Environmental and Social Impact Assessment for a 61.0 MWp / 47.5 MWac Solar Power Project in Sulekal and Benkanhal Villages, Kanakagiri Taluk, District Koppal, Karnataka

Volume 1: Non-Technical Summary

1.0 INTRODUCTION

This document is the Non-Technical Summary (NTS) for the ESIA. The document presents the details of the 61.0 MWp / 47.5 MWac solar plant, activities carried out during the ESIA study, identified environmental, social and ecological sensitivities and summary of impacts. The NTS summarizes the outcome of the ESIA, which is to identify environmental and social impacts that will occur due to construction and operation of the solar project, suggestion of mitigation measures to reduce these impacts and the understanding of residual impacts after implementation of the mitigation measures. The NTS also summarizes the implementation and supervisory framework for the mitigation measures.

1.1.Project Background

Ampyr intends to develop 47.5 MWAC solar plant in District Koppal in the State of Karnataka.

ERM was commissioned by Ampyr and CFM to undertake the E&S Scoping Study and ESIA Study for the Project as per the agreed upon scope of work for the two studies. The ESIA is a composite report consisting of the main impact assessment, stakeholder engagement plan (SEP), grievance redressal mechanism (GRM). The ESIA report is supported by Gender Action Plan (GAP) and Community Needs Assessment Plan (CNA) studies.

Terminology used in the ESIA Report

The 47.5 MW_{AC} solar power project has been referred to as 'Project' for the remainder of the document.

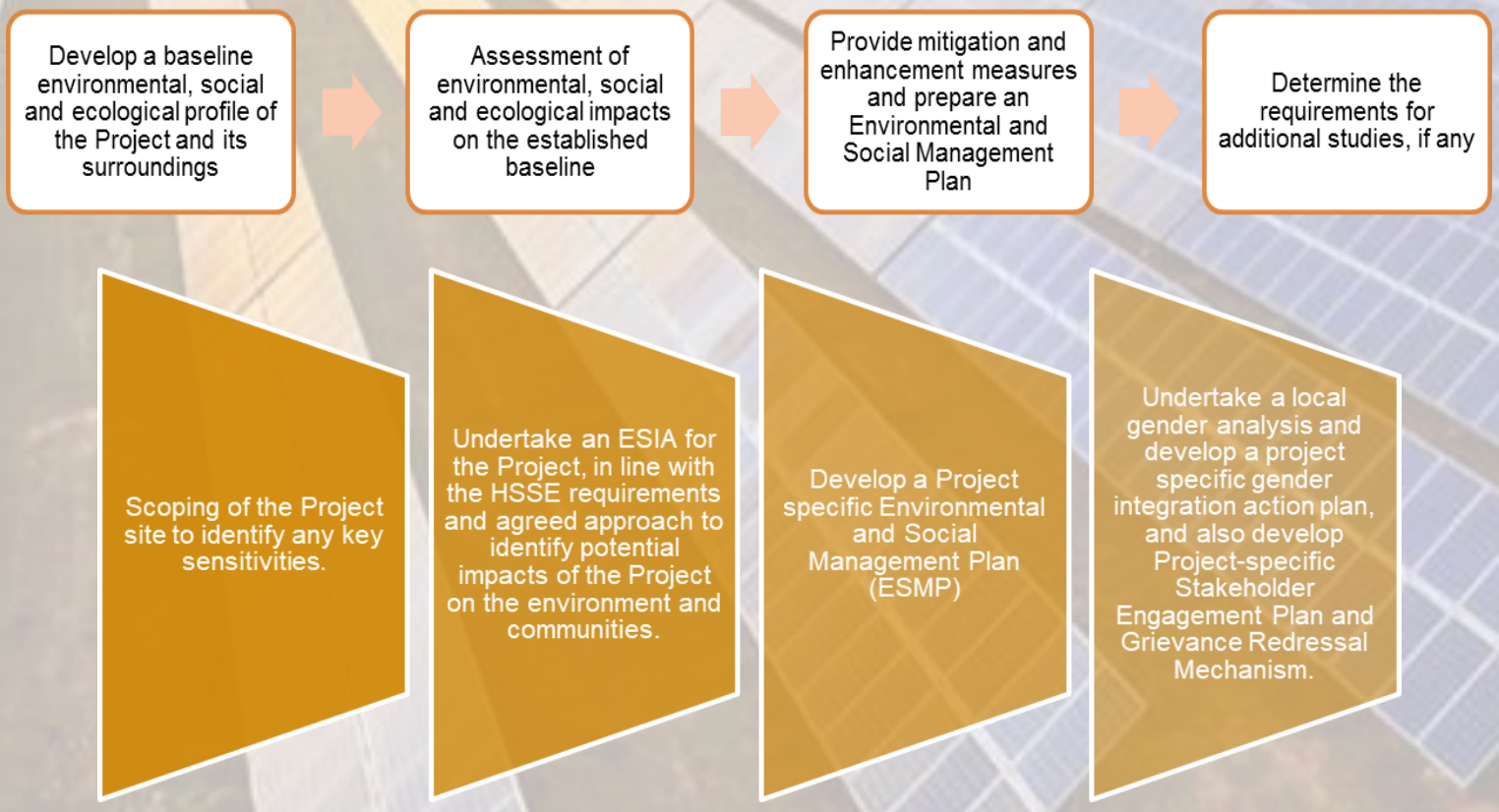
Justification for the ESIA

Solar power projects do not require an Environmental Clearance (EC) in India in accordance to the Environmental Impact Assessment (EIA) Notification, 2016 and further amendments. Ampyr had commissioned an Environmental &Social (E&S) Scoping Study in May 2022 to determine any risks and impacts due to the construction and establishment of the solar plant. The E&S Scoping Study has identified the requirement for a detailed ESIA study. ERM undertook a review of the E&S Scoping Study and developed a work plan for the ESIA that also identified the necessity for a SEP-GRM and GAP.

1.2. Objectives and Scope of work

The main objective of the ESIA is to assess social, environmental and ecological impacts of the proposed solar plant and provide management strategies to comply with the reference framework. The specific objectives are depicted in ***Figure 1***.

Figure 1: Objectives of ESIA

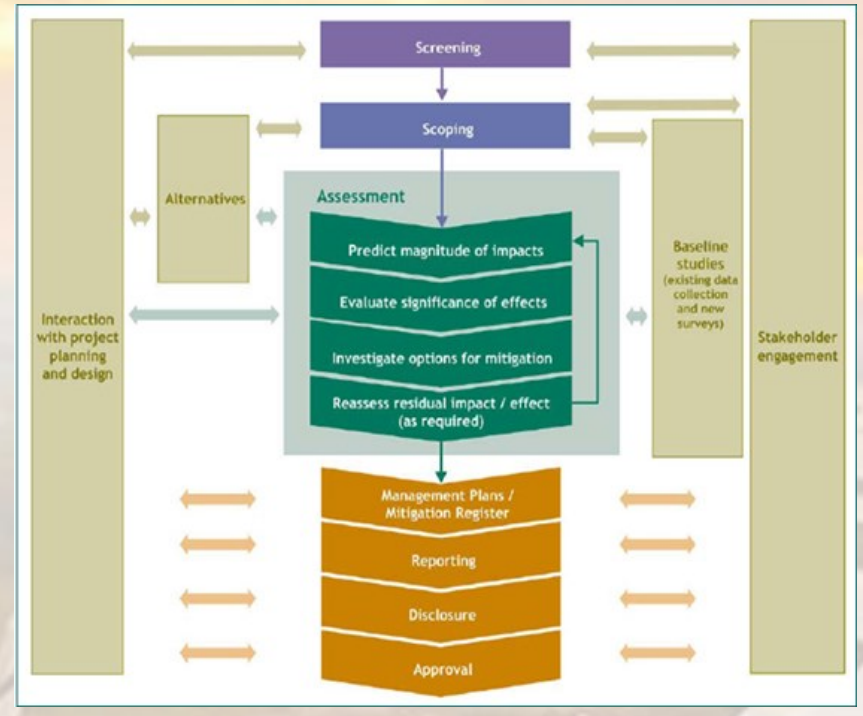


Approach and Methodology for ESIA and Brief on Technical Management Plans

Approach broken down into two work streams:

Work Stream 1: E&S Scoping Study

Work Stream 2: ESIA



The **Stakeholder Engagement Plan (SEP) - Grievance Redressal Mechanism (GRM)** is being undertaken to meet Ampyr ESMS to identify modes of continuous engagement with key stakeholders across the Project life cycle

The **Gender Action Plan (GAP)** is being undertaken to meet Ampyr focus on gender-related development as part of its Community Development Framework. The GAP is focused on mainstreaming gender issues and concerns into all aspects of the Project lifecycle and promote participation of women in Project activities.

The objective of **Community Needs Assessment (CNA)** is to contribute to the identification of key needs of the local community for the Client to be able to make meaningful investments by means of community development initiatives. The information presented in the report is proposed to be used to gain an understanding of the study area through review of secondary data, Focus Group Discussions and Key Informant Interviews in the community, to enable Ampyr to develop strategic community development initiatives in alignment with their key focus areas based on the themes and activities identified in this report.

Work Stream 1

⇒ **Desk-based Review** of key environmental, social and ecological sensitivities

⇒ **Site Visit** was undertaken in July 2022 to observe prevalent land use and environmental aspects at the Project site. Community consultations, and discussions with representatives were also undertaken as a part of the study.

⇒ **Project Call** was undertaken on **5th May, 2022** to understand timelines.

⇒ The **E&S Scoping report** was submitted on **18 July, 2022** which summarized the salient features and preliminary categorization of the project.

Work Stream 2

⇒ A **Document Review** of maps and satellite imagery was undertaken to understand the key environmental, social and ecological sensitivities

⇒ **Site Surveys and stakeholder consultations** was undertaken in July 2022 for the baseline data collection and identification of risks and impacts for the Project. From 3rd to 9th November a bird and bat monitoring survey was conducted covering the early migratory season

⇒ An **analysis of alternatives** process was undertaken to assess the no Project scenario, alternative modes of power generation and alternate project site scenario.

⇒ Assessment of **potential impacts** on the various environmental, ecological and social elements

⇒ An **Environmental and Social Management Plan (ESMP)** has been developed to summarizes the list of mitigation measures recommended to reduce the overall impacts on environmental, social and ecological elements

Area of Influence for the ESIA

Project Footprint Area, *area which is reasonably expected to be physically touched by the Project activities, across all phases.* The area does not have any demarcation or fencing to indicate the footprint boundary.

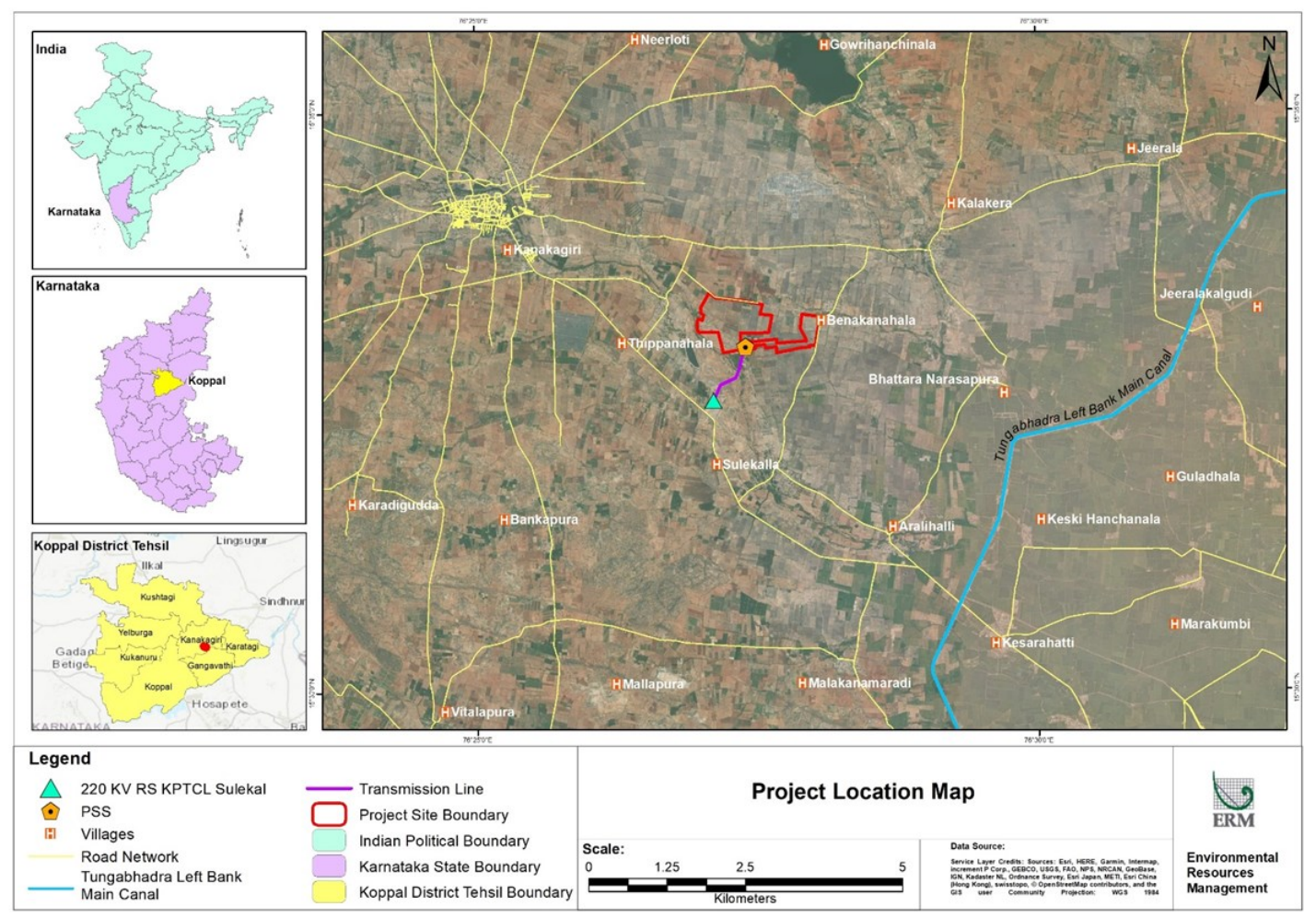
Project Area of Influence, area where the Project and Project activities can affect a particular resource or receptor. The AoI has spatial (distance) and temporal (time) dimensions, the scale of which is dependent on a number of factors.

Study Area, 100% overlap with the AoI. The study area is broken down into the core zone where majority of impacts are anticipated and buffer zone where induced or indirect impacts are anticipated.

Core Zone is 500m for environment and ecology and 2 km for social. **Buffer Zone** is 5 km for all parameters.

2.0. Project Description

Particular	*Description*
Location and Terrain	The proposed 47.5 MW solar Project is located in Sulekal and Benkanhal villages , Tehsil Kanakagiri, District Koppal in Karnataka, India. The Project lies between the 15°33'21.04"N, 76°26'55.18"E and 15°33'14.79"N, 76°28'4.40"E coordinates . Site for the Project is located on a flat terrain, with slight undulations. Elevation of the Project site ranges from 451 m above mean sea level to 467 m above mean sea level.
PV Modules	Multi-crystalline Modules
Power Evacuation	• Power from the solar modules will be evacuated through the use of cables to the Project's 33 kV Switchyard within the plant premises. • At the PSS of 33/110KV, power will be stepped up and will be further evacuated to Karnataka Power Transmission Corporation Limited's 220 kV Sulekal Substation (GSS). • Power evacuation will be undertaken through one (01) km long 110 kV external transmission line.
Land Requirement	The total land requirement for the project is estimated to be ~94 hectares. As reported by the land aggregator and Preliminary survey of landowners, the registration for approximately 74 hectares (79 %) of the land has been done already as of December 2022. The land identified for the project is private dry agricultural land with low productivity. The project boundary falls under villages of Sulekal
Current Status	• The Project is currently in the land leasing phase.
Commissioning Date	• The project is proposed to be commissioned by January 2023



Resource Requirements

Land Footprint

S. No	Aspect	Details
1.	Solar Farm (Total)	~94 hectares
2.	Type of land	The land identified for the project is private dry agricultural land with low productivity
3.	Village	Sulekal and Benkanhal Villages
4.	External Transmission Line	110 kV external Line to 220/110 kV Sub-Station common Grid Sub-Station at village Sulekal which is approx. 01 km away from the proposed project boundary. The land required for the TL footprint is 6.27 ha.

Land related sensitivities

Landlessness: As on December 2022, 41 out of 55 landowners had been registered to lease their land. It was reported during the survey of the landowners that out of 24 land owners surveyed, only 8 had alternate land available after leasing their land and 16 do not have alternate land. It was revealed during the survey that that the landowners were willing to lease the land due to rain fed agriculture, water stress due to low rainfall, and lack of agricultural labourers to support cultivators in the area.

Schedule V Area and Tribal Land: The Project area does not fall under designated Schedule V area. It was reported by site representative and the land aggregator that no tribal land is procured for the proposed project and no landowners belongs to schedule tribe community

Forest land: The proposed solar plant location is planned on private and as reported, no forest land is used for the project.

Encroachment: No encroachments on the project land procured till date were reported or were observed during the site visit by ERM team.

Common Property Resources: The project land identified is all private land, hence no common property resources will be used for the project.

Cultural Heritage: During the site visit, no structures of local significance were identified and same was confirmed through the satellite imagery of Google .Moreover, the same aforesaid information has been confirmed through the Archaeological Survey of India website as well.

Resource Requirement

Resource	Construction Phase	Operation Phase
Workforce	Around 250 workers will be required during the peak construction period	Approximately 10-20 unskilled workers will be involved during operation phase of the Project for grass cutting and module cleaning.
Water	900 m^3 water is required	45 lpcd for domestic water usage and for drinking wa-
Raw Material	1960 MT cement, 575 MT/month steel, 5500 m^3 sand and 18000 bricks	There will not be major requirement of raw materials during operation except for maintenance purpose viz. consumable spares.
Fuel	The on-site fuel requirements during construction	NA

3.0. Applicable Reference Framework

The applicable reference framework for the ESIA is provided below:

- Applicable policy and legislation with respect to environment, health, safety, labour, land acquisition, stakeholder engagement and indigenous peoples;
- Good International Industry Practice (GIIP) as set out in the World Bank Group Environment, Health and Safety (EHS) Guidelines including both the General EHS Guidelines and sector- specific guidance (EHS Guidelines for Transmission and Distribution);
- IFC Performance Standards (2012);
- IFC Workers' Accommodation: Process and Standards;
- Relevant international treaties applicable to the host country including UN Declaration on the Rights of Indigenous Peoples, UN Guidelines Principles on Business and Human Rights, International Covenant on Economic, Cultural and Social Rights and ILO Core Labour Standards ratified by the host country;
- Agreements with other external stakeholders e.g. community groups and non-governmental organizations;
- Agreements with government authorities.
- ERM will also be referring to the following standards during the ESIA process: and
- IFC Utility Scale Solar Photovoltaic Power Plants: A Project Developer's Guide (2015);

Status of Key Permits and Licenses

Permit or License	Status as of June 2022
Environmental Clearance	Not required as per Schedule A of the EIA Notification 2006 for solar projects
Consent to Establish/Operate	Not required in accordance to CPCB 2016 notification for harmonization of industrial categories as solar projects are classified as 'white category'
Hazardous Waste Authorization	Not required in accordance to the Hazardous and Other Wastes Amendment Rules, 2019 for projects that are classified as 'white category'

4.0. Analysis Of Alternatives

1. Project Vs. No Project Scenario
2. Alternate Source for Power Generation
3. Alternate Location for project site

Project vs. No Project Scenario

No project scenarios for the purpose of this ESIA report is the situation where the project does not proceed. Under this scenario, there will be no adverse environmental or social impact around the Project site, as there will be no construction and operation of solar plant and its associated facilities. The Project is therefore important to provide power to meet the increasing energy demands of the country and to contribute towards renewable sources of energy. A “No Project Scenario” will not address the issue of power shortage. An alternative without the Project is undesirable, as it would worsen the power supply-demand scenario, which would be a constraint on economic growth. Also the region receives good solar radiation intensity in India

Alternative Methods of power generation

1.Water: Several evaluation methods are being employed to assess the footprint of electricity generation through various ways. Solar plants require less quantity of water are used to clean solar modules in arid climates (where rainfall does not keep the blades clean). For current energy investment of 47.5 MW, Ampyr might consume about 1425 gallons MW/h; saving almost 37200 gallons MW/h and 29400 gallons MW/h; w.r.t nuclear and coal respectively. However, as the Project is going with dry cleaning of modules, water consumption is for module cleaning is not required.

2. Carbon offsetting: According to National Renewable Energy Laboratory, 1 MW of solar energy results in 4,750 tons of CO2 offsetting. In case of the 47.5 MW project, carbon offsetting will be about 225625 tons CO2.

Thus, it is clear the harnessing solar energy is an eco-friendly process, inexhaustible and possesses a minimal environmental footprint as there are no significant fuel requirements or large quantities of water for operation of the plant.

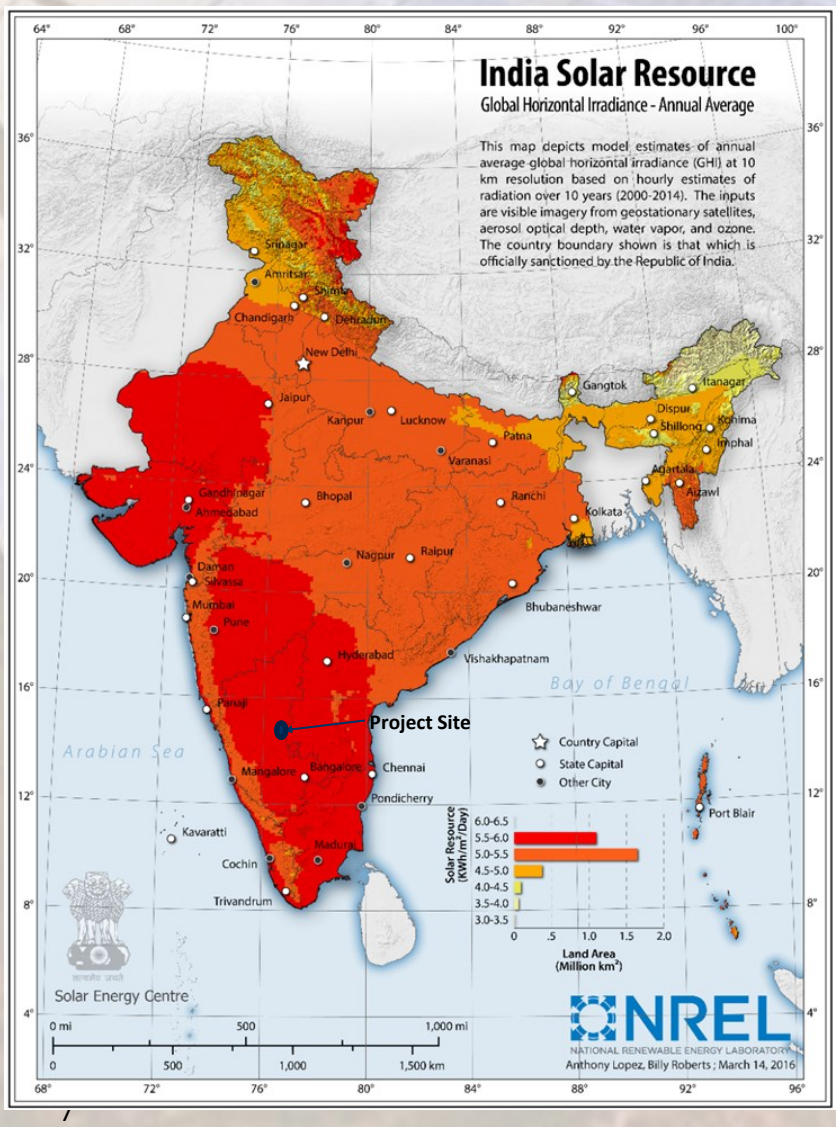
Optimizing Land Requirement

Land requirement for the Project was optimized as the Project was conceptualised through Loop-in Loop-out (LILO) method for evacuating of power from an existing switchyard and external transmission line. Due to this, the Project was not required to procure additional land for power evacuation and develop infrastructure for the same, thereby, ensuring effective use of existing power evacuation infrastructure

Alternative locations for individual WTGs

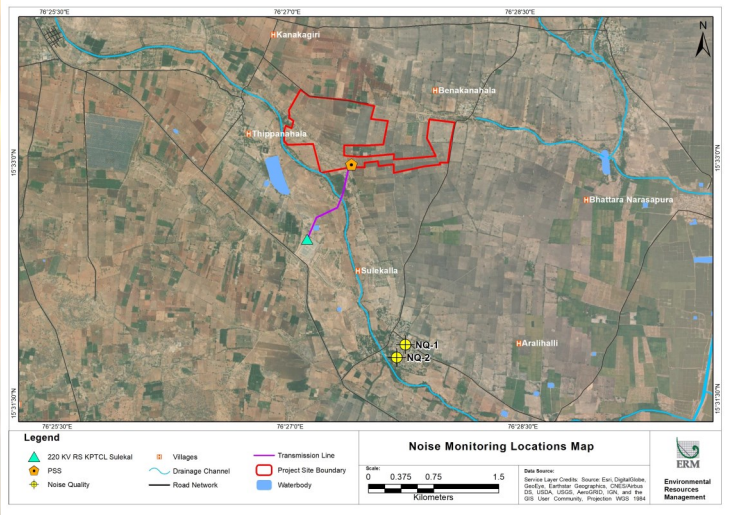
Solar power projects are low-polluting sources of energy, which are site specific and dependent on the availability of solar irradiance resources. Through solar irradiance mapping, it can be noted that the current site is located in an area where the irradiation is 5.5 - 6.00 kWh/m2/day, hence, there is a limited choice for site selection for the developer.

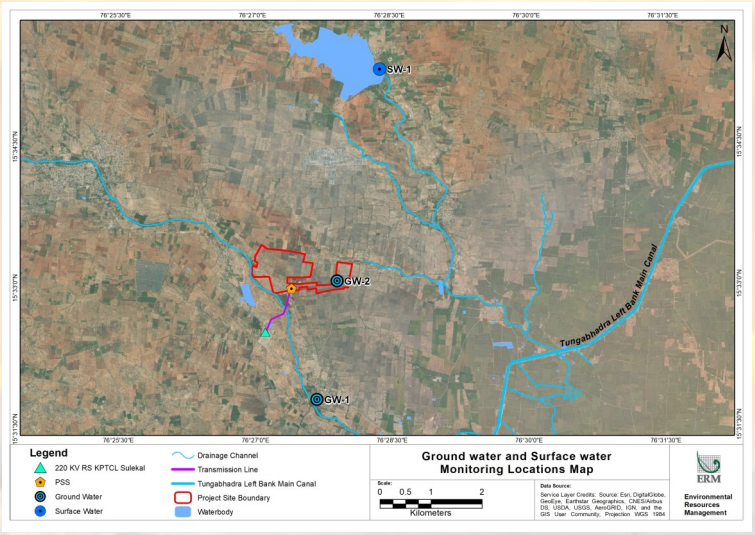
Annual Average Direct Normal Irradiance Map showing Project Site



5.0. Environmental Baseline

ERM team undertook a site survey between 22 July, 2022 to 28 July, 2022 to understand the site setting and to map environmental sensitivities in the area. The collection of water samples and 48 hour noise monitoring was carried out during 13th May 2022 to 19th May 2022





Ground Water status and quality

- As per the district ground water brochure published by CGWB, Project site is falling under the over exploited category.
- As pre the results of the ground water baseline sampling carried out it is observed that as compared to the IS drinking waters, few parameters are higher than the acceptable limit standards - Total dissolved solids, Total hardness as $CaCO_3$, Total alkalinity, Chlorides, Sulphates, Fluorides, Calcium and Magnesium.
- As per the CPCB water quality criteria surface water quality of the sample analysed falls under class 'B' that is the designated best use is Outdoor bathing (Organised).

Equivalent Noise Levels Day Time (dB [A])			
Location	**L_{eq} Day**	**CPCB Limit**	**WHO/IFC Limit**
NQ 1	53.4	55	55
NQ 2	47.0		
Equivalent Noise Levels Night Time (dB [A])			
Location	**L_{eq} Night**	**CPCB Limit**	**WHO/IFC Limit**
NQ 1	46.2	45	45
NQ 2	44.8		

Ambient Noise Monitoring

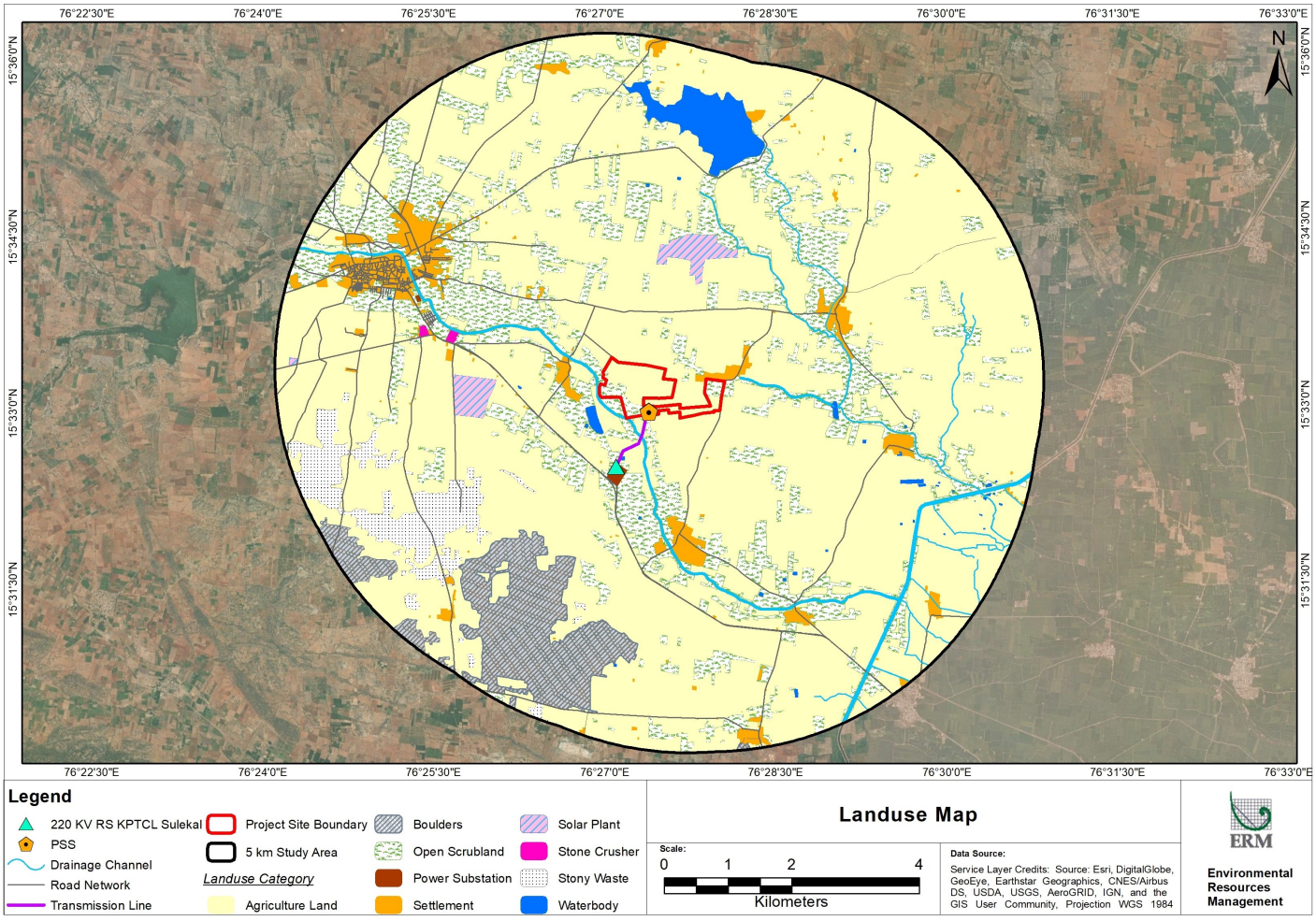
Noise levels were recorded at two (02) locations once during the study period with the aid of a digital noise level meter. Noise levels were recorded continuously for 48 hours. The L_{eq} values for daytime time at both the noise monitoring locations are observed to be within the residential area limit of 55 dB(A) and 45 dB(A) as prescribed by CPCB and IFC/WHO. Night time noise level at one location was observed to be slightly higher than the ambient noise standards.

Natural Hazards (As per BMPTC Vulnerability map)

Characteristics	Details
Earthquake	Low Damage Risk Zone (MSK VI or less).
Wind Hazard	Low Damage Risk Zone (wind velocity of 33 m/ sec) .
Land Slide	the Project site is located in an area not prone to landslide incidents.
Flood	District disaster management plan of 2019-2020 mentions that Koppal district is flood affected from some areas in Thunga Bhadra River. However, the project site and study area is reportedly not affected by flood.

Environmental Baseline (continued)

Land Use of the study area



Local Topographic Features

Site for the Project is located on a flat terrain, with slight undulations. Elevation of the Project site ranges from 371 m above mean sea level (amsl) to 399 m amsl. As can be observed in the maps, elevation is at its lowest towards southern and south-eastern parts of the Project site.

Geomorphology and Soil Type

Geomorphology : The district is mainly underlain by gneisses, granites and schists. The hard rock does not have any primary porosity. However, weathering, fracturing, joints and tectonic features like folds and faults develop secondary porosity and permeability in these rocks, which stores and yield water to the wells.

Soil Type: As per CGWB's District Groundwater Brochure for Koppal, dated February 2013, soils in the district have been classified into three (03) types: Black cotton soil; Red soil; and Red Sandy Soil.

The Project site is characterised by presence of black cotton soil and red soil. Red soil is generally fertile in nature and is suitable for cultivating groundnut, millets and sunflower. As reported by the land owners only single crops are being cultivated with major dependency on rains, which is scanty in the region.

Drainage

The district is part of Krishna basin, the main streams draining the area are Maskinala, Ilkal-nadi and Hirenala. These are Ephemeral in nature, these come under Tungabhadra sub-basin. The drainage exhibit dendritic to sub dendritic with drainage density varies from 1.4 to 7.0kms/sq.km.

Surface Water

There are no surface water bodies within the Project site. There are few seasonal streams and ponds in the study area. Tungabhadra river channel is flowing in the south east of the project site within 5 km radius.

5.1. Ecological Baseline

An ecological survey was undertaken from 11 May 2022 to 14 May 2022 to cover the breeding season in the pre-monsoon/dry season and a further survey was undertaken from 21st to 27th July 2022 during the breeding season in the monsoon/wet season. From 3rd to 9th November a bird and bat monitoring survey was conducted covering the early migratory season.

Classification Scheme	Classification
Biogeographical Provinces of India[42]	6D: Deccan Peninsula—Central Plateau
Agro Ecological Sub Region (ICAR)	North Sahyadris and Western Karnataka Plateau, hot dry sub humid (3.0)
Agro-Climatic Zone (Planning Commission)	Southern Plateau and Hills Region (X)
Agro-Climatic Zone (NARP)	Northern Dry zone (KA-3)

Habitat Classification

Agricultural Land

Scrub Land

Water Body

Floral Assessment

It is observed that the land for the Solar Plant project is being used as agricultural land and grazing land. These land parcels are primarily characterized by undergrowth and shrubs and grazing of livestock was observed on these lands. Scrub lands are present in the study area in patches along with the agriculture lands. The habitat is vegetated with herbs, shrubs, and few trees. The common species of this habitat are, *Abutilon indicum* (L.) Sweet (Country mallow), *Acacia nilotica* (L.) Delile (Babool), *Acacia leucophloea* (Roxb.) Willd. (Babool), *Achyranthes aspera* L. (Prickly chaff flower), *Calotropis procera* (Aiton) Dryand. (Rubber bush), *Dactyloctenium aegyptium* (L.) Willd. (Crowfoot grass), *Dalbergia sissoo* DC. (Shisham), *Euphorbia hirta* L. (Asthma weed), *Euphorbia tirucalli* L. (Pencil tree), *Lantana camara* L. (Lantana), *Opuntia*

Faunal Assessment

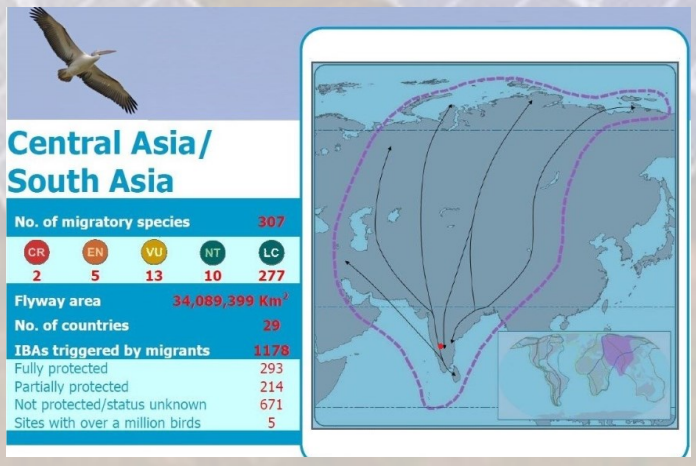
Herpetofauna: Six (6) were observed from the 5 km study area of the proposed solar power plant. All of the observed species are classified as 'Least Concern' according to the IUCN Classification.

Avifauna: A total 75 species were observed during the early migratory season survey. 12 species were observed to be **migratory** (winter visitors) and 63 species were observed to be resident . Only (01) one species River Tern (*Sterna aurantia*) was observed to be categorized as **Vulnerable** (IUCN v2021.3). 2 species, Painted Stork (*Mycteria leucocephala*), and Black-headed Ibis (*Threskiornis melanocephalus*) were observed to be categorized as **Near Threatened** (IUCN v2021.3). 7 species observed in the study area, Short-toed Snake-Eagle (*Circaetus gallicus*), Black-winged Kite (*Elanus caeruleus*), Brahminy Kite (*Haliastur indus)*, Bonellis's eagle (*Aquila fasciata)*, Black Kite (*Milvus migrans*), Indian Peafowl (*Pavo cristatus*), Oriental Honey Buzzard (*Pernis ptilorhynchus*), were listed as **Schedule I** of the Indian Wildlife Protection Act 1972. A total of 21 species recorded from the study area were associated with aquatic habitats and observed during the water body survey. Six (06) species of **raptors** were observed during the surveys in the solar plant area. **No vulture** species was recorded from the study area during the surveys

Mammals: Seven (07) mammals were observed and nine (9) further reported from the 5 km study area of the proposed solar power plant. Besides, three Vulnerable [VU (IUCN v2021.3)]) - [Bonnet Macaque (*Macaca radiate), Leopard (Panthera pardus), & Sloth Bear (Melursus ursinus)];* and one Near Threatened [NT (IUCN v2021.3)] Striped Hyena *(Hyaena hyaena)] species*, all the species have been classified as 'Least Concern' as per the latest IUCN Red List (Online Version 2021-3). Total three (03) species reported or observed from the study area - Blackbuck *(Antilope cervicapra),* Indian Wolf *(Canis lupus pallipes), &* Leopard *(Panthera pardus)* are protected and categorized under Schedule I as per the Indian Wildlife Protection Act, 1972.

Migratory Routes

Koppal district, including the project site is located along the Central Asian Flyway. **12** winter migratory species Barn Swallow (*Hirundo rustica) -LC,* Common Coot *(Fulica atra) – LC,* Rosy Starling *(Pastor roseus),* Common Sandpiper *(Actitis hypoleucos) – LC,* Painted Stork (*Mycteria leucocephala*)- NT, Blue-checked bee-eaters (*Merops persicus*)-LC, Blue tailed bee-eaters (*Merops philippinus*)- LC, Common Greenshank (*Tringa nebularia*)-LC, Common Redshank (*Tringa tetanus*)-LC, Yellow wagtail (*Motacilla flava*)-LC were observed majorly around the waterbodies. There are is just one major waterbody in the 5km radius of the project. No threatened species were observed in



5.1. Ecological Baseline (Contd.)

Delineation of Habitats

Habitat Type	Discussion	Conclusion
Open Scrub land (Study area comprising the Project site and 5 km radius)	The project site has patches of fallow agricultural land, due to the absence of agricultural activity for a long time, it is presently open scrubland in nature. Such fallow land within the study area are grazed by cattle from local villages. These open scrubland habitats are primarily represented by stunted growth of shrubs and trees and expanses of grass in between. Scrubland habitats within the study area are overgrazed and support populations of cattle from local villages. Moreover, scrubland have resulted from past removal of vegetation and agricultural activity. Moreover low rainfall results in poor regeneration or germination. Considering constant grazing pressure and dry drought like conditions, it is anticipated that these habitat type have been modified through generations of grazing activity. Thus it is considered as "Modified Habitat". (based on IFC PS6 Habitat Classification)	The habitat can thus be considered as "**Modified Habitat".** (based on IFC PS6 Habitat Classification).
Agricultural Land (Study area comprising the Project site and 5 km radius)	~73% of the project land is agricultural land. Agricultural activity is highly dependent on availability of water. Presently tubewells were observed to be used to draw water for agricultural purposes, agricultural activity within the study area is still largely dependent on monsoon rainfall. Agricultural habitats are highly modified as human constantly use and bring change in this type of habitat/ land use to increase the productivity of their fields. So agricultural habitats are classified as "Modified Habitat" (based on IFC PS6 Habitat Classification).	The habitat can be considered as **Modified habitat**
Waterbodies (Study area comprising the Project site and 5 km radius)	Waterbodies within study area are "manmade", formed by constructing depressions. Water of these reservoirs are regularly extracted by pumps by local farmers for irrigation or for livestock drinking. So considering all these factors, waterbodies in the study area are considered as "Modified Habitat". There is only one such waterbodies present in the project area.	This habitat can thus be considered as **Modified habitat.**

Critical Habitat Applicability

Protected Areas like National Parks or Wildlife Sanctuaries are not located within 5 km of the Project site (i.e. the study area). No internationally recognized biodiversity areas like KBAs [Key Biodiversity Areas (KBAs) are the most important places in the world for species and their habitats] are located within 5 km of the project site.

The nearest Protected Area to the Project site is the "Daroji Bear Sanctuary" is located approximately 14km south-east of the project site.

5.2. Socio-Economic Baseline

This baseline provides an understanding of the administrative set up of the district, the demographic profile of the villages in the Project AoI, the social groups present, the land use patterns in the area, the livelihood profile of the community and the social and physical infrastructure available. The social and physical infrastructure includes education and health infrastructure, the water supply for irrigation and drinking purposes, sanitation facilities and connectivity.

Profile of the Study Area

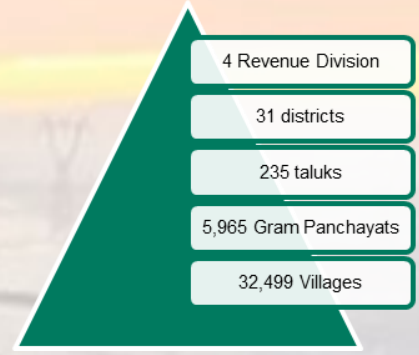
The area up to 2 km from the Project boundary has been considered as the Project direct influence area (core zone) and the area between 2 km and 5 km is considered the buffer Zone. The study area thus, includes 5 villages.

State: *Tamil Nadu has a total population of 7.21 crore (Census, 2011) and has a geographical area of 1.3 lakh sq. km. The population density of the state is 555 persons per sq. km. in 2011.The state has significantly higher sex ratio as compared to India; 996 females per 1000 males as compared to India's sex ratio, which stands at 943 (Census, 2011). The state has a child sex ratio (0-6 years) of only 943 girl children to every 1000 boys. The state has a literacy rate of 80 percent, which is higher than India's overall literacy rate of 73 percent. The female literacy rate is 73.44 percent and the male literacy rate is 64.43 percent*

District: The Project is located in Tenkasi district. Tenkasi is located in southern Tamil Nadu and is surrounded by is the State of Kerala to the west, and the districts of Thoothukudi to the east, Tirunelveli in the south and Virudhunagar to the north. Tenkasi is divided into 8 Talukas – Tenkasi, Kadayanallur, Thiruvengadam, Sankarankoil, Shencottai, Veerakeralampudur, Alangulam, and Sivigiri. At the time of Census 2011, Tenkasi was a part of Tirunelveli until it became a separate district in 2019.

Study Area for Social Baseline: Based on the Census, 2011, the study area covering a total of 15 villages in the 5 km radius, has a total of 13,441 households and a population of 50,163 persons. The average family size in the study area is 4 persons. The adult sex ratio of the study area is 1028 females per 1000 males and the child sex ratio fares significantly well at 1000 females per 1000 males as compared to the taluka, district, and state level

Administrative structure of karnataka



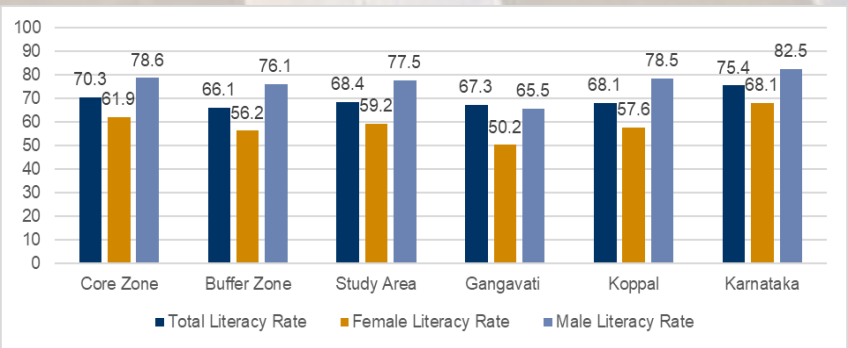
Social Stratification

The Scheduled Caste (SC) population is 18%, and the Scheduled Tribe (ST) population is 13% of the total population of the study area (i.e. in 19 villages). Koppal district has not been declared a Schedule V area, hence there are no Schedule V areas in the project footprint. The core zone has 5% STs as per the Census, 2011 and 18% of the total population in the villages in the core zone are SCs. Arlihalli has the highest proportion of SCs (53%). Sulekal has 14% of SC and 7% of ST population while Benkalhal has just 3% of SC and 5% of ST population.

The dominant caste group in the study area are Lingayats who are classified as Other Backward Classes (OBCs) while other OBC caste groups include *Gangamatha* (Bestha), Uppara, and Kuruba. The major SC sub-castes in the study area are Madiga, Harijan, Bhovi, and Domba while the ST sub-castes include Nayakas. It was reported during the consultations with the local communities that Muslims in the study area are classified under OBC category.

Literacy Profile

The literacy rate in the core zone (70.3%) is comparable to that of the district but is still relatively lower than that of the state and the female literacy rate is lower than the state, but higher than the district and Taluka average in the study area.



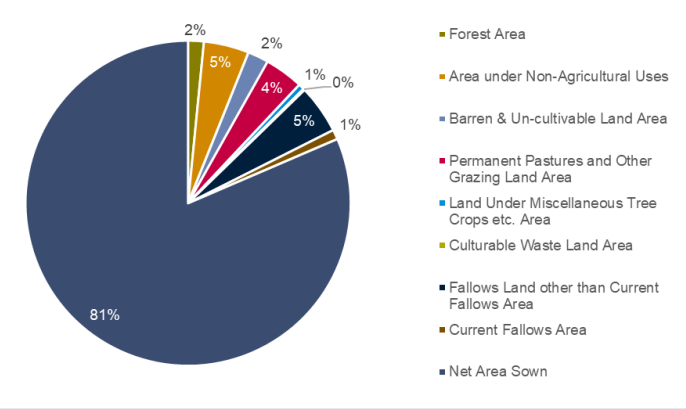
It was reported that all the children in the villages study upto 8th class (age of 13-14 years). Beyond that, nearly 20% of the children drop out and work on the farm with their families and the rest go to secondary and senior secondary school in Kanakagiri which is 5 km away. The major reason pointed out for girls dropping out of school was the financial conditions of the households, not being able to travel far to attend secondary school, and lack of labourers or sharecroppers in the area to work on the farm. It was understood that most girls get married by the age of 18 and most boys get married by the age of 21 - 25. It was reported that prevalence of early marriage is due to low education among people in the area.

Social Baseline (continued)

Land Use Pattern :

The data shows that 82% of the land in the Core Zone and 81% of the land in the Buffer Zone accounts for the Net Sown Area and 2% of the Core Zone and 7% of the Buffer Zone are current fallows. Apart from land under cultivation, nearly 18% of the land in the Study Area (16% in the Core Zone) is comprised of area under non-agricultural uses (5%), permanent pastures and other grazing land area (4%), fallow land other than current fallows area (5%), barren and uncultivable land area (2%), and area under forests (2%).

The average landholding in the study area varies from 2 - 4 ha among the OBC community, 0 to 0.4 ha among the SC, and 0.8 - 1.2 ha among the ST community.



Occupation and Livelihood

Work Participation Rate (WPR) is the % of total workers (main workers and marginal workers) to the total population of the study area. The WPR in the Study Area is 48%, the Core Zone is 46% and in Buffer Zone is 51%. This figure highlights a significant factor of unemployment in the study area. Non-workers constitute 54% of the Core Zone and 52% of the Study Area population. The prevailing unemployment was brought up during community consultations as well. Consultations reveals that the younger generations are not looking forward to farming and are more interested in non-farm based occupations. Increasing access to education over the last couple of decades is one of the major reasons cited by the local communities. However, it was also reported during the consultations that students from low earning households or whose parents are agricultural labourers, end up taking agriculture/labour work. The community pointed out lack of awareness and weak financial conditions among these households due to which there are limited employment opportunities.

Gender

The WPR of female workers is 41% which is comparatively less than the ratio of male workers 56% in the study area. The gender disparity is even more prominent in the type of work engagement. While 88% of male workers are main workers, only 68% of the female workers are main workers. A greater proportion of women is engaged in work as marginal work. Women in the region rely more on agricultural labour.

Social and Physical Infrastructure

Water and irrigation: All villages in the study area have access to potable drinking water through panchayat bore wells located in the villages. As per census data, 99% of the Core Zone is irrigated by water tanks. In the Study Area, 43% of the land is irrigated by canals, 19% is irrigated by bore wells, and 34% is irrigated by water tanks. Consultations with the community in the project footprint revealed that majority of the farmers in the study area practice rain fed agriculture while for the rest of the year they depend on bore wells.

Sanitation: It was reported during the consultations in the Core Zone that under Swatch Bharat Mission, toilets are constructed for all the households. However, the local community in Sulekal reported that 78% of the households in the villages use toilets. The village also has one common government toilet. In Benkanhal, it was reported that there are two common government toilets and only 50% of the households use toilets. In Tippanhal, it was reported that only 20% of the people use toilets and the others defecate in open. The reason cited for open defecation is lack of awareness and habit among older generation especially among men.

Electricity: It was reported that all the households have electricity connections and get domestic supply the whole day under the government scheme of Nirantar Jyoti. It was reported that power outages usually happened during the bad weather during monsoons. For agricultural consumers, the electricity is supplied 6 hours a day.

Key Takeaways from Social Baseline

- SCs constituted major part of the landless population and was also identified to be vulnerable due to physical/community segregation. average landholding of SC across the core area varied across 0 to 0.4 ha. During the FGD, it was understood that most of the SC farmers did not have any access to bore wells and only a few households had livestock.
- Based on an understanding of the prevalent livelihood pattern – rain-fed agriculture and daily wage labour, and the lack of employment opportunities in the study area, livelihood enhancement through skill development trainings has been considered as potential area of intervention to strengthen the socio-economic conditions in the study area and project footprint. The community needs assessment plan aims to identify, assess the needs of the of the local community.
- Women have lack of employment opportunities to work as skilled workers in renewable energy and institutional barriers to progress. The Gender Action Plan (GAP) will need to identify opportunities for livelihoods and gender mainstreaming.

6.0. Impact Assessment

The impact assessment section below presents a summary of the IA carried out for the Project. For each of the scoped-in impacts in the ESIA, the table identifies the impact nature (positive/negative), impact significance, mitigation measures and residual impact significance after implementation of the mitigation measures.

Construction Phase

Impact Description	Impact Nature	Impact Significance		
		Without Mitigation	Mitigation Measure	With Mitigation
Change in land use	Negative	**Moderate**	• Construction activity should to be restricted to designated area • On completion of the construction activities, land used for temporary facilities will be restored to the extent possible and handed over to the owners • The land use around the permanent project facilities will not be disturbed	**Minor**
Topography and Drainage	Negative	**Minor**	• Project shall ensure to avoid changes in the topography by unnecessary clearing of land and levelling, especially during the preconstruction and construction phase • The Project shall develop a storm water drainage system, to ensure that water collected in the site flows out the site through said drainage system constructed within the plant boundary	**Negligible**
Soil erosion, compaction	Negative	**Minor**	• The topsoil present shall be removed and stock piled in separate area • The stock pile should be protected from natural elements to prevent from erosion and also degradation • Topsoil to be reused on site for landscaping purpose • Defined routes for transportation and construction vehicles, workers etc. to minimize soil compaction • Maintenance of natural drainage and good cross drainage as per the natural slope condition should be provided to reduce surface runoff and associated erosion • Back filling and revegetation of the area disturbed will be undertaken phase wise immediately after the completion • Site clearance, piling, excavation and access road development will not be carried out during the monsoon season to minimize erosion and run-off	**Negligible**
Soil Contamination	Negative	**Moderate**	• Designated areas should be provided for Municipal Solid Waste (MSW) and daily collection and periodic disposal should be ensured • Construction and Demolition Waste should be stored separately and be periodically collected by an authorized treatment and storage facility • All waste should be stored in a shed that is protected from the elements (wind, rain, storms, etc.) and away from natural drainage channels • EPC/decommissioning contractor should ensure that no unauthorized dumping of used oil and other hazardous waste is undertaken at the site • A log book should be maintained for quantity and type of hazardous waste generated • In case of accidental/unintended spillage, the contaminated soil should be immediately collected and stored as hazardous waste • Ensure hazardous waste containers are properly labelled and stored onsite provided with impervious surface, shed and secondary containment system awaiting handling and disposal by an authorised vendor (authorised by the KSPCB and as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, as amended) • E waste, used discarded batteries shall be disposed of in accordance to e-waste management rules and batteries management and handling rules • Use of spill control kits to contain and clean minor spills and leaks • The guidelines and procedures shall be prepared and followed for immediate clean-up actions following any spillages • Unloading and loading protocols should be prepared for diesel, oil and used oil respectively and workers trained to prevent/contain spills and leaks	**Minor**

Impact Description	Impact Nature	Impact Significance		
		Without Mitigation	Mitigation Measure	With Mitigation
Water Resources	Negative	**Minor**	• Construction labour deputed onsite to be sensitised about water conservation and encouraged for optimal use of water • Alternate sources of water supply shall be evaluated and ground water abstraction should be avoided to the maximum extent possible • In case groundwater is being supplied by the authorised vendor, EPC Contractor must ensure that the vendor/source of the vendor has a groundwater abstraction authorisation from Central Groundwater Authority • Regular inspection for identification of water leakages and preventing wastage of water from water supply tankers is necessary for efficient utilisation of water • Blending of low quality water with fresh water for construction uses to ensure efficient use of natural resource • Groundwater recharge measures should be undertaken • Recycling/reusing to the extent possible	**Minor**
Water Quality	Negative	**Minor**	• Ensure proper cover and stacking of loose construction material at site to prevent surface runoff and contamination of receiving water body • Provision of number of toilets across easily accessible locations at the Project site • Avoid disturbing soil layers at the edges of the hillock • Open defecation and random disposal of sewage will be strictly restricted • Planning of toilets, soak pits and septic tanks, waste collection areas away from natural drainage channels • Use of licensed contractors for management and disposal of waste and sludge • Labourers will be given training towards proactive use of designated areas/bins for waste disposal and encouraged for use of toilets • Provision for impervious storage area, especially for fuel & lubricant, hazardous waste, etc. will be made onsite • Spill/ leakage clearance plan to be adopted for immediate cleaning of spills and leakages	**Negligible**
Human Wildlife Conflict	Negative	**Minor**	Strict anti-poaching policies should be adopted by Ampyr, and the policy along with penalties associated with poaching must be communicated to all project personnel, subcontractors and labours. Adequate toilets, gas/firewood and space should be provided in any anticipated labour accommodation and the labourers should be informed not to enter or utilize any resources from surrounding forest land over the course of the construction period. Excavated areas should be adequately fenced and security should be deployed to prevent wildlife intrusion into these areas. Construction activities and transportation should be avoided during peak ecological activity i.e. dawn (5:30 am to 7:30 am) and dusk (5:00 pm to 7:00 pm). Nighttime activities should be kept to a minimum. Areas with pre-existing nests, ground-roosting sites and burrows should be avoided for construction related work to reduce the impact on local fauna. off in pits dug in ground. Pits should be covered by soil every night to prevent release of smell. As smell of cooked/ uncooked/ raw/ decomposing food material	**Negligible**

Impact Description	Impact Nature	Impact Significance		
		Without Mitigation	Mitigation Measure	With Mitigation
Air Quality	Negative	**Minor**	• Storage of construction material in sheds, covering of construction materials during transportation to be undertaken, for reducing dust • The construction site shall be barricaded • Keep areas of open excavation to a minimum • Minimize stockpiling by coordinating excavations, spreading, re-grading and compaction activities • Speed of vehicles on site will be limited to 10-15 km/hour, which will help in minimizing fugitive dust emissions due to vehicular movement • Emissions from the D.G. set and other stationary machines will be controlled by ensuring that the engines are always properly tuned and maintained • D.G. sets to be provided with adequate stack height • Cease or phase down work if excess fugitive dust is observed. Investigate the source of dust and ensure proper suppression measures • Proper maintenance of engines and use of vehicles with Pollution Under Control (PUC) Certificate • Idling of vehicles and equipment will be prevented	**Negligible**
Noise Quality	Negative	**Minor**	• Only well-maintained equipment to be operated on-site • If it is noticed that any particular equipment is generating too much noise then lubricating moving parts, tightening loose parts and replacing worn out components to be carried out to bring down the noise • Machinery and construction equipment that may be in intermittent use to be shut down or throttled down during non-work periods • Low noise equipment shall be used as far as practicable • The number of equipment operating simultaneously shall be reduced as far as practicable • DG set with acoustic enclosures shall be used • Vehicular movement through village roads should be planned to avoid traffic jam and inconvenience to local residents • Equipment noise should be 85 dB (A) at 1 m from the source in line with WB/ IFC EHS guidelines • Minimal use of vehicle horns needs to be encouraged • Limit construction related activities to day time in order to restrict the noise related issues at night, where permissible noise threshold is lesser • Noise monitoring should be undertaken periodically during the construction phase at any receptors or in the direction of receptors • Vehicles and equipment used for the Project should be well maintained and oiled to prevent excess noise during construction	**Negligible to minor**
Occupational Health and Safety	Negative	**Moderate**	• Health & safety training to be provided to all the workers during construction • Prior to start of work, workers should be informed about the related safety risks and precautions to be taken through tool box meetings • Adequate PPEs to be provided for all activities at site including for welding, cutting or similar operations which may cause hazard to eyes • All persons performing construction work to wear safety shoes and helmets confirming to national standard • Every worker engaged in handling sharp objects which may cause injury to hand shall be provided suitable hand gloves • While working in hot conditions, measures such as work break at regular intervals, keeping hydrated by drinking water and liquids, covering face with damp cloth etc. shall be used • Trained workers will be involved in the specific work activities such as tower erection and stringing Manual lifting by adult men to be less than 55 kg and for women it should be less than 30 kg • Erection of steel structures should be carried out by experienced workers and they should use safety harness, lifelines, catchment etc • Appropriate safety harnesses and lowering/raising tools should be used for working at heights • All equipment should be turned off and checked when not in use • Emergency contact numbers and route to the nearest hospital to be displayed at the construction site • Site specific safety or emergency response plan should be in place to account for natural disasters, accidents and any emergency situations • Site specific/ activity specific Hazards Identification and Risk Assessment (HIRA) should be developed prior to start of the activities at site • Security should be deputed at potential accident sites to restrict entry and prevent near miss or fatal incidents • An up-to-date first aid box should be provided at construction and a trained person should be appointed to manage it	**Minor**

Impact Description	Impact Nature	Impact Significance		
		Without Mitigation	Mitigation Measure	With Mitigation
Community Health and Safety	Negative	**Minor to Moderate**	• Motor Vehicle (amendment) Act, 2019 should be strictly followed at site. • Several recommendations including defensive driver training, management of traffic flows, liaising with local authorities and seeking stakeholder feedback can be implemented to further reduce the impact on community health and safety; • Development of a local contracting and procurement plan to minimise the number of migrant workers; • Measures to ensure that the worker accommodation during the construction and operations phase are not located in close proximity to settlements and if they are, then controls for hygiene will have to be put in place; • Measures to reduce the prevalence of diseases will include the screening of workers especially with respect to Covid19, undertaking health awareness in the local community, implementation of vector control programmes and eliminating any unsanitary conditions; • Provide the local community an understanding of the project activities and the potential H&S risks and the grievance redressal mechanism as part of the stakeholder engagement process; • With respect to managing COVID-19 in particular, the Project should ensure adequate waste management, PPE, social distancing in labour accommodation, regular disinfection, and screening of workers. • Risks to general public during operation will be reduced by public awareness and education and physical measures by attaching an appropriate warning sign on all faces of the tower; • Once the stringing work is complete, notices and permanent anti climbing devices to be installed on the tower. The operational start date for electricity transmission and safety implications to be publicized locally in advance. • The SOP for preventive maintenance and repairing of fault to be defined and followed; • Fire-fighting measures to be maintained at substation; • Provide the local community an understanding of the project activities and the potential H&S risks and the grievance redressal mechanism as part of the stakeholder engagement process.	**Minor**
Impact on Title Holders	Negative	**Minor to Moderate**	• Procuring resources from the local sources so as to induce more employment in the supply chain; • During the landowners' survey and consultations with the local land agents, it was understood that landowners are getting two years advance payment. Advance for beyond two years on need basis can be provided to the landowners so that they can purchase land elsewhere using the money they earned through the advance lease payment so as to ensure that the total land holding of such families does not decline . • Undertake livelihood enhancement measures through vocational training, skill building and agricultural intensification. • Provide financial literacy training as part of the livelihood enhancement measures; • Provide employment (to the extent feasible) to the members of the land leasing households (already an embedded measure, but should be implemented). The contractors need to hire members of these households which needs to be monitored by Ampyr and records should be maintained. It must be noted that the local community must be informed before about the kind of employment and its duration. • Ensure the inclusion of members of land selling households in community development initiatives such as skill building, entrepreneurship support etc.;	**Negligible**

Impact Description	Impact Nature	Impact Significance		
		Without Mitigation	Mitigation Measure	With Mitigation
Impact on Title Holders	Negative	**Minor to Moderate**	• The GRM of the project should be disclosed and made accessible to all the land owners and the larger community. Engagement activities, grievances received and actions taken must be documented. • Only the designated access road will be used for transporting panels and other components for the transmission line and access road; • The truck drivers carrying construction machinery and materials will be instructed to drive within speed limits with careful consideration for village traffic; • Movement of heavy equipment and construction materials will be regulated during the day time and hours of peak road usage (09:00 AM to 06:00 PM); • The landowners affected by the transmission line or access road widening/ construction should be preferred for the Project's employment opportunities and livelihood enhancement activities.	**Negligible**
Impact on non-title holders	Negative	**Moderate**	• Provision of preference for employment services during the construction phase of the project to the agricultural labourers along with landowning households; • Prepare a Livelihood Restoration Plan (LRP) targeting the non-title holders. The LRP should also focus on the landless households in the Core Zone. The LRP should take cropping cycle on the land that the project is going to lease into consideration to minimize the sudden loss of income for the sharecroppers. As part of the livelihood restoration measures, if the loss of income can't be minimized, there should be a provision of paying the sharecroppers for the standing crops; • Provide financial literacy training as part of the Livelihood Restoration Plan; • The GRM of the project should be disclosed and made accessible to not just the land owners but also to the non-title holders and the larger community. Engagement activities, grievances received and actions taken must be documented. • Livelihood Restoration Plan and Social Compliance audit will be done as part of the follow-on work after the conclusion of TOR.	**Negligible**
Labour Influx	Negative	**Moderate**	• Ensure that most of the labor requirements are sourced from the neighboring villages for unskilled work; • Ensuring health check-ups of all laborers employed at the Project site to screen pre-existing communicable diseases like Covid19; • Extending provisions for hygiene at Work Site, in terms of adequate lighting, sanitation facilities, proper drinking water facilities and monitoring of drinking water quality, proper disposal of waste, etc.; and • Access to healthcare services and emergency medical care.	**Minor**
Employment and Economy	Positive	**Positive**	• Sourcing local labour wherever possible should be made obligatory for the sub-contractors and in all major procurement activities. Ampyr should establish a mechanism to audit subcontractors and suppliers with respect to compliance of utilizing local labour and resources; • It should be clearly communicated to the workers during the construction period that the employment will be short-term and the duration should be communicated upfront; • Information on local employment should be communicated to the Gram Panchayats and information on availability of employment opportunities should be displayed at the Gram Panchayat office (in the local language) in consultation with the Sarpanch; and • The Grievance Redressal Mechanism of the project should be applicable to the contractual workforce engaged throughout the project lifecycle.	**Positive**

Impact Description	Impact Nature	Impact Significance		
		Without Mitigation	Mitigation Measure	With Mitigation
Habitat Modification and Loss	Negative	**Minor**	• Vegetation disturbance and clearance should be restricted to the Project activity area only; • Larger mature trees with significant height and girth, along the edge of solar plant (provided they are not predicted to impact power production, by shading) should be avoided to the extent possible when constructing the solar compound and access road. • Unnecessary disturbance of neighbouring vegetation due to off-road vehicular movement, fuel wood procurement, needless expansion of labour camp and destruction of floral resources should be prohibited; • Project construction related facilities such as site office, store yard, camp, should be sited within the land parcel planned to be developed as the solar project site to reduce physical footprint of the project and avid additional loss/modification of terrestrial habitat site, that area should be temporarily avoided for construction activity. • Labour Camp/ Mess Facility should be provided with cooking gas, to reduce additional modification of habitat from fuel weed collection. • Camp and site office should be provided with Toiled and sewage generated onsite should be treated and disposed through septic tanks and soak pits as per specifications given in IS 2470: 1995 (Part I and II) • Ensure proper cover and stacking of loose construction material at site to prevent surface runoff and contamination of receiving water body. • Unloading and loading protocols should be prepared for diesel, oil and used oil respectively and workers trained to prevent/contain spills and leaks; • Provision for impervious storage area, especially for fuel & lubricant, hazardous waste, etc. should be made onsite. • Spill/ leakage clearance plan to be adopted for immediate cleaning of spills and leakages • Vehicles and equipment should undergo regular maintenance to avoid any oil leakages. • Broken or damaged solar panels are required to be immediately shifted to a designated area in scrap yard to avoid any type of land contamination;	**Negligible**
Impact on Threatened (IUCN v2.2020) and Schedule I (WPA, 1972) Vulture specie, Birds of Prey and Migratory Birds, due to electrocution and collision.	Negative	**Minor**	• In areas where large birds are present (around the GSS) like birds of prey and migratory birds, distance greater than 2.7m between power lines and more than 1.8m between perch and energised parts are recommended. • Line markers like spheres, swinging plates, spiral vibration dampers, strips, swan flight diverters, bird flappers, aerial marker spheres, ribbons should be installed on conductors to increase visibility of the conductor, it is recommended to install barker balls on the topmost earth wire at an interval of 25m. Line markers should be placed on the conductors at alternate arms of the tower with at least 10 m difference • Where poles or pylons or substation hardware pose a risk of electrocution to birds by virtue of the insufficient clearances between critical hardware, it is possible to rectify the situation with add-on mitigation like using insulation • All terminal Structure should be constructed with sufficient insulation on jumper wires and surge arrestors	**Minor**

Operation and Maintenance Phase

Impact Description	Impact Nature	Impact Significance		
		Without Mitigation	Mitigation Measure	With Mitigation
Waste Disposal / Generation	Negative	**Minor**	• Municipal domestic waste generated at site to be segregated onsite • Daily collection and disposal of waste to be ensured • The municipal waste will be routed through proper collection and handover to local municipal body for further disposal • Ensure oil/ lubricants are stored on impervious floor in the storage area having secondary containment • Use of spill control kits to contain and clean small spills and leaks during O&M activities • The guidelines and procedures shall be prepared and followed for immediate clean-up actions following any spillages • Ensure hazardous waste is properly labelled, stored onsite at a location provided with impervious surface, shed and secondary containment system as per in accordance to Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016	**Negligible**
Water Availability	Negative	**Moderate**	• Adopt less water consuming module cleaning methods • As a good industry practise and in line with MNRE's advisory for effective usage of water in Solar Power Plants, management to check feasibility of using dry cleaning of modules • Provisions for rain water harvesting structures • Optimising water usage by application of water conservation measures such as sensor based taps, low flush urinals etc. • Maintain logbook for water consumption • Team should be sensitized about water conservation and encouraged for optimal use of water • Regular inspections of pipelines and water storage infrastructure within the control monitoring office should be undertaken to ensure that there is no wastage of water resources • Recycling/reusing to the extent possible	**Minor**
Economy and Employment	Positive		• Sourcing local labour wherever possible should be made obligatory for the sub-contractors and in all major O&M activities. Ampyr should establish a mechanism to audit subcontractors with respect to compliance of utilizing local labour and resources; • The contractor shall inform the workers and local community about the duration of work;	
Impact on nearby Terrestrial Habitat and Ecosystem Services	Negative	**Minor**	• Unloading and loading protocols should be prepared for diesel, oil and used oil respectively and workers trained to prevent/contain spills and leaks; • Provision for impervious storage area, especially for fuel & lubricant, hazardous waste, etc. should be made onsite. • Spill/ leakage clearance plan to be adopted for immediate cleaning of spills and leakages • Vehicles and equipment should undergo regular maintenance to avoid any oil leakages. • Broken or damaged solar panels are required to be immediately shifted to a designated area in scrap yard to avoid any type of land contamination; • The sewage generated onsite (from site office) should be treated and disposed through septic tanks and soak pits as per specifications given in IS 2470: 1995 (Part I and II)	**Negligible**

Operation and Maintenance Phase

Impact Description	Impact Nature	Impact Significance		
		Without Mitigation	Mitigation Measure	With Mitigation
Electrocution and collision with transmission line components	Negative	**Minor**	• Installed Bird diverters, if any, should be checked monthly for damage and repaired or replaced. • If any section of transmission line is insulated then monthly insulating covers should be check for damage and if required replaced or repaired. • Restrictions should be imposed so that dead carcasses are not disposed near the Project. The O&M team should be trained on removing any carcasses found around these Project components in a timely manner to ensure that no birds of prey are attracted to the Project site; • The O&M team should be instructed to regularly inspect transmission towers as part of their periodic maintenance and rounds of the operational Project. The purpose is to identify any roosting or nesting of bird species;	**Negligible**
O&M work of TL: Impact on Threatened (IUCN v2.2020) and Schedule I (WPA, 1972) Birds of Prey and Migratory Birds, due to electrocution and collision.	Negative	**Minor**	Prior to operation a detailed Collision Risk Modelling/Assessment is required to be done for each species based on their specific morphometrics, for the transmission line, complemented with bird flight movement data collected through "Vantage Point survey" spread across different seasons. This will estimate predicted annual mortality for each species and allow estimation of residual impacts. Post operation, Ampyr should regularly monitor the transmission line and the ground below the line for signs of bird hit and maintain a carcass register as part of the Operation and Maintenance (O&M) phase to record any bird carcasses or suspected bird carcasses. The register should include a date, type of specie (to the extent identifiable), geographic location and nearest transmission line infrastructure for each carcass entry. If possible, the register should be backed-up with photo-documentation of any identified carcasses or remains. If the number of carcasses are significant, then Ampyr should commission an ecologist to suggest more stringent mitigation measures at the sensitive Project components.	**Negligible**

Decommissioning Phase

Impact Description	Impact Nature	Impact Significance		
		Without Mitigation	Mitigation Measure	With Mitigation
Soil Erosion and Compaction	Negative	**Minor**	Same as construction phase	**Negligible**
Water Availability	Negative	**Minor**	Same as construction phase	**Negligible**
Waste Disposal /Generation	Negative	**Moderate**	Same as construction phase	**Negligible**
Soil Contamination	Negative	**Minor**	Same as construction phase	**Negligible**
Air Quality	Negative	**Minor**	Same as construction phase	**Negligible**
Noise Quality	Negative	**Moderate**	Same as construction phase	**Negligible**
Impact on Economy and Employment	Negative	**Minor**	• The Client shall ensure that retrenchment packages are provided for all staff who stand to lose their jobs when the plant is decommissioned; • The contractor shall inform the workers and local community about the duration of work; • Reduction of worker will be done phase wise and corresponding to completion of each activity; and • All waste generated from demobilisation shall be collected and disposed of at the nearest municipal disposal site. • The Grievance Redressal Mechanism of the project shall be applicable to the contractual workforce engaged throughout the project lifecycle. • The Project shall provide the local community an understanding of the decommissioning activities and the potential H&S risks and the grievance redressal mechanism as part of the stakeholder engagement process	**Negligible**

7.0 Environmental and Social Management Plan (ESMP)

The purpose of this ESMP is to specify the standards and controls required to manage and monitor environmental and social impacts during different phase of project life cycle, i.e. construction, operation and decommissioning phases. To achieve this, the ESMP identifies potential adverse impacts from the planned activities and outlines mitigation measures required to reduce the likely negative effects on the physical, natural and social environment. This is in accordance to IFC Performance Standards 1 that emphasizes the importance of managing social and environmental performance through the lifecycle of the Project. This section therefore identifies the implementation mechanism, supervisory responsibilities and key outcomes of the recommended mitigation measures.

Organizational Structure

Implementation

The SPV will have ultimate responsibility for implementing the provisions of the ESMP. This role will include the on-going management of environmental and social impacts, monitoring of contractor performance as well as development of mechanisms for dealing with environmental and social problems. SPV will also ensure that the activities of its contractors (both during construction and operation phase) are conducted in accordance with good practice measures, implementation of which will be required through contractual documentation.

The overall management and coordination of the Project will be the responsibility of Project Manager of SPV. SPV will engage EPC contractor to undertake construction activities including installation of solar modules, site office, etc. At project level, implementation of management plans and corrective actions are the responsibilities of HSE Engineer of EPC Contractor. In construction and operational phase, HSE Manager of Ampyr/ Project Manager will supervise the Contractor HSE Engineer's performance to implement the management action plans.

EHS Department

Environment, health and safety department shall be responsible for monitoring of the implementation executed by the agencies specified in the ESMP

Stakeholder Engagement and Grievance Management

Ampyr needs to establish a community disclosure and grievance redressal system that will be a part of the stakeholder engagement plan

The Gender Action Plan (GAP)

GAP Will aim to assess the implications of livelihoods and other Socio-economic parameters on gender in the study area. In particular women and effects on them

Inspection, Audit and Monitoring

Through the process of inspection and auditing, the SPV will ensure that the conditions stipulated in various permits are compiled with the entire process

Reporting and documentation

The SPV will develop and implement a programme of regular reporting through the stages of the Project lifecycle

ESMP Review and Amendments

The ESMP acts as an environment and social management tool which needs to be periodically reviewed to address changes in the organization, process or regulatory requirements.

8.0. Stakeholder Engagement and Grievance Redressal

Stakeholder mapping refers to the process of identifying individuals or groups having influence over a project and assessing the effects of their actions on the project. It helps in identifying the different stakeholders as primary or secondary based on the degree of influence on a project and by analysing the stakes or interest each of them has in the project and the manner in which both the stakeholder group as well as the project can benefit from each other.

Stakeholder Group categorisation

Stakeholder Groups	*Primary Stakeholders*	*Secondary Stakeholders*
Community	• Land lessers from Sulekal and Benkanhal • Land Aggregator, Local Land Agents, Developers, Contractors • Local Labourers, female workers and labourers	• Local Community, • Vulnerable Communities
Institutional Stakeholders	Gram Panchayat—Sulekal, Government School Teachers, and ASHA Workers	Civil Society/ Local NGOs
Government Bodies	Regulatory Authorities, District Administration	Solar panels and equipment suppliers
Other Groups	Employees, EPC and O&M Contractors, Contractual labourers (non-local)	-

Summary of overall stakeholder influence

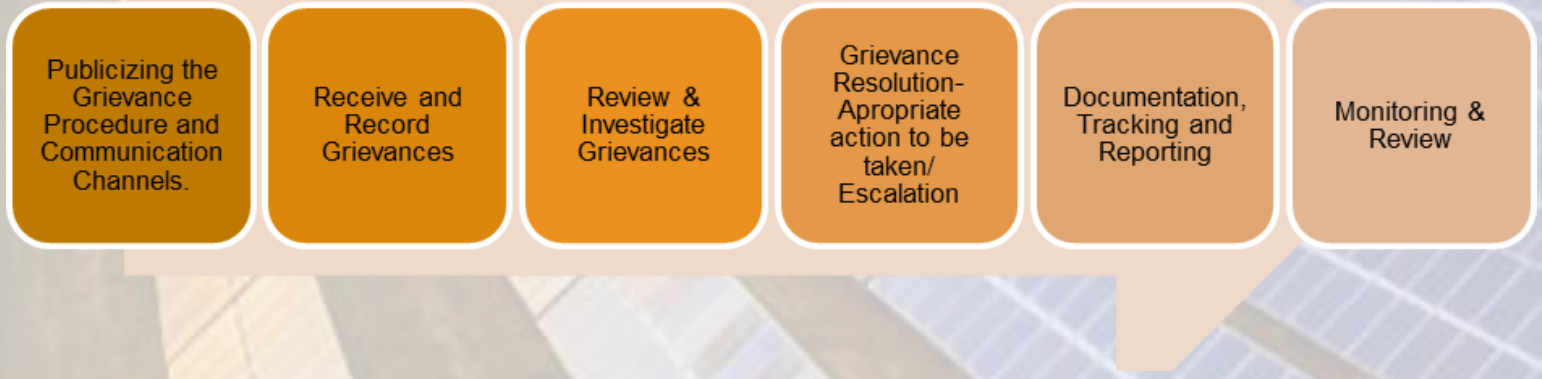
Stakeholder Category	Stakeholder group	Magnitude of influence/ Impact	Likelihood of influence/Impact	Overall rating of stakeholder influence
Primary	Land lessers	Medium	Medium	Medium
	Land Users	Low	Low	Low
	Land Aggregator	Medium	Medium	Medium
	Developers and EPC Contractors	High	High	High
	Local Labourers	Low	Medium	Medium
	Female Workers and Labourers	Low	Low	Low
	Local Gram Panchayat	Medium	Medium	Medium
	Regulatory Authorities	High	Medium	High
	Employees	Low	Low	Low
	Contractual Labours	Low	Low	Low
	District/Taluka Administration	Negligible	Negligible	Medium
Secondary	Local community	Medium	Negligible	Low
	Civil Society/Local NGOs	Medium	Medium	Medium
	Vulnerable Groups	Low	Negligible	Low
	Equipment Suppliers	Medium	Medium	Medium

9.0 SEP-GRM (Contd.)

The types of grievances that would be taken into consideration by the project under the ambit of this GRM are as follows:

- Grievances pertaining to any adverse impacts from project's operations on community assets or resources
- Grievances due to project activities from construction and operations phase.
- Grievances arising from land based disputes.
- Conflict between any workers or labourers engaged under project operations and local community.
- Any other issues relevant to project operations.

Stages of GRM



In order to manage its engagements with the project stakeholders and meet the objectives of SEP-GRM processes, Ampyr is required to ensure that this engagement process is given as much importance as the other project activities as well as guarantee the availability of certain resources. For the management of the E&S aspects of the Project, three entities will be responsible for various activities linked with the Construction and Operations phases of the project, viz., Ampyr, appointed EPC contractor and O&M team. However, the overall responsibility of implementation of the GRM lies with Ampyr, in close coordination with appointed EPC contractor and O&M team, during the construction and operations phases. Additionally, the project team at site shall be trained on aspects of engagement with various key stakeholders and the staff deputed/ identified for SEP and GRM implementation shall be assigned the responsibility of documenting and maintaining records of all stakeholder engagement activities undertaken during the project lifecycle and providing updates to the corporate on the same.

LAYOUT OF THE ESIA-ESMP

Volume	Volume Name	Details
1	Volume 1: Non-technical Summary (NTS)	A concise summary of the ESIA process and key findings that can be easily read and understood by the general public.
2	Volume 2: ESIA Introduction, Project Context and Summary of Scoping Report (*this report*)	• Introduction • Project Description • Policy, Legal and Administrative Framework • Summary of ESIA Scoping Process • Analysis of Alternatives
3	Volume 3: Environmental and Social Baseline and Impact Assessment	• Environmental, Social and Ecological Baseline • Stakeholder Engagement
4	Volume 4: Impact assessment	• Impact Assessment (Environmental, Social and Ecology)
5	Volume 5: Environmental and social management plan	• Summary of impacts identified during pre-construction, construction, operations and de-commissioning stages; and • Complete ESMP summarising recommendations across the ESIA
6	Volume 6: Technical Annexures	• Stakeholder Engagement Plan (SEP) and Grievance Redressal Mechanism (GRM); • Gender Action Plan; • Stakeholder records (summary of discussions, commitments, dates and locations); • Landownership details with due regards for confidentiality in view of potential disclosure; • Summary of consultations with land sellers and aggregators; and • Summary of Focused Group Discussions