below) and process, decision and actions documented If unresolved within five working days, the grievance proceeds to step 2 formal submission.

**Step 2**: **Formal Grievance Submission**. The community members can submit grievances through a) written forms (available at local offices and online, in local languages and pictorial formats for accessibility), b) dedicated email address or hotline (with assistance for those with limited literacy), c) Grievance boxes placed in accessible community centres and public spaces. The grievance should include information such as a) Name and identification of the parties to the dispute, b) the identity of the complainant or the victim shall be optional (for anonymity), c) The place where the dispute exists, d) Subject matter of the dispute, e) Description of the issue with relevant details (dates, incidents, witnesses, etc.), f) Desired resolution or outcome.

**Step 3**: **Acknowledgment**. The Grievance Redressal Officer (GRO) or CLO shall acknowledge receipt within 48 hours and provide a resolution timeline.

**Step 4**: **Investigation**. a) The Grievance Redressal Committee (GRC), comprising the GRO, CLO (as permanent members), and additional members as needed (ensuring gender and social diversity), conducts a thorough and impartial investigation. b) For complex cases, a small investigation sub-committee (1–2 permanent members, with additional ad hoc members as needed) may be formed to ensure impartiality and practicality. c) Investigation methods include site visits, interviews, and document review. d) Investigations are completed within 7–14 days, depending on complexity.

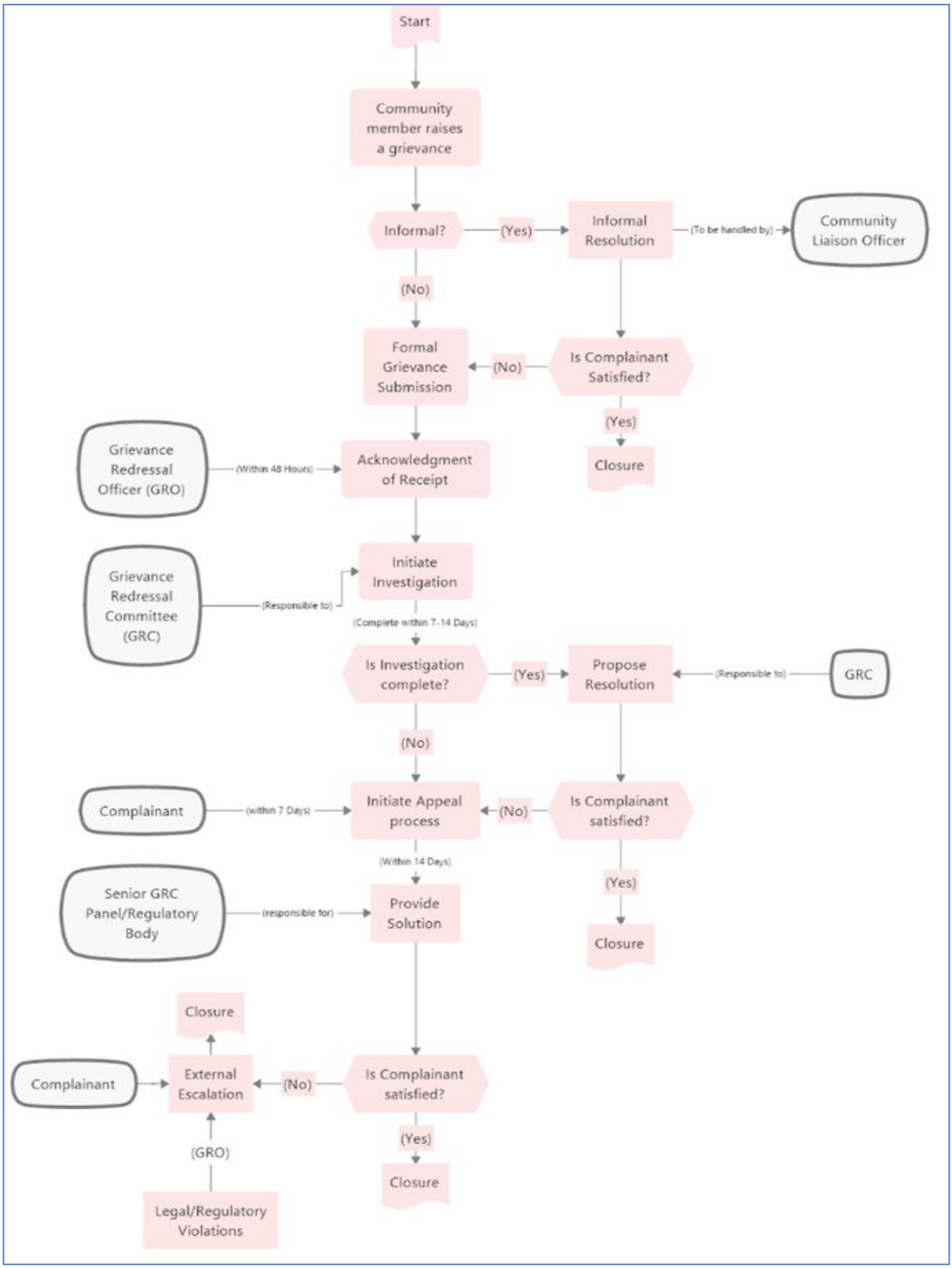
**Step 5: Resolution**: Based on investigation findings, the GRC proposes a resolution, which may include: a) Corrective actions (for instance repairing equipment, resolving billing errors, infrastructure repairs, b) Compensation for damages or losses, c) Policy changes or community engagement initiatives d) Referral to external authorities if necessary. Resolution actions are aligned with the specific types of grievances reported (for instance power supply, construction impacts, environmental or social issues). Resolution is communicated in writing to the complainant and, if applicable, the community.

**Step 6: Appeal**. If the complainant is dissatisfied with the resolution, responsible project staff will forward it to appeal to a higher authority (e.g., a senior GRC panel or regulatory body) within 7 days of receiving the decision. The appeal shall be reviewed, and a final decision shall be communicated within 14 days from the receipt of appeal.

**Step 7**: **Closure.** The appellate body's decision shall be final for the project level GRM and the case is formally closed with confidential record-keeping if applicable. The complainant, without prejudice and discrimination, shall have the right to withdraw the complaint after submission of a written application at any stage of dispute resolution.

94. The GRM notwithstanding, an aggrieved person shall have access to the country's legal system at any stage. This can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM.

**Figure 2: DPC GRM Flow Chart**



## 5.8 Alternative Grievance Resolution Option

166. The GRM notwithstanding, an aggrieved person shall have access to the country's legal system at any stage. This can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM.

167. The affected persons may approach the i) ADB Bhutan Resident Mission to be provided in RPs or ii) the ADB project officer contact information available in ADB project website to address the complaint. If still dissatisfied with the result of their interaction with ADB's Resident Mission or project officer, complainants may send their complaint to the ADB Accountability Mechanism by directly contacting (in writing) the Complaint Receiving Officer at ADB headquarters. The complaint can be submitted in any of the official languages of ADB's Developing Member Countries. The ADB Accountability Mechanism information will be conveyed during public consultation and gewog meetings.

## 5.9 Information Dissemination

168. DGPC, BPC will be required to ensure the following:

- Disclose the GRM process with contact details on the BPC, DGPC website and at the site level and ensure details of GRM process with contact details of nominated members conveyed to affected persons and other stakeholders
- Identification of GRM focal of the contractor and BPC, DGPC site supervisor and posting of contact details.
- DGPC, BPC and contractors to ensure that the signage is prominently visible at the installation site detailing site-level GRM focal contact details.
- DGPC, BPC to undertake community awareness raising on the GRM including the process and means of submitting a project grievance.
- Consultations, disclosure and Awareness raising activities are to be documented in RPs, SIA, IEE report and semi-annual environmental and social monitoring reports.
- The contractor's GRM focal and BPC, DGPC site supervisor will keep the local communities informed of the status of work and be readily available on-site to receive documents, and deal with any grievances at the site level.
- DGPC, BPC and contractors to carry out awareness raising for workers about the GRM at the start of their employment on site including disseminating GRM contact details on noticeboards at construction site offices.

Encourage use of the GRM project GRM for efficient resolution yet clarify that this does not prevent affected persons from pursuing any legal action, if they feel it is needed, and inform communities about the ADB Accountability Mechanism and eligibility criteria for making good faith efforts to resolve grievances at project level and ADB operation departments, their possibility to resort to it if any grievance is not resolved by the project level GRM.

169. Documentation Information on the complaints received including contact details of the complainant, date when the complaint was received, type of complaint, decisions or actions taken to resolve the complaint, and the date the complainant was informed will be kept by the PMU, DGPC, BPC. A summary of the complaints received and resolved will be included in environmental monitoring reports to be submitted by the PMU to ADB semi-annually during construction stage and annually during project implementation from effectiveness date and the post-construction stage.

170. Disclosure of information. The PMU will provide the details of the GRM through: (i) community awareness raising during community meetings, (ii) pamphlets distributed to the

public in the direct vicinity of the project site in English, and translated in local language as applicable; and (iii) notices on the radio and/or local newspaper, at local DGPC, BPC offices, and on the website of DGPC, BPC. Details to be provided are: (i) designated focal or contact person, email address, a hotline phone number (and an alternate phone number), and (ii) a simplified flowchart on how to file a complaint. The number of grievances recorded and resolved will be similarly disclosed displayed/disclosed.

## 5 Institutional Arrangements and Responsibilities

### DGPC

171. DGPC will serve as the executing and implementing agency for solar project development. DGPC will be overall responsible for impact assessments, safeguards planning and implementation DGPC is responsible for ensuring the safeguards, selection criteria and avoiding and minimizing the adverse social and environmental impact, planning safeguard and mitigation and compensation measures for unavoidable impact, and preparing the safeguard documents as per requirements of and national laws, in pursuing solar development through various approaches, including sole ownership, public-private partnerships (PPP), strategic partnerships, and privately-owned models. The PMU will assume full responsibility for all aspects of safeguards in solar project development and implementation, from initial site prospecting and feasibility studies to project handover to the appropriate Special Purpose Vehicle (SPV) once a project is ready for implementation.

172. The key responsibilities on social and environmental safeguards include, but are not limited to, the following:

- Identify and assess potential sites for solar projects, according to environmental and social criteria and screening described in section above, conducting preliminary studies to evaluate site suitability, including technical, social, environmental, and geographic data collection.
  Perform in-depth feasibility studies for selected sites, covering social and environmental impact assessments, avoiding and minimizing such impact by location and design alternatives, with consideration of financial modeling, and technical evaluations to confirm project viability and sustainability.
- Develop comprehensive Detailed Project Reports (DPRs) that cover project design, engineering, cost estimates, and risk assessments, ensuring DPRs serve as detailed blueprints for stakeholders and implementation teams.
- Prepare all necessary tender documentation, including technical specifications, scope of work, and evaluation criteria to ensure clarity for competitive bidding and alignment with project requirements.
- Conduct and oversee the tendering process to ensure transparency and competitiveness, evaluate bids, and award contracts to qualified candidates meeting technical and financial standards.
- Transfer projects to the implementation team with a complete project roadmap, necessary documentation, and clear guidelines to facilitate seamless project execution.
- Monitor project progress to ensure timely completion and adherence to quality standards, track milestones, address issues as needed and maintain oversight until project objectives are achieved.

- Conduct testing and commissioning activities to verify operational readiness, ensuring all systems meet performance and safety standards before transitioning to the operational phase.
- Assist management in sourcing financing and liaise with public-private partnership (PPP) and Independent Power Producer (IPP) candidates, fostering strong relationships with stakeholders to align with financial and strategic goals.

173. The Solar Project Division under Projects and Contract Department, headed by a General Manager is responsible for the implementation of all the DGPC fully owned Solar PV projects. While the Division oversees the implementation of the PV projects, the implementation of each of the projects is entrusted to a project-based team led by a Project Manager. The Solar Project Division will function as the Project Management Unit for the implementation of Solar PV Projects who will carry out the tendering and oversee the implementation and reporting to ADB.

174. A Project Implementation Team (PIT) for Subproject 1, led by a Project Manager will be constituted under the Solar Project Division, be responsible for project management, supervision of the works of the Engineering Procurement and Construction contractor and work with the Project Implementation Assistance Consultants for the Subproject. The dedicated PITs will be constituted for each of the upcoming subprojects.

175. The Project Implementation Assistance Consultants (PIAC) will support PMU and PIT in overseeing project implementation, including a national EHS supervisor to monitor implementation of the EMP for the solar power plant

## 6.1 BPC

176. Bhutan Power Corporation Ltd (BPC) will be implementing agency and overall responsible for Transmission Line, and associated components, impact assessments, safeguards planning and implementation.

177. It is responsible for ensuring the safeguards, selection criteria and avoiding and minimizing the adverse social and environmental impact, planning safeguard and mitigation and compensation measures for unavoidable impact, and preparing the safeguard documents as per requirements of and national laws, in developing the power evacuation systems for the solar subprojects. The Construction Division under the Construction & Procurement Department as the Project Management Unit (PMU), will assume full responsibility for all aspects of the environmental and social safeguards, from initial site prospecting and feasibility studies to project handover once the projects are completed. The key responsibilities on social and environmental safeguards include, but are not limited to, the following:

- Identify and assess the most feasible routes for the transmission line projects, conducting feasibility studies to evaluate site suitability, including technical, social, environmental, and geographic data collection.
- Perform in-depth feasibility studies for selected sites, covering social and environmental impact assessments, avoiding and minimizing such impact by location and design alternatives, with consideration of financial modeling, and technical evaluations to confirm project viability and sustainability.
- Prepare all necessary tender documentation, including technical specifications, scope of work, and evaluation criteria to ensure clarity for competitive bidding and alignment with project requirements.

- Conduct and oversee the tendering process to ensure transparency and competitiveness, evaluate bids, and award contracts to qualified candidates meeting technical and financial standards.
- Transfer projects to the implementation team with a complete project roadmap, necessary documentation, and clear guidelines to facilitate seamless project execution.
- Monitor project progress to ensure timely completion and adherence to quality standards, track milestones, address issues as needed and maintain oversight until project objectives are achieved.
- Conduct testing and commissioning activities to verify operational readiness, ensuring all systems meet performance and safety standards before transitioning to the operational phase.

## 6.3 Project Implementation Arrangement (BPC)

178. The Construction Division under the Construction & Procurement Department, headed by General Manager will oversee the implementation of the ATS of the subprojects including procurement, contracting, supervision and monitoring, and reporting to ADB.

179. The Construction Project Offices (CPO) under the Construction Section, headed by Project Managers will report to the Construction Division. The CPOs will be responsible for the day-to-day site activities including direct supervision of all co

## 6.4 DGPC/PMU Roles and Responsibilities

180. DGPC will be the executing and implementing agency and their management will establish a PMU to be responsible for day-to-day management of project implementation during pre- construction and construction including EMP and RPs (periodic safeguard monitoring reports, other environmental and social safeguard documents as corrective actions, livelihood restoration plan as applicable) preparation and implementation, supervision, and monitoring of their contractors' performance as well as establishment of the GRM and resolution of any grievances received. The PMU will be supported by an E&S Officer. DGPC will delegate relevant detailed design, pre-construction, and construction measures to its contractor through the contract. It will also put in place the institutional arrangements to ensure BPC will follow the EMP requirements (not just RGOB regulatory requirements) in undertaking the associated transmission system works and its operation and maintenance. However, DGPC, BPC will have ultimate responsibility for ensuring the provisions of the RP EMP are implemented by all parties concerned. During project implementation, DGPC is responsible for the following activities (not an exclusive list):

- Ensuring adequate budget, institutional/management support, and staff resources are allocated to implement, supervise, and monitor the RPs (other social safeguard documents as will be applicable) during the project and RP implementation, and the EMP during the O&M and decommissioning stages.
- Ensuring that all DGPC, BPC E&S Officers and the Plant Management Team support and attend all capacity development and training activities provided, and to facilitate the provision of the training venues etc.
- Adopt a zero-tolerance approach to OHS risk on the project, enforce all DGPC, BPC staff to comply with the OHS requirements of the EMP including the wearing of appropriate PPE.

- Implementing the EMP during the O&M and any decommissioning stages of project implementation and complying with any requirements set in the national environmental clearances.
- Implementing the RP during project implementation according to the approved RP and reporting on progress
- Monitoring and reporting on RPs (social safeguard documents as applicable) during the project implementation, and EMP implementation during operation, including to ADB for at least the first year of operation up until the ADB project completion report (usually 1-2 years after financial close) or longer period if required (Section E)
- Undertaking environmental monitoring as set out in the EMoP (Appendix 13) during O&M and decommissioning and documenting qualitative and quantitative monitoring results.
- Thoroughly investigating all unanticipated impacts, near-misses, and accidents; preparing a detailed incident report where applicable, identifying and undertaking appropriate corrective action particularly to avoid any repetition of near-misses and accidents.
- Upon handover, update the community liaison/consultation plan and continue ongoing consultation by informing affected communities of the change in management team, all ongoing consultation, such as, minutes of the meetings will be documented in the ESMRs submitted to ADB.
- Locally disclosing environmental safeguards documentation including DGPC website publication.
- Developing an O&M Plan reflecting operation and maintenance-related measures to be followed by the Plant Management Team.
- Upon any decommissioning developing a Decommissioning EMP reflecting construction-related measures in relation to the dismantling of equipment and restoration of the sites and other specific activities like transport and disposal of used PV panels and electrical equipment.
- Developing and taking all requisite corrective action in case of any non-compliance with the EMP during implementation including repair of any property damage and financial compensation (insurance) for any health and safety incidents.
- Update the RPs as needed and for any unanticipated IR impact, and prepare IPP for any subprojects posing impact on IPs as per ADB SPS.

181. For the O&M and decommissioning phases, any contractors hired for major maintenance works on decommissioning of the solar power plant will be supervised and monitored by DGPC with their roles and responsibilities the same as those of the contractors for construction.

## 6.6 Environmental and Social Safeguards Staffing

182. The Environment Unit (EU) under the Projects and Contract Department, DGPC will be responsible for environmental and social safeguard aspects of the project. All environmental and social advisory/guidance and expertise related to safeguard policy, planning, programs, project oversight, monitoring and reporting to donors as per national and donor requirements fall within its mandate

183. EU will support the PIU in preparing, supervising and monitoring subprojects ensuring project and subproject compliance with the national and local statutory and legal requirements, ADB's SPS 2009, loan covenants, the ESARF, and any EMP for category B subprojects. One member from the EU will be nominated as the full-time Environment and Social Officer in the PMU to look after the environment, health and safety, and social issues. The officer must be available for the entire project duration and have sufficient time set aside to provide inputs up until issue of the ADB project completion report. The Environment and Social Officer will work closely with the Environmental Consultant and the Health and Safety Consultant of the PIAC in the implementation of the Project.

184. The Environment, GIS & Survey Section (EGSS) under the Construction Division, BPC will be responsible for all environmental and social safeguards aspects of the ATS for each subproject. The Section will support the Construction Project Offices to maintain compliance with national statutory requirements, ADB's SPS 2009 requirements, loan covenants, the ESARF, RP, and the EMP for the ATS projects. Environment Officers from the EGSS will be attached with each CPO to look after the environment, social and health and safety issues. The officers will be allocated for the entire project duration and will be responsible for assisting BPC with safeguard compliance in the project implementation with important inputs for its project completion.

## 6.7 Project Implementation Assistance Consultant (PIAC) Roles and Responsibilities

185. The PIAC will include a national EHS supervisor to support DGPC/PMU by undertaking the following activities (not an exclusive list):

- The PIAC will document the project's compliance monitoring system in an environmental supervision procedures manual so that all parties have a clear understanding of their roles including regular monitoring tasks to be undertaken, checklists to be used and procedures to be followed. This would include roles and responsibilities of various parties, lines of communication, checklists to be used, and procedures to be followed including how and when noncompliance is communicated to the contractor and corrective actions initiated, tracked, and resolved. The manual should also describe regular recording and reporting requirements of these activities including information to be provided in monthly progress reports.
- Following the formal systems and templates developed for supervision and monitoring undertake day-to-day supervision to ensure that contractor adheres to all the provisions in the EMP as well as their CEMPs and sub-plans as approved by DGPC/PMU.
- Support any update and implementation of RP, impact assessments, social safeguard monitoring and reporting.
- Keep daily records and photo logs of site observations to inform preparation of the semi-annual ESMRs.
- Report on any grievances or violations of the EMP, RP and assist in implementing solutions and remedial measures.
- Support delivery of safeguard training and capacity building activities and provide on-the-job guidance to contractors ensuring compliance with the EMP requirements.
- Support DGPC/PMU to undertake ongoing meaningful consultation with affected communities to keep them informed of progress and local disclosure of the findings of the IEE reports and ESMRs etc.

- Coordinate the implementation of the GRM and assist DGPC/PMU to resolve complaints, on- going issues related to environmental and social safeguards during project implementation, pre- construction and construction.

### Key stakeholders

186. The main parties that will be involved in environmental management and monitoring activities for this project are:

- DECC will be responsible for enforcing all national environmental clearances required for the solar power plant.
- DOFPS: Issuance of Forestry clearance based on the site-specific information/enumeration and application from DGPC and BPC.
- Community Forest Management Group: Issuance of clearance for land use and tree felling in community forest area.
- DoST: Issuance of clearance take off for new roads construction for access to site from the nearest existing road.
- DoE: Review and vetting of the project design.
- Local community: Issuance of public clearance
- Gewog Administration: Issuance of administrative clearance
- Dzongkha Administration: Issuance of administrative clearance
- NLCS: Issuance of LUC and lease agreement.
- DoL: Issuance of labor permits and inspection for compliance to labor and OHS requirements for foreign workers.
- ERA: Issuance of power evacuation clearance
- DoAT: Issuance of aviation clearance.
- Project Financers – Asian Development Bank (ADB).

## 6.7 Contractor Roles and Responsibilities

187. The contractor will be required to comply with the EMP during the pre-construction and construction phases, relevant provisions of contract on RP and, closely supervised and monitored by DGPC. The contractor will be delegated, through the contract, the requirement to undertake relevant mitigation and monitoring actions as set out in this EMP at the construction site for the solar power plant as well as at any temporary workers camps/overnight accommodation provided by them, and to assist with operation of the GRM.

188. The contractor is required to ensure that the EMP requirements are cascaded down to all sub-contractors undertaking works relating to the project, regardless they are formally or informally employed.

189. The construction contractor will preferably have a corporate EHS policy and environmental management certifications preferably such as ISO 14001 (or equivalent) and EHS certification such as ISO 45001 or equivalent. The contractor is to employ the following suitably qualified and experienced EHS officers as their environment safeguards team

- At least one dedicated environment and social officer with an environmental management bachelor’s degree or similar qualification to be based full-time on-site for the duration of works under the contract package, to monitor and supervise the contractor’s EMP implementation on a day-to-day basis reporting to their management,

- At least one dedicated health and safety officer with NEBOSH/IOSH certification or similar qualification to be based full-time on-site for the duration of works under the contract package, to monitor and supervise the health and safety aspects of the contractor's EMP implementation on a day-to-day basis reporting to their management.

190. The contractor's environment safeguard team will include an environmental expert with proven experience in preparing CEMP for major construction contracts in line with internationally recognized standards. Such a role might be an itinerant short-term role separate from that of the fulltime "environmental and social officer". Contractor will have designated staff for social issues, community liaison and grievance redress

191. Further, the active construction site is to have adequate health and safety supervision to ensure the health and safety of all workers and local communities; the health and safety officer will be supported by full-time on-site Health and Safety steward(s) with at least one steward to each team of up to 50 people. The contractor's environment safeguard team should include an environmental expert with proven experience in preparing CEMP for major construction contracts in line with internationally recognized standards. Such a role might be an itinerant short-term role separate from that of the fulltime "environmental and social officer". A bill of quantities (BoQ) item to be included in the bidding document will provide for the services of such environmental expert to assist the contractor prepare the CEMP to meet international financing institutions' requirements.

192. The social and environment safeguards team of the contractor will be responsible for reporting environmental safeguards progress and performance at least monthly to DOE including record data required by the EMoP and providing necessary inputs to the quarterly progress reports and semi-annual ESMRs for the duration of their contract. The contractor's environment safeguards team will also act as their GRM Focal for each contract package/lot to keep affected persons informed of works and be available to receive and deal with any grievances at the project site level.

193. During project implementation, the Contractor is responsible for the following activities (not an exclusive list):

- Implementing all actions and responsibilities allocated to the contractor under the EMP for the full duration of the contractor's involvement in the project and relevant provisions and section of contract on RP.
- Ensuring adherence to all applicable Royal Government of Bhutan environment, health, safety, and labour laws and regulations in force at the time.
- Ensuring adherence to ADB's SPS, 2009 and the related IFC Environment, Health, and Safety (EHS) general guidelines.
- Ensuring the detailed design reflects the EMP requirements; seeking to ensure it has the same or no worse impact than the indicative design which was assessed in the IEE.
- Supporting EA's to update (as required) the IEE in respect of the detailed design by undertaking further assessment as required by the EMP and providing sufficient details to inform a revised project description and any subsequent reassessment of impacts.
- Ensuring adequate budget and staff resources are allocated to comply with and implement the contractor's responsibilities under the EMP and to supervise and monitor the active construction site to protect the environment and ensure the health and safety of all workers and affected communities.

- Ensuring a suitably qualified and experienced environment safeguards team has been appointed to undertake regular on-site supervision and monitoring activities before the commencement of works.
- Ensuring that the trees to be cut are marked and removed by the NRDCL prior to construction.
- Undertaking and documenting a facilitated health and safety (H&S) risk assessment considering all stages of the project.
- Preparing a Construction Environment Management Plan (CEMP) and a Construction Health and Safety Management Plan (CHSMP) both with sub-plans as specified in the EMP for review and approval by DGPC prior to the commencement of works.
- Ensuring that all construction workers including all formal and informal employees and subcontractors understand their responsibilities to implement the EMP and mitigate environmental impacts associated with pre-construction and construction activities
- Providing and ensuring attendance at EHS training to formal and informal construction workers and other personnel as required.
- Adopting a zero-tolerance approach to OHS on the project, enforce all workers to comply with the OHS requirements of the EMP including the wearing of appropriate PPE on the construction site.
- Supporting EA's in undertaking ongoing public consultation and implementing the site-level GRM; in particular, the contractor's GRM focal shall thoroughly document details of complaints and make its best efforts to resolve the complaints at project site level; all this information is to be included in the contractor's monthly reports to DGPC.
- Undertaking environmental monitoring as set out in the EMoP (Appendix 13) during pre-construction and construction and documenting qualitative and quantitative monitoring results.
- Submitting monthly environmental management reports to EA's (these reports will be included as part of the contractor's monthly progress reports), relating the work undertaken over the reporting period and documenting the environmental measures including monitoring activities that have been carried out, problems encountered, record data including near misses and accidents, grievances received, and follow-up actions that were taken (or will be taken) to correct the problems.
- Informing DGPC immediately in case of any approved detailed design changes or unanticipated environmental impacts occurring during the project implementation stage, and as required, provide any information needed to the EA's to enable them to promptly update the EIA/IEE/EMP for clearance by ADB before any changes are implemented.
- Informing DOE within 24 hours in case of chance find or accident on site and providing within 48 hours an incident report with corrective action detailing how reoccurrence will be prevented.
- Informing EA's immediately in case of any non-compliance and help them to prepare as necessary a corrective action plan for clearance by ADB, the contractor is required to implement all necessary corrective action requested by EA's to ensure the project remains in compliance with Royal Government of Bhutan regulatory requirements, ADB's SPS 2009, the project's loan covenants and EMP requirements.
- Capacity Development and Safeguard Support Consultants
- As the EU staff of EA's are relatively new to the solar photovoltaic projects and do not have health and safety or social expertise, a capacity building program for these personnel will be beneficial as it would enable them undertake screening and categorization, prepare due diligence reports, IEE, supervise and monitor implementation, and prepare environmental and social monitoring reports.

**Table 18. Capacity building requirements for DGPC**

| Session | Attendees | Timing | Delivery | Budget Source |
|---|---|---|---|---|
| ESARF Implementation | DGPC EU Solar Project Division | Upon loan effectiveness | PIAC and TA Consultants | Project Loan (Consultant Budget) |
| Screening and subprojects selection | DGPC EU Solar Project Division | Upon loan effectiveness | PIAC and TA Consultants | Project Loan (Consultant Budget) |
| EIA/IEE/RP Preparation and Update | DGPC EU | Upon loan effectiveness | PIAC Consultants | Project Loan (Consultant Budget) |
| BMP, BMMP, BMOP, Biodiversity Offsets | EGSS<br>DGPC<br>E&S | Upon loan effectiveness | External Biodiversity Expert | Project Loan (Consultant Budget) |
| Preparation of RP and update document during implementation for addressing emerging IR impacts | EGSS<br>DGPC<br>E&S | Upon Loan effectiveness | PIAC Consultants | Project Loan (Consultant Budget) |
| Environmental and Social Measures and EMP and RP Implementation | DGPC PMU<br>DGPC PIU<br>Contractor x 4 | Upon contract award<br>(repeated as required) | EU and PIAC<br>Consultants | Project Loan (Consultant Budget) |
| E&S Supervision, Monitoring and Reporting | DGPC PMU<br>DGPC PIU<br>Contractor x 4 | Upon contract award<br>(repeated as required) | EU and PIAC<br>Consultants | Project Loan (Consultant Budget) |
| GRM Operationalization | DGPC PMU<br>DGPC PIU<br>Contractor x 4<br>Third Parties | Upon loan effectiveness (repeated as required) | EU and PIAC<br>Consultants | Project Loan (Consultant Budget) |
| Health and Safety | DGPC PMU<br>DGPC PIU<br>Contractor x 4 | Upon contract award | EU and PIAC<br>Consultants | Project Loan (Consultant Budget) |

| Session | Attendees | Timing | Delivery | Budget Source |
|---|---|---|---|---|
| | | (repeated as required) | | |
| E-waste Management | DGPC PMU<br>DGPC PIU<br>Contractor x 4 | Upon contract award<br>(repeated as required) | EU and PIAC Consultants | Project Loan (Consultant Budget) |

**Table 19. Capacity building requirements for BPC**

| Session | Attendees | Timing | Delivery | Budget Source |
|---|---|---|---|---|
| ESARF Implementation | EGSS | Upon loan effectiveness | PIAC and TA Consultants | Project Loan (Consultant Budget) |
| Screening and subprojects selection | DPC E&S Staff | Upon loan effectiveness | PIAC and TA Consultants | Project Loan (Consultant Budget) |
| EIA/IEE/RP Preparation | EGSS | Upon loan effectiveness | PIAC Consultants | Project Loan (Consultant Budget) |
| Use of subprojects selection/exclusion criteria, consultations and disclosure | EGSS<br>DGPC<br>E&S | Upon loan effectiveness | PIAC Consultants | Project Loan (Consultant Budget) |
| BMP, BMMP, BMOP, Biodiversity Offsets | EGSS<br>DGPC<br>E&S | Upon loan effectiveness | External Biodiversity Expert | Project Loan (Consultant Budget) |
| Preparation of RP and update document during implementation for addressing emerging IR impacts | EGSS<br>DGPC<br>E&S | Upon Loan effectiveness | PIAC Consultants | Project Loan (Consultant Budget) |
| Environmental and Social Measures and EMP and RP Implementation | Construction Section,<br>Construction Project Offices, Contractors | Upon contract award<br>(repeated as required) | EGSS and PIAC Consultants | Project Loan (Consultant Budget) |

| Session | Attendees | Timing | Delivery | Budget Source |
|---|---|---|---|---|
| E&S Supervision, Monitoring and Reporting | Construction Section,<br><br>Construction Project Offices, Contractors | Upon contract award<br><br>(repeated as required) | EGSS and PIAC Consultants | Project Loan (Consultant Budget) |
| GRM Operationalization | Construction Section, Const ruction Project Offices, Contractors | Upon loan effectiveness (repeated as required) | EGSS and PIAC Consultants | Project Loan (Consultant Budget) |
| Health and Safety | Construction Section, Const ruction Project Offices, Contractors | Upon contract award<br><br>(repeated as required) | EGSS and PIAC Consultants | Project Loan (Consultant Budget) |
| E-waste Management | Construction Section, Const ruction Project Offices, Contractors | Upon contract award<br><br>(repeated as required) | EGSS and PIAC Consultants | Project Loan (Consultant Budget) |

## 8. Monitoring and Reporting

194. DGPC, BPC (PMU and PIU) will monitor the safeguards compliance and progress of ESARF and subproject EMP implementation in the different locations of the subprojects. The contractors will conduct day-to-day implementation of their respective. Site-Specific Environmental Management Plan (SSEMPs) and contractual requirements. The PIU for the subproject will undertake day-to-day supervision and monitoring of the contractor's implementation of their contract requirements and EMP whilst the PMU Environment and Social Officer with support from the consultants (as required) will undertake monthly site inspections and document implementation progress.

195. The contractors will submit monthly reports to their respective PIU with jurisdiction over the subproject sites. The monthly reports will include a compilation of copies of monitoring sheets accomplished and duly signed by the contractors' EHS supervisors daily. A sample daily monitoring sheet which can be used by the contractors is in Appendix 9. This monitoring sheet is indicative and can be modified to suit the actual situation at each subproject construction site.

196. The PIUs will submit the quarterly report as part of QPR but also submit detailed semi-annual environmental and social monitoring reports in accordance with EMP requirements to PMU. The latter will include a summary of the monthly monitoring reports from the contractor and copies of checklists completed by the PIU. A sample inspection

checklist is in Appendix 10. This checklist is indicative which can be further enhanced depending on the actual situations at subproject construction sites.

197. PMU shall consolidate the reports from the PIUs and results of its own monitoring activities. QPRs will include safeguards information and progress on implementation of mitigation measures, focusing on compliance and any needed corrective actions. The PMU will submit combined semi-annual environmental and social monitoring reports to ADB for review and disclosure on ADB website. Submission of these reports will continue semiannually until all subprojects are installed; it will then revert to annual until ADB issues a project completion report. The ESMR template is provided as Appendix 12. The ESMR will be disclosed by ADB on their website once cleared, they will also be disclosed on the DGPC website and be available locally as per the SIA and IEE reports (Chapter 5).

198. As project/subprojects of only category C and B for IR and IP will be allowed under the Project (Category A both on IR and IP impacts are excluded), monitoring on social safeguards (IR and IP impact and safeguards) will be conducted internally by BPC and DGPC. DGPC and BPC will ensure internal monitoring for above mentioned objectives and the Resettlement Plan implementation. Internal monitoring will be carried out by PMU supported by the PIAC. DGPC will submit to ADB semi-annual social safeguard monitoring reports from project effectiveness date until the project completion report issued, covering reporting periods from January to June, and July to December, to be submitted to ADB by 15th of following months upon the reporting period. However, in case of any major non-compliance issues or unanticipated major IR and IP impact, ADB may require additional monitoring and reporting measures, such as external monitoring and/or quarterly social safeguard monitoring reports. Monitoring reports will be disclosed on the ADB website after clearance. Monitoring reports and any corrective actions will be disclosed in ADB website.

199. ADB will carry out the following monitoring actions to supervise the project implementation:

- On an as needed basis, conduct site visits for components with potential adverse environmental or social impact.
- Conduct supervision missions with detailed review by ADB's environment and social safeguard specialists and/or officers and/or consultants for subprojects with adverse environmental and social impacts.
- Review the ESMR submitted by PMU to ensure that adverse impacts and risks are mitigated as required in the SIA and IEE.
- Work with IAs/EA's to rectify to the extent possible any failures to comply with its environmental safeguard commitments, as covenanted in the loan agreement and elaborated in all environmental safeguard documents; and formulate and implement a corrective action plan to re-establish compliance as appropriate; and
- Prepare safeguard status in the project completion report that assesses whether the objective and desired outcomes of the safeguard plans have been achieved, considering the baseline conditions and the results of monitoring.
- ADB's monitoring and supervision activities are carried out on an on-going basis until a Project Completion Report is issued. ADB issues a Project Completion Report within 1-2 years after financial closure and the project infrastructure is physically completed and in operation.

# Appendix 1. Selection Criteria Checklist and Rapid Environmental Assessment Checklist

REA Screening Questions

| Screening Questions | Yes | No | Remarks |
|---|---|---|---|
| **A. Project Siting**<br>Is the project area… | | | |
| ▪ Densely populated? | | | |
| ▪ Heavy with development activities? | | | |
| ▪ Adjacent to or within any environmentally sensitive areas? | | | |
| ● Cultural heritage site | | | |
| ● Protected Area | | | |
| ● Wetland | | | |
| ● Mangrove | | | |
| ● Estuarine | | | |
| ● Buffer zone of protected area | | | |
| ● Special area for protecting biodiversity | | | |
| ● Bay | | | |
| **B. Potential Environmental Impacts**<br>Will the Project cause… | | | |
| ▪ impacts on the sustainability of associated sanitation and solid waste disposal systems and their interactions with other urban services. | | | |
| ▪ deterioration of surrounding environmental conditions due to rapid urban population growth, commercial and industrial activity, and increased waste generation to the point that both manmade and natural systems are overloaded and the capacities to manage these systems are overwhelmed? | | | |
| ▪ degradation of land and ecosystems (e.g. loss of wetlands and wild lands, coastal zones, watersheds and forests)? | | | |
| ▪ dislocation or involuntary resettlement of people? | | | |
| ▪ disproportionate impacts on the poor, women and children, Indigenous Peoples, or other vulnerable group? | | | |
| ▪ degradation of cultural property, and loss of cultural heritage and tourism revenues? | | | |
| ▪ occupation of low-lying lands, floodplains, and steep hillsides by squatters and low-income groups, and their exposure to increased health hazards and risks due to pollutive industries? | | | |

| Screening Questions | Yes | No | Remarks |
|---|---|---|---|
| ▪ water resource problems (e.g. depletion/degradation of available water supply, deterioration for surface and ground water quality, and pollution of receiving waters? | | | |
| ▪ air pollution due to urban emissions? | | | |
| ▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, and biological hazards during project construction and operation? | | | |
| ▪ road blocking and temporary flooding due to land excavation during rainy season? | | | |
| ▪ noise and dust from construction activities? | | | |
| ▪ traffic disturbances due to construction material transport and wastes? | | | |
| ▪ temporary silt runoff due to construction? | | | |
| ▪ hazards to public health due to ambient, household and occupational pollution, thermal inversion, and smog formation? | | | |
| ▪ water depletion and/or degradation? | | | |
| ▪ overpaying of ground water, leading to land subsidence, lowered ground water table, and salinization? | | | |
| ▪ contamination of surface and ground waters due to improper waste disposal? | | | |
| ▪ pollution of receiving waters resulting in amenity losses, fisheries and marine resource depletion, and health problems? | | | |
| ▪ large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)? | | | |
| ▪ social conflicts if workers from other regions or countries are hired? | | | |
| ▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction? | | | |
| ▪ community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation, and decommissioning? | | | |

**Modified Habitats** In areas of modified habitat, where the natural habitat has apparently been altered, often through the introduction of alien species of plants and animals, such as in agricultural areas, the borrower/client will exercise care to minimize any further conversion or degradation of such habitat, and will, depending on the nature and scale of the project, identify opportunities to enhance habitat and protect and conserve biodiversity as part of project operations. **b. Natural Habitats** 26. In areas of natural habitat,3 the project will not significantly convert or degrade4 such habitat, unless the following conditions are met: (i) No alternatives are available. (ii) A comprehensive analysis demonstrates that the overall benefits from the project will substantially outweigh the project costs, including environmental costs. (iii) Any conversion or degradation is appropriately mitigated. 27. Mitigation measures will be designed to achieve at least no net loss of biodiversity. They may include a combination of actions, such as post project restoration of habitats, offset of losses through the creation or effective conservation of ecologically comparable areas that are managed for biodiversity while respecting the ongoing use of such biodiversity by Indigenous Peoples or traditional communities, and compensation to direct users of biodiversity. **c. Critical Habitats** 28. No project activity will be implemented in areas of critical habitat5 unless the following requirements are met: (i) There are no measurable adverse impacts, or likelihood of such, on the critical habitat which could impair its high biodiversity value or the ability to function. (ii) The project is not anticipated to lead to a reduction in the population of any recognized endangered or critically endangered species6 or a loss in area of the habitat concerned such that the persistence of a viable and representative host ecosystem be compromised. (iii) Any lesser impacts are mitigated in accordance with para. 27. 29. When the project involves activities in a critical habitat, the borrower/client will retain qualified and experienced external experts to assist in conducting the assessment. 3 Land and water areas where the biological communities are formed largely by native plant and animal species, and where human activity has not essentially modified the area's primary ecological functions. 4 Significant conversion or degradation is (i) the elimination or severe diminution of the integrity of a habitat caused by a major, long-term change in land or water use; or (ii) the modification of a habitat that substantially reduces the habitat's ability to maintain viable populations of its native species. Significant conversion may include, for example, land clearing; replacement of natural vegetation (for example, by crops or tree plantations); permanent flooding (by a reservoir for instance); drainage, dredging, filling, or canalization of wetlands; or surface mining. 5 Critical habitat is a subset of both natural and modified habitat that deserves particular attention. Critical habitat includes areas with high biodiversity value, including habitat required for the survival of critically endangered or endangered species; areas having special significance for endemic or restricted-range species; sites that are critical for the survival of migratory species; areas supporting globally significant concentrations or numbers of individuals of congregatory species; areas with unique assemblages of species or that are associated with key evolutionary processes or provide key ecosystem services; and areas having biodiversity of significant social, economic, or cultural importance to local communities. Critical habitats include those areas either legally protected or officially proposed for protection, such as areas that meet the criteria of the Word Conservation Union classification, the Ramsar List of Wetlands of International Importance, and the United Nations Educational, Scientific, and Cultural Organization's world natural heritage sites. 6 As defined by the Word Conservation Union's Red List of Threatened Species or as defined in any national legislation.

## Appendix 2. Social Safeguards Screening – Involuntary Resettlement

| Social Screening Questions | Yes | No | Remarks |
|---|---|---|---|
| Will the subproject involve any form of land acquisition from private owners, including communal lands, or will restrict existing land use or access to legally designated parks and protected areas that will affect more than 200 households | | | Yes = ineligible |

| Probable Involuntary Resettlement Effects | Yes | No | Not Known | Remarks |
|---|---|---|---|---|
| **Involuntary Acquisition of Land** | | | | |
| 1. Will there be land acquisition? | | | | Yes=ineligible as category C |
| 2. Is the site for land acquisition known? | | | | |
| 3. Is the ownership status and current usage of land to be acquired known? | | | | |
| 4. Will easement be utilized within an existing Right of Way (ROW)? | | | | |
| 5. Will there be loss of shelter and residential land due to land acquisition? | | | | |
| 6. Will there be loss of agricultural and other productive assets due to land acquisition? | | | | |
| 7. Will there be losses of crops, trees, and fixed assets due to land acquisition? | | | | |
| 8. Will there be loss of businesses or enterprises due to land acquisition? | | | | |
| 9. Will there be loss of income sources and means of livelihoods due to land acquisition? | | | | |
| **Involuntary restrictions on land use or on access to legally designated parks and protected areas** | | | | |
| 10. Will people lose access to natural resources, communal facilities and services? | | | | Yes=ineligible as category C |
| 11. If land use is changed, will it have an adverse impact on social and economic activities? | | | | |
| 12. Will access to land and resources owned communally or by the state be restricted? | | | | |
| **Information on Displaced Persons: If persons will be displaced = ineligible** | | | | |
| Any estimate of the likely number of persons that will be displaced by the Project?<br>[ ] No [ ] Yes If yes, approximately how many?<br>_____ | | | | |
| Are any of them poor, female-heads of households, or vulnerable to poverty risks?[ ] No [ ] Yes | | | | |
| Are any displaced persons from indigenous or ethnic minority groups? [ ] No [ ] Yes | | | | |

Note: The project team may attach additional information on the subproject, as necessary.

## Appendix 3. Social Safeguards Screening – Indigenous people's impact checklist

| KEY CONCERNS (Please provide elaborations on the Remarks column) | YES | NO | NOT KNOWN | Remarks |
|---|---|---|---|---|
| **A. Indigenous Peoples Identification** | | | | |
| 1. Are there socio-cultural groups present in or use the project area who may be considered as "tribes" (hill tribes, schedules tribes, tribal peoples), "minorities" (ethnic or national minorities), or "indigenous communities" in the project area? | | | | Yes=ineligible as category C |
| 2. Are there national or local laws or policies as well as anthropological researches/studies that consider these groups present in or using the project area as belonging to "ethnic minorities", scheduled tribes, tribal peoples, national minorities, or cultural communities? | | | | |
| 3. Do such groups self-identify as being part of a distinct social and cultural group? | | | | |
| 4. Do such groups maintain collective attachments to distinct habitats or ancestral territories and/or to the natural resources in these habitats and territories? | | | | |
| 5. Do such groups maintain cultural, economic, social, and political institutions distinct from the dominant society and culture? | | | | |
| 6. Do such groups speak a distinct language or dialect? | | | | |
| 7. Has such groups been historically, socially and economically marginalized, disempowered, excluded, and/or discriminated against? | | | | |
| 8. Are such groups represented as "Indigenous Peoples" or as "ethnic minorities" or "scheduled tribes" or "tribal populations" in any formal decision-making bodies at the national or local levels? | | | | |
| **B. Identification of Potential Impacts** | | | | |
| 9. Will the project directly or indirectly benefit or target Indigenous Peoples? | | | | Yes=ineligible as category C |
| 10. Will the project directly or indirectly affect Indigenous Peoples' traditional socio-cultural and belief practices? (e.g. child-rearing, health, education, arts, and governance) | | | | |
| 11. Will the project affect the livelihood systems of Indigenous Peoples? (e.g., food production system, natural resource management, crafts and trade, employment status) | | | | |

| KEY CONCERNS (Please provide elaborations on the Remarks column) | YES | NO | NOT KNOWN | Remarks |
|---|---|---|---|---|
| 12. Will the project be in an area (land or territory) occupied, owned, or used by Indigenous Peoples, and/or claimed as ancestral domain? | | | | |
| **C. Identification of Special Requirements**<br>*Will the project activities include:* | | | | |
| 13. Commercial development of the cultural resources and knowledge of Indigenous Peoples? | | | | Yes=ineligible as category C |
| 14. Physical displacement from traditional or customary lands? | | | | |
| 15. Commercial development of natural resources (such as minerals, hydrocarbons, forests, water, hunting or fishing grounds) within customary lands under use that would impact the livelihoods or the cultural, ceremonial, spiritual uses that define the identity and community of Indigenous Peoples? | | | | |
| 16. Establishing legal recognition of rights to lands and territories that are traditionally owned or customarily used, occupied or claimed by indigenous peoples? | | | | |
| 17. Acquisition of lands that are traditionally owned or customarily used, occupied or claimed by indigenous peoples? | | | | |

**D. Anticipated project impacts on Indigenous Peoples**

| Project component/ activity/ output | Anticipated positive effect | Anticipated negative effect |
|---|---|---|
| **1. LIST ALL PROJECT COMPONENT / ACTIVITY / OUTPUTS HERE** | **INDICATE EFFECTS TO IPS OR PUT N/A AS NECESSARY** | **If effects = ineligible** |
| **2.** | | |
| **3.** | | |
| **4.** | | |

Note: The project team may attach additional information on the subproject, as necessary

## Appendix 4. Outline of an Initial Environmental Examination Report

1. An initial environmental examination (IEE) report is required for all environment B projects. Its level of detail and comprehensiveness is commensurate with the significance of potential environmental impacts and risks. An IEE report will follow the outline below. The substantive aspects of this outline will guide the preparation of the IEE reports, although not necessarily in the order shown.

2. **Executive Summary**. Describe concisely the critical facts, significant findings, and recommended actions.

3. **Policy, Legal, and Administrative Framework.** Discuss the national and local legal and institutional framework within which the environmental assessment is carried out. Identify project-relevant international environmental agreements to which the Government of Bhutan is a party.

4. **Description of the Project.** Describe the project, its major components, and its geographic, ecological, social, and temporal context, including any associated facility required by and for the subproject/package (for example, access roads, power plants, water supply, quarries and borrow pits, and spoil disposal). Include drawings and maps showing the project's layout and components, the project site, and the project's area of influence.

5. **Description of the Environment (Baseline Data).** Describe relevant physical, biological, and socioeconomic conditions within the project area. Include any known current and proposed development activities within the project's area of influence, including those not directly connected to the project. Indicate the accuracy, reliability, and sources of the data.

6. **Anticipated Environmental Impacts and Mitigation Measures.** Predict and assess the project's likely positive and negative direct and indirect impacts to physical, biological, socioeconomic (including occupational health and safety, community health and safety, vulnerable groups and gender issues, and impacts on livelihoods through environmental media and physical cultural resources in the project's area of influence, in quantitative terms to the extent possible; identify mitigation measures and any residual negative impacts that cannot be mitigated; explore opportunities for enhancement; identify and estimate the extent and quality of available data, key data gaps, and uncertainties associated with predictions and specify topics that do not require further attention; and examine global, trans boundary, and cumulative impacts as appropriate.

7. **Analysis of Alternatives.** Examine alternatives to project or project component site, technology, design, and operation—including the no project alternative—in terms of their potential environmental impacts; the feasibility of mitigating these impacts; their capital and recurrent costs; their suitability under local conditions; and their institutional, training, and monitoring requirements. State the basis for selecting the particular project design proposed and, justify recommended emission levels and approaches to pollution prevention and abatement.

8. **Information Disclosure, Consultation, and Participation.** (i) Describe the process undertaken during project design and preparation for engaging stakeholders, including information disclosure and consultation with affected people and other stakeholders; (ii) Summarize comments and concerns received from affected people and other stakeholders and how these comments have been addressed in project design and mitigation measures, with special attention paid to the needs and concerns of vulnerable groups, including women,

the poor, and Indigenous Peoples; and (iii) Describe the planned information disclosure measures (including the type of information to be disseminated and the method of dissemination) and the process for carrying out consultation with affected people and facilitating their participation during project implementation.

9. **Grievance Redress Mechanism.** Describe the grievance redress framework (both informal and formal channels), setting out the time frame and mechanisms for resolving complaints about environmental performance.

10. **Environmental Management Plan.** Describe and discuss the set of mitigation and management measures to be taken during project implementation to avoid, reduce, mitigate, or compensate for adverse environmental impacts (in that order of priority). Include multiple management plans and actions, if necessary. Include the following key components (with the level of detail commensurate with the project's impacts and risks):

(i) **Mitigation.** Identify and summarize anticipated significant adverse environmental impacts and risks; describe each mitigation measure with technical details, including the type of impact to which it relates and the conditions under which it is required (for instance, continuously or in the event of contingencies), together with designs, equipment descriptions, and operating procedures, as appropriate; and provide links to any other mitigation plans (for example, for involuntary resettlement, Indigenous Peoples, or emergency response) required for the project.

(ii) **Monitoring.** Describe the monitoring measures with technical details, including parameters to be measured, methods to be used, sampling locations frequency of measurements, detection limits and definition of thresholds that will signal the need for corrective actions; and describe monitoring and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures and document the progress and results of mitigation.

(iii) **Implementation arrangements.** Specify the implementation schedule showing phasing and coordination with overall project implementation; describe institutional or organizational arrangements, namely, who is responsible for carrying out the mitigation and monitoring measures, which may include one or more of the following additional topics to strengthen environmental management capability: technical assistance programs, training programs, procurement of equipment and supplies related to environmental management and monitoring, and organizational changes; and estimate capital and recurrent costs and describe sources of funds for implementing the environmental management plan.

(iv) **Performance indicators.** Describe the desired outcomes as measurable events to the extent possible, such as performance indicators, targets, or acceptance criteria that can be tracked over defined time periods.

11. **Conclusion and Recommendation.** Provide the conclusions drawn from the assessment and provide recommendations.

## Appendix 4 ADB Prohibited Investment Activities List

The following do not qualify for Asian Development Bank financing:

(i) production or activities involving harmful or exploitative forms of forced labor1 or child labor;2

(ii) production of or trade in any product or activity deemed illegal under host country laws or regulations or international conventions and agreements or subject to international phaseouts or bans, such as (a) pharmaceuticals,3 pesticides, and herbicides,4 (b) ozone-depleting substances,5 (c) polychlorinated biphenyls6 and other hazardous chemicals,7 (d) wildlife or wildlife products regulated under the Convention on International Trade in Endangered Species of Wild Fauna and Flora,8 and (e) transboundary trade in waste or waste products;9

(iii) production of or trade in weapons and munitions, including paramilitary materials;

(iv) production of or trade in alcoholic beverages, excluding beer and wine;10

(v) production of or trade in tobacco;10

(vi) gambling, casinos, and equivalent enterprises;10

(vii) production of or trade in radioactive materials,11 including nuclear reactors and components thereof;

(viii) production of, trade in, or use of unbonded asbestos fibers;12

(ix) commercial logging operations or the purchase of logging equipment for use in primary tropical moist forests or old-growth forests; and

(x) marine and coastal fishing practices, such as large-scale pelagic drift net fishing and fine mesh net fishing, harmful to vulnerable and protected species in large numbers and damaging to marine biodiversity and habitats.